Report Card for Maine's Infrastructure

December 10, 2008

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Maine Section
American Society of Civil Engineers

ASCE

Report Card FOR MAINE'S Infrastructure

Issued December 10, 2008

AREA		2008	Comments:
Contaminated Site Remediation		**D+**	Policies have been established in Maine to investigate, remediate, and redevelop sites where contamination poses a risk to the environment and human health, typically due to contamination of drinking water supplies. While programs are adequate, funding for state-led investigation and remediation of known contaminated sites is inadequate. More than $41 million in additional funding is currently needed.
Dams		**D+**	Maine has over 1,000 registered dams of which 153 are classified as high or significant-hazard-potential. Almost half of Maine dams are the responsibility of private owners. Maine spends ¼ to ½ of what other Northern New England states spend per dam on inspection. Maine's Dam Safety Program is understaffed and has no enforcement division. Seventeen public high-hazard dams require over $12 million in repairs.
Energy		**C+**	The overall health of the energy generation and transmission system in Maine is good, but reliability and security concerns are posed by the state's dependence on natural gas fueled generation, as well as weak links and interface limits in the transmission system. Diversification of energy supply and approximately $2 billion of transmission system investment are needed to address these issues.
Municipal Drinking Water		**C**	More than two-thirds of Maine residents are served by 150 public community drinking water systems. Maine has a more than adequate water supply and water quality is addressed through mandatory testing of public water supplies. Approximately $900 million in water projects will be needed over the next 20 years. Current funding, approximately $15 million per year, only provides for one-third of needs.
Municipal Wastewater		**D+**	Maine's 2004 Clean Watersheds Needs Survey listed a wastewater infrastructure need of $854 million. The primary source of funding for wastewater improvements is the State Revolving Fund (SRF), which has declined by 50% since 2004 and is scheduled to end entirely in 2011. Without adequate funding, waitlists will increase and improvements to treating wastewater and protecting the environment will be deferred.
Schools (K-12)		**C-**	Capital funding needs for Maine schools exceed what is currently allocated through the two primary state funding programs. The state forecasts that during the period of 2005 to 2026, needed funding from existing and new bonds is approximately $1.6 billion. Current funding levels result in a projected 20-year gap of $600 million. Less than half of priority health and safety project requests have been funded over the past 6 years.
Solid Waste		**C**	Progress has been made, but Maine's solid waste policies are outdated. Planning must be based on realistic projections of generation rates and capacity. Maine's solid waste plan must address high waste generation rates (51% more than national average in 2005), an unmet recycling goal of 50 percent, advances in public policy and technology, and the time and multi-million dollar investment required to develop new capacity.
State Parks		**B-**	State parks are a key component of tourism, Maine's number one industry. The condition of the infrastructure of Maine's 47 state park facilities is stable and safe; however, additional investment would help greatly in providing the optimum level of service and gaining greater economic impact. A recent $7.5 million bond provided some funding, though a backlog of $30 to 40 million in needs remain.
Transportation	**Airports**	**B-**	Overall, the condition of Maine's airport system is good. However airports face a funding challenge. The agencies continue to prioritize projects based on safety needs and then capacity enhancements. For 2007, just over $25 million was allocated from federal funding. Based on today's funding levels, a minimum $100 million shortfall will occur over the next 20 years for planned airport capital development needs.
	Bridges	**D+**	Thirty-four percent of Maine's bridges subject to federal inspection requirements are deficient, compared to a national average of 25 percent. Though the 2008 Legislature approved an additional $160 million in funding over 4 years for MaineDOT bridges, it will not have any impact on other agency bridges. The 10-year need for MaineDOT bridges is $1.3 billion, resulting in a $440 million funding gap.
	Passenger Transportation	**C-**	Ridership on transit in Maine grew 113% from 2004 to 2006, but only 55% of transit vehicles are in good condition. Passenger rail continues to expand, but a sustainable funding source has yet to be identified. Ferry services provide primary transportation from the island communities and require $12.5 million to replace two vessels. Funding levels for all modes need to grow in order to meet demands.
	Ports & Waterways	**C-**	Maine's industrial ports are in fair to good condition, but require an additional $12 million in capital funding in the short-term to remain competitive, safe, and secure. Substantial long-term investments are also required to facilitate the projected surge in containerized cargo traffic. Maine should also continue to promote enhancements to ports and harbors serving its viable cruise, commercial fishing, and recreation industries.
	Railroads	**C**	There are 1,162 miles of active railroad in Maine. State funding for joint rail initiatives including customer rail sidings and interchange improvements has made the system more efficient and productive. Further investment in railroads will facilitate higher use and reduce trucks on roadways. The pulp and paper industry is the primary customer of rail. Maine ranks 48th in nation in freight tonnage moved by rail.
	Roads	**D**	Poor pavement has increased from 2% of MaineDOT roads surveyed in 1996 to 26% in 2006. Roads rated good and fair dropped from 81% in 2005 to 73% in 2006. Due to conditions Maine motorists spend an average of $285 per year in extra vehicle operating costs. Current funding for roads is not sufficient. The pavement preservation program for "built" roads is only funded to address half its needs.
Overall Grade		**C-**	The health, safety and welfare of our citizens are directly tied to the quality of our infrastructure. Maine's economy is built on its infrastructure. Current and forecasted funding is inadequate to meet the needs. If Maine is to grow economically, investment into infrastructure needs to be a higher priority.

A is exceptional where all aspects of the area are in great shape.	**B** is good where condition is safe and reliable; there are minimal capacity issues and minimal risks.	**C** is mediocre; condition and capacity are adequate in general, though some risks and consequences of failure which need to be weighed when prioritizing funding. Maintenance is likely being deferred due to inadequate funding.	**D** is poor; condition and capacity are concerning with risk of failure high, condition and/or capacity will likely have a negative impact on economic activity.

Maine Section
American Society of Civil Engineers

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Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

Executive Summary

Civil engineering is a broad field dealing with the planning, design, construction, maintenance and management of infrastructure networks and the safety of the public. Most civil engineering today includes power plants, bridges, roads, railways, runways, structures, retaining walls, foundations, water supply, irrigation, sewer, flood control, transportation and the protection of the natural environment.

The maintenance and improvement of Maine's infrastructure is vital to our economy, health, safety, security and to the environment. The Maine Section of the American Society of Civil Engineers (Maine Section ASCE) represents over 750 civil engineering professionals who live and work in the State of Maine. As a public service to the residents of Maine, led by 12 ASCE infrastructure leaders, a team of engineers and industry experts volunteered hundreds of hours to review public records and provide an overview of infrastructure in Maine.

The Maine Section ASCE analyzed the following fundamental components of each infrastructure area:

- Existing conditions,
- Capacity,
- Operations & maintenance or deferred maintenance,
- Public safety & security,
- Risk and consequences of failure, and
- Current and projected levels of funding.

A is exceptional - all aspects of the area are in great shape.
B is good- condition is safe and reliable; minimal capacity issues, there is minimal risks.
C is mediocre- condition and capacity are adequate; some risks and consequences of failure which need to be weighed; maintenance is being deferred due to lack of funding.
D is poor- conditions and capacity are concerning with risk and/or consequences of failure high. Condition/capacity has or will have a negative impact on economic activity.

With double-digit construction inflation and rising fuel costs over the past four years, all areas are susceptible to falling further behind if the public and our leaders do not carefully monitor conditions and make significant investments in our infrastructure. As an example, there are six areas under transportation that will compete for $3 billion in funding over next ten years, with a $6 billion need forecasted. Decisions about infrastructure, which we all pay for through user fees and taxes, as well as private investments, need to be made based on long-term comprehensive planning, with sustainable and reliable funding sources.

As with the national report cards produced by ASCE, the purpose of this state report card is to raise public awareness of the importance of a modern and well-maintained infrastructure. Our infrastructure cannot be taken for granted and requires daily maintenance and continuous planning. We believe discussion of the issues detailed in this report card will lead to a greater understanding of the current and future needs of our state, prompting decision makers in our communities, the state legislature, and our congressional delegation to formulate policies and provide the necessary funding to address our infrastructure needs. In five years, Maine ASCE will report on progress or decline. Please contact us at www.maineasce.org with any comments or questions.

Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

CONTAMINATED SITE REMEDIATION

Grade: D+

Overview

Policies have been established in Maine to investigate, remediate, and redevelop sites where contamination poses a risk to the environment and human health, typically due to contamination of drinking water supplies. While programs are adequate, funding for state-led investigation and remediation of known contaminated sites is inadequate. More than $41 million in additional funding is currently needed.

Introduction and Background

Collectively, the United States Environmental Protection Agency (EPA) and Maine Department of Environmental Protection (DEP) administer six programs that oversee contaminated site investigation, remediation, and redevelopment:

- EPA's Superfund Program;
- DEP's Uncontrolled Sites Program;
- DEP's Petroleum Clean Up Program;
- DEP's Voluntary Response Action Program (VRAP);
- EPA's and DEP's Brownfields Programs; and
- DEP's Landfill Closure Program

The cost of remediating oil and hazardous waste spills and discharges that impact drinking water supplies is high. According to DEP, for example, the DEP and the Portland Water District incurred $3 million in costs when two wells serving 2,000 residents in North Windham had to be abandoned and replaced with a waterline extension when they became contaminated with gasoline.

Condition and Adequacy

EPA's Superfund and DEP's Uncontrolled Sites and Petroleum Clean Up Programs

The federal "Superfund" (Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)) law was enacted in 1980 to respond to the improper disposal of hazardous substances that occurred prior to the regulation of waste disposal, and it allows EPA to clean up sites and compel potentially responsible parties to perform cleanups or reimburse the government for EPA-led cleanups. The dirtiest "discovered" sites are listed on the EPA's National Priority List (NPL), which is associated with the Superfund program. Sites are placed on the NPL only after initial investigation indicates that federal involvement is warranted.

As of 2007, 14 of the nation's 1,569 NPL sites are located in Maine. Of the 14 sites, investigation and remedial work at 11 sites is deemed complete, with continued monitoring, and two of these sites have been removed from the NPL. The latest addition to Maine's NPL sites was Callahan Mines in Brooksville in 2002.

The Superfund law requires the federal government to identify and address environmental problems from past activities at current and former military installations, even when the environmental issue is not eligible for the NPL. Three military installations are included on Maine's NPL.

The Superfund cleanup process is complex, with several distinct steps from discovery to cleanup to post-remedial-construction monitoring before removal from the NPL. The Superfund law and subsequent amendments established an $8.5 billion national trust fund for investigation and cleanup of NPL sites.

Maine's Uncontrolled Sites Program was created in 1983 and is Maine's equivalent of the federal Superfund program. The program was created in response to threats or potential threats to human health and the environment posed by abandoned hazardous waste sites not eligible for NPL status. The legislation authorizes DEP to issue orders to potentially responsible parties requiring them to conduct DEP-approved cleanup actions. If there are no viable potentially responsible parties, the legislation authorizes DEP to undertake necessary remedial actions. State-led remediation is funded through bonds. Since its inception, more than $20 million has been spent on state-led site remediation, bringing 203 sites to closure. As of October 3, 2008, 230 uncontrolled sites requiring further action were on DEP's list, with an estimated aggregate "cost to closure" of more than $20 million.

Approximately 90,000 gallons of petroleum products are spilled in Maine each year. Investigation and remediation of petroleum contamination from aboveground and underground petroleum storage facilities is managed by DEP's Petroleum Clean-Up Program, which was established in 1991. As of September 2008, 500 sites were listed on DEP's Petroleum Priorities List, which includes only those petroleum-contaminated sites referred to the Bureau of Remediation and Waste Management's Division of Technical Services for long-term remediation. Many of these sites pose an imminent threat to, or have resulted in, contamination of private or public drinking water supplies, and it is necessary to install and maintain in-line treatment systems or supply bottled water to affected entities.

Remediation of groundwater impacted by petroleum is funded by the Ground Water Oil Clean-up Fund. The fund's income is derived from fees on importation of oil to Maine, registration fees from oil storage facilities, fines, reimbursements (from potentially responsible parties, for example), and interest. In 2008 the "groundwater fund" risked insolvency as a result of an unusually large number of grossly contaminated sites undergoing remediation during the 2007 construction season. As a result, future funding of remediation projects is being prioritized based upon the risk posed to human health and the environment. Many cleanups have been deferred until funding is available. The backlog of sites needing remedial work has typically fluctuated between 300 and 450 since 2002. As of September 29, 2008, DEP listed 500 petroleum-contaminated sites that require remedial work, with an estimated aggregate "cost to closure" of $16.2 million.

Voluntary Response Action Program (VRAP) and Brownfields Program

An unintended consequence of the Superfund law is that properties with an industrial past are assumed to have insurmountable environmental liability. As such, developers and financers decide, often without data, that the environmental liability risks outweigh the redevelopment potential of brownfield sites and opt to invest in undeveloped or greenfield sites. By definition, brownfield sites are property, whose expansion, redevelopment, or reuse is impeded because of contamination, real or perceived. DEP cites the following benefits of brownfields redevelopment: the protection of public health and the environment through the cleanup of commercial and industrial properties; slowing urban sprawl by encouraging reuse of properties; the use of existing infrastructure; the increased tax revenues and creation of jobs; and the revitalization of declining commercial and industrial communities.

In 1993, Maine legislation established the Voluntary Response Action Program (VRAP) that allows and encourages applicants to voluntarily investigate and remediate properties to the DEP's standards in exchange for protections from DEP enforcement actions. VRAP was intended to encourage the cleanup and redevelopment of contaminated properties in the State that were under the DEP's jurisdiction, including the uncontrolled and petroleum priority sites discussed above. Most brownfield sites enter VRAP. The original federal brownfields legislation had its origins with the Superfund law and as a result included burdensome and time-consuming processes that were not conducive to site redevelopment. In 2002, a new federal brownfields law was enacted that was less onerous.

Remediation of brownfield sites conducted with oversight of the VRAP process is privately funded, but can result in the release of environmental liability (to the extent allowed by the VRAP law). While remediation under the VRAP process is privately funded, the EPA provides some funding for brownfield redevelopment through two competitive grant programs.

One program is available to municipalities. Entities receiving these grants are required to work with DEP through the VRAP process. The EPA also provides funding for Maine and tribal programs administered by DEP as part of the VRAP. A portion of the EPA funds is utilized by DEP to conduct environmental site assessment activities on brownfield sites on behalf of municipalities. Applications for financial assistance received by DEP from municipalities are prioritized based on redevelopment potential. Other EPA funds are available to municipalities through DEP to provide contractors and oversight for remedial activities on municipality-owned brownfield properties, but grants are limited to $50,000 and must result in a "clean" site ready for redevelopment.

A 2004 survey by DEP of all of Maine's 492 municipalities resulted in the identification of 2,105 potential brownfield sites (based upon responses from 462 municipalities). A total of 46 percent of these sites were gas stations and auto repair facilities. DEP has enforcement authority over these sites and, therefore, the sites are eligible for brownfields funding. The DEP cites many success stories from VRAP and the Brownfields Program, such as the revitalization of Waterville's former industrial waterfront area. As of October 3, 2008, 35 brownfield grant sites and an additional 427 VRAP sites have been returned to productive use in Maine since the inception of the programs. Currently, 78 brownfield grant sites and an additional 120 VRAP sites are undergoing investigation and remediation.

Landfill Closure Program

In 1987, Maine enacted legislation that established a remediation and closure program for municipal landfills within DEP. The legislation resulted in the closure of 388 of Maine's 414 municipal landfills. Most of these municipal landfills, dating back to the 1960s and 1970s, were unlicensed and threatened groundwater and surface water quality due to inappropriate siting, inadequate design, or improper operation. To encourage the prompt closure of the landfills, the law provided for state and municipal cost sharing for closure and remedial activities. In addition, it expedited landfill closures by allowing reduced closure options for facilities deemed not to pose a high risk to public health or the environment.

Most communities closed their non-secure (unlined) landfills prior to 2000, when closure cost sharing dropped to zero percent. Since 2000, no further closure costs can be incurred by the state. The DEP is conducting inspections and reviews of previously closed sites. Non-closure costs incurred by municipalities related to further remedial activities at these closed landfills continue to be eligible for assistance, with up to 90 percent of applicable costs paid for by the state.

According to a DEP report, approximately $80.5 million in bond and state general funds has been distributed as part of the landfill closure and remediation program. Additional bond funds are necessary for on-going investigation and remedial activities, and continue to be approved by Maine voters. DEP estimates $4.7 million will be needed for future investigation and remedial activities at closed municipal landfills.

Investment Needs

Currently, funding is inadequate for state-led investigation and remediation of sites where contamination poses a risk to human health and the environment. Additional funding is needed in the form of bonds and increased revenues to the "groundwater fund."

As of October 3, 2008, 230 uncontrolled sites requiring further action were on DEP's list, with an estimated aggregate "cost to closure" of more than $20 million. As of September 29, 2008, DEP listed 500 petroleum-contaminated sites that require remedial work, with an estimated aggregate "cost to closure" of $16.2 million. DEP estimates $4.7 million will be needed for future investigation and remedial activities at closed municipal landfills.

Private funding of voluntary site remediation is essential and can be encouraged through reauthorization and proactive application of the VRAP Law and the protections it offers.

At the federal level, continued funding and reauthorization of Superfund and the reauthorization of the 2002 Brownfields Revitalization and Environmental Restoration Act will continue to encourage the remediation of contaminated sites and the return of many of those sites to productive use.

Conclusions and Recommendations

Policies and programs have been established at the federal and state levels to investigate, remediate, and redevelop contaminated sites once they are discovered. In general these policies and programs are adequate; however, drinking water supplies have been and continue to be contaminated and require remediation. Costs for investigation and cleanup are sought from potentially responsible parties, but funds are often not obtainable. Limited funding is available through federal programs, including the Superfund, grants for brownfields, and some cost-sharing with states for state-led cleanups.

At the state level, investigation and remediation of uncontrolled hazardous waste sites and sites contaminated as a result of municipal landfills are funded by bonds. Remediation of groundwater impacted by petroleum storage facilities is funded by the Ground Water Oil Clean-up Fund, which in 2008 risked insolvency despite a significant backlog of sites requiring remedial work. Maine ASCE gives contaminated site remediation a grade of **D+**.

Maine ASCE makes the following recommendations:

- Provide additional funding for the $41 million of backlogged projects in the form of bonds and increased revenues for the "groundwater fund;"
- Determine the best use of available funds. This determination must be made by risk-based prioritization of identified sites in and across the multiple programs, in addition to realizing accountability;
- Shift focus from the reactive to the proactive, such as enforcement of preventative aspects of existing regulations;
- Congress needs to authorize $1 billion in annual funding for the Safe Drinking Water Act State Revolving Loan Fund; and
- Congress needs to reauthorize the Brownfields Revitalization and Environmental Restoration Act of 2002 to provide continued federal funding for the redevelopment of brownfield sites.

Sources:

- Report entitled "State of Maine 2003 & 2004 Biennial Hazardous Waste Activities Report," prepared by DEP - BRWM, and dated December 2005;
- Report entitled "Part II: Administration of Ground Water Oil Clean-up Fund, Maine Department of Environmental Protection," prepared by DEP, and dated February 15, 2008;
- Report entitled "DEP FACT SHEET, Facts & Figures, LD2073, An Act to Prevent Contamination of Drinking Water Supplies" prepared by DEP, and updated June 5, 2008;
- Web site of the United States Environmental Protection Agency;
- Web site of the Bureau of Remediation and Waste Management, Maine Department of Environmental Protection; and
- Fact check and comments received from the Bureau of Remediation and Waste Management, Maine Department of Environmental Protection on the October 2, 2008 version of this draft report card.

Report Card
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DAMS

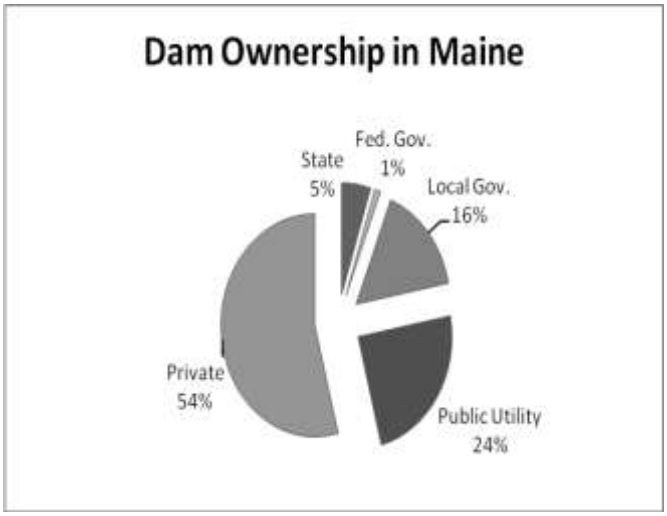
Grade: D+

Overview

Maine has over 1,000 registered dams of which 153 are classified as high- or significant-hazard-potential. Almost half of Maine dams are the responsibility of private owners. Maine spends ¼ to ½ of what other Northern New England states spend per dam on inspection. Maine's Dam Safety Program is understaffed and has no enforcement division. Seventeen public high-hazard dams require over $12 million in repairs.

Introduction and Background

Maine has over 1,000 dams registered with the Maine Emergency Management Agency (MEMA). Maine's dams range in size from small simple structures to larger, relatively modern hydropower (power-generating) dams. The Federal Energy Regulatory Commission (FERC) regulates 131 dams. The New Hampshire Department of Environmental Services regulates 51 dams, which can impact Maine through common watersheds. A total of 250 dams are not regulated or classified due to the specifics of the classification criteria. MEMA regulates 658 dams and can order a dam owner to repair, maintain or operate a dam in a particular manner. These orders result from a safety inspection by MEMA's two State Dam Inspectors (SDIs).



Condition and Adequacy

Maine's dam hazard classification system is based on the nationally accepted United States Army Corps of Engineers hazard classification system. Of the 658 state-regulated dams, 26 are classified as high-hazard-potential dams, 76 are classified as significant-hazard-potential dams and the remaining 556 dams are classified as low-hazard-potential.

In accordance with state law, all high-hazard-potential and significant-hazard-potential dams have to be inspected every two and four years, respectively, to determine their condition. Low-hazard-potential dams do not require condition inspection, but are required to have a verification of their hazard potential completed every six years. The SDIs provide inspection for all state-regulated dams. FERC-regulated dams are inspected by FERC engineers or independent engineers.

Most Maine dams are more than 50 years old and are showing signs of gradual deterioration. Typically, FERC-regulated dams generate revenue for their owners, which can then be used to fund repairs and maintenance. Generally, these dams are in good condition and are safe. However, continual deterioration of most state-regulated dams is a cause for concern. Maine's high-hazard and significant-hazard dams are in fair condition and continue to be monitored. The remaining 500-plus low-hazard dams receive little attention and are in generally poor condition.

There are 73 dams owned by state agencies including Inland Fisheries and Wildlife (IF&W), Department of Conservation (DOC) and the Department of Transportation. Of those, six are significant-hazard-potential dams, four owned by IF&W and two owned by DOC, with the rest being low-hazard-potential dams.

Once a dam is classified as significant-hazard or high-hazard, its owner has to file an Emergency Action Plan (EAP) within six months and update that plan every two years. EAPs are kept on file with MEMA to be used during a dam incident. Additionally, MEMA's Maine Dam Safety Program (MDSP) manages the EAPs for 43 FERC-regulated dams. Most high-hazard-potential and significant-hazard-potential dams regulated by FERC, and nearly 96 percent of state-regulated dams have EAPs. Enforcement actions are underway against owners of the remaining four percent of dams that do not have EAPs. According to state law, each owner that is out of compliance with EAP requirements can be fined.

Some of Maine's challenges related to dam regulation and safety are associated with the inadequate number of personnel for inspection and difficulty in enforcing the inspection findings. Additionally, there is no unified record-keeping system.

Based on the SDI's report, the Commissioner of the Department of Defense, Veterans and Emergency Management, under whose jurisdiction MEMA falls, is empowered by the law to issue an order for lowering the lake of a dam or repairing a dam. Costs associated with the implementation of the order are the responsibility of the dam owner. This can be a serious economic issue for owners of non-revenue producing dams.

An example of the difficulties involved in implementing and enforcing a dam safety order is the case of a privately-owned significant-hazard-potential dam in Bowdoinham in 2007. The order stipulated control of the dam's lake level and a remedial action plan to be prepared. In this case, owners were unable to pay for professional services for the latter and the matter remains unresolved. In another example, in 2006 in Canton, another significant-hazard-potential dam in poor condition threatened homes and roads. Due to the condition of the dam, the order required gates to be removed to lower the lake level, thus impacting shorefront properties. The town at that time, assumed ownership and has installed a temporary sandbag dam to increase shore level back to normal. The temporary dam is considered a low-hazard-potential dam and is not subject to the dam safety order.

Dam integrity assessments can, in some cases, be conservatively performed using physical observations without incurring major expense. On the other hand, regulated dams generally do not have detailed construction records, therefore, making it difficult to assess their structural integrity and safety conditions without comprehensive investigation.

The importance of registration, routine inspection and maintenance is illustrated by recent history. Dam failures are not unprecedented in Maine. For example, two previously unregistered dams failed during floods in April 2008. The first, Meserve Dam, caused $100,000 in damages while the second, Shorey Brook Dam, caused little damage.

Investment Needs

In Maine, dam safety and liability, as well as the financing for their maintenance, upgrade and repair, is the responsibility of the dam owners. MEMA's MDSP is understaffed, with two full-time SDIs. There was only one full-time inspector until October 2008, when a new position was filled. Furthermore, there is no enforcement division.

The MDSP is funded by the state and federal government. Based on the 2006 budget, which has approximately $110,000 for the MDSP, Maine ranks among the bottom five states in the nation. The annual MDSP budget is less than similar programs in either New Hampshire or Vermont. Vermont, which has less than half the number of dams as Maine, spent more than twice as much money on dam inspection. New Hampshire, which has more than three times the number of dams as Maine, has a budget almost six times larger for dam inspection. The estimated 2008-2009 budget for the MDSP is approximately $133,000. Of that, nearly 80 percent is contributed by the state and nearly 20 percent is contributed by the federal government. The present budget does not appear to change the rank of Maine's MDSP compared to those of the previously mentioned New England states.

In 2007, according to the Association of State Dam Safety Officials (ASDSO), Maine has 17 high-hazard dams owned by public entities that require an estimated $11.9 million in repair costs. Only $1.78 million in funding was being considered for Maine from the National Dam Safety Program from federal legislation passed by the House of Representatives in October 2007. As of October 2008, the Senate had yet to enact the legislation.

Conclusions and Recommendations

According to ASDSO's *Guidelines for the Model Dam Safety Program*, Maine's current staffing levels for the MDSP are inadequate. Considering the age of the state's existing dams, the demand for comprehensive and intensive safety inspections is on the rise. Even with an additional dam inspector, MDSP personnel will still not be able to provide the necessary level of inspection and enforcement of dam safety orders.

Currently, the inspection system does not provide quantitative evaluation or grading data about dam functionality or the likelihood of a failure. Incorporating such data into the inspection process would improve dam evaluation procedures and help in the development of dam improvement and repair programs.

The state owns approximately five percent of the entire dam inventory in Maine, and does not have a budget for maintenance for most of those dams. In most cases, only limited resources are available for meeting the needs of municipal- and privately-owned dams, as well. Private and municipal dam owners have difficulty completing the repairs and improvements required by the state through dam safety orders. Maine ASCE gives dams a grade of **D+**.

Maine ASCE makes the following recommendations:

- Increase the staff and budget levels to accommodate current and projected inspection needs. Funding must be increased to almost three times the current level to be in line with the budgets of other New England states, and to almost six times the current level to keep up with annual inspections and implementation of dam safety orders, as mandated by state dam safety law;
- Develop a long-term strategic program and plan, including identification of possible funding sources, that address the needs to investigate, repair, upgrade and operate the aging state, municipal and privately owned dams, and increased accountability of dam owners;
- Work with Maine's Congressional delegation to persuade the Senate to enact the Dam Rehabilitation and Repair Act to fund the National Dam Safety Program and address the most critical non-federal public dams; and
- Improve the record keeping system. Unification of data from different agencies will help concentrate dam safety, operation and maintenance under one oversight organization or department.

Sources

- State of Maine law, Title 37-B MRSA c.24 Chapter 24 " Dam Safety"
- NID/State Program Performance Report, July 26, 2008
- Personal communication with Maine's State Dam Inspector (SDI), Oct. 2008
- Maine Dam Safety Program (MDSP) 08/09, DRAFT-2, 10/2/08, by T. Fletcher -Maine's State Dam Inspector (SDI).
- "Dam Safety in Maine" & "Maine Dam Safety Program", Association of State Dam Safety Officials, Spring 2008
- "Cracks in the system", Investigation Report by Maine Sunday Telegram, July 2006
- Executive Summary of A Review of State Dam Abandonment and Registration Laws and Federal Dam Licensing Laws (Joint Standing Committee on Natural Resources to carry over LD 626, An Act to Reinstate the Laws Governing Dam Abandonment, from the First Regular Session of the 117th Legislature to the Second Regular Session)

ENERGY

Grade: C+

Overview

The overall health of the energy generation and transmission system in Maine is good, but reliability and security concerns are posed by the state's dependence on natural gas fueled generation, as well as weak links and interface limits in the transmission system. Diversification of energy supply and approximately $2 billion of transmission system investment are needed to address these issues.

Introduction and Background

Maine, like many other states, developed its electric energy system over a long time period as technology and demand permitted. Originally, electricity was generated locally (often dependent on hydro power) to meet specific demands such as in a mill or for community street lighting. As demands grew, distribution circuits were developed to get the energy from the source to the point of need. These early electrical systems were islands, operating independently from other electrical systems, with generation matching the local demand.

As demand continued to grow, it became apparent that connecting some of these island systems together would improve economy of scale and offer improved service to the end user, in addition to a better price. This was the beginning of electric energy transmission. It was also the beginning of Maine's electric companies – Central Maine Power (CMP), Bangor Hydro Electric (BHE), and Maine Public Service Company (MPS), which grew out of the small island suppliers with the addition of transmission networks. As demands and economics continued to change, these new "islands" discovered the need to interconnect. BHE connected to CMP, which connected to New Hampshire's utilities as well as the rest of New England, and MPS connected to New Brunswick. These connections allowed economical energy exchange, which met demands and improved reliability. This expansion and the addition of 345kV class transmission lines developed into the electrical system we know today.

In the 1990s there was a major shift in Maine's electric utilities. The traditional utilities were required to divest from generation resources and generation became a competitive market. With this change of structure came a change of need for transmission. Today, generation is no longer locally controlled and dispatched. Transmission and distribution utilities do not rely on the local generation as in the past, but are obligated to ensure that adequate energy is available from the open, regional market.

The regional energy system is operated and managed by independent system operators (ISO) that are private, non-profit entities responsible for the procurement of energy generation via a wholesale electricity market and auctions, as well as the efficient and reliable transmission and distribution of that electricity. ISO New England Inc. (ISO-NE) is the operator of the region's bulk power system and wholesale electricity markets except in northern Maine, which is connected to the New Brunswick system. In 2006, the Federal Energy Regulatory Commission (FERC) created a newly designed Forward Capacity Market (FCM) in New England that established competitive auctions for capacity resources held three years ahead of their projected need. The first FCM auction was held in February 2008. This capacity market setup aims to provide incentives to encourage adequate future capacity, efficient generation, increase reliability, and control the cost of electricity to end users. However, there is some concern in the industry that these goals may not be fully realized. It often takes significantly longer than three years to site and construct new transmission or large generation projects, which could present major investor risk for bringing these projects to market.

Condition and Adequacy

Generation - Table 1 represents Maine's current generation capacity, actual generation, and mix of generation sources. Maine went from a net exporter of electricity in the early to mid-1990s to a net importer with the closing of the Maine Yankee nuclear power plant in 1997, back to a current net exporter with the increase in natural-gas-fired plants since 2000.

Table 1: Energy Generation for Maine

Source	2007 Generation Capacity[i] (Claimed Summer Capacity)		2004 Actual Generation[viii]
	Megawatts (MW)	% of Total Capacity	% of Total
Natural Gas	1,533	46.6% *	60%
Hydroelectric	587	17.8%	20%
Biofuel/Refuse	306	9.3% *	13%
Petroleum (oil)	867	26.3%	5%
Coal	-	-	2%
Nuclear	-	-	-
Total	**3,294**	**100%**	**100%**

*Generation resources with dual fuel fired capabilities, 13.5% of total generation capacity, 8.6% from gas with oil backup and 4.9% from bio and refuse with gas or oil backup.

Wind energy generation was not included in the above capacity data by regulators and system operators because wind is not an on-demand energy source. Wind generation often does not coincide with peak electricity demands due to time of day and seasonal constraints. However, wind power is a viable source of small scale generation, helps to offset our carbon footprint, and reduces dependence on fossil fuels. Maine has one active wind facility with 28 turbines (42 Megawatt (MW)) in Mars Hill, and two under construction at Stetson Mountain (38 turbines, 57 MW) and Kibby Mountain (44 turbines, 132 MW). Several other potential sites for wind turbines have been identified.

Development of alternative and renewable energy generation sources such as wind, biofuel, and tidal are on the rise and Maine is considered a leader in this arena. LD 1920 has been enacted and requires that Maine increase its share of renewable capacity resources at one percent per year beginning in 2008—to reach 10 percent by 2017.[v] This is an increase beyond the 30 percent renewable portfolio standard set in 1997. This bill requires competitive electricity providers to meet this portfolio standard through "green" credits or compliance payments. The Governor's Office of Energy Independence and Security, along with a Wind Power Development Task Force, has set a goal of 2,000 MW of wind power generation statewide by 2015. There also has been recent state legislative action to better facilitate co-generation and distributed generation by small producers.[vii] In addition, a wood to energy initiative has been established.

Due to energy generation and transmission being a *regional* infrastructure, with electricity being dispatched throughout New England largely by ISO-NE (except northern Maine), the following discussion on current and forecasted capacities versus system demands is on a regional level. The Northeast Power Coordinating Council (NPCC) establishes standards for generation and transmission system reliability. The resource adequacy reliability criterion is a loss of supply expectation of 0.1days per year or one day per ten years for both the reference (baseline peak) and high (extreme peak) demand load forecasts.[iii]

The New England region experienced record electricity use on August 2, 2006, when consumer demand peaked at 28,130 MW due to above average temperatures and humidity. [iii] This event triggered ISO-NE to implement several standard operating procedures, which included delivery of electricity sales from outside their operating region, with little to no impact on consumers.

In April 2008, ISO-NE forecasted a potential for record-breaking electricity use in the summer of 2008, but indicated that power supplies would be sufficient to meet consumer demand.[iv] ISO-NE forecasted that under normal weather conditions of 90 degrees Fahrenheit, the peak electricity demand could reach 28,000 MW. Under extreme weather conditions, such as an extended heat wave with 95 degree temperatures and high humidity, a new record

could be set at approximately 29,900 MW. Generating capacity was forecasted to be 31,100 MW.[iii] This represents a four to 11 percent margin over the forecasted demand load depending on what weather model is utilized. This margin needs to be significant to cover unplanned contingencies such as the loss of a major generator or transmission line. In this instance, the forecasted peak demands did not occur.

ISO-NE forecasts that in 2010, 32,305 MW of power resources will be needed under the baseline peak load forecast to meet NPCC's resource adequacy reliability criterion—a 15 percent increase from 2008.[iii] The first FCM auction was held in February 2008 for the commitment period of June 2010 to May 2011. A total of 38,405 MW of resources were qualified to participate in the auction—a 23 percent increase from 2008 capacity—which is well above the 32,305 MW forecasted demand. Not all 38,405 MW of the qualified resources will be procured by ISO-NE, only those that are cleared will be committed and available in 2010. However, this forecasting implies that potential generation supply is increasing at a rate at least equal to system demands—23 percent versus 15 percent. It is also worth noting that in 2002, ISO-NE forecasted 2007 baseline peak demand to be 27,360 MW and extreme peak demand to be 30,082 MW. The actual 2007 peak load topped out at 26,145 MW, demonstrating the accuracy of the forecasting.[iv] This indicates that there is sufficient power generation capacity in the ISO-NE system to meet demand over the next several years.

In terms of the reliability of energy generation resources in Maine, the biggest concern is dependence on natural gas as a generation fuel, particularly since the closing of the Maine Yankee nuclear power plant. Prior to 1997, nuclear power represented approximately one-third of Maine's power generation. Currently, natural-gas-fired plants account for at least half of Maine's power generation. Since 1999, a large percentage of the natural gas powering these plants has been imported from Canada through two pipelines.

Maine, and New England in general, will continue to face potential reliability risks associated with the availability of natural gas during winter peak load periods due to coincident demand for natural gas from the core natural gas heating industry. Unlike the natural gas electricity generation industry, the core natural gas heating industry is served by "firm" delivery contracts.[iii,vi,vii] Currently, there is a downward trend in Maine on natural-gas-fueled generation, while renewable generation is increasing. Actual natural gas generation was as high as 73 percent in 2002,[v] and fell to 60 percent in 2004. Comparing 2007 capacity in Table 1 to 2004 actual generation data suggests that natural gas is favorably dispatched over oil in the open market, likely due to the volatility of oil pricing.

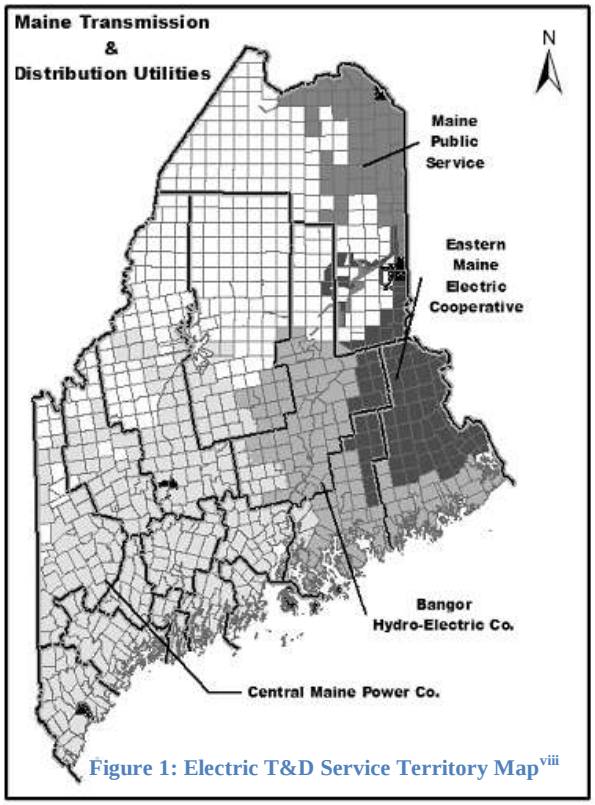


Figure 1: Electric T&D Service Territory Map[viii]

Transmission and Distribution - Maine is served by three investor-owned utilities (IOUs): Maine Public Service Company,[ix] Bangor Hydro Electric Company,[x] and Central Maine Power Company,[xi] in addition to a number of consumer-owned utilities (cooperatives). The state's largest cooperative is the Eastern Maine Electric Cooperative. Figure 1 shows the service territory of the major electric transmission and distribution utilities in the state.

The Maine Public Service transmission system is not connected with the energy market in southern Maine or the rest of the United States. Instead, its transmission system is connected with New Brunswick, Canada. The northern Maine electric system is managed by the Northern Maine Independent System Administrator.

The southern Maine transmission system is administered by ISO-NE and currently interfaces with New Hampshire through four—two 345 kV and two 115 kV—lines. An additional 115kv line will be operational soon. This system also interfaces with New Brunswick, through two 345 kV lines.

While Maine has multiple 345 kV transmission paths—from southern Maine to Wiscasset and a recently completed second path from the Bangor area to New Brunswick—there is a gap, with only a single path between Wiscasset and the Bangor area. This is a critical weak link, creating the potential that a single 345 kV line outage or double circuit tower failure would result in separation of major portions of Maine and eastern Canada from the rest of New England.[xiii]

Transmission congestion has not been an issue in Maine, but transmission constraints have limited exports to the rest of New England, creating higher transmission costs to the south.[xiv] This also has an impact on the economic viability of constructing additional generation in Maine, with a potential impact on regional price, reliability, fuel mix and future jobs. Maine recently commissioned the Northeast Reliability Interconnect Project (NRI).[x] In December 2007, Bangor Hydro Electric commissioned the second 345 kV transmission tie between Maine and New Brunswick to improve interface limits between these areas. This project also included New England's first 345 kV series capacitor installation to further enhance performance.

Investment Needs

Overall, the health of the energy generation and transmission system in Maine is good, but reliability and security concerns are posed by the state's dependence on natural-gas-fueled generation, as well as weak links and interface limits in the transmission system. A large part of the transmission and distribution system is 30 to 40 years old. If Maine is to maintain efficient, cost-effective energy generation sources and a robust transmission and distribution grid that meet regional reliability standards and environmental emission regulations, significant investments are needed.

Fortunately, the majority of these needs have been studied and identified by the utility owners. Project plans have been filed with ISO-NE and the Maine Public Utilities Commission for two milestone projects: the Maine Power Reliability Program (MPRP)[xv] and the Maine Power Connection Program (MPC).[xvi] The MPRP is a $1.4 billion project on Central Maine Power's bulk transmission system, which includes reinforcements to meet the projected needs through the year 2017. This includes a second 345 kV path from the Bangor area to southern Maine, installing additional parallel transmission paths and transformers. The MPC project would invest $625 million to interconnect the northern Maine Public Service transmission system with southern Maine, and subsequently connect Aroostook County wind energy facilities to the electric grid.

Further regulatory review of these projected needs is necessary in order to finalize project scopes and investment levels. The capital for these projects will be provided by private investments that will be offset by regulated transmission rates. This focus on improved reliability needs to continue and cooperation of the many public and private entities will be needed to get these projects through regulatory approval and construction.

Conclusions and Recommendations

The energy generation, transmission and distribution systems in Maine are in need of significant investment in order to ensure reliable, efficient and cost-effective delivery of electricity. Maine ASCE gives energy in Maine a grade of **C+**.

Maine ASCE makes the following recommendations:

- Continue to diversify power generation sources, including dual-fired-generation sources and new generation types, to address natural gas dependency;
- Expand renewable energy generation projects and research to meet federal Regional Greenhouse Gas Initiative compliance by 2012[iii] and the state's LD1920 Renewable Portfolio Standard (10% increase beyond original 30%) compliance by 2017;[v]
- Address regional transmission interface limits and reliability concerns by designing and constructing the projects in the $1.4 billion Maine Power Reliability Program and the $625 million Maine Power Connection Program; and
- Continue inspection, maintenance, and upgrade of the electric system in order to ensure reliability.

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Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

MUNICIPAL DRINKING WATER

Grade: C

Overview

More than two-thirds of Maine residents are served by 150 public community drinking water systems. Maine has a more than adequate water supply and water quality is addressed through mandatory testing of public water supplies. Approximately $900 million in water projects will be needed over the next 20 years. Current funding, approximately $15 million per year, only provides for one-third of needs.

Introduction and Background

Maine has approximately 2,000 public drinking water supply systems, which range from large systems supplying entire communities to small systems that provide water to seasonal facilities such as campgrounds and restaurants. Two-thirds of Maine residents are supplied by a few large systems, such as those serving Portland, Lewiston/Auburn and Bangor, which use surface water sources. Most other public water systems use groundwater as their water source.

A public water supply in Maine is defined as a system that supplies more than 25 people for more than 60 days a year. Three types of systems are regulated in Maine:

- **Community supply systems** serve residential customers. Approximately 400 of these systems exist in Maine. Of the community supply systems, 250 systems are either investor-owned or privately held community systems, which serve many trailer parks, condominiums and apartments. The remaining 150 are quasi-municipal community water systems/public utilities and are the focus of this brief.
- **Non-transient, non-community systems** serve facilities such as schools and office buildings. Approximately 400 of these systems exist in Maine (not addressed in this brief).
- **Transient water systems** serve facilities such as summer camps and hotels. Approximately 1,200 of these systems exist in Maine (not addressed in brief).

Water supply infrastructure includes:

- Source of water supply
- Watershed area or zone of influence that supplies recharge water
- Intake systems or wells and pumps
- Treatment plants
- Transmission and distribution systems
- Storage tanks and reservoirs
- Administrative facilities and laboratory testing facilities

Condition and Adequacy

Water supply systems are vastly different as each has a different "owner," varying numbers of customers, and treatment processes. While one system may have an intake in a lake, use slow sand filtration and pump to a reservoir on a mountain before distribution through WWII-era pipes,[1] another may have three sand and gravel wells, need little more than disinfection, and be sent to a storage tank connected to brand new piping. For these reasons, comprehensive data for conditions do not exist.

[1] WWII-era piping was installed when high quality materials were in short supply.

Maine's environment provides more than adequate sources of supply. However, the infrastructure components that make up public water systems require continued and adequate funding. Storage, treatment and distribution facilities require maintenance, replacement and upgrades to meet current drinking water standards. The greatest need may lie out of sight in underground lines, many of which are more than 100 years old. Sources of supply also need funding for protection from pollutant and security threats.

In addition to the obvious aging infrastructure needs, many water systems are constructing facilities to address other concerns. Redundant wells, interconnections with neighboring systems, water storage structures, treatment facilities and new plant and process improvements to reduce disinfection by product formation are being put in place to ensure adequate service and reliability for the future.

Despite variations in facilities, regulatory oversight of Maine's public systems is firmly rooted in the Safe Drinking Water Act. The Safe Drinking Water Act is enforced by the Maine Drinking Water Program (DWP). The DWP is part of Maine's Department of Health and Human Services and has a staff of approximately 32 to conduct compliance, enforcement, field services, revolving loan fund administration, drinking water security, capacity development and source water protection.

A primary responsibility of the DWP is oversight of compliance with and enforcement of United States Environmental Protection Agency (EPA) National Primary Drinking Water Standards.[2] "Drinking water standards are regulations that EPA sets to control the level of contaminants in the nation's drinking water. These standards are part of the Safe Drinking Water Act's 'multiple barrier' approach to drinking water protection, which includes assessing and protecting drinking water sources; protecting wells and collection systems; making sure water is treated by qualified operators; ensuring the integrity of distribution systems; and making information available to the public on the quality of their drinking water. With the involvement of EPA, states, tribes, drinking water utilities, communities and citizens, these multiple barriers ensure that tap water in the United States and territories is safe to drink. In most cases, EPA delegates responsibility for implementing drinking water standards to states and tribes.

"A **National Primary Drinking Water Regulation** (NPDWR or primary standard) is a legally enforceable standard that applies to public water systems. Primary standards protect drinking water quality by limiting the levels of specific contaminants that can adversely affect public health and are known or anticipated to occur in water. They take the form of Maximum Contaminant Levels or Treatment Techniques, which are described below.

"A **National Secondary Drinking Water Regulation** (NSDWR or secondary standard) is a non-enforceable guideline regarding contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, states may choose to adopt them as enforceable standards."

In addition to the DWP, the Source Water Protection Program (SWAP) was established in 1998 to protect Maine's drinking water sources and to provide additional protection to public water supplies. SWAP focuses on protecting the water supply before contamination occurs by delineating recharge areas, inventorying land uses within recharge areas, evaluating potential hazards and communicating protection strategies to the public.

The viability of each system also depends on capacity, which refers to the ability of a water system to operate in compliance with NPDWRs. The effectiveness of system capacity depends on the interaction of technical, managerial and financial capacity. Technical capacity concerns the ability of a system to meet standards and to provide safe and reliable drinking water, including infrastructure adequacy (source water adequacy and collection, storage, treatment and distribution facilities). The 1996 amendments to the Safe Drinking Water Act require states to implement strategies to ensure that new public water systems have sufficient capacity to meet federally mandated drinking water requirements.

[2] http://www.epa.gov/ogwdw000/standard/setting.html "The Safe Drinking Water Act (SDWA), passed in 1974 and amended in 1986 and 1996, gives the Environmental Protection Agency (EPA) the authority to set drinking water standards.

Security

The DWP has received approximately $500,000 during the last five years for security planning and training through the EPA and the Department of Homeland Security. With that funding, DWP personnel provided training, developed emergency response plans, and created templates for public water systems to develop their own plans. DWP personnel also conducted tabletop exercises and emergency response plan training, as well as internal coordination with other state agencies regarding safety. Additionally, funding was given for a series of public service announcements on water system security. Some water systems received portions of the EPA money and some of the funding, earmarked for safety and security, was routed to county emergency management agencies. DWP funded fencing and other security measures for wells and associated structures through wellhead protection grants.

Investment Needs

Safe and abundant water is critical to human health, sustainable development and economic growth. The DWP estimates that hundreds of millions of dollars worth of necessary water projects remain unfunded due to shortfalls in both state and federal budgets. According to ASCE, the national gap in funding versus need is more than $11 billion. While Congress mandated improvements in both water quality standards and in sewage treatment, federal funding for water and wastewater has decreased by $600 million since 2003.

In Maine, funding for drinking water system maintenance and upgrades is provided through user fees or local taxes and from loans provided by the Drinking Water State Revolving Loan Fund (DWSRLF). In addition, the United States Department of Agriculture Rural Development Authority provides funding for systems with less than 4,000 customers, or for communities with less than a total population of 10,000. The table below, from DWP, summarizes the funding available, as well as priority projects that did not receive funding (waitlisted) in a given year:

YEAR	2006	2007	2008
Amount Funded (in millions)	$13.4	$14.7	$15.0
Amount Waitlisted (in millions)	$11.4	$12.8	$7.5

DWP believes the low number of waitlisted projects reflects expectations of the amount of funding available. Water utilities might not apply for funds when the amount of funding available is projected to be low.

On June 18, 2008, the *Bangor Daily News* reported that "Maine's economic development has been slowed because of an increasing backlog of drinking water projects and needed wastewater treatment upgrades." The state and the utilities identified $900 million in water projects that will be needed over the next 20 years. Through 2008, $15 million in funding is expected to be available for water projects. However, with infrastructure need of $900 million over 20 years, $45 million in funding per year is needed. At that rate, current funding is approximately one-third of what is needed. Many systems defer maintenance to keep from having to raise rates.

Due to competing state budgetary lines, Maine's DWP has experienced difficulty obtaining the required 20 percent matching funds from the state. This match is required to maintain the revolving loan fund and the DWP continues to search for options to provide adequate matching funds. In the November 2008 election, Maine voters approved a state bond issue for $3.4 million which will leverage an additional $17 million in federal aid. However, for the DWP to both assist public water systems to maintain the health objectives of the Safe Drinking Water Act and maintain the fiscal integrity of the fund, the need is far greater.

Conclusions and Recommendations

The drinking water grade applies only to the 150 publicly funded water systems. Many of the underground facilities for drinking water are more than 100 years old. Although individual systems have not been graded, state and industry officials estimate that systems range from A to D-, but because of mandatory state support, no systems fall into the failing F category. Overall, Maine ASCE gives drinking water a grade of **C**.

Maine ASCE makes the following recommendations:

- Work with the federal government and Congress to fully fund the needed projects and eliminate the waitlist. Congress needs to provide $1 billion to the DWSRLF in FY2009;
- Develop a more reliable funding mechanism, such as a federal or state infrastructure trust fund, that would provide both low interest loans and grants for infrastructure investment. The availability and access to sufficient and economically attractive funding resources would help utilities make the necessary investments to their systems;
- Require active asset management programs be implemented and reviewed annually to maintain the terms and conditions of the new grants or loans; and
- Advocate the consolidation or regionalization of utilities throughout the state to reduce operational costs.

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Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

MUNICIPAL WASTEWATER

Grade: D+

Overview

Maine's 2004 Clean Watersheds Needs Survey listed a wastewater infrastructure need of $854 million. The primary source of funding for wastewater improvements is the State Revolving Fund (SRF), which has declined by 50% since 2004 and is scheduled to end entirely in 2011. Without adequate funding, waitlists will increase and improvements to treating wastewater and protecting the environment will be deferred.

Introduction and Background

Maine cities, towns, and utility districts are being severely challenged with the need to repair and upgrade old or failing infrastructure in their wastewater treatment systems. These entities are supported by a population of 1.32 million citizens that earn the lowest average annual income ($41,287) in New England.[1] Limited financial resources and other community demands have postponed, delayed, and neglected the repair, upgrade, and modernization of the infrastructure that is a vital component of a community's public health, environmental stewardship, and economic vitality.

In conjunction with the need to rehabilitate a significant portion of the existing infrastructure, federal and state regulatory requirements on wastewater and stormwater are becoming more restrictive. These increasingly stringent conditions and effluent limits are designed to reduce pollutant loads on receiving waters. In addition, stormwater pollution has become a concern to regulatory agencies, with communities, utilities, private and public entities just entering the preliminary stages of stormwater management.

Separation of stormwater from wastewater allows for better treatment and less overload on facilities by eliminating stormwater peaks that may exceed the capacity of the treatment processes. Separation of sewers that carry both wastewater and stormwater (known as combined sewers) has become a major area of investment for many of the larger municipalities in Maine. The Portland City Council has recently authorized a $61 million bond to fund Tier II of their Combined Sewer Overflows (CSO) Long Term Control Plan. Additional phases will be needed to achieve complete separation. Bangor, Augusta, and Lewiston-Auburn have invested heavily in CSO control, and continue to invest in solving sewer overflows caused by wet weather and snow melt.

Condition and Adequacy

Municipally-based wastewater infrastructure got a boost in Maine in the 1930s when Civilian Conservation Corps projects led to the development of the earliest systems. The second leap in development of municipal wastewater infrastructure was in the 1970s and 1980s in response to the Clean Water Act and the subsequent funding programs that developed. In all, there are approximately 166 publicly owned treatment works (POTW) in municipalities around the state. Through the years, the areas within the communities served by the infrastructure have increased to support more widespread economic growth. Now many communities are faced with the reality of maintaining an infrastructure that is 30 to 40 years old and approaching or exceeding its design life, with federal funding programs at risk.

Many larger communities in the state have completed one or more upgrades of their treatment processes; however, a much larger percentage of facilities, generally in the smaller, more rural communities, have had little or no upgrades. Federal and state funding for these communities has not been available due to the low number of users and the relative high cost per user to repay the necessary loans. Local user fees are typically designed to cover operating and

[1] U.S. Census Bureau, 2007 data.

regular maintenance costs and do not address the need for major renovation or replacement. Low average annual income of ratepayers prohibits the payment of high user fees to support the upgrades and replacement of aging infrastructure.

Wastewater infrastructure can be broken down into two primary categories: the Publicly-Owned Treatment Works (**POTW)** facilities where treatment occurs; and the **collection systems** comprised of pipes, manholes, pump stations and other subsurface components that convey the wastewater to the POTW facilities. Almost half of back-logged wastewater treatment projects are related to CSO, an indication that combined collection systems continue to be a significant problem in Maine. According to the Maine Department of Environmental Protection's (DEP's) report on the *Status of Licensed Discharges and Combined Sewer Overflow Abatement Program* approximately 12% of licensed discharges are not maintained in substantial compliance with license requirements, indicating that many treatment facilities require significant improvements. Unfortunately, there has been no comprehensive statewide assessment of collection systems so our understanding is based on CSO projects that have been brought to the attention of the DEP.

Investment Needs

Maine's 2004 Clean Watersheds Needs Survey (most recent available) conducted by the DEP and submitted to the United States Environmental Protection Agency (EPA) listed a total wastewater need of $854 million. According to data gathered by the DEP, approximately 87 communities are waiting for funding assistance for a variety of upgrade projects with total project costs estimated in 2007 at over $420 million. Over $174 million of that cost is related to CSO issues that continue to be a problem where systems struggle with stormwater infiltration and inflow.

The funding for the necessary investment in infrastructure improvements has primarily come from the Clean Water State Revolving Loan Fund (CWSRLF), Rural Development, Community Development Block Grant Program (CDBGP), State Clean Water Grants (SCWG), other grants and commercial loans and bonds. Environmental and Community Development Block Grants are based on a community's median household income, as compared against other Maine communities, plus other considerations including current and anticipated user fees. In most funding packages, grants are a small part of the total funding. The CWSRLF program is the most advantageous funding resource available with its interest rate 2% below market. In FY 2007, the budget for the United States for this fund was over $1 billion. In FY 2009, the President's budget recommended only $555 million. Rural Development offers a mix of loans and grants, but in recent years the loan portion has dominated the financing package, that has an interest rate about the same as SRF programs. It is not uncommon for public infrastructure projects to have participation from multiple agencies and resources to obtain the level of funds necessary to finance infrastructure and facility improvements.

The capital investment needs for the wastewater treatment and conveyance facilities, stormwater management programs, and water recycling programs are greater then allocated funding. The needs represent the capital investment necessary to plan, design, build, replace or rehabilitate publicly-owned wastewater treatment and collection facilities, and establish and implement stormwater management programs. The projected total annual loan amount available is estimated at $40 million. The SRF program will remain a major component in funding wastewater projects through 2011, when it is slated to end. However, it is becoming evident that inflation and unrecognized costs associated in rehabilitating existing infrastructure will rapidly decrease the resources of the SRF program. With $854 million in current unmet needs, it would take more than 20 years to address all current issues assuming no additional project needs during that period.

In November 2008, Maine voters authorized $3.4 million in state bond funds to leverage an additional $17 million in federal grant funds to support the SRF program. These funds are intended to support the construction of water and wastewater treatment facilities and continue to establish a sufficient capital investment fund to ensure the SRF program can continue beyond 2011. The 5:1 matching ratio is an advantageous way to grow the fund as long as federal funding is available and the bond referendums continue to pass. The combined impact of the $20 million investment, which is divided between water and wastewater, is considered minor when compared to the $854 million need for watewater.

In addition to treatment process and collection system upgrades, security of facilities and the possible risk to public health is a factor considered in this grading. The majority of public wastewater facilities have not had security system updates within the decade. Otherwise, there is no official data available to identify the actual anticipated investment.

Conclusions and Recommendations

The most influential factor preventing consistent investment has been the setting of user rates and fees. Since the Clean Water Act legislation was adopted, regulation has existed that requires local utilities to set user rates to allow maintenance and capital investment. Unfortunately, the rates are rarely set high enough to achieve the intended goal. In some instances, the funds have been directed to other projects. The lack of funding for infrastructure investment and proper maintenance adversely affects Maine's ability to protect the public health.

The condition of Maine's wastewater infrastructure suffers from declining conditions, decreasing reliability, limited capacity for future growth, security issues, environmental stewardship concerns and sustainability problems. Current federal, state and local funding levels are insufficient to support existing funding requests for major upgrades and CSO separation. No major effort has been undertaken to understand collection system conditions and that the actual need is substantially larger than identified, and that environmental impact will continue to increase. Maine ASCE gives municipal wastewater a grade of **D+**.

Maine ASCE makes the following recommendations:

- Work with federal government and Congress to fully fund the CWSRLF program and reduce the list of needed projects. Congress would need to provide $1.5 billion to the fund in FY2009;
- Develop a reliable funding mechanism, such as a federal or state infrastructure trust fund that would provide both low interest loans and grants for infrastructure investment. The availability and access to sufficient and economic attractive funding resources would help utilities make the necessary investments to their systems;
- Encourage all utilities to develop an Asset Management Plan, implement full cost pricing and educate the public as to the importance of sustainable operations. A requirement for a utility to access any new funds is that an active Asset Management Program is implemented and reviewed annually to maintain the terms and conditions of the grant/loan; and
- Advocate the consolidation or regionalization of utilities throughout the state to reduce operational costs.

Sources:

Maine Department of Environmental Protection report to the 123rd Legislature "Status of Licensed Discharges and Combined Sewer Overflow Abatement Program" dated April, 2007

Maine Department of Environmental Protection "Maine Wastewater Facilities Needs" dated January 2008

Maine Department of Environmental Protection 2004 Clean Watershed Needs Survey dated January 2008

Maine Waste Water Control Association, "Maine Clean Water State Revolving Fund (SRF) Funding the Future Clean Water of Maine" dated October 23, 2008

Steve McLaughlin, Maine Department of Environmental Protection

SCHOOLS (K-12)

Grade: C-

Overview

Capital funding needs for Maine schools exceed what is currently allocated through the two primary state funding programs. The state forecasts that during the period of 2005 to 2026, needed funding from existing and new bonds is approximately $1.6 billion. Current funding levels result in a projected 20-year gap of $600 million. Less than half of priority health and safety project requests have been funded over the past 6 years.

Introduction and Background

Maine has 710 public schools with an enrollment of approximately 210,000 pupils. Enrollment statewide is projected to decrease 10.4% between October 2005 and October 2014. Enrollment in the more populous counties (York and Cumberland) is projected to decrease less than 5% during this same period. The shrinking student population can be attributed to the state having the nation's oldest median age and eighth-lowest birth rate.[1] Maine's school facilities have been historically evaluated by various state appointed Task Forces[2] or academic research institutions.[3] School systems operational funding is provided by three primary sources: local (approximately 47%), state (approximately 46%) and the federal (approximately 8%) governments. The schools in Maine are rurally located in the same manner as the populations they serve.

Condition and Adequacy

When referring to the components of school infrastructure, these are generally referred to as facilities. School facilities inherently rely on many infrastructure components to operate, both directly and indirectly. These include water supply (potable and fire protection), wastewater disposal, transportation and energy. Operational and building infrastructure, in particular indoor air quality, has a direct impact on health. Due to the rural nature of many schools common public utilities are often not available to serve individual schools and these schools must rely on private infrastructure systems to support the operation of the school. This is most prevalent with drinking water and wastewater disposal systems. The more rural districts often have high operational costs attributable to the extensive transportation required to accommodate students.

Individual analysis of school facilities would be a daunting task and require extensive resources as well as a comprehensive rating system. To address this challenge, the Maine State Legislature passed LD 2252 - An Act to Implement the Recommendations of the Governor's Commission on School Facilities in 1998, which authorized the Maine Department of Education (Maine DOE) to require school units to develop and implement a maintenance and capital improvement program for school buildings. The Maine DOE has provided extensive assistance to schools, both technically and financially. The byproduct of that is a Capital Asset Management (CAM) database.

The CAM database was generated by data provided by the school administrative units for asset management and planning purposes. The Maine DOE reports that 52% of school administrative units have participated in the CAM database. The CAM database uses a Facility Condition Index (FCI), which is an industry standard for measurement of the relative condition of assets. The FCI is obtained by looking at the cost to bring an asset into good condition

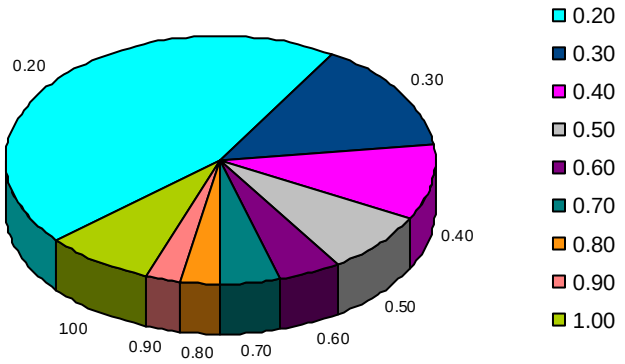
[1] *Sun Journal* article dated September 3, 2008 quoting David Connerty-Marin, Maine Department of Education
[2] 1998 Governor's School Facilities Commission Task Force
[3] 1997 - University of Maine review of Summary of Inventory of School Repairs

and dividing that cost by the current replacement cost of the asset, the resultant is the FCI. The higher the FCI ratio, the poorer the condition of the asset. An FCI of 1.0 or over identifies an asset that has exceeded its useful life and should be replaced.

The Maine DOE requires that all deficiency requirements be used in the calculation of the FCI regardless of the timing of the necessity. Short-term and long-term requirements are grouped together. The Maine DOE School Facilities Program Review identified the presence of 20,717 records in the CAM database. Of the schools in the CAM database, 90.4% had an FCI of 1.0 or less. The balance had an FCI of greater than 1.0 (9.6% of the schools in the CAM database).

The pie chart depicts the FCI distribution within the CAM database of records having an FCI less than 1.0. As can be seen from the pie chart, approximately 45% of the records have an FCI of 0.20 or less, which is considered in "good condition" by the Maine DOE. Of the total records in the CAM database (including those with an FCI greater than 1.0), approximately 55% of these records have an FCI greater than 0.5, which indicates these are in need of attention.

Chart 1: FCI Distribution within CAM Database



Issues of primary concern represent 35% of records in the database with an associated cost totaling $236 million. The balances of the corrective measures are likely to require implementation in the immediate to near future, thus there is an anticipated future need of $423 million.

While the CAM database yields the most comprehensive assessment of facility needs and is a good planning tool, only 52% of the school administrative units participated in its development and, thus, other aspects should be evaluated in consideration of the condition of Maine schools. Another mechanism to understand school needs is to review applications for school facility upgrades, either through renovation or major capital construction projects.

Investment Needs

In 1999, the School Revolving Renovation Fund (SRRF) was created by the Maine State Legislature to provide funding through loans or grants that would contribute to safe, healthy and adequate school facilities.[4] The SRRF has the major categories:

- **Priority 1**. This category is limited to health and safety projects. Specifically, Priority 1 addresses roofs, Americans with Disabilities Act compliance, air quality, asbestos and other health and safety issues.
- **Priority 2.** This category covers projects that are not health and safety related. These include infrastructure issues, windows, doors, water and septic systems.
- **Priority 3.** This category is limited to the upgrade of learning space and small capital projects.

[4] *A Review of School Facilities Programs and Analysis of School Facility Needs*, Maine Department of Education, March 2006

As of 2006, there were 832 requests for SRRF projects. Of these requests 710 were Priority 1, 92 were Priority 2 and 30 were Priority 3. Of the 710 Priority 1 requests, 316 (45%) totaling just under $91 million were funded. Of the 92 Priority 2 requests, 24 (26%) totaling $10 million were selected. Of the 30 Priority 3 requests, 15 (50%) were selected and totaled $16 million. Since 1999, the SRRF program has only funded 43% of the requests. The SRRF is an insufficient mechanism in funding school infrastructure needs.

Between 1999 and 2006 the SRRF, program funded $117 million out of $237 million of requests; this represents a funding level of slightly over 49% of the monetary needs during that time frame. Continuation of this trend suggests that the current infrastructure deficiencies are not getting adequate funding and, thus, will burden the school administrative unit with deficient facilities.

Major capital construction projects generally involve new school facility construction. Selection for this is a rigorous process. In addition to selecting the projects, the Maine DOE has strict site selection requirements. The current selection process format has been in place since 1999 and has gone through three rating cycles between 1999 and 2005. Projects are ranked by the Maine DOE and presented to the Maine State Board of Education for funding approval. During the three funding cycles, approximately $478 million dollars of projects were funded, representing the state and local allocation. In 2005, the average project cost was approximately $17 million.

During this period, 228 applications were received and rated. As of 2006, 48 projects had been funded. Of the 48 funded projects, 13 have been funded without state subsidy. During this three cycle process, of the 228 total applications, 128 applications were first time applications and 100 applications were repeat applications. As of 2006, there were 66 projects that remain unfunded with the potential for additional project applications in the future; future cost for these projects is unpredictable at this time. Should the average cost of $17 million per project remain (ignoring inflation), the potential outstanding needs in 2005 dollars could exceed a billion dollars.

Conclusions and Recommendations

The cost of construction in the past four years has exceeded any typical planning forecasts and thus, the ability to fund the same number or more projects will require further increases in the available funding for these projects. The Maine Legislature has made strides in passing legislation which empowers the Maine DOE to mandate certain facility and asset management reporting, which has provided a means for assessing the infrastructure (CAM database). Only 45% of priority health and safety project requests have been funded. The required level of needs identified exceeds what is currently allocated through the two primary means of dealing with school infrastructure: the SRRF and Major Capital Projects program.

The Maine DOE reports that during the period of 2005 to 2026, the total of existing and new bonds needed is approximately $1.6 billion. Current funding levels would result in a gap of $600 million.

Many new school facilities are designed to consolidate resources and facilities, so many substandard and aging facilities are often addressed through the implementation of a Major Capital Projects (building of a new school replaces two older facilities, for example). The recently passed school merger law will likely further consolidate facilities which should further address areas of deficiency. Maine ASCE gives schools a grade of **C-**.

Maine ASCE provides the following recommendations:

- Increase school participation in the utilization of the CAM software for assessing and managing infrastructure needs;
- Establish a mechanism to more frequently evaluate construction cost increases and provide a summary of necessary changes to debt service levels to coincide with these increases so that infrastructure project funding does not fall behind;

- Emphasize effective management and maintenance of existing facilities since the funding levels for new projects are unlikely to increase with the pace of escalating construction costs;
- Prepare and submit annual reports on the state of the school system, which highlight achievements, outstanding funding requests, anticipated funding needs and completed projects; and
- Increase the bond cap to match the rate of construction inflation. This supplemental funding to match inflation should be allocated to funding outstanding health and safety projects in the School Revolving Renovation Fund.

Sources:

- 1998 Governor's School Facilities Commission Task Force
- 1997 - University of Maine review of Summary of Inventory of School Repairs
- *A Review of School Facilities Programs and Analysis of School Facility Needs*, Maine Department of Education, March 2006

Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

SOLID WASTE

Grade: C

Overview

Progress has been made, but Maine's solid waste policies are outdated. Planning must be based on realistic projections of generation rates and capacity. Maine's solid waste plan must address high waste generation rates (51% more than national average in 2005), an unmet recycling goal of 50 percent, advances in public policy and technology, and the time and multi-million dollar investment required to develop new capacity.

Introduction and Background

Legislation was enacted in 1987 and 1989 that resulted in far-reaching changes to the management of Maine's non-hazardous solid waste. In accordance with the legislation, Maine subsequently developed a comprehensive solid waste management plan. Together, the legislation and plan establishes a management hierarchy, recycling and waste reduction goals, and requirements for the periodic assessment of Maine's long-term disposal needs and available disposal capacity. Should additional disposal capacity be needed, state planners are responsible for siting and overseeing the operation of any new landfills. Planning for Maine's solid waste management needs was effectively shifted from the municipal level to the state level, though each community remains responsible for managing its own solid waste.

The plan was the result of conventional wisdom at the time, resulting in a shift away from traditional landfilling practices to volume reduction of the waste stream through incineration, with the subsequent landfilling of residues (process residuals, by-pass, and ash). Other aspects of the legislation expedited the closure and remediation of most municipal landfills; banned new commercial landfills in Maine; and imposed significant restrictions on the ability to expand existing licensed commercial landfills, including requiring the demonstration that an expansion of an existing commercial landfill would provide a substantial public benefit. In accordance with federal legislation, the Maine Department of Environmental Protection (DEP) developed regulations for the siting, design, construction, operation, and closure of new solid waste facilities. Maine's legislation established the Maine Waste Management Agency to develop, oversee, and implement the plan. In 1995 the Agency was dismantled and most of its responsibilities were transferred to the Maine State Planning Office (SPO).

According to an April 2006 review of Maine's solid waste management policies, developed from a task force convened by the SPO, significant changes have occurred since the late 1980s that indicate the policies should be re-examined. The report cited the following:

- Continuing increase in the amount of non-hazardous waste generated by residents and businesses;
- Increasing concern over toxics contained in household products;
- Growing public awareness of the environmental impacts of solid waste facilities, including air and water quality, truck traffic, and aesthetic issues (visual, noise, and odor);
- Increasing difficulty siting solid waste facilities;
- Rising costs and increasing expertise needed to operate disposal facilities;
- Increasing energy costs;
- Increasing amount of imported waste and bypass waste, and the legal ramifications;
- Many programs have maximized participation in recycling programs using current methods; and
- Maine's acquisition and operation of the Juniper Ridge Landfill in West Old Town.

Additionally, emerging technologies and current public policies have changed some of the fundamental concepts upon which Maine's solid waste legislation and the subsequent plan were based. Emerging technologies include advanced recycling methods, as well as energy production from "biomass" recovered from construction and demolition debris and from landfill gas. Current public policies include reduction of toxics in the waste stream,

green credits, and reduction of carbon footprint. According to SPO, Maine's solid waste plan is currently being updated.

Condition and Adequacy

The SPO's Waste Management and Recycling Program was assigned three major areas of responsibility: planning for the solid waste management needs of Maine; providing technical and financial assistance to municipalities with respect to solid waste management and overseeing municipal implementation of waste reduction and recycling practices; and developing additional solid waste disposal capacity for non-hazardous wastes. The solid waste legislation established the following solid waste management hierarchy for Maine, in order of preference: reduction, reuse, recycling, composting, volume reduction, and land disposal.

Solid waste, municipal solid waste, bulky waste, special waste, and hazardous waste are defined as follows:

- **Solid waste**: is defined as all non-hazardous waste streams; consisting of municipal solid waste plus special waste.
- **Municipal Solid Waste (MSW)**: consists of non-hazardous household and normal commercial and business waste, plus bulky waste,
- **Bulky waste**: can be thought of MSW that does not fit into a typical 30-gallon trash can, such as appliances, demolition debris, and construction debris.
- **Special waste**: is defined as non-hazardous industrial and agricultural wastes, including ash from waste-to-energy incinerators and sludge from wastewater treatment plants. Special waste and MSW are mutually exclusive. Special wastes are highly regulated, but are permitted to be landfilled at facilities in Maine.
- **Hazardous waste**: highly regulated, but, with few exceptions, must be treated to meet the criteria for special waste or must be shipped outside of Maine for disposal. Heavy industry is typically thought of as the sole producer of hazardous waste, but in reality there are many small generators of hazardous waste, including households. Household Hazardous Waste (HHW) should not be discarded like regular MSW; however, residences are exempt from Maine's rigorous hazardous waste management requirements.

Maine's solid waste policies have reduced toxics in the MSW waste stream and have established two permanent HHW facilities in Maine.

MSW Generation Rates: In 2005, the SPO estimated that Maine residents and businesses generated 1.95 million tons of MSW (includes bulky waste), or eight pounds per person per day. If bulky waste is not included in the MSW tonnage (making it comparable to United States Environmental Protection Agency (EPA) calculations), this quantity drops to approximately 6.8 pounds per person per day, compared to the national average of approximately 4.5 pounds per person per day.

The SPO reported that MSW generation in Maine increased over 51 percent between 1993 and 2005. During the same period, Maine's population grew only 6.7 percent, but economic activity increased over 61 percent, according to the report.

3Rs (Reduce, Reuse, Recycle): "Reduce" refers to keeping materials from becoming waste, such as eliminating junk mail or excessive packaging on products. Once in the waste stream, Maine's legislative goal is to achieve a 50-percent MSW recycling rate by January 1, 2009. Waste volume reduction through incineration is not considered either "reduce" or "recycle." In 2005, the SPO's figures indicate that Maine recycled approximately 36 percent of Maine's MSW (household and business waste, as well as bulky waste). Using the EPA definition of MSW (no bulky waste), Maine achieved a recycling rate of 42 percent in 2005.

Approximately 140 Maine municipalities have instituted "pay as you throw" (PAYT) trash collection programs, requiring residents to purchase bags to use for curbside trash collection. The fees collected from the sale of the bags are used to help offset the municipalities' costs for providing trash removal and disposal services, but do not cover the full cost of waste disposal.

PAYT programs have resulted in increased recycling rates, particularly in communities that also provide curbside recycling. Technology advances have also made recycling easier for the consumer and have resulted in increased, but now essentially stagnant, recycling rates.

Maine's solid waste policies have also emphasized beneficial reuse of components of the waste stream, which reduces the amount of waste requiring landfilling. An example of "reuse" is the diversion of clean wood construction and demolition debris from the waste steam for use as biomass fuel. However, the amount of waste generated continues to increase faster than the recycling rate.

Volume reduction (incineration): There are four Waste-To-Energy (WTE) facilities in Maine that, according to an SPO report, serve approximately 70 percent of Maine's population: ecomaine (formerly Regional Waste Systems), Portland; Maine Energy Recovery Corporation (MERC), Biddeford; Mid-Maine Waste Action Corporation (MMWAC), Auburn; and Penobscot Energy Recovery Company (PERC), Orrington. MERC and PERC utilize refuse derived fuel technologies (whereby the waste is processed prior to incineration), while ecomaine and MMWAC are mass burn technologies, which does not include waste processing prior to incineration. MMWAC and ecomaine are municipally owned operations; MERC is privately owned; and PERC is 75 percent privately owned and 25 percent municipally owned.

A 2008 SPO report specific to Maine's WTE facilities indicates that the four WTE facilities managed 853,817 tons of MSW from Maine municipalities and businesses, as well as from out-of-state sources. Importation of waste is necessary to allow the WTE facilities to operate at an efficient burn rate in the incineration units. WTE processing and incineration of the 853,817 tons generated 158,695 tons of front-end process residue and by-pass and 169,000 tons of ash that required landfilling. In addition, 22,044 tons of metal was recycled.

The four WTE facilities have managed approximately 800,000 to 900,000 tons of MSW per year since 1998. Though built in the late-1980s and early-1990s with a 20- to 30-year life expectancy, significant on-going environmental upgrades and other capital investments have extended the life expectancy until 2025 to 2030. Most of a WTE facility's income is derived from tipping fees paid by users on incoming waste, and to a lesser extent, from electricity generation. WTE representatives indicate that the facilities achieve approximately 80 to 90 percent volume reduction through processing and incineration.

Landfilling and Disposal Capacity: According to SPO and DEP records, 12 of the remaining 45 active landfills in Maine accept the majority of waste generated in Maine, including ash from the four WTE facilities. Of the 12 landfills, seven are municipally owned and are used primarily to dispose of MSW generated in the member communities; two are municipally owned and operated by regional entities to dispose of residue from two of the WTE facilities; two (Crossroads in Norridgewock and Pine Tree in Hampden) are privately owned and accept MSW and special wastes; and one (Juniper Ridge in West Old Town) is owned by Maine, with its operation subcontracted to a commercial solid waste company. The Pine Tree commercial landfill facility is closing.

With the 1989 ban on new commercial landfills, the legislature tasked the SPO with siting and developing new disposal capacity for Maine for MSW and special waste, depending on the needs identified through the SPO's periodic disposal capacity projections. In the 1990s, the State permitted a landfill on a site in the unorganized territory of T2 R8, outside of Lincoln, which is known as the Carpenter Ridge site. This permit is held in reserve in case Maine's estimated disposal capacity becomes less than six years. At that time, the SPO is required to notify the legislature and provide recommendations regarding construction and operation of the Carpenter Ridge facility.

Maine's solid waste hierarchy emphasizes incinerating MSW over landfilling MSW as a means of achieving volume reduction and preserving landfill capacity. Though volume reduction is achieved, incineration of MSW results in a special waste that requires more stringent landfilling practices than MSW. Though lowest on the 1989 solid waste management hierarchy, today's MSW or co-disposal landfills are a source of "green" energy. Already, landfill-gas-to-energy plants are in use, under construction, or in the design phase at three Maine facilities.

In 2005, the SPO projected that Maine will need to landfill 32 million cubic yards of solid waste between 2005 and 2025, including incinerator ash. These projections suggest Maine will have sufficient landfill capacity. However, the waste generation projections, as well as the disposal capacity projections were based on assumptions that are dynamic and optimistic. For example:

- Waste generation rates are increasing;
- Recycling rates are stagnant. However, a statewide recycling campaign is underway to encourage renewed recycling efforts, including single-stream recycling;
- Waste volume reduction rates will decrease significantly if one WTE facility closes, which could also result in the immediate need for additional MSW disposal capacity, ideally in close proximity to the closed WTE facility; and
- The projections assume that significant additional disposal capacity at the state's Juniper Ridge Landfill will be approved.

Conclusions and Recommendations

Solid waste legislation enacted in the late 1980s, together with external influences since that time, have resulted in many positive outcomes, including:

- Closure of obsolete facilities;
- Increased public awareness of solid waste issues and infrastructure;
- Development of new technologies;
- Enhanced protection of public health and the environment, through the closure of obsolete facilities, reduction of toxics in the MSW waste stream, and strict regulations governing solid waste facilities;
- Achievement of reasonable recycling rates; and
- Provision of adequate disposal capacity.

Today, Maine's solid waste infrastructure is adequate; however, Maine's solid waste plan is outdated and must address:

- Increasing solid waste generation rates;
- Stagnated recycling rates and unmet recycling goals;
- A solid waste management system that relies heavily on commercial and private investment;
- The basis for Maine's solid waste management policies (i.e., hierarchy) was appropriate in 1990, but has not been updated despite significant advancements in technology and public policy;
- Though policy decisions are made at the State level, solid waste management is still the responsibility of and funded almost entirely at the local level. Thus, state policy makers must consider the costs to local tax payers for solid waste management, yet strive to maintain environmental protection; and
- The challenges posed by Maine's wide variation in population density, waste generation rates, and type of waste generated.

Maine ASCE gives solid waste a grade of **C**.

Maine ASCE makes the following recommendations:

- Continue support to municipalities to enhance local solid waste management programs, with emphasis on cost-effective reuse and recycling, and support of household hazardous waste collection;
- Continue financing of public education programs to encourage recycling;
- Review mechanisms to promote waste reduction, recycling, and beneficial reuse of waste products. This should include incentives for solid waste service providers for research and development and capital investments to encourage development of new technologies, enhanced and new beneficial reuse of waste, new markets for recyclables, and enhanced environmental safeguards;
- Review and update Maine's solid waste policies to reflect technological advances made in the solid waste industry, current or present-day public opinion, and current management policy, as well as Maine's variations in population density, waste generation rates, and type of waste generated;
- Timely response to annual reviews of the solid waste plan and capacity projections, to begin permitting and constructing facilities for additional disposal capacity or other means to manage additional waste; and
- Report actual cost information for solid waste management on municipal property tax bills.

Sources

- Code of Federal Regulations (CFR) Title 40: Protection of the Environment; Part 258 – Criteria for Municipal Solid Waste Landfills;
- Maine Revised Statutes Annotated (MRSA) Title 38; Chapters 13 (Waste Management) and 24 (Solid Waste Management and Recycling);
- Report entitled "Solid Waste Disposal Capacity Report," prepared by the Maine State Planning Office for the Joint Standing Committee on Natural Resources of the 123rd Legislature, and dated March 2007;
- Report entitled "Review of Solid Waste Management Policies, Recommendations for Moving Maine Beyond 50% Recycling," prepared by the Maine State Planning Office for the Joint Standing Committee on Natural Resources of the 122nd Legislature, 2nd Regular Session, and dated April 2006;
- Report entitled "Waste-to-Energy Facility 'Talk' – 2006, An Overview," prepared by the Maine State Planning Office and dated March 2008;
- Web site of the Waste Management and Recycling Program of the Maine State Planning Office;
- Fact check and comments received from the Maine State Planning Office on the October 2, 2008 draft of this report card
- Web site of the Bureau of Remediation and Waste Management, Maine Department of Environmental Protection;
- Comments received from the Maine Municipal Association on the August 2008 draft of this report card;
- *Environmental Business Journal* – "Solid Waste and Recycling 2008," Volume XXI, Number 6, 2008; a ZweigWhite Publication.

STATE PARKS

Grade: B-

Overview

State parks are a key component of tourism, Maine's number one industry. The condition of the infrastructure of Maine's 47 state park facilities is stable and safe; however, additional investment will help greatly in providing the optimum level of service and gaining greater economic impact. A recent $7.5 million bond provided some funding, though a backlog of $30 to 40 million in needs remain.

Introduction and Background

Maine's public recreation backbone consists of 47 state parks and historic sites. An even larger destination for hiking, camping, fishing and interacting with nature is provided by public reserve land and easements, which total more than 500,000 acres. These areas are managed by the Maine Department of Conservation (DOC) and its associated divisions. The work of the DOC includes recent activities such as the development of the Seboomook Unit, as well as additions to Baxter State Park pending ongoing discussions with adjacent private landowners. In addition, the State Planning Office's Land For Maine's Future is working in general to identify lands holding special significance that need to be protected to maintain their value. The state also has numerous municipal areas, a national park and other recreational activity areas, though they are not addressed in this brief.

Maine's economy is heavily dependent on the tourism industry. A 2005 Department of Economic and Community Development (DECD) study outlined the state's extensive natural resources as the basis for further development of marketing programs to enhance the economic impact of outdoor activities. An estimated 2.1 million visitors to state parks and facilities spent $60.3 million on goods and services directly related to their state park visits. Park visitors were responsible for economic activity totaling $95.7 million, including 1,449 full- and part-time jobs that provide $31.1 million in personal income.

Condition and Adequacy

In 2004, the DOC commissioned a study to assess the condition of state parks' major infrastructure assets and develop a recommended capital improvement program. This study enabled the DOC to establish an updated baseline for prioritizing infrastructure improvements to the system. The assessment covered the 47 state park facilities, including more than 200 buildings and multiple site facilities, with an emphasis on assets that would likely require more than $15,000 each to renovate or replace. A comprehensive team of engineers, planners, landscape architects, surveyors and historical preservation consultants conducted the assessment and worked with the DOC to develop the capital improvements plan.

The statewide assessment categorized the potential improvements from levels A through D. Condition A represents assets that require focus on long-term maintenance, while condition D denotes facilities that require full replacement given their condition. An additional category, E, was established for facilities requiring removal only. The improvements were prioritized according to the impact of condition on health, safety, operations and maintenance costs, resource significance and enhanced customer service. Priorities were categorized one through four—the highest priorities, such as health and safety, were assigned a priority of one.

Summary of 2005 DOC Capital Program Estimates

Category	Capital Need	Estimated Cost (2005)
A	Maintenance	$ 0.5 million
B	Reconditioning	$ 4.8 million
C	Rehabilitation	$ 5.1 million
D	Replacement	$ 29.4 million
	Total Need	**$ 39.8 million**

Approximately 42 of the 47 facilities evaluated included projects in category D, emphasizing that facilities throughout the system require replacement. Approximately $700,000 worth of projects listed as category D were projects deemed to have health and safety issues. Such projects include activities involving drinking water infrastructure or restroom facilities. The large majority of projects require capacity or maintenance improvements and the replacement of facilities reaching the end of life span.

Investment Needs

A $7.5-million infrastructure bond was approved by Maine voters in November 2007. The DOC's Bureau of Parks and Lands (BP&L) recently contracted more than $5 million in critical need improvements for major sanitary projects to upgrade restroom facilities, including six major projects ranging from $300,000 to $1.19 million. Currently, the focus is on the highest-use facilities, such as Popham Beach. Other projects include masonry repairs, sanitary system replacements and shoreline protection. Costs for BP&L projects continue to escalate, making it increasingly difficult to address capital improvement needs. The $7.5 million bond will begin to address critical major improvements, including health and safety projects, but a stable funding source is still necessary to upgrade aging facilities and utilities in parks and historic sites statewide. Furthermore, for at least a decade, the state's general fund has not provided BP&L with capital money for renovations and new construction.

Money from dedicated license plate sales and water extraction fees have only been sufficient to make minor improvements and to cover a portion of maintenance for the past six years. Upgrades to the facilities—for sanitary systems, shelter, wayfinding and interpretive signage—are necessary to promote the areas, as well as to preserve the quality and natural existence of the resources. Without the maintenance of the recreational areas, the quality of the experience will be degraded and economic opportunity for the state will be lost.

Conclusions and Recommendations

The backlog of capital improvements identified for state parks, coupled with the rising costs of construction, demonstrate that more work could be done to maximize the level of service to the users of Maine's parks. The condition of Maine park facilities' infrastructure is stable and safe, but could benefit from additional investment to provide the optimum level of service and positive economic impact. Overall, Maine ASCE gives state park infrastructure in Maine a grade of **B-**.

Maine ASCE makes the following recommendations:

- Update the BP&L database to include recent investments and establish an updated baseline of where the inventory stands; and
- Evaluate fee structures to determine if any further optimization can be leveraged for support of funding key assets. User fees can potentially be leveraged further to assist with the funding process, resulting in a more sustainable infrastructure.

Sources:

State of Maine Department of Conservation www.maine.gov/doc

"Maine State Parks Major Capital Improvements Plan", December 2004, Department of Conservation, Bureau of Parks and Lands, State of Maine, Prepared by Clough Harbour and Associates, LLP with sub-consultants.

2007 Highlights. Report by the Maine Department of Economic and Community Development. 2007.
http://www.econdevmaine.com/resources/pdfs/Highlights_2007.pdf

"The Economic Contributions of Maine State Parks: A Survey of Visitor Characteristics, Perceptions and Spending", June 2006. Margaret Chase Smith Policy Center, University of Maine.
http://www.maine.gov/doc/parks/publications/EcConMEStateParksAllandCov.pdf

Land for Maine's Future www.maine.gov/spo/lmf

Maine Island Trail Association www.mita.org/

Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

AIRPORTS

Grade B-

Overview

Overall, the condition of Maine's airport system is good. However airports face a funding challenge. The agencies continue to prioritize projects based on safety needs and then capacity enhancements. For 2007, just over $25 million was allocated from federal funding. Based on today's funding levels, a minimum $100 million shortfall will occur over the next 20 years for planned airport capital development needs.

Introduction and Background

Maine is served by two small hub[1] commercial service airports, Portland and Bangor,[2] as well as more than 145 Federal Aviation Administration (FAA) registered regional, municipal and private facilities located throughout the state. However, for this analysis, only the 36 publicly owned facilities are evaluated. The other 100 plus facilities are almost exclusively privately owned and ineligible for federal funding. Herein, airports are described by "levels,"[3] depending on capabilities:

- Level I airports have at least one runway with precision approach capabilities.
- Level II airports have at least one runway with non-precision capabilities.
- Level III and IV airports are those with sufficient visual approach capabilities.

Commercial Service Airports - There are six airports in the state that provide scheduled commercial service: Augusta State, Bangor International, Hancock County-Bar Harbor, Knox County Regional-Rockland, Northern Maine Regional-Presque Isle, and Portland International Jetport.

Primary General Aviation Airports – In addition to the six commercial service airports, the Maine Aviation System Plan (MASP) has identified three additional airports as Level I facilities including Auburn-Lewiston, Sanford and Waterville.

Secondary General Aviation Airports– For purposes of this analysis, the other 27 state system airports are categorized as "secondary." In the MASP, these facilities are described as Level II, III or IV.

Condition and Adequacy

Thirty-seven runways at 28 airports were included in a March 2006 to November 2007 study sponsored by Maine Department of Transportation (MaineDOT), which concluded that overall airport conditions are good.

[1] The term "hub" is used by FAA to identify very busy commercial service airports as measured by passenger enplanements. Primary commercial service airports are grouped into four categories. Large hubs are those airports that each account for at least one percent of total U.S. passenger enplanements; medium hubs for between 0.25 percent and one percent, small hubs for between 0.05 percent and 0.25 percent, and non-hubs for less than 0.05 percent of all enplanements, but more than 10,000 annual enplanements.
[2] Based on 2006 data presented in National Plan of Integrated Airport Systems (NPIAS)
[3] Levels used to categorize state publicly owned airports were developed in the Maine State Aviation System Plan and are not recognized as an official descriptor by FAA or other national regulatory agencies.

Of the 37 runways, 46 percent (17 runways), were in excellent condition, and 54 percent (20 runways) fell into lower category conditions. It was concluded that the overall runway conditions averaged to be in very good condition with an average pavement condition index (PCI) of 81. The 28 airports assessed also averaged a rating of good, according to the taxiway rating scale and the apron rating scale.[4]

For Level I airports to meet airside infrastructure requirements, there must be at least one runway with precision approach capabilities. The six Commercial Service and three Primary General Aviation facilities have this capability. Level II airports have at least one runway with non-precision capabilities. In review of MASP data, it appears that all 36 facilities reviewed also meet this objective.

For landside facilities, such as hangar storage, MASP has benchmarked data for various level airports that indicates that Level I facilities have the largest shortfall. This is driven by the lack of general aviation (GA) aircraft hangar storage at the Portland Jetport. A proposed GA complex on the airport's south side would address this shortfall, if approved.

Airfield capacity is not an issue for any Maine airports. MASP notes that only the Portland Jetport will approach 60 percent of airfield capacity (Annual Service Volume - ASV) by 2010.

As noted in the MASP, 35 percent of the state, from a geographical perspective, is within a 30-minute drive from a public airport. Approximately 98 percent of the state's residents live in this drive-time parameter. This percentage drops only slightly—to 90 percent—if further refined to the percentage of Maine residents within a 30-minute drive time from airports with charter services or scheduled service. However, the two major airports in the state, Portland and Bangor, are not easily accessible to all state residents.

Safety issues for state airports are assessed in this report by their compliance with airspace requirements and runway safety areas. Based on MASP data, 78 percent of runway approach zones for Level I airports are obstruction-free. This percentage decreases for smaller facilities—approximately 42 percent of all state airport approaches require attention to mitigate obstructions. Compliance with mandated runway safety areas has improved during the past decade, with only 22 percent of Maine airport runways requiring upgrades or modifications.

Investment Needs

To discuss future investment needs for Maine system airports, it is important to understand the interrelationship of respective funding sources including, federal (primarily FAA), state (MaineDOT), local (the sponsoring municipality), and occasionally private investments.

Currently, Maine airports listed in the National Plan of Integrated Airport Systems (NPIAS) are eligible to receive funding from three basic sources, including federal, state and local sources, for eligible projects.[5] Federal funding is provided by the FAA, with oversight of approved Congressional limits set-forth in the Airport Improvement Program (AIP). The AIP allows expenditures from the Aviation Trust Fund. As of late fall 2008, the AIP is in the process of a final two year reauthorization. To keep the funding stream open, Congress enacted a temporary reauthorization bill for 2008 that will allow eligible projects to move forward. AIP legislation is anticipated to continue funding 95 percent of all eligible project costs. For 2007, the FAA dedicated more than $25 million for eligible projects in Maine.

[4] Based on measurements of roughness, surface distress, skid resistance and deflection, pavements can be assigned a score that reflects their overall condition. This score, sometimes called a pavement condition index (PCI), quantifies a pavement's overall performance and can be used to help manage pavement networks.

[5] Most eligible projects are for an airport's publicly used infrastructure, including runways, taxiways, aprons, airspace maintenance, navigational aids and related land acquisition, etc. Those projects that have revenue producing potential are typically excluded.

Table 1 FAA AIP funding for New England states

FAA AIP FUNDING						NPIAS AIRPORTS	2007 $ / AIRPORT (MIL)
State	2003	2004	2005	2006	2007		
Connecticut	8,001,524	9,463,558	4,729,826	9,721,270	17,531,094	14	1.25
Massachusetts	38,344,750	37,957,497	51,773,213	36,617,353	37,185,760	28	1.32
Maine	22,414,137	27,449,065	18,366,880	15,681,693	25,160,189	36	.70
New Hampshire	18,985,842	17,550,830	21,126,784	35,819,755	36,483,310	15	2.43
Rhode Island	7,385,825	12,195,181	20,138,498	25,653,884	17,399,079	6	2.89
Vermont	4,019,612	3,703,707	10,898,416	4,720,775	3,122,798	13	.24

For most eligible airport projects funded through the AIP, MaineDOT will typically fund 2.5 percent of project costs. State funding is available for all publicly owned airports in Maine. Tax revenue from airport activities, aircraft registration, fuel tax and use tax on the sale of aircraft is deposited into the State Transportation Aviation Rail Transportation Fund (STAR).[6] The disbandment of the previous State Airport Fund Program in 2003 is important to consider. The previous state funding program set aside a certain amount specifically for airports. With the creation of the STAR account, the state eliminated an annual $2 million dedicated fund that was split 80 percent state to 20 percent local to supplement critical AIP projects.

As noted in Table 1, Maine is ranked near the bottom of other New England states, only ahead of Vermont, in terms of AIP expenditures per airport.

Under current AIP funding requirements, the local airport sponsor is responsible for the remaining 2.5 percent for eligible projects. Since most airports in the state do not operate with a surplus, local funding needs are paid by the town's annual budget. A typical runway project can cost $3 million to $5 million, including planning, design, permitting, mitigation and construction. Small towns' budgets may have a funding requirement in excess of $100,000.

Between 2008 and 2025, the total cost to fund the Maine airport system's capital programs could reach an estimated $579 million, according to MASP.[7] If averaged out over the 20-year planning period, approximately $29 million will be required on an annual basis.

Security requirements in the aftermath of September 11, 2001 have led to mandatory upgrades and personnel additions, which, previously, were mostly unfunded and became the responsibility of the state or local government to address. These requirements include training and educational requirements for airport staff. Such security capital expenditures negatively impact the ability to readily secure matching local funds for AIP-funded projects and delay other critical infrastructure improvements and upgrades.

Examining Maine's recent funding history indicates that when all federal, state and local sources are considered, annual investments in Maine's commercial and public general aviation airports have been slightly more than $24 million per year. The single most important component of funding is the health and viability of the AIP. With recent

[6] The State Transit, Aviation and Rail Transportation fund was established as an enterprise account through the Department of Administrative and Financial Services. Money disbursed from the STAR Transportation Fund may be used for the purpose of purchasing, operating, maintaining, improving, repairing, constructing and managing the assets of the STAR Transportation Fund including buildings, structures, improvements and equipment.

[7] These costs are presented in a "top-down" approach within the MASP, in other words. specific airport development projects are not necessarily reflected therein. Although known larger capital projects such as the proposed terminal improvements at the Portland Jetport and a possible replacement airport for Machias are not specifically identified, it is likely that the overall average for each airport's benchmark is an accurate reflection of the system's capital needs.

airline bankruptcies, increasing fuel costs and anticipated economic challenges, it is reasonable to assume there will be additional reductions in AIP funding. Based on current funding, a minimum $100 million shortfall is possible through 2025 for all airport capital development needs. If MASP's assumptions regarding funding cuts in AIP come to fruition, this shortfall could easily more than double over the next 20 years.

Conclusions and Recommendations

Overall, the condition of Maine's airport system is good. The challenge in the future will be maintaining the relative health of the airport system given the constraints to local, state and federal funding. The FAA and MaineDOT staffs have worked well with various local sponsors in prioritizing various projects based on safety needs first, followed by capacity enhancements. Maine ASCE gives airports a grade of **B-.**

If the Maine airport system is to maintain existing infrastructure, achieve overall compliance with FAA mandates and design guidelines, and provide improvements to address economic and capacity enhancement needs, Maine ASCE makes the following recommendations:

- Work with the U.S. congressional delegation to ensure reauthorization of a fully funded AIP and to maintain federal funding at 95 percent. Without a federal program allowing funding from the Aviation Trust Fund, it will be all but impossible for the state and local budgetary processes to undertake even the basic safety capital expenditures recommended in the MASP and airport master plans; and
- Re-establish a state/local program similar to the previous State Airport Fund Program. It is appropriate for this to be user fee driven, which will help maintain infrastructure for those projects not eligible for AIP funding.

Sources:

Interviews with aviation experts in Maine including:
Jeffrey Northgraves, Knox County Regional Airport; John Guimond, Augusta State Airport; Jeni O'Brien, Maine DOT; Douglas Hazlett, Houlton International Airport; and Paul Bradbury, Portland International Jetport

1. http://mainegov-images.informe.org/mdot/aviation/pdf/maspu.pdf (Maine Aviation System Plan)
2. http://mainegov-images.informe.org/mdot/aviation/pdf/economicimpacts.pdf (Economic Impact of Aviation in Maine)
3. http://www.faa.gov/airports_airtraffic/airports/planning_capacity/npias/ (National Plan of Integrated Airport Systems)
4. http://www.maine.gov/mdot/aviation/aviation-home.php (Maine Department of Transportation – Airports and Aviation)
5. http://www.nasao.org/ (National Association of State Aviation Officials)

Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

BRIDGES

Grade: D+

Overview

Thirty-four percent of Maine's bridges subject to federal inspection requirements are deficient, compared to a national average of 25 percent. Though the 2008 Legislature approved an additional $160 million in funding over 4 years for MaineDOT bridges, it will not have any impact on other agency bridges. The 10-year need for MaineDOT bridges is $1.3 billion, resulting in a $440 million funding gap.

Introduction and Background

There are 2,387 known bridges, defined as spans greater than 20 feet long, in Maine, and an additional 1,453 minor spans, measuring 10 to 20 feet long. In this brief, the term "bridges" generally refers to both categories. Maine's bridge inventory is primarily comprised of 2,705 Maine Department of Transportation (MaineDOT) bridges, 812 municipal bridges and 182 bridges owned by the Maine Turnpike Authority (MTA). An additional 141 bridges are owned by other government and private agencies.

In terms of route importance, Maine's bridge inventory includes 448 bridges located on the National Highway System (NHS). The NHS includes the Interstate Highway System, as well as other roads vital to the nation's economy, defense and mobility. While reviewing the condition and ratings of bridges, Maine's NHS bridges will be evaluated separately since they are an integral part of the national transportation system.

According to MaineDOT data, nearly half of the state's bridges (49 percent) were constructed more than 50 years ago. Many of these bridges were only designed to last approximately 50 years before requiring significant repairs or replacement. Historic funding levels have not permitted Maine bridges to be replaced before reaching their design life.

Inspection Frequency and Methods

All Maine bridges are regularly inspected in accordance with the Federal Highway Administration's (FHWA) National Bridge Inspection Standards (NBIS). MaineDOT inspects most bridges every two years. MTA bridges are inspected annually. Inspection data for bridges with spans of at least 20 feet are submitted to FHWA for inclusion in the National Bridge Inventory (NBI). NBIS inspection data, supplemented with data from MaineDOT and MTA, was used as the basis for the evaluation of Maine bridges.

NBIS Rating System

The NBIS established by FHWA and the American Association of State Highway and Transportation Officials (AASHTO), defines the scope of bridge inspections and provides guidelines for rating and documenting the condition and general attributes of bridges. Standard condition evaluations are documented and functional aspects of the bridge are rated. NBIS provides criteria to define a bridge as either structurally deficient or functionally obsolete.

Structurally Deficient (SD): A bridge is structurally deficient if there is significant deterioration to the bridge deck, bridge supports or other major components. Although bridges classified as structurally deficient are safe for continued use, they may be posted for lower weight limits or closed if their conditions warrant such action. In a worst case scenario, a structurally deficient bridge may be closed to traffic.

Functionally Obsolete (FO): A bridge that is functionally obsolete is safe to carry traffic, but has less than desirable geometric conditions required by current design standards. Bridges that are functionally obsolete often have narrow lanes, inadequate clearances or poor alignments.

Bridges that qualify as both structurally deficient and functionally obsolete are categorized only as structurally deficient.

Condition and Adequacy

The breakdown of Maine bridges listed as either structurally deficient or functionally obsolete is shown in Table 1. In addition to statewide averages, percentages of structurally deficient and functionally obsolete bridges are listed by owner and by span length. Given that minor spans are not included in NBI data and, therefore, cannot be easily compared to national averages, structurally deficient and functionally obsolete counts for these bridges are listed separately.

In 2007, 34 percent of Maine bridges 20 feet or longer in length were classified as deficient, including 15 percent classified as structurally deficient and 19 percent classified as functionally obsolete. For the same period, NBI data indicates that 25 percent of bridges nationally were deficient, including 12 percent classified as structurally deficient and 13 percent classified as functionally obsolete.

When Maine's NHS bridges are considered separately, the percentage of deficient bridges 20 feet or greater in length drops to 25 percent, including six percent structurally deficient and 19 percent functionally obsolete. The smaller percentage of structurally deficient and functionally obsolete bridges on Maine's NHS roadways indicate these vital structures are generally in better condition than the average Maine bridge. For the same period, NBI data indicates that 20 percent of NHS bridges nationally are deficient, including five percent classified structurally deficient and 15 percent classified as functionally obsolete.

Maine's minor span bridges are in a similar condition with 17 percent classified as structurally deficient. Although only one percent are classified as functionally obsolete, it should be noted that a large percentage of pipe structures comprise the minor span category. Culverts do not have rating criteria that can classify them as functionally obsolete.

Table 1 – Deficient MaineDOT, Municipal, and MTA bridges by owner and span length[1]

Bridges Reported to the National Bridge Inventory *(Spans ≥ 20' in length)*

Owner	# Bridges	# SD	% SD	# FO	% FO	# SD or FO	% SD or FO
MaineDOT	1952	234	12.0%	360	18.4%	594	30.4%
Municipal	208	89	42.8%	26	12.5%	115	55.3%
MTA	162	17	10.5%	65	40.1%	82	50.6%
Total	2322	340	**14.6%**	451	**19.4%**	791	**34.1%**

Minor Spans not reported to the National Bridge Inventory *(spans 10' to 20' in length)*

Owner	# Bridges	# SD	% SD	# FO	% FO	# SD or FO	% SD or FO
MaineDOT	753	84	11.2%	7	0.9%	91	12.1%
Municipal	604	152	25.2%	5	0.8%	157	26.0%
MTA	20	0	0.0%	0	0.0%	0	0.0%
Total	1377	236	**17.1%**	12	**0.9%**	248	**18.0%**

All Maine Bridges *(spans ≥ 10' in length)*

Owner	# Bridges	# SD	% SD	# FO	% FO	# SD or FO	% SD or FO
MaineDOT	2705	318	11.8%	367	13.6%	685	25.3%
Municipal	812	241	29.7%	31	3.8%	272	33.5%
MTA	182	17	9.3%	65	35.7%	82	45.1%
Total	3699	576	**15.6%**	463	**12.5%**	1039	**28.1%**

Furthermore, Maine's bridge inventory includes 63 non-redundant bridges. A bridge is non-redundant if a failure in any major component could potentially lead to a collapse of the bridge. As of 2007, 49 percent of Maine's non-redundant bridges were classified as structurally deficient. An additional 27 percent were classified as functionally obsolete.

[1] The 141 bridges owned by federal government and others are not included in this table.

Based on bridge inspection data, MaineDOT developed a watch list including 386 bridges that are in jeopardy of being closed or weight-restricted if they are not repaired or replaced in 10 years. Eighty-two Maine bridges are already weight restricted or closed.

Investment Needs

In a November 2007 report to the governor, *Keeping Our Bridges Safe*, MaineDOT estimated the minimum investment to maintain MaineDOT's bridge infrastructure is between $120 million and $130 million per year. In 2008, the Maine Legislature approved an additional $160 million over four years (or $40 million per year), totaling an annual investment of $110 million.

In spite of this step in the right direction, the current funding level continues to fall short of demand. In late 2007, MaineDOT released its statewide long-range transportation plan, *Connecting Maine*, which documents a 10-year funding gap for the entire transportation system of $3.3 billion out of a total system-wide need of $6.5 billion. Included in that total is $440 million gap for MaineDOT bridges, out of a total $1.3 billion need.

Furthermore, the four-year, $160 million MaineDOT funding increase approved by the Legislature in 2008 will have little effect on the state's 812 municipally owned bridges. With nearly 30 percent of municipal bridges categorized as structurally deficient, many of these structures are either already posted or are in danger of being posted or removed from service.

Similarly, MTA has not met revenue needs during the past five years, while construction costs for highway and bridge projects have far exceeded forecasted amounts. Funding for MTA's 10-year, $559 million capital improvement program, which includes $230 million for bridge replacement, rehabilitation and repairs, is critical to maintaining the MTA's infrastructure. In October 2008, MTA announced that a toll increase is likely in 2009 to accommodate this need.

Conclusions and Recommendations

Bridge conditions in Maine are significantly below desirable standards and the national average. Based on 2007 inspection data, 34 percent of the state's bridges 20 feet or greater in length are structurally deficient or functionally obsolete, compared to a national average of 25 percent. Additionally, bridge funding continues to fall below levels necessary to maintain our existing infrastructure. Maine ASCE gives Maine's bridge inventory a grade of **D+.**

Successfully and efficiently addressing Maine's bridge infrastructure will require a long-term, comprehensive strategy, including identifying potential financing methods and investment requirements. Continued neglect and lack of adequate maintenance will ultimately result in higher annual bridge life-cycle costs due to shortened service life. Increasing investment levels now to improve the condition and functionality of Maine's bridges will significantly reduce the required investment in the future.

For the continued safety of bridges, Maine ASCE makes the following recommendations:

- Fully fund the bridge program outlined in MaineDOT's *Keeping Our Bridges Safe* report;
- Establish a state funding mechanism for municipal bridges and encourage municipalities to establish capital reserve funds for the repair of important municipally-owned bridges;
- Develop, implement and consistently operate a systematic approach for the repair, rehabilitation and replacement of deficient Maine bridges. At a minimum, the approach should prioritize bridge investments considering public safety, route importance and bridge redundancy; and
- Reduce the percentage of structurally deficient bridges in Maine to 10 percent or below the national average, whichever is less.

Sources

Information for this report was obtained from a number of sources including the MaineDOT, Federal Highway Administration (FHWA), the Maine Turnpike Authority, TRIP, and the Maine Better Transportation Association.

1. "Keeping Our Bridges Safe, A report on Maine's bridge inspection and improvement programs", November 26, 2007, MaineDOT
2. FHWA website, Bridge Technology Section, National Bridge Inventory, highway bridges by owner, 2007 inspection data
3. "Losing Ground, A Report on the State of Maine's Highway Fund", July 2005, Maine Better Transportation Association
4. "Future Mobility in Maine: Meeting the State's Need for Safe and Efficient Mobility", June 2007, TRIP
5. August 2008 Maine Turnpike Authority Board of Directors Meeting Minutes
6. Maine Turnpike Authority 10 year plan, Updated 2008
7. "MaineDOT Bridge Watch List", November 21, 2007, MaineDOT
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PASSENGER TRANSPORTATION

Grade: C-

Overview

Ridership on transit in Maine grew 113% from 2004 to 2006, but only 55% of transit vehicles are in good condition. Passenger rail continues to expand, but a sustainable funding source has yet to be identified. Ferry services provide primary transportation from the island communities and require $12.5 million to replace two vessels. Funding levels for all modes need to grow in order to meet demands.

Introduction and Background

For the purposes of this report, passenger transportation includes traditional mass transit, but also passenger rail, car-pool and van-pool programs, and bicycle and pedestrian focused projects. The Maine State Ferry Service is also included, due to its importance to the overall transportation system. However, the four private intercity bus services, currently one of the primary modes of connectivity in this rural state and a vital part of Maine's transportation system, are not included as they do not receive public funding.

Transit, for the purposes of this report, is limited to the 21 rural and small urban transportation systems that are supported by the Maine Department of Transportation (MaineDOT) through funds mostly provided by the Federal Transit Administration (FTA). These services are reliant on other infrastructure (roads, bridges, ports and railroads) in order to operate efficiently and effectively.

Maine's 21 transit systems fall into one of three categories:

- **Regional transportation systems.** There are nine regional transit systems receiving MaineDOT funding support (and one that is not funded) that serve rural areas of the state known as Full Service Transportation Brokers (FSTBs). In general, the systems serve low income, elderly, the disabled, and clientele of the Department of Health and Human Services and other agencies.
- **Fixed route transit systems.** There are 13 systems that generally operate on a fixed route according to a schedule and they include urban bus systems as well as inter-city services. For example the Bangor Area Transit (BAT) Community Connector is a fixed route public transit system operated by the City of Bangor for the communities of the Greater Bangor Urbanized Area. The Casco Bay Island Transit District which provides ferry service between Portland and various island communities also receives funds through MaineDOT/FTA.
- **Transit systems supporting the tourist industry.** Four of the providers above also operate services on a seasonal basis including the Island Explorer, a fixed route, seven day per week seasonal service on Mount Desert Island which is operated by Downeast Transportation, Inc.

Passenger rail service includes Amtrak's Downeaster from Portland to Boston which is operated by Amtrak under a 20-year agreement with the Northern New England Passenger Rail Authority (NNEPRA). The 116-mile corridor is owned by Pan Am Railways and the Massachusetts Bay Transportation Authority.

Other transportation systems include GO MAINE Commuter Connections rideshare program operated by the Greater Portland Council of Governments and administered by the MaineDOT and the Maine Turnpike Authority (MTA); 50 Park & Ride lots with over 2,200 parking spaces, funded and maintained by MaineDOT (39 lots, 1423 spaces) and MTA (11 lots, 794 spaces); and the Maine State Ferry Service (MSFS), which is the primary mode for access to the mainland from six of Maine's year-round island communities.

To increase both bicycle and pedestrian mobility, MaineDOT instituted a program to construct paved shoulders, bike lanes and/or sidewalks. In addition, this includes the construction of the three shared-use (separated from highways)

trails: the Mountain Trail, 45 miles from Westbrook to Fryeburg; the Downeast Trail, 87 miles from Ellsworth to Ayers Junction; and the Eastern Trail, 55 miles from Kittery to South Portland.

Condition and Adequacy

Ridership

In 2006, total ridership on transit systems serving Maine was estimated to be 8.1 million, an increase of 113 percent from 2004 estimates, and most transit systems have experienced additional jumps in ridership from 2006 to 2008. For example, Lewiston-Auburn's City-Link transit service in 2006 carried approximately 215,000 riders, an increase of over 25 percent over 2004. In Bangor, ridership increased on the Bangor Area Transit system by more than 10 percent in 2007, and during the first full half of 2008, the system carried more than 800,000 riders representing another 12 percent increase.

As fuel prices continued to rise in 2008, ridership on transit systems across the state experienced even greater growth. In May 2008, the Zoom Turnpike Express Bus service, operating from Saco to Portland along the Maine Turnpike, reported a 93 percent increase since April 2007. Van pools run by GO MAINE, have a waiting list, and in early 2008, the database of users surpassed 5,000 participants for the first time. A Park & Ride lot study in 2007 identified 12 lots that are nearing capacity. One of those has been expanded (Scarborough Exit 42) and additional capacity for the Saco Exit 36 lot will be completed by Fall 2008.

Transit Vehicle/Ferry Vessel

According to MaineDOT, 217 of the state's 393 transit vehicles in Maine are in good condition (55 percent), 62 are in fair condition and scheduled for replacement (15 percent) and 119 were considered critical, scrap, or poor condition (30 percent). Of the five active vessels used by the Casco Bay Island Transit District to provide nearly 900,000 passenger trips per year, the oldest is nearly 35 years old. The Maine State Ferry Service provides service to 1.6 million passengers per year and its seven ferries range in age from 15 to 49 years old. The oldest only provides limited service to Matinicus. Of the seven, three are rated good, two as fair and two as poor. The 40-year-old vessel, *Governor Curtis*, was slated for replacement in the 2006-2007 biennial budget, but has yet to be replaced.

Amtrak Downeaster

The Downeaster's ridership, with approximately 442,000 riders in 2008, grew 28 percent from 2007 to 2008. An additional passenger car has been added to meet the added demand for the five round trips per day. Amtrak's Downeaster cars and locomotives range in age from 10 years to more than 35 years old and it operates with two train sets with typical seating capacity of 232 for the one-way, 2 hour and 25 minute trip. The Portland layover facility is inadequate to service the trains efficiently and cost effectively, so all heavy maintenance is performed in Boston. While some schedule delays occur due to the limited capacity of the rail line, the Downeaster continues to get the highest customer service ratings in the Amtrak system. Plans are in place to continue service to Brunswick in the future with connections to the seasonal Rockland Branch. Amtrak and NNEPRA have agreed to a tentative schedule that would utilize existing Amtrak equipment.

Bicycle/Pedestrian

Due to the increased focus in recent years, including increased investments in bike lanes and paved shoulder, in 2008 the League of American Bicyclists ranked Maine as 6th in the nation for being bicycle friendly.

Investment Needs

Financial support from the FTA to MaineDOT is distributed to 21 rural and small urban transportation systems. The FTA allocates these funds by formula and identifies annual funding levels for five years. The majority of these funds are used for operating support. Federal and state funds can cover 90 percent of the capital costs or 95 percent if that agency is using clean fuel vehicles like Compressed Natural Gas (CNG) or bio-fuels. These funds can support up to 90 percent of the administrative costs and up to 60 percent of an operating deficit. In 2006, Maine received $11.6 million in FTA program funds. In 2008, that allocation increased to just over $12 million. In both years, these FTA funds were matched with $555,000 in state funds; however, in the 2007-2008 budget year, only $517,009 in matching funds was distributed and in the 2008-2009 budget year, only $528,000 was budgeted by the state. As operating costs rise, the burden on local communities increases. This represents a growing challenge for

municipalities in Maine. In 2007, the total budget for all public transit operators in Maine was $46.8 million, approximately $4.7 million short of the $51.5 million strategic need per biennium as identified in the 2005 MaineDOT State of the System (SOS) report.

Finding sustainable funding sources for new or expanded transit services is a concern, though there have been success stories in Maine. The Island Explorer on Mt. Desert Island established a sustainable funding source utilizing special national park entrance fees and FTA rural funds. The Mountain Explorer, a seasonal service in Western Maine connecting the ski areas with local towns, operates with the majority of funding provided by local businesses and towns. This promotes economic development, reduces congestion and air emissions caused by cars. MaineDOT recently concluded an evaluation of unmet general public transit needs in Maine. This transit needs study, which concluded prior to the current rise in fuel prices and subsequent increased interest in transit, identified $660,000 in additional operating funds needed annually and $250,000 in start-up funds needed to implement services such as coordinated transit and job access and reverse commute programs. The greater interest in transit will only increase the unmet needs.

Maine's 21 transit systems operate 393 vehicles, ranging in size from minivans to full size transit buses. With 45 percent of these vehicles in poor to fair condition, the state is falling behind on the needed replacement schedule. The 2008-2009 biennial budget included $17 million total capital funds, with $8 million for vehicle replacement. The total cost to replace all those vehicles scheduled or in poor conditions is close to $18 million. In addition to replacing vehicles, switching the Portland METRO fleet to clean and domestically secure Compressed Natural Gas (CNG) fuel, and continuing to expand the Island Explorer propane fleet are state priorities due to positive impacts to environment. This will require approximately $15 million over the next five years to fully implement.

Casco Bay Island Transit District is seeking $5.5 million in capital investment for a ferryboat replacement that has been identified as a "high priority" project. In 2006, the Maine State Ferry Service required $10.6 million to replace the *Governor Curtis* and make improvements at two berthing pens. In the 2006-2007 budget and the 2008-2009 budget, $3.7 million and $2.86 million were allocated, respectively, for these improvements. The state has been unable to find a shipbuilder to build the $7 million replacement ferry. As of 2006, the minimal state funding ($2.4 million) and fare box revenues ($3.4 million) provided for the operating budget and minimal maintenance of the vessels and facilities. According to the SOS report, to maintain the aging fleet, approximately a 20 percent increase in the operating subsidy is necessary in the operating and maintenance budgets. Recent spikes in fuel costs will also have a detrimental effect on the level of service unless the budget is increased or vessels and engines become more fuel efficient.

The Downeaster line's 2007 operating budget was $15.7 million. Seven million came from fares, $1.7 million from MaineDOT and the remaining $7 million was provided by Congestion Mitigation and Air Quality (CMAQ) federal funding. Beginning in October 2009, CMAQ funding will no longer be available for this use as those funds are only available for new projects and not to sustain operations indefinitely. In late 2006, a task force on passenger rail funding met, and in January 2007 they provided recommendations to the Legislature and the Governor. Recommendations linked the Downeaster's role in regional economic development[1] and included tax revenues from car rentals, general merchandise sales, meals and lodging, and vehicle sales. According to a recent *Portland Press Herald* article,[2] general fund revenues have been committed by the Governor to replace the CMAQ funds. New Hampshire and Massachusetts do not contribute to the operating funding, even though a portion of the ridership is from those two states. In the 2008 Legislative session, a $30 million federal loan was authorized to upgrade the tracks from Portland to Brunswick in order to support a 60 mph train connecting passenger rail between Portland and Brunswick. In addition, a transportation bond was approved in 2008 to provide $6.5 million to improve the Downeaster's layover facility in Portland.

MaineDOT is currently expanding the Portland and Augusta rideshare programs with a budget of $200,000 per year. This amount is only adequate to incrementally expand the program statewide. MaineDOT has $281,000 in the

[1] "New Report shows Downeaster Train adds Billions to Maine's economy" www.amtrakdowneaster.com dated April 7, 2008

[2] "With gas prices up, so is ridership for Downeaster" by David Sharp, AP, Portland Press Herald article dated July 22, 2008

2008-2009 biennial budget for Park & Ride lot improvements. The MTA has an additional $500,000 in 2009 for Park & Ride lot improvements within the MTA corridor.

In 2005, only $2.5 million was invested in bicycle and pedestrian projects and the Safe Routes to School Program (SRSP) had a budget of only $5 million over a 5-year period. At that time, the SRSP had received more than $14 million in municipal requests. In the 2008-2009 budget, $13.37 million is dedicated to bicycle and pedestrian improvements, including SRSP. This is over a $4 million increase from 2006-2007. In 2006, the three trails of significance needed $70 million to build.

Table 1 Data/Budgets are based on latest information available.

Mode	Annual Ridership	Annual Budget	Capital
Transit	In 2006 was 8.1 million, and growing due to recent interest	$47 million	$17 million (2 yrs)
Maine State Ferry	1.6 million	$5.8 million	$2.86 million (2 yrs)
Downeaster Rail	441,769 (including MA and NH ridership)	$15.8 million	$36.5 million (bonds)
Go Maine Ride Share	7,000 on list	$200,000	(included in $17 million under transit)
Park & Ride Lots (MTA & MaineDOT)	2,217 spaces	$500,000 (est.)	$781,000 (2 yrs)
Bicycle/Pedestrian	-	-	$13.31 million (2 yrs)

Conclusions and Recommendations

Most areas in Maine do not have the population density to support typical transit services, but many Maine citizens and visitors need transportation options in addition to driving a car. Choices are made based on convenience, schedule, costs and the environment, and as Maine's population ages, these alternatives will become increasingly important. FSTBs provide on-demand, door-to-door non-emergency medical transportation to thousands of Maine residents in rural communities. In order to fulfill the needs of the communities, FSTB services have been expanding beyond health care to include transportation to work and school. There is a concern that these agencies are already under resourced.

Fixed-route transit providers' limited funds restrict their ability to continue meeting growing demand. Rising operating costs burden local providers and jeopardize service to an expanding customer base. Finding a sustainable funding source to supplement the fare box is a challenge for passenger rail. In addition, funding for ferries is minimal and will result in decreased service in the future. Ferries are the only mode of transportation from the islands, increasing the importance of maintaining them in the most long-term and cost-effective way.

According to the MaineDOT's *Connecting Maine* report, these modes of passenger transportation will be competing with funding shortfalls for the next 10 years in the comprehensive transportation system of more than $3 billion out of a total 10 year projected need of $6.5 billion. Each mode is an important part of the overall transportation system, and Maine faces some big challenges to provide residents with an adequate transportation system. Maine ASCE gives passenger transportation in Maine a Grade of **C-.**

Maine ASCE's recommendations for passenger transportation include:

- Promote and implement statewide land use strategies and demand management measures (e.g., the discouragement of the use of cars by increasing parking fees in urban areas). This would slow growth in traffic in urbanized areas and promote transit use or car/van pooling;
- Provide additional financial support for Regional Full Service Transportation Brokers (FSTBs);
- Consider coordinating FSTB's with statewide programs for alternative transportation. This would expand capacity, which would allow the FSTBs to serve a broader function as regional travel management resource centers to provide one-call resources for carpooling, ridesharing, and park and ride information;

- Consider additional state funding for fixed route transit providers where population densities merit, as well as for ferry services, though fare box revenues should be increased proportionately for both modes as well;
- Implement the recommendations from the joint MaineDOT/MTA 2007 Park & Ride Lot Study;
- Provide passenger rail with funding from state's general fund as Governor has stated and as recommended by the "2007 Task Force on Passenger Rail Funding," as well as expanding support to the State Transit Air Rail account; and
- Persuade NH and MA to provide equitable support of Amtrak's Downeaster service.

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Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

PORTS & WATERWAYS

Grade: C-

Overview

Maine's industrial ports are in fair to good condition, but require an additional $12 million in capital funding in the short-term to remain competitive, safe, and secure. Substantial long-term investments are also required to facilitate the projected surge in containerized cargo traffic. Maine should also continue to promote enhancements to ports and harbors serving its viable cruise, commercial fishing, and recreation industries.

Introduction and Background

Maine has 12 significant ports and harbors, which are well suited to handle the requirements of modern cruise vessels. Five of these ports, Portland, Searsport, Bucksport, Bangor, and Eastport, are also considered suitable to handle the requirement of most modern cargo vessels.[i]

Figure 1: Ports and Harbors of Maine

List of Maine Ports and Harbors

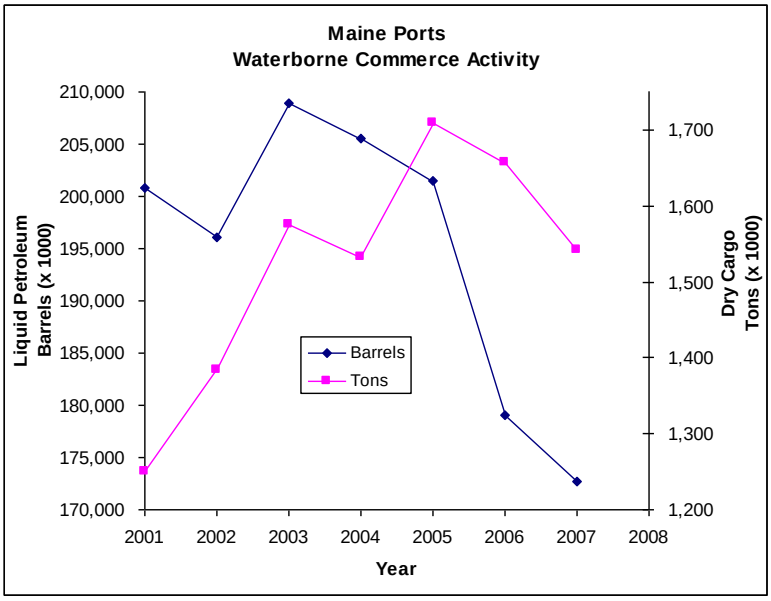
1. Kennebunkport
2. Portland
3. Freeport
4. Bath
5. Boothbay Harbor
6. Rockland
7. Camden
8. Belfast & Searsport
9. Bucksport
10. Bangor
11. Bar Harbor
12. Eastport

Industrial

Since 1970, industrial port development has been generally concentrated in three areas: Eastport/Quoddy Bay, Penobscot Bay and River (Searsport, Bangor and Bucksport), and Portland Harbor. Each area offers deep water, quality pilotage and services necessary for oceangoing vessels. Utilization of industrial ports in Maine varies depending on the terminals, time of year and market conditions. Recent trends in utilization of industrial ports of Maine, as well as the U.S. are illustrated in Figure 2 and Figure 3. In 1980, only a small amount of dry cargo was handled at the Port of Searsport; none in Eastport and Portland. Today, the three ports collectively handle more than 1.5 million tons of dry cargo per year, including containers. Additionally, Portland and Searsport also handle more than 125 million barrels of petroleum products per year.[ii]

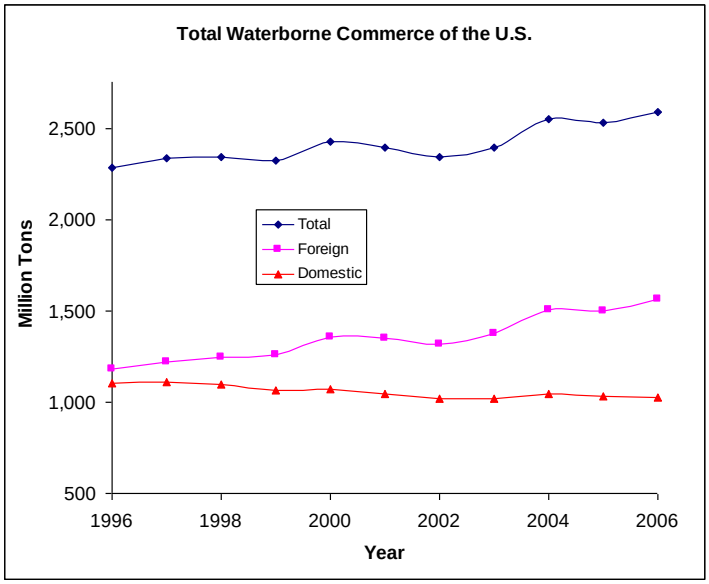
As depicted in Figure 2, since 2001, the trend in total volume of petroleum shipped through Maine's ports has been generally declining while the total volume of dry cargo has increased. The data indicates that liquid petroleum shipping volume decreased at an average annual rate of 4.5 million barrels and dry cargo shipping increased at an average annual rate of 56,000 tons from 2001 to 2007. However, it should be noted that both the cargo and petroleum industries have experienced significant decreased activity in the past 2 to 4 years.

Figure 2: Maine's Total Waterborne Commerce



As depicted in Figure 3, total waterborne commerce activity increased during the last 10 years, due primarily to increases in foreign commerce.[iii] The Maritime Administration, an agency of the U.S. Department of Transportation, projects a surge in international cargo traffic through U.S. ports over the next 10 to 15 years.[iv] According to a Cornell Study, North Atlantic ports will need to add at least 43 percent in additional capacity to accommodate the increased demand for shipping containerized cargo.[v]

Figure 3: US Total Waterborne Commerce



Intermodal Connections
Intermodal connectivity is critical to the long-term success of shipping and handling cargo through Maine's ports. The two most critical modal connectors, highway and rail, provide avenues for moving freight to and from port terminals. The Maritime Administration has been exploring the development of a robust short-sea shipping system to aid in reducing the growing amount of freight congestion on our nation's rail and highway systems. Short-sea shipping refers to the movement of freight along coasts and inland waterways.

Cruise
Maine has enjoyed an increase in coastal cruising programs during recent years and is currently a summer home for the cruise operations of American Cruise Line, American Canadian Caribbean Line and Clipper Cruise Line. The ports of Portland and Bar Harbor are deep-draft ports and regularly host vessels of all sizes. The port of Rockland, which has been a port of call for military ships, is beginning to attract deep-draft cruise passenger vessels. In addition, the ports of Bangor, Belfast, Bucksport, Camden and Rockland have flourished as popular boutique ports of call.

Commercial Fishing and Recreation
The Maine coast is over 3,000 miles long and is known worldwide for its beauty, sailing grounds, fishing industry and deep-water ports. Maine and, in particular, the port of Portland is a nationally recognized leader in the commercial fishing industry.

Condition and Adequacy

Industrial
During the past 10 years, the Maine Department of Transportation (MaineDOT) and the Maine Port Authority have invested more than $50 million to promote growth in the three industrial ports. In Eastport, a $16 million facility was completed in 1998.[vi] In Searsport, an $18 million investment in a public/private partnership with Sprague Energy resulted in a new terminal completed in 2003. In Portland, more than $16 million was invested in the Ocean Gateway project and the International Marine Terminal, which included the purchase of a new container crane and additional land.[vii]

Maine's dry cargo facilities are supported on concrete and steel piles. All three of Maine's dry cargo ports' major piers were rebuilt in the past decade. Generally, Maine's cargo piers are built to the current industry standard of a load capacity of 1,000 pounds per square foot. Pier condition is considered good, but annual maintenance of pipe coating and cathodic protection is necessary. New pavement, better rail, highway upgrades and additional crane capacity is needed at these ports.

Intermodal Connections
In Portland, the new waterfront connector provides a direct connection from the marine terminals to the interstate highway system.[viii] In addition, direct rail access from Pan Am Railways is available to Sprague Energy's Merrill Marine Terminal. The recent agreement between Pan Am and Norfolk Southern Railway to improve Pan Am's main corridor in Massachusetts will have a direct benefit to Maine rail users who move their product to inland U.S. markets.[ix] In Searsport, direct rail access is available to the terminal at Mack Point via the Montreal Maine and Atlantic (MMA) Railroad. The MMA offers double-stack rail clearance from Searsport to Montreal and then via class I connections to the U.S. Midwest. In Rockland, a considerable amount of cement product is moved via rail and then onto barges for transport to other U.S. markets. Without these intermodal connections, this traffic would travel down the busy Interstate 95 corridor. The port of Eastport could be improved with the addition of a rail connection.[x]

Cruise
Waterfront facilities supporting Maine's cruise industry are adequate for the current market, but need upgrading and expansion to keep up with the increasing demand for port calls. According to Cruise Lines International Association Inc., the cruise industry has had an average growth rate of 8.5 percent annually since 1980 and is an important factor in our nation's overall economic growth.[xi] Industry data shows that 40 percent of cruise ship passengers stay at least one night in a port city and each overnight cruise visitor spends an average of $289 per visit on retail, dining, local transit and lodging.[xii]

Maine has been partnering with various public and private agencies to develop its waterfront infrastructure in support of the cruise industry. The following three projects have recently been completed as part of waterfront development programs:[xiii]

1. Portland's Ocean Gateway: 18,100-square-foot passenger building and a 12,400-square-foot pier expansion.
2. Rockland's Gateway Center and Maine Lighthouse Museum
3. Bangor Waterfront Project: High-speed ferry dock with public and private boat slips, office buildings, parking garage, hotels and conference center.

Commercial Fishing and Recreation

Maine was ranked seventh in the nation in total commercial landings of fish while the port of Portland is ranked thirty-fourth out of all United States ports. The port of Portland recorded more than 70 million pounds of commercial fish landings in 2006—a 24.8 percent increase from 2005. In 2006, the entire state recorded more than 234 million pounds of commercial fish landings—a 9.1 percent increase from 2005. However, partially due to increased regulations over the years, fish landings in 2006 were 34 percent less than the record 356 million pounds recorded in 1950.[xiv]

As of September 30, 2007, four waterway projects were either under contract or study by the U.S. Army Corps of Engineers for maintenance dredging or channel improvements serving the commercial fishing industry. Unfortunately, some of these activities have not been completed due to either lack of federal funding, regulatory reviews, or execution of cost sharing agreements with the affected municipalities.[xv]

MaineDOT has provided $960,000 in funding to support the 2008 Small Harbor Improvement Program (SHIP). These funds will be provided to 21 coastal communities to help preserve working waterfronts and public access.[xvi]

Safety and Security

In Maine, considerable effort has been made by both public and private operators to perform gap analyses and construct considerable upgrades to Maine's facilities. These upgrades have been possible largely through annual federal port security grants. Continued funding of this program is critical to the long-term safety and security of Maine's facilities.

Investment Needs

MaineDOT reports that an annual investment of at least $2 million is necessary to maintain and upgrade Maine's three industrial ports. Incremental capital investment is also being sought to supplement future bond issues for the following projects:[xvii]

- $4.5 million for a dredging project at Searsport,
- $2.0 million for a trans-load facility at Eastport and
- $5.5 million for additional improvements to the International Marine Terminal and Ocean Gateway project in Portland.

In the long-term, at least $200 million is needed for the development of a modern container terminal in Searsport.[xviii] Continuous SHIP grants are needed to promote Maine's growing cruise, fishing and recreational maritime industries.

Conclusions and Recommendations

Maine's industrial ports are in fair to good physical condition; however, the ports need improvements to accommodate the demands of the shipping industry. Maine ASCE gives ports and waterways a grade of **C-**.

Maine ASCE makes the following recommendations:

- Continue to invest in maintenance of industrial ports;
- Upgrade containerized cargo capacity to capitalize on opportunities of a growing market;
- Program incremental capital improvements to the ports to enhance intermodal connections, such as rail and short-sea shipping terminals;

- Continue to invest in waterfront development projects through the SHIP program;
- Increase investments in ports supporting the cruise industry to capitalize on the economic impacts of this growing industry;
- Continue to promote and prioritize U.S. Army Corps of Engineers maintenance dredging and channel improvement projects in Maine's navigable waterways.

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Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

RAILROADS

Grade: C

Overview

There are 1,162 miles of active railroad in Maine. State funding for joint rail initiatives including customer rail sidings and interchange improvements has made the system more efficient and productive. Further investment in railroads will facilitate higher use and reduce trucks on roadways. The pulp and paper industry is the primary customer of rail. Maine ranks 48th in nation in freight tonnage moved by rail.

Introduction and Background

Rail service is an under-utilized, but important component of the transportation mix in Maine and is particularly cost-effective when moving high-volume, low-value commodities over long distances. In 2005, Maine had just less than eight million tons of freight moved annually by rail, ranking it 48th in the nation just behind New Hampshire. The first railroad company in Maine was chartered in 1832. Bangor to Old Town was the first section of track completed in this timeframe. The peak mileage for track in service for freight and passenger rail was in the 1920s with over 2,300 miles. Since the 1920s, abandonment and removal of track has been the norm. Today, Maine has 1,162 miles of active railroad of which 66 miles is owned by the state.[1] The state owns an additional 254 miles of inactive track.

Maine is serviced by six private railroads, three of which form the core of the regional rail network: St. Lawrence & Atlantic Railroad (SL&A), Pan Am Railways (formerly Guilford Rail), and Montreal, Maine and Atlantic Railway (MMA). The state leases some of its track to private railroads such as the Maine Eastern Railroad and the Belfast and Moosehead Lake Railroad. Freight railroads are classified by the Federal Rail Administration (FRA) based on annual operating revenues as follows:

- Class I – annual revenues greater than $258.5 million;
- Class II- annual revenues between $40 million and $258.5 million; and
- Class III- annual revenues under $40 million.

MMA, Pan Am and SLA are all Class II railroads.

The Bangor and Aroostook Railroad was purchased in 2003 by Rail World, Inc. and renamed **Montreal, Maine and Atlantic Railroad** (MMA). MMA owns 504 miles of track in northern and central Maine from Van Buren to Searsport, several branches serving Caribou, Presque Isle, Easton and Houlton, and a line from Brownville Junction to the international boundary west of Jackman and on into Canada. MMA connects with nine Class I railroads outside of Maine and connects to Pan Am at the Northern Maine Junction outside of Bangor, with Canadian National (CN) at St. Leonard, New Brunswick, and with the New Brunswick Southern System at Brownville Junction, Maine.

[1] Complete New England Rail maps are available through MRG, Inc., P.O. Box 5494, Augusta, ME, 04332

Pan Am Railroad was originally known as the Maine Central Railroad and later as the Guilford Rail System. Based in Waterville, Pan Am's main freight line runs from South Berwick to Mattawamkeag with branches to most of the major paper mills. A critical link for Pan Am is not just their southern mainline, but also their connection to the Canadian provinces through the Eastern Maine Railroad. Pan Am owns a total of 372 miles of rail in Maine and connects to many Class I railroads, as well (CSX, Norfolk Southern and others). Pan Am also connects to the St. Lawrence & Atlantic system at Danville Junction.

The **St. Lawrence & Atlantic Railroad** (SLA) runs from Portland to Montreal, Canada and interchanges with the Canadian National Railroad (CAN). SLA has 85 miles of track in Maine. This railroad operates the 35-acre intermodal terminal facility in Auburn.

Other railways operating in Maine include Eastern Maine Railways (105 miles), Tuners Island LLC (2 miles) and Maine Eastern Railroad (93 miles) which lease railroad track from the state.

Condition and Adequacy

Currently, sections of Maine's active track will not support 286,000-pound rail cars that are becoming the standard with the Class I railroads. The ability to utilize consistent car types with Class I railroads would reduce handling costs and make systems more efficient. Upgrading the remaining track to accommodate the larger freight rail cars will require significant investment by both the Class II railroads and state/private partnerships. The issue is not only the track right of way (rail, ties, ballast, and substructure) but the ratings of many of the railroad bridges as well. To support the heavier cars, railroad bridges need to be certified to carry the additional weight, which will require time and resources. Currently, most of Maine's railroad bridges are rated for 263,000 pounds.

Funding by private rail companies for inspections and upgrades depends on the ability to guarantee a return on that investment through economic activity. As businesses that use the railroad grow, or as new businesses come into the state that will utilize rail, the need for the larger cars becomes more necessary and the cost for the improvements can be justified.

Bridge clearance restrictions surrounding the railroad also present an issue. Many bridges are unable to accommodate double-stack containers. Some are owned by the railroads themselves and carry the track structure itself but others are road bridges carrying vehicular traffic crossing over the railroad and are primarily owned and maintained by local, county, and state governments. As these bridges are owned and maintained by governmental bodies, they would be likely only be raised over time when the bridge is due for major rehabilitation or replacement. As both the Maine Department of Transportation (MaineDOT) and municipalities have a back-log of bridges in need of repair, increasing clearances on all these bridges would not likely occur in the short term, unless a specific initiative is undertaken in a certain corridor identified by the railroad owners as a priority.

SLA is fully cleared for double-stacked containers from Auburn to Montreal, Canada and beyond to the Port of Vancouver, Canada. From points in Canada, double-stacks can continue down to Chicago and points in the mid-western states. This bodes well for long-term rail freight growth in Auburn. MMA also has clearance for double-stack containers from Searsport to Montreal, Canada and then via Class I connections to points in the U.S. Midwest and Canada as well. Searsport's port facility requires upgrades in capacity in order to maximize opportunities of a growing containerized cargo market.

Pan Am recently announced a partnership with Norfolk Southern to improve the "Patriot Corridor" between Albany, New York and Boston, Massachusetts. Rail advocates in Maine say this partnership will provide a direct benefit to freight rail in Maine, even though double-stack clearance on Pan Am's rail line into Maine is not available.

The frequency and number of rail crossings inhibit the movement of both passenger and freight trains due to necessity to slow the train at these points. In some cases several roadways cross tracks in close proximity creating multiple crossing locations. Working with the local jurisdictions, as well as the MaineDOT, the elimination of these redundant at-grade crossings would provide for faster train travel and safer travel for pedestrians and vehicles, as well as reducing costs for maintenance. Maintenance of the 630 active at-grade crossings is critical. There are 430

crossings with active protection that include lights and gates or lights only. The cost to maintain the crossings is shared between the railroad owner and the state. The remaining 200 crossings have signs only. There have been a total of 15 crashes with vehicles using the crossings in the last five years (2003-2007).

The MaineDOT provided condition assessments for 230 of the 320 miles of rail that it owns.[2] Of the segments assessed, conditions were classified into three categories: 70 miles or 30.4 percent were good, 51 miles or 22.2 percent were fair, and 109 miles or 47.4 percent were poor.

Investment Needs

In recent years, there has been a major effort to create partnerships for investing and improving rail infrastructure in Maine. MaineDOT and private railroads are working jointly where both have interests on several capital projects around the state.

The 2005 MaineDOT State of the System (SOS) report recommended total investments for rail of $7.6 million for the biennium, including maintenance of state-owned track at $1.6 million, The Industrial Rail Access Program (IRAP) at $4 million, and interchange projects at $2 million per biennium. Currently, funding continues to fall short of this identified strategic need.

IRAP has been designed by the MaineDOT to encourage economic development and increased use of the rail transportation mode. Customers near the railroad apply to get a siding installed (track from customer to the mainline). MaineDOT IRAP will provide 50 percent match and customer provides the rest. The program has awarded $1 million in late 2007 and has awarded an additional $600,000 in projects in 2008. Currently the MaineDOT requests funding of approximately $1 million per year for this program, though the SOS report recommended up to $2 million per year to be an appropriate level.

According to the SOS report, $1.6 million per biennium is needed to maintain the state's 300 track miles of railroad. Funding for the 2004-2005 biennial budget was $300,000. The biennium budget for 2008-2009 is slated for $1.45 million for maintenance of state-owned track, which should improve the condition of state-owned track in the short term.

The current biennium has budgeted $2 million for other interchange and joint projects, including $1 million for the MMA system.

In 2008, the state purchased the last remaining 5.2 mile section of the 50-mile Mountain Division between Portland and Fryeburg in order to preserve the corridor for future transportation use. This 5.2 mile section was purchased for $800,000. An additional $20 million would be required to repair the entire 50 miles of track to handle any potential train service (either freight or passenger). In 2007, a MaineDOT-funded report determined the entire corridor does not currently have the population density to support passenger rail, and the line may be able to support only seasonal freight service. A steady, long-term increase in fuel prices and population shifts could have a large impact on the corridor's potential.

MaineDOT's 2008-2009 biennial budget for funding crossing projects is $3 million, including Federal Highway Administration (FHWA) funding of $2.3 million. The FHWA allocation is intended to fund approximately eight to ten crossing improvement projects.

Conclusions and Recommendations

A comprehensive system-wide grade is difficult to determine because much of the system is privately owned and actual condition ratings are not available. Given the poor shape of state-owned rail lines, the state's rail network deserves a poor grade, though most of it is inactive. However, given current funding for maintenance this biennium,

[2] "Summary Condition of Maine's Transportation System and the related funding challenges", from Chip Getchell, MaineDOT, December 2007

conditions should improve in the short term. Joint initiatives with private railroads are important to assuring the system remains efficient and effective. With an identified $3.3 billion gap in funding over the next 10 years for all of Maine's transportation needs, rail funding will be competing for resources. Maine ASCE gives Maine's railroads a grade of **C**.

Maine ASCE makes the following recommendations:

- Continue to fund and promote the siding program, IRAP;
- Continue to work with railroad owners on interchange projects to assure the system's smooth performance;
- Review all agency policies on raising bridges that pass over rail lines. By raising bridges to 20'6" to 22' height over the long term, double-stack trains will become the norm, increasing the efficiency and cost effectiveness of the system;
- Continue to invest in at-grade crossing improvements and advocate for increased levels of funding. Reviews with municipalities for redundant crossing locations and alternative traffic pattern opportunities should be undertaken to improve efficiency of system; and
- Develop policies to increase and improve intermodal freight transportation (ASCE policy statement 149)[3].

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Report Card
FOR MAINE'S
Infrastructure

Issued December 10, 2008

ROADS

Grade: D

Overview

Poor pavement has increased from 2% of MaineDOT roads surveyed in 1996 to 26% in 2006. Roads rated good and fair dropped from 81% in 2005 to 73% in 2006. Due to conditions Maine motorists spend an average of $285 per year in extra vehicle operating costs. Current funding for roads is not sufficient. The pavement preservation program for "built" roads is only funded to address half its needs.

Introduction and Background

Maine's highway system is the most critical transportation service for the state's 1.3 million residents and visitors, providing access to homes, employment, shopping, agricultural land and recreation. Improved roads provide Maine's residents with greater mobility and traffic safety, which in turn improve personal and commercial productivity and boost tourism and economic development statewide. Currently 87 percent of all Maine freight is transported via the state's roads, and more than 95 percent of all passenger movements within Maine occur on its highway system.[i] Note: Bridges are covered in a separate issue brief.

Maine is a large, predominantly rural state with a current roadway system that comprises more than 22,500 miles of highway managed by several different jurisdictions – local, county, state and federal. There are over 14,000 miles of city and town roads. The state's transportation agency, the Maine Department of Transportation (MaineDOT) is responsible for 8,547 miles, or about 38 percent of that total mileage. Table 1 compares Maine to the rest of New England in this regard.

Table 1 New England's Roadway Systems[ii]

State	Total System Mileage	State Controlled Mileage	Percent State Controlled	Apportioned Fed. Funds FY2007	Fed $/ per Mile[iii]	Total State Fund.[iv]
Connecticut	21,248	3,716	17	$463,276,000	$124,670	1.2 B
Maine	**22,783**	**8,547**	**38**	**$155,135,000**	**$18,150**	**0.6 B**
Massachusetts	35,936	2,830	8	$570,957,000	$201,751	2.7 B
New Hampshire	15,646	3,981	25	$157,763,000	$39,628	0.5 B
Rhode Island	6,528	1,104	17	$175,036,000	$158,547	0.5 B
Vermont	14,406	2,633	18	$147,121,000	$55,875	0.3 B

It is evident from Table 1 that the size of Maine's roadway system is only surpassed in New England by Massachusetts. Furthermore MaineDOT is responsible for a greater percentage of this total than any other state DOT in the northeast. In fact, MaineDOT controls more than twice the mileage of any other New England DOT.

For purposes of this report card, Maine ASCE has chosen to focus its attention on the 6,272 miles of MaineDOT-controlled roads that are analyzed by federal functional[1] class, as well as the separately controlled 110-mile Maine Turnpike from Kittery to Augusta. These particular roads provide the state with its primary interstate

[1] Federal functional classes include interstate, freeway/expressway, other principal arterials, minor arterials and major urban collectors and are broken out in Table 2 on page 2.

and intrastate mobility, and in fact carry most of the daily vehicle miles traveled within Maine. All of MaineDOT-controlled roads carry 78%[v] of vehicle miles travelled in Maine and, with just 110 miles of highway, the Maine Turnpike carries approximately 9%.

Table 2 The MaineDOT roadway network is broken up into Federal Functional Classes[vi]:

Federal Functional Class	Urban Miles	Rural Miles	Total Miles	Approx. VMT % of total[vii]
Interstate (not MTA)	44	322	366	13%
Freeway/Expressway	14	5	19	1%
Other principal Arterials	150	808	958	19%
Minor arterials	241	1051	1292	20%
Major/urban Collectors	451	3286	3737	22%
Totals:	**900**	**5472**	**6272**	**75%**

Note: Maine Turnpike, MaineDOT state-aid, and Local roads make up the remaining VMT.

Daily Vehicle Miles of Travel (VMT) on Maine's highways increased 9.3% between 2000 and 2006, rising from just under 33 million to 36 million,[viii] for an average rate of 1.45% compounded annually. Of that increase, the majority was on the urban system, which grew 27%, while travel on the rural system during those six years only grew 3%.

Condition and Adequacy

According to The Road Information Program (TRIP), a non-profit transportation research organization, a desirable goal for organizations that are responsible for road maintenance is to have 75% of their major roads in good condition. Maine currently does not meet this standard except on the interstate.[ix] In fact, TRIP estimates that ***Maine's road conditions are currently costing each Maine motorist an average of $285 per year in extra vehicle operating costs (accelerated depreciation, additional repair costs, increased fuel consumption, and increased tire wear), which amounts to over $286,000,000 statewide costs annually***.

To determine the condition of Maine roadways, three existing composite indices are used.

- **The Maine Economic Growth Council's composite "Roadway Deficiency Index"**[x] This index evaluates three criteria: narrow lanes, deficient bridges and poor pavement. The greater the value, the greater the problem. Based on 2006 data, Maine's transportation infrastructure scored 86, up from 85 in 2005 and 65 in 2002. The report gave this indicator a "red flag," indicating that state highways "need attention, with a trend toward dramatic decline." The primary reason for the rating increase is the amount of poor pavement, which has increased from 2% in 1996 to 26% in 2006.
- **MaineDOT's composite Highway Adequacy Index (HAI).**[xi] The HAI is an empirical evaluation of the health of a particular highway segment, that takes into consideration pavement condition (50%), safety (25%) and service (25%). For 2006, 6,238 miles were reviewed and rated. The 2006 HAI is: good 50%; fair 23%; **poor 15%; and critical 10%** (2% is missing)**.** By contrast, the HAI in 2005 was 81% good and fair in comparison with only 7% at critical stage. [xvi] Urban Roads only had 14% of their system rated as good. This is concerning as this is where the majority of growth in the system is occurring. When broken down by federal functional class:
  1. Interstate HAI 99% Good
  2. Arterials HAI 60% Good
  3. Collectors <40% Good
- **Hartgen Report.**[2] MaineDOT has dropped in its national ranking of cost effectiveness, as measured by the Reason Foundation, from 12th in 2001 to 22nd in 2006. [xii]

[2] The Reason Foundation study measures the performance of state-owned roads and highways from 1984 to 2005 in 12 different categories, including traffic fatalities, congestion, pavement condition, bridge condition, highway maintenance and administrative costs, to determine each state's ranking and cost-effectiveness. David T. Hartgen, Ph.D. is the study's lead author.

In addition, statewide highway safety, mobility data, local roads and Maine Turnpike pavement condition data are also considered.

Highway Safety[xiii]: Maine currently averages 188 fatalities on its highways annually (for all Maine roads), or a fatality rate of 1.132 deaths per 100 million miles travelled. The national average is 1.453. Among the New England states, Maine has had the highest fatality rate four of the past five years, though the five New England states typically have been some of the lowest in nation. In 2005, Maine published its Strategic Highway Safety Plan "One is Too Many."[xiv] The plan outlined action items that would help in addressing fatalities on Maine's roads.

System Mobility: In 2004, less than 10% of Maine's arterials experienced moderately high or worse congestion. Most of that delay was seasonal and only during peak hours such as the 5 pm commute hour. The majority of current and future delays will occur on the state's urban arterials, where capacity is limited, volumes are high and land use access is generally uncontrolled. Growth in development along these corridors has resulted in more driveway entrances and left-turn turning movements adding to the congestion. In addition to traffic issues causing mobility concerns, condition of the roadway also provides inefficiencies each Spring, when approximately **25 percent** of state highways are posted (restricted for loads over 23,000 pounds).[xv]

Current congestion mitigation activities and projects:

- Currently, some use of Intelligent Transportation Systems (ITS) has been implemented as part of a statewide ITS strategic plan to increase highway safety and efficiency (variable message signs, roadway weather stations and traffic information systems).
- Recent projects like the Gray bypass and the Gorham bypass, both of which take traffic out of congested downtowns, will also enhance system mobility.
- In addition, over $6 million in Congestion Mitigation and Air Quality (CMAQ) funds will again be available for intersection and mobility projects beginning October 1, 2009 due to a federal requirement that these funds no longer be used for passenger rail.
- Over 50 intersections have been identified for improvements in 2008-2009 biennial budget.

Local Roads: The Portland Area Comprehensive Transportation System (PACTS) recently reviewed 200 miles of collector roads within their system and only 12% of these roadways meet current design standards, 30% need minor upgrades to bring them up to standards and the remaining 58% of the roadways would require roadway widening or full reconstruction to meet the current design standards.[xvi]

Maine Turnpike: The average segment of pavement of the 110 mile Maine Turnpike rates a 7.8 out of a possible 10.0.

Investment Needs

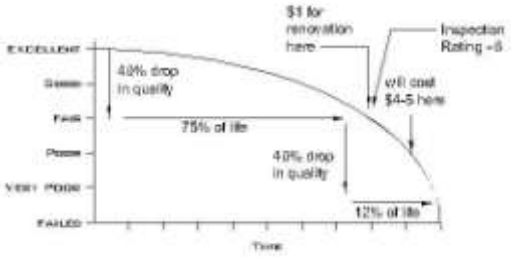
Maine is among more than forty states with a dedicated fund to finance construction and maintenance of major roads and bridges. About two-thirds of the state's Highway Fund revenues come from the fuel tax. The other third comes from vehicle registrations, titles, driver's licenses, and fines and penalties. About 80% of Maine's Highway Fund revenues are used to plan, design, construct, and maintain highways and bridges. The remaining 20% goes to financing a portion of the State Police and a majority of the Secretary of State's Motor Vehicle Division.[xvii]

Over the past twenty years, MaineDOT has seen its buying power from its revenue stream steadily decline. This can be attributed to inflation, an extraordinary rise in fuel and material prices, and increased vehicle fuel efficiency. As revenues declined over this period so too did transportation system spending as a state priority. In 1976, state investments in highway transportation represented 26% of all state spending. Today that figure is only 11%.[xviii] When resources are limited, maintenance is often deferred, thus costing the agency more in the long-run.

Unfortunately, deferred maintenance has negative ramifications in future years. Maine is in the middle of this situation today. The Hartgen Report indicates that Maine spends $29,542 which is less than 20% of the New England average ($151,000) on a per-mile basis on its capital program for roads and bridges. Maine spends less than any other New England state on a per mile basis ($18,831) on its maintenance program (average of the other four

New England states is $54,500 per mile). Under-investing in our road system for a number of years has created a growing backlog of unmet needs that is severely burdening our state today.

According to MaineDOT,[xix] 535 miles of arterials and 2,135 miles of collector roads need to be reconstructed to modern standards ("unbuilt" were created before 1950s or have reached HAI ratings of critical or poor). This effort over the next 20 years would cost over $432 million per biennium to complete and fulfill the requirements of 2008 legislation. Current biennial budgets, though, only fund a small fraction of that amount. To preserve the current "built" system of arterials, including the interstate, with the Pavement Preservation Program (PPP), an investment of $181 million per biennium would be required. As seen by the **Pavement Life Cycle** chart[xx], preserving the investment of a "built" road needs to occur when the pavement condition rating reaches "fair." Current MaineDOT paving budgets, though, will only fund half of the needed PPP.[xxi]



PAVEMENT LIFE CYCLE

The Maine Turnpike collects 100% of its revenues from toll and concessions and does not receive any state or federal funds. In 2008, revenues are on the decline, with recent projections for 2008 of negative growth over 2007 (planned growth had been 2.5% per year)[xxii]. Over the past five years, the MTA has seen capital project costs for road and bridge projects increase an average of 11% per year.[xxiii] While MTA operating budgets have been cut, and can be further managed, capital cost projections for the next five-year period, especially bridges and paving, will far exceed current revenue forecasts. The Maine Turnpike has a $559 million capital program planned for the next 10 years. The MTA announced in October 2008 that a toll increase in 2009 is likely in order to accommodate this need.

The preliminary estimate to bring the Portland area (PACTS) collector system up to standard would be approximately $189 million with an additional $40 million required to maintain those roadways that either meet or could meet the design standards with either a design exception or minor improvements. This far exceeds the $5.6 million PACTS can appropriate towards their collector road improvements each biennium.[xxiv]

In 2007, the Maine Better Transportation Association in conjunction with key members of the Legislature's Transportation Committee put forward LD 1790, an Act to Secure Maine's Transportation Future before in the 123rd Maine State Legislature. This bill set forth a comprehensive transportation capital improvement program based on measurable goals. This legislation eventually passed, but with no funding attached. Later in 2007, MaineDOT released its Statewide Long-Range Transportation Plan, *Connecting Maine*, for which recent updates document a total transportation system need of $6.5 billion over the next 10 years,[xxv] with funding only projected at $3.2 billion. MaineDOT highway needs represent $3.99 billion of the total need (excluding bridges).

In 2008, the Legislature and the Governor enacted several new and critical infrastructure initiatives that included new money for bridges and other transportation needs. MaineDOT will receive an additional $58 million of new funding over five years for roadways from revenue bonds that are supported by new fees. While a step in the right direction, this additional revenue falls significantly short of the projected gap. Recent cuts to the existing MaineDOT biennial budget and further paving project deferrals and cancellations in August 2008 do not bode well for the future condition of Maine's highways.[xxvi] Bridge funding issues are covered in the bridge issue brief.

Conclusions and Recommendations

In 2008 it is apparent that the condition of Maine's roadway system is on the decline. Current investment levels by the state are not sufficient to address the growing needs of the system. Maine must restore investment in its highway infrastructure as a funding priority for the safety and economic well being of the state's residents and businesses. Maine ASCE gives Maine roads a grade of **D**.

Maine ASCE makes the following recommendations:

- Maximize existing resources of funding, such as state's general fund, bonds, impact fees, tolls and car registration fees, as continued reliance on gas tax for majority of MaineDOT funding will not suffice;
- Identify new funding sources;
- Maintain the existing roadway network in safest and most cost effective way;
- Fully fund the Pavement Preservation Program at $181 million per biennium;
- Provide additional funding to improve "unbuilt" segments of roads to modern standards;
- Implement the strategies to address the four focus areas as outlined in the Maine Highway Safety Strategic Plan (June 2007);[xxvii]
- MaineDOT and its partners need to continue simple operational techniques for congestion mitigation, such as intersection improvements, as well as continue to study the need for bypasses and capacity enhancements where required; and
- In densely populated areas, develop more efficient land use policies to assist in mitigating growth in congestion.

Sources:

[i] Losing Ground, A Report on the State of Maine's Highway Fund, July 2005, Maine Better Transportation Association
[ii] FHWA website "Highway Statistics 2006", Section V Roadway Extent, Characteristics, and Performance, HM-10.
[iii] FHWA website "Highway Statistics 2006", Section IV Finances, FA-4
[iv] FHWA website "Highway Statistics 2006", Section IV Finances, SF-21
[v] MaineDOT State of System report, 2006, from MaineDOT website & email Todd Pendleton, HNTB, Traffic Engineer dated 8/28/08
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[vii] MaineDOT State of System Report (on web site 4/1/2008)
[viii] FHWA website "Highway Statistics 2006", Section V Roadway Extent, Characteristics, and Performance, Table HM-81
[ix] Future Mobility in Maine: Meeting the State's Need for Safe and Efficient Mobility, April 2007, by TRIP, Washington, DC at http://www.tripnet.org/MaineReportJune2007.pdf
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[xii] http://www.reason.org/ps360/
[xiii] MaineDOT Office of Safety
[xiv] http://www.maine.gov/mdot-stage/safetyoffice/pdf/strategic%20plan%20rev%206.1june2007a.pdf
[xv] Email from Robert Skehan, Maine DOT September 24, 2008
[xvi] Excerpt from a preliminary report on PACTS collector road program, email from Gorrill-Palmer, Oct. 8, 2008
[xvii] Losing Ground, A Report on the State of Maine's Highway Fund, July 2005, Maine Better Transportation Association
[xviii] Losing Ground, A Report on the State of Maine's Highway Fund, July 2005, Maine Better Transportation Association
[xix] Email from Robert Skehan, Maine DOT September 19, 2008
[xx] Chart provided by Roland Lavallee, HNTB Corp. Originally from Army Corp of Engineers.
[xxi] Email and Phone conversation with Robert Skehan, MaineDOT September 22, 2008
[xxii] Interviews with MTA personnel August 2008, and Board meeting minutes and updated 10 yr plan from same time period
[xxiii] AGC inflation chart from website at www.agc.org
[xxiv] Excerpt from a preliminary report on PACTS collector road program, email from Gorrill-Palmer, Oct. 8, 2008
[xxv] Email from Gerry Audibert, MaineDOT, dated August 5, 2008 regarding 'Connecting Maine' updated information
[xxvi] Announcement by MaineDOT August 2008 to cancel remaining paving projects for 2008 due to high cost of asphalt and lack of funding
[xxvii] http://www.maine.gov/mdot-stage/safetyoffice/pdf/strategic%20plan%20rev%206.1june2007a.pdf