

MAINE STATE RAIL PLAN

Rail System Performance, Needs, and Opportunities



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prepared for



MaineDOT

prepared by



**CAMBRIDGE
SYSTEMATICS**

date

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TABLE OF CONTENTS

1.	Introduction	1
2.	Performance Measures	1
3.	Safety	4
3.1	Rail Safety Agencies	4
	Federal Railroad Administration	5
	Pipeline and Hazardous Materials Safety Administration	5
	Department of Homeland Security and Transportation Security Administration.....	5
	National Transportation Safety Board	6
	MaineDOT Office of Freight and Passenger Services	6
3.2	Rail Safety Mandates	6
	Rail Safety Improvement Act of 2008.....	6
	Federal Railroad Safety Act of 1970	7
	Americans with Disabilities Act.....	7
	Grade Crossing Action Plan Rule.....	8
	Infrastructure Investment and Jobs Act (IIJA)	8
3.3	Rail Accident and Incident Statistics	9
	Rail Equipment Accidents and Incidents.....	10
	Trespassing	13
3.4	Highway-Rail Grade Crossings	14
	Grade Crossing Inventory	14
	Safety at Highway-Rail Grade Crossings.....	15
	Highway-Rail Grade Crossing Accidents	19
	SAP Proposed Actions	21
3.5	Safety Programs and Projects.....	22
	Operation Lifesaver	22
	MaineDOT Grade Crossing Safety Improvement Program (Section 130 Funds).....	23
4.	Rail Needs and Opportunities	23
4.1	Rail Improvement Opportunities.....	23
	Passenger Rail Improvement Opportunities.....	24
	Freight Rail Improvement Opportunities.....	27
5.	Rail Service and Investment Program	33
5.1	Passenger and Freight Rail Capital Program.....	33

5.2 Program Effects 35

A. Passenger and freight Rail Program of Projects 37

LIST OF TABLES

Table 2.1	<i>Downeaster</i> PRIIA Section 207 Performance.....	2
Table 2.2	Rail System Performance Measures.....	3
Table 3.1	Rail Safety Agency Summary	4
Table 3.2	Rail Safety Summary.....	9
Table 3.3	Accident Cause and Number of Incidents by Category, 2017-2021	12
Table 3.4	Trespassing in Maine 2011-2020.....	13
Table 3.5	Maine Grade Crossing Summary.....	14
Table 4.1	Short-Term 2023–2026 Passenger Rail Program.....	26
Table 4.2	Long-Term 2027–2042 Passenger Rail Program	27
Table 4.3	Short-Term 2023–2026 Freight Program Investments	30
Table 4.4	Long-Term 2027–2042 Freight Program Investments	32
Table 5.1	Summary of Passenger and Freight Rail Capital Program.....	34
Table 5.2	Potential Program Effects by Improvement Type	35

LIST OF FIGURES

Figure 3.1	Historic Maine Rail Equipment Accident/Incidents (1975-2021).....	10
Figure 3.2	Maine Rail Equipment Accident/Incidents by County 2017-2021	11
Figure 3.3	Maine Rail Equipment Accident/Incident Types 2017-2021	12
Figure 3.4	Functional Class by Crossings and Lane Miles	15
Figure 3.5	Tracks at Public Grade Crossings.....	17
Figure 3.6	Smallest Crossing Angle, Public Road Crossings	18
Figure 3.7	Pavement Conditions in Rural versus Urban Areas.....	18
Figure 3.8	Crossing and Trespasser History, 1975 to 2021.....	19
Figure 3.9	Driver Contributing Action, Train-Involved No Injury.....	20
Figure 3.10	Injury Level By Incident, State Crash Data	21

1. INTRODUCTION

This memorandum describes the proposed measures for evaluating the performance of the rail system, including an overview and analysis of rail transportation safety, and the improvements and investment opportunities that could help address the near- and long-term rail needs of Maine. The physical condition of the infrastructure, market conditions, and capacity were assessed utilizing feedback from the stakeholder engagement process. The memorandum concludes with an overview of projects identified by Maine railroads, MaineDOT, Northern New England Passenger Rail Authority (NNEPRA), and other stakeholders during the development of this State Rail Plan.

2. PERFORMANCE MEASURES

This section identifies the proposed measures for tracking and evaluating rail system performance for the *Downeaster* service and the general rail system.

The performance measures specific to the *Downeaster* route are listed in Table 2.1. These are categorized as financial, on-time performance (OTP), train delays, or customer service indicators. Each performance measure includes a specific metric, target, and current status. These performance measures, metrics, and targets were reviewed by NNEPRA. The *Downeaster* is exceeding most of the targets with room for improvement in end point OTP and reliability. Due to significant single-track sections of the route's right-of-way in Maine and New Hampshire, even minor disruptions can result in passenger train interference and cascading delays throughout the day.

Table 2.1 Downeaster PRIIA Section 207 Performance

Category	Performance Measure	Metric	Four-Quarter Status (FY21Q3-FY22 Q2)	Target
Financial	Farebox recovery	Percentage of operating costs recovered by passenger-related revenue	40%	Continuous Improvement
On-Time Performance (OTP)	End-Point OTP	Percentage of trains with on-time end-point arrival	70%	≥85%
	Customer OTP	Percentage of customers with on-time arrival for all passengers served	82%	≥90%
Train Delays	Host Responsible Delays	Delay minutes per 10,000 train miles (by each host railroad)	836	Continuous Improvement
	Amtrak Responsible Delays	Delay minutes per 10,000 train miles	140.5	Continuous Improvement
Customer Service Indicators (adjusted for train performance)	Overall Service	Percent of survey respondents who provided a score of 70 percent or greater	93%	≥90%
	On-Board Crews	Average score from survey respondents	96%	≥90%
	Reliability	Average score from survey respondents	89%	≥90%
	Onboard Cleanliness	Average score from survey respondents	95%	≥90%
	Onboard Comfort	Average score from survey respondents	95%	≥90%
	Onboard Food Services	Average score from survey respondents	84%	≥85%

Note: Federal targets for Metrics and Minimum Standards for Intercity Passenger Rail Service are defined in 49 CFR 273: <https://railroads.dot.gov/legislation-regulations/regulations-rulemaking/metrics-and-minimum-standards-intercity-passenger>.

Source: <https://railroads.dot.gov/passenger-rail/amtrak/intercity-passenger-rail-service-quality-and-performance-reports>.

The performance measures for the overall system in Maine are listed in Table 2.2. The performance measures are categorized as system effectiveness, system condition, system safety, or system initiatives. System effectiveness performance measures sets targets for the system's use; system condition performance measures establish targets that meet current standards; system safety performance tracks incidents; and system initiative performance measures establish targets to raise the current standard. Each performance measure includes a specific metric, target, and current status.

Table 2.2 Rail System Performance Measures

Category	Performance Measure	Metric	Status	4-Year Target
System Effectiveness	Freight rail volumes	Tons of freight rail originating and terminating in Maine	4.5 million tons (2019)	5.71 million tons
	Recruit rail-using businesses	Number of rail-using businesses	125	130
	Improve freight rail shipper concentration	Reciprocal Index (equivalent number of equal volume rail users)	36	41
	Passenger trips in Maine	Quarterly total ridership associated with Maine (either origin and/or destination)	86,119 -(four-quarter avg.)	100,000
	FRA PRTIA performance and service quality indicators	Percentage of reporting categories above national average	100%	≥50%
System Condition	Rail lines meeting 286,000-pound standards	Corridors that need to meet 286,000-pound standards: SLR, Rockland Branch, BML, DSRX, CSX Northern Maine Junction to Mattawamkeag, Houlton Branch, Presque Isle Sub, Fort Fairfield Sub, Limestone Sub	No	Yes (5 out of the 9 corridors)
	Rehabilitate, upgrade, or eliminate rail crossings	Number of crossings improved or closed	16 (FY21)	40 (or 10 per year)
System Safety	FRA reportable rail incidents	5-year average of total FRA reportable incidents	20 incidents/year	5% decline (19 average incidents/year)
System Initiatives	Facility Condition	Percentage of passenger, maintenance, and administration facilities rated below condition 3.5 on the TERM scale	0%	0%
	Continuously welded rail along all passenger routes	Percentage of passenger route track-miles continuously welded	100%	100%
	Remove obstructions along mainline routes to allow double-stack operations	Corridors that need to meet 23 feet vertical clearance: CSX (Mattawamkeag-Ayer, MA)	No	Yes
	Minimum FRA Track Class 2 for all non-passenger routes	CP/EMRY (McAdam, NB-Jackman)	Yes	Yes
	Minimum FRA Track Class 4 for all passenger routes	CP/EMRY/MNR (Bangor - Presque Isle)	No	Yes

Source: MaineDOT and NNEPRA

3. SAFETY

Railroad safety and security are a top priority for all involved parties, including the State, railroad owners and operators, and local and federal agencies. This section describes the agencies working to ensure railroad safety, the progress that has been made nationally and within Maine, and programs that are continuing to promote railroad safety.

3.1 Rail Safety Agencies

The agencies listed below provide different levels of safety oversight and regulation. A brief description of each agency's responsibilities is provided below, while Table 3.1 expands on each agency's authorities and responsibilities.

Table 3.1 Rail Safety Agency Summary

Agency	Authorities/Responsibilities
FRA	<ul style="list-style-type: none"> • Develop and enforce basic operating rules for train safety, tank car safety, rail equipment safety, highway-rail grade crossing safety, and trespass prevention. • Conduct research and development to ensure the safe, efficient and reliable movement of people and goods. • Perform track inspections. • Collect and analyze rail accident/incident data from the railroads. • Oversee the movement of hazardous materials, employee hours of service regulations, and signal and train control regulations. • Manage funding programs for rail improvements, including safety improvements.
PHMSA	<ul style="list-style-type: none"> • Regulate and enact rules aimed at improving the safe movement of hazardous materials. • Permit, inspect, and enforce safety of hazardous materials. • Collect data on the movement of hazardous materials.
DHS and TSA	<ul style="list-style-type: none"> • Coordinate with rail operators and owners to protect critical rail infrastructure and the people who use it. • Conduct rail security research and development. • Conduct rail security training. • Track hazardous materials shipments.
NTSB	<ul style="list-style-type: none"> • Investigate any rail accidents that result in at least one fatality or major property damage. • Recommend ideas that may prevent future accidents and set safety priorities.
MaineDOT OFPS	<ul style="list-style-type: none"> • Handle proceedings pertaining to the abolition, alteration, construction, relocation, or suspension of public highway-railroad crossings. • Perform track inspections in coordination with the FRA.

Source: FRA (2020); PHMSA (n.d.); TSA (n.d.-a); NTSB (n.d.-a); MaineDOT OFPS (n.d.)

Federal Railroad Administration

The Federal Railroad Administration (FRA) has primary responsibility for regulating, monitoring and improving safety on the nation's rail system. The FRA's Office of Railroad Safety is the primary regulatory body responsible for promoting and enforcing rail safety regulations. These regulations include basic operating rules for train safety, tank car safety, rail equipment safety, highway-rail grade crossing safety, bridge and structure inspections, track inspections, and trespass prevention.

Pipeline and Hazardous Materials Safety Administration

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is a division of USDOT and is responsible for regulating and ensuring the safe and secure movement of hazardous materials by all modes of transportation, including railroads. Specifically, the PHMSA in coordination with FRA regulates the rail transportation of poisonous by inhalation materials carried in tank cars. A 2009 regulation, "Hazardous Materials: Improving the Safety of Railroad Tank Car Transportation of Hazardous Materials," mandates commodity-specific improvements in safety features and design standards for newly manufactured DOT-specification tank cars. The regulation also imposes a 50-mph maximum speed restriction on all loaded poisonous by inhalation tank cars and allows for an increased gross weight of tank cars to accommodate enhanced safety measures.¹ As a result of the boom in crude oil transportation by rail during the 2010's, a revised tank car safety rule that specifically addresses issues associated with high-hazard flammable trains was adopted by the USDOT in 2015.²

Department of Homeland Security and Transportation Security Administration

The Transportation Security Administration (TSA) is housed within the Department of Homeland Security (DHS) and is responsible for oversight of both passenger and freight rail

¹ 74 Fed. Reg. 1770–1802 (Jan. 13, 2009).

² Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains, <https://www.transportation.gov/mission/safety/rail-rule-summary>.

security and protecting the nation's transportation systems to ensure freedom of movement for people and commerce. TSA works with industry leaders and other government partners to reduce threats to the freight rail network by producing security actions, procedures, and informational materials for the rail industry. The TSA also establishes rules for the proper routing, storage and transit of highly hazardous materials from state to finish, including shipment handoffs, secure areas for transfers, and reporting of shipment locations to the TSA. In addition, TSA works with passenger rail systems to ensure the safety and security of millions of passengers across the nation who use one of the 6,000 transit systems in the United States. As part of this role, the TSA funds surface transportation security grants to owners and operators of all passenger rail systems and freight rail carriers that transport rail-sensitive security materials through high-density population areas.

National Transportation Safety Board

The National Transportation Safety Board (NTSB) is an independent agency responsible for investigating all rail accidents that result in at least one fatality or major property damage. While the NTSB can both make recommendations aimed at preventing future accidents and set safety priorities, it has no regulatory enforcement authority.

MaineDOT Office of Freight and Passenger Services

The Office of Freight and Passenger Services (OFPS) forms policy, programs, and projects that improve Maine's freight transportation network as a cohesive system. The Office helps Maine fulfill their responsibility for regulating, monitoring and improving safety on the state's rail system as directed by U.S. DOT.³ The State's role in railroad safety and security is closely aligned to the federal requirements, and is often related to more localized conditions and circumstances.

3.2 Rail Safety Mandates

Rail Safety Improvement Act of 2008

In response to several fatal rail accidents between 2002 and 2008, Congress passed the Rail Safety Improvement Act of 2008 (RSIA). The RSIA established several important safety

³ 23 M.R.S. § 7312 (2021)

initiatives and programs. These regulations govern different areas related to railroad safety, such as hours of service requirements for railroad workers, positive train control (PTC) implementation, performance monitoring requirements, railroad safety risk reduction program, standards for track and bridge inspections, certification of locomotive conductors, and safety at highway-rail grade crossings. The legislation increases penalties for violations of safety laws and gives the FRA more enforcement tools. The legislation also contains provisions to improve the conditions of rail bridges and tunnels.

Federal Railroad Safety Act of 1970

The Federal Railroad Safety Act (FRSA) was enacted to promote safety in all areas of railroad operations. The regulations that were established are meant to reduce railroad-related accidents, reduce deaths and injuries, and reduce damage to property caused by accidents involving any carrier of hazardous materials.

FRSA also protects individuals working for railroad carriers from retaliation for reporting potential safety or security violations to their employers or to the government. In 2007, FRSA was amended to transfer authority for railroad carrier worker whistleblower protections to the Occupational Safety and Health Administration (OSHA). The law was most recently amended in 2008 to specifically prohibit discipline of employees for requesting medical treatment or for following medical treatment orders.

Americans with Disabilities Act

The Americans with Disabilities Act of 1990 (ADA) prohibits discrimination and ensures equal opportunity and access for persons with disabilities. The ADA and the ADA Amendments Act of 2008 were created to ensure safe and accessible transportation to all U.S. citizens.

In September 2011, the U.S. Department of Transportation issued amendments to Part 37 – Transportation Services for Individuals with Disabilities and Part 38 – Americans With Disabilities Act (ADA) Accessibility Specifications for Transportation Vehicles. These revisions require intercity, commuter, and high-speed passenger railroads to ensure, at new and altered station platforms, that passengers with disabilities can get on and off any accessible car of the train.

In March 2015, the U.S. Department of Transportation issued amendments to Part 27 – Nondiscrimination on the Basis of Disability in Programs or Activities Receiving Federal

Financial Assistance and Part 37– Transportation for Individuals With Disabilities. Revisions require transportation entities to make reasonable modifications/accommodations to policies, practices, and procedures to avoid discrimination and ensure that their programs are accessible to individuals with disabilities.

The FRA Office of Civil Rights is responsible for civil rights compliance and monitoring to ensure non-discrimination of inter-city rail services. The FRA and state of Maine work to provide passenger rail service that accommodates the safety of disabled passengers on trains and at stations.

Grade Crossing Action Plan Rule

The Federal Railroad Administration (FRA) published a Notice to Proposed Rulemaking (NPRM) in November 2019 requiring all states to create grade crossing action plans, and a Final Rule in December 2020 specifying the timeline and requirements for the SAPs.

State Action Plans provide an opportunity to conduct a systematic review of highway-rail grade crossings from the standpoint of safety risks, prioritizing needs, identifying specific solutions for improving safety, and developing strategic actions to improve crossing safety.

The scope of SAP work, which concluded in 2021, included stakeholder outreach, including coordinating a Project Advisory Committee (PAC) and conducting stakeholder interviews; collecting and analyzing highway, rail, and crash data; developing a risk analysis for Maine's grade crossings; and developing the State Action Plan (SAP). Stakeholder outreach efforts helped the consultant team identify key issues regarding highway-rail grade crossings, including public education around rail safety; maintenance needs around crossing equipment; and coordination between localities, law enforcement, and railroads with regards to enforcement, crossing maintenance, and data sharing.

Infrastructure Investment and Jobs Act (IIJA)

The Infrastructure Investment and Jobs Act (IIJA) established several programs to provide significant funding for passenger and freight rail projects with a safety impact. IIJA includes \$3 billion for the railroad crossing elimination program, increased funding for the FHWA Section 130 program, as well as \$5 billion for the Consolidated Rail Infrastructure and Safety Improvements Program (CRISI). Funding from CRISI can be utilized for a broad range of rail-

related capital investments, including installation of Positive Train Control, grade crossing upgrades or eliminations, as well as other safety-related improvements.

3.3 Rail Accident and Incident Statistics

The FRA uses the term “accident/Incident” to describe a number of reportable events, including collisions, derailments, and other events involving the operation of on-track equipment and causing reportable damage above an established threshold; impacts between railroad on-track equipment and highway users at crossings; and all other incidents or exposures that cause a fatality or injury to any person, or an occupational illness to a railroad employee. For reporting purposes, FRA accidents/incidents are divided into three major groups that correspond to the following FRA forms:

- » **Train accidents** are a safety-related event involving on-track rail equipment (both standing and moving), causing monetary damage to the rail equipment and track above a prescribed amount. Incidents exceeding a monetary threshold or involving a grade crossing, injury, or fatality are reported on form FRA F 6180.54 (Form 54) Rail Equipment Accident/Incident Report.
- » **Highway-rail grade crossing incidents** are any impact involving rail equipment and associated with a designated crossing site including walkways, sidewalks, etc. Incidents at a grade crossing are reported on form FRA F 6180.57 (Form 57) Highway-Rail Grade Crossing Accident/Incident Report.
- » **Other incidents** are any death, injury, or occupational illness of a railroad employee that is not the result of a "train accident" or "highway-rail incident." Reported on form FRA F 6180.55a (Form 55a) Railroad Injury And Illness Summary.

This section utilizes all three types of data to summarize rail incidents and accidents in Maine. Table 3.2 summarizes rail safety data in Maine from 2012 to 2021.

Table 3.2 Rail Safety Summary

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
Total Incidents	16	33	29	13	17	15	17	22	23	24	209
Fatalities	1	1	3	0	0	0	1	1	3	1	11
Injuries	8	19	17	12	16	11	13	14	11	19	140
Rail Equipment Incidents (Not at	5	8	2	2	0	2	0	5	3	0	27

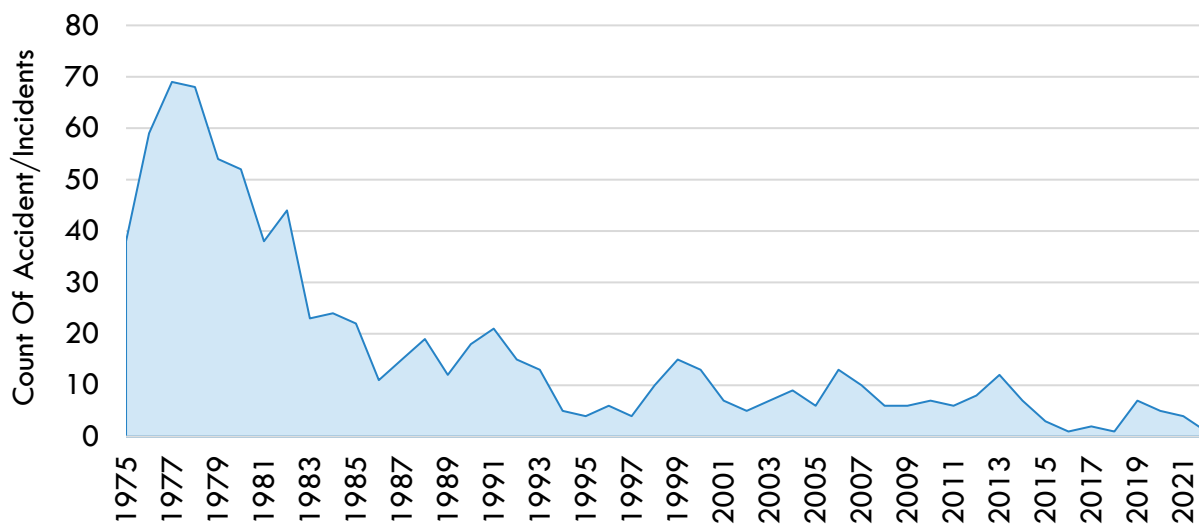
crossings, not trespassers)												
Fatalities	0	0	0	0	0	0	0	0	0	0	0	0
Injuries	0	0	0	0	0	0	0	0	0	0	0	0
Trespasser Incidents (Not at crossings)	1	3	5	0	1	0	1	1	2	3	17	
Fatalities	1	1	3	0	0	0	1	1	2	1	10	
Injuries	0	2	2	0	1	0	0	0	0	2	7	
Highway-Rail Grade Crossing Incidents	1	3	3	4	1	3	3	1	5	2	26	
Fatalities	0	0	0	0	0	0	0	0	1	0	1	
Injuries	1	1	2	6	2	2	0	0	3	6	23	
Other Incidents	9	19	19	7	15	10	13	15	13	19	139	
Fatalities	0	0	0	0	0	0	0	0	0	0	0	
Injuries	7	16	13	6	13	9	13	14	8	11	110	

Source: FRA Safety Data

Rail Equipment Accidents and Incidents

Rail accidents and incidents in Maine have fallen over the past decades, with fewer than 10 accidents or incidents every year but 2013 for the past decade (Figure 3.1).

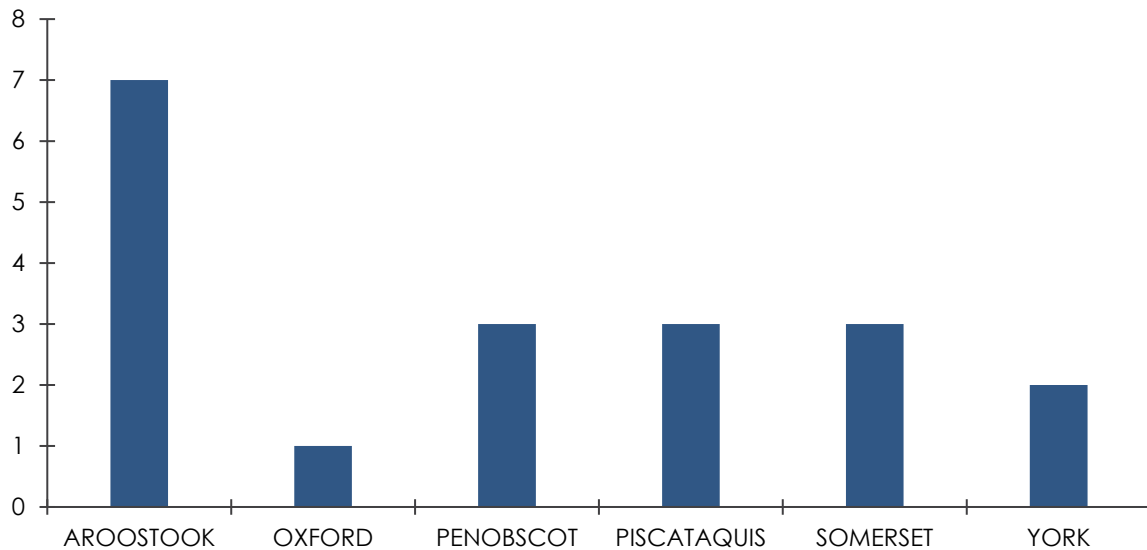
Figure 3.1 Historic Maine Rail Equipment Accident/Incidents (1975-2021)



Source: FRA Safety Data

The bulk of Maine's rail network is located in the southern half of the state, which aligns with the state's population density patterns. At the same time, incidents and accidents have occurred most frequently in Aroostook County over the past five years, reflecting that northern, rural county's high volume of rail traffic connecting New England markets to Canadian markets to the east, west, and north (Figure 3.2).

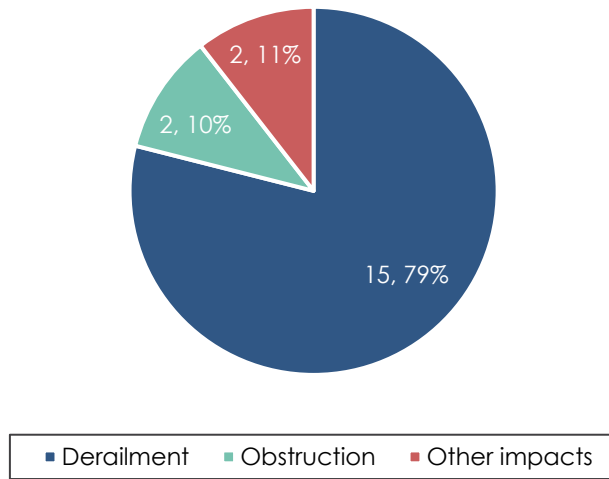
Figure 3.2 Maine Rail Equipment Accident/Incidents by County 2017-2021



Source: FRA

Among rail accidents and incidents, derailment is the most common type of incident. A derailment is a type of train accident where on-track equipment leaves the rail for a reason other than a collision, explosion, or highway-rail grade crossing impact. Derailments may be caused by operational errors or through track maintenance issues (e.g., broken or stretched rails, defective ties). Maine rail equipment accident/incident types from 2017-2021 are shown in Figure 3.3.

Figure 3.3 Maine Rail Equipment Accident/Incident Types 2017-2021



Source: FRA

Among incidents occurring in the past five years, there was a range in reported accident causes. Accident causes were categorized as related to the operation of on-track equipment, track maintenance, rolling stock and on-track equipment maintenance, and other causes such as vandalism and harmonics. The accident causes and incidents are listed in Table 3.3.

Table 3.3 Accident Cause and Number of Incidents by Category, 2017-2021

Operations	Track-Related Maintenance	Equipment Maintenance	Other Causes
<ul style="list-style-type: none"> Improper operation of train line air connections (bottling the air) (2) Throttle (power), improper use (1) 	<ul style="list-style-type: none"> Broken Rail - Base (1) Broken Rail - Transverse/compound fissure (2) Broken Rail - Vertical split head (1) Cross level of track irregular (at joints) (1) Track alignment irregular (buckled/sunkink) (2) Wide gage (due to defective or missing crossties and due to worn rails) (1) Roadbed settled or soft (1) 	<ul style="list-style-type: none"> Journal (plain) failure from overheating (1) Truck bolster stiff (failure to slew) (1) 	<ul style="list-style-type: none"> Interaction of lateral/vertical forces (includes harmonic rock off) (1) Object or equipment on or fouling track - other than above (for vandalism, see code M503) (2)

Source: FRA

Trespassing

There are two types of rail trespassing. The more commonly understood type of railroad trespassing is anytime a person accesses railroad property without authorization such as along the tracks or in a railyard. Accidents resulting from individuals trespassing on railroad property are a significant safety concern. Much of the railroad right-of-way is not fenced, and passenger stations are intended to be open to public access. Trespassers on railroad property put themselves at serious risk of injury or death, and also threaten the safety and security of railroad operations, employees and passengers. The circumstances around trespassing are complex and vary depending on location.

The second type of railroad trespassing is trespassing at a grade-crossing--when a motorist or pedestrian enters a crossing after the warning lights have illuminated and the gates have lowered. This action is commonly referred to as "going around the gates".

Over the past 10 years, Maine has seen relatively few trespassing incidents annually (Table 3.4). The rural nature of much of the state and the somewhat limited operations in Maine impact these data. However, for reasons of safety and security trespass on railroad rights-of-way is a serious issue and trespassers are subject to arrest and fines.

Table 3.4 Trespassing in Maine 2011-2020

Year	Trespassing Incidents at Railroad Crossings (Fatalities/Injuries)	Trespassing Incidents on RR Right-of-Way excluding grade crossings (Fatalities/Injuries)	Trespasser Suicide Incidents (Fatalities/Injuries)	All Trespasser Incidents (Fatalities/Injuries)
2011	1 (1/8)	0	0	1 (1/8)
2012	0	1 (1/0)	0	1 (1/0)
2013	0	3 (1/2)	1 (0/1)	3 (1/2)
2014	1 (0/1)	5 (3/2)	1 (1/0)	6 (3/3)
2015	2 (0/3)	0	0	2 (0/3)
2016	1 (0/1)	1 (0/1)	0	2 (0/2)
2017	2 (0/1)	0	0	2 (0/1)
2018	1 (0/0)	1 (0/1)	0	2 (0/1)
2019	0	1 (1/0)	1 (0/1)	1 (1/0)
2020	2 (1/0)	2 (2/0)	2 (2/0)	4 (3/0)
2021	1 (0/1)	3 (1/2)	0	4(1/3)
10-year total	11 (2/15)	17 (10/7)	5 (3/2)	28 (12/22)

Note: The 8 injuries in 2011 were passengers on an Amtrak train which collided with a trespassing highway vehicle at a railroad crossing.

Source: FRA (<https://data.transportation.gov/Railroads/Injury-Illness-Summary-Casualty-Data/rash-pd2d/data>)

3.4 Highway-Rail Grade Crossings

Public safety at highway-rail grade crossings has been a federal priority since conflicts first developed between trains and motor vehicles during the early 1900s. Federal grants for states to reduce hazards of highway-rail grade crossings were first established in 1933. Since 1974, the Federal Highway Administration's (FHWA) Railway-Highway Crossings Program (Section 130) has provided funds to states for the elimination of hazards at railway-highway crossings.

Maine's Grade Crossing State Action Plan (SAP), completed in 2021, provides the basis of much of the content in this section. The SAP's aim was to develop an ongoing strategy to reduce accidents and incidents at highway-rail and pathway grade crossings in the State of Maine. In doing so, it identifies specific actions designed to improve grade crossing safety with a focus on five primary types of conditions: passive crossings, active crossings, local crossings, trespassing, and incidents on the railroad right-of-way that are not located at a grade crossing. This includes highway-rail and pathway grade crossings that have experienced at least one accident or incident over the past three years; more than one accident or incident over the past five years; or are at high risk for accidents and incidents as defined in this plan.⁴

Grade Crossing Inventory

Table 3.5 summarizes all 2,722 rail crossings in Maine by the number of active and passive crossings. Public grade crossings comprise the vast majority of all active crossings in the state; 62 percent of public grade crossings (487 crossings) are active, compared with only three percent (26 crossings) of private highway-rail grade crossings. There are several public and private pathways, and these crossings are all equipped with passive safety features.

Table 3.5 Maine Grade Crossing Summary

Crossing Type	Active	Passive	Total
Unknown	5	37	42

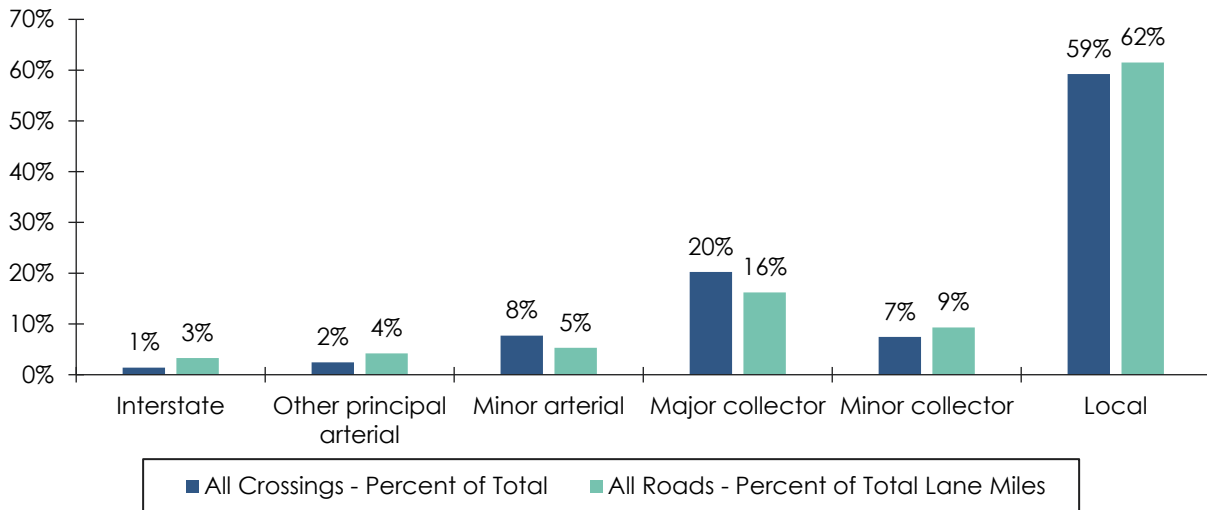
⁴ FRA Rule §234.11, State Highway-Rail Grade Crossing Action Plans, December 2020.

Crossing Type	Active	Passive	Total
Closed	62	768	830
Grade Separated	1	256	257
Private Highway-Rail Grade Crossing	26	775	801
Public Highway-Rail Grade Crossing	487	293	780
Private Pathway-Rail Grade Crossing	0	9	9
Public Pathway-Rail Grade Crossing	0	3	3
Total	581	2,141	2,722

Source: MaineDOT, FRA.

Maine is a rural state, and this characteristic is reflected in the fact that over one-half of public grade crossings (59 percent) are located along local roads. Figure 3.4 compares functional classifications by the portion of grade crossings and total lane miles. The chart indicates roughly comparable portions of crossings to lane miles total.

Figure 3.4 Functional Class by Crossings and Lane Miles



Source: Maine Grade Crossing SAP; FRA.

In general, the local crossings in Maine are passive (64 percent); have only one main track (85 percent); and have one (10 percent) or two (88 percent) lanes of traffic.

Safety at Highway-Rail Grade Crossings

The FRA and FHWA Manual of Uniform Traffic Control Devices (MUTCD), guided by the Highway-Rail Crossing Handbook Third Edition (Handbook), defines passive control crossings

as those with only a passive warning feature, such as a crossbuck, yield or stop signs, and/or pavement markings.⁵ These devices provide static messages of warning, guidance; and in some instances, mandatory action for the driver. Their purpose is to identify and direct attention to the location of a crossing to permit drivers and pedestrians to take appropriate action.

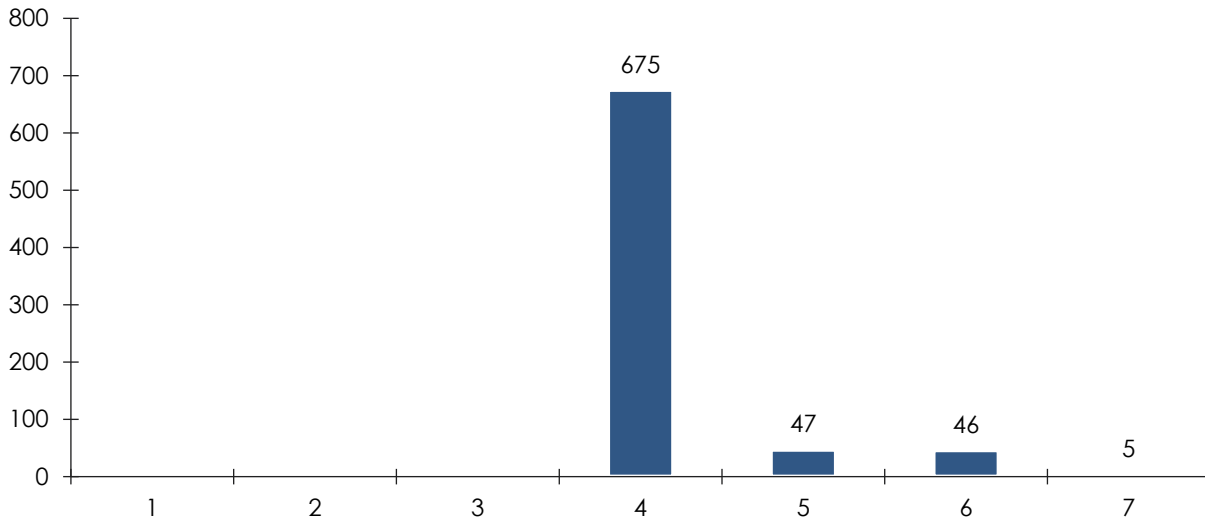
FRA defines active control crossings as those giving visual and audible advance notice of the approach of a train through active warning and control devices—such as bells, flashing lights, and/or gates—in addition to any passive control features. Active devices are typically activated by the passage of a train over a detection circuit in the track, except in those rare situations where manual operation is used. Agencies often add such active control features to a crossing to reduce incident risk.

There are several crossing characteristics that impact crossing safety:

- » **Number of tracks.** Crossings with a high numbers of tracks likely are located in or near rail yards and terminals with switching activity. Crossings with two or more tracks have higher risk as the highway vehicles have further to travel in the dynamic envelope. Drivers are also less likely to expect a second train on the other tracks, which can lead to risky driver behavior. In Maine, the vast majority of public grade crossings (87 percent) have only one track. The number of tracks at public grade crossings are shown in Figure 3.5.

⁵ The Highway-Rail Crossing Handbook Third Edition is intended for use by practitioners involved with the design and management of highway-rail crossings. The purpose is not to establish standards, but to provide guidance developing safe treatments for crossings. This edition is intended to be consistent with the 2009 edition of the MUTCD.

Figure 3.5 Tracks at Public Grade Crossings

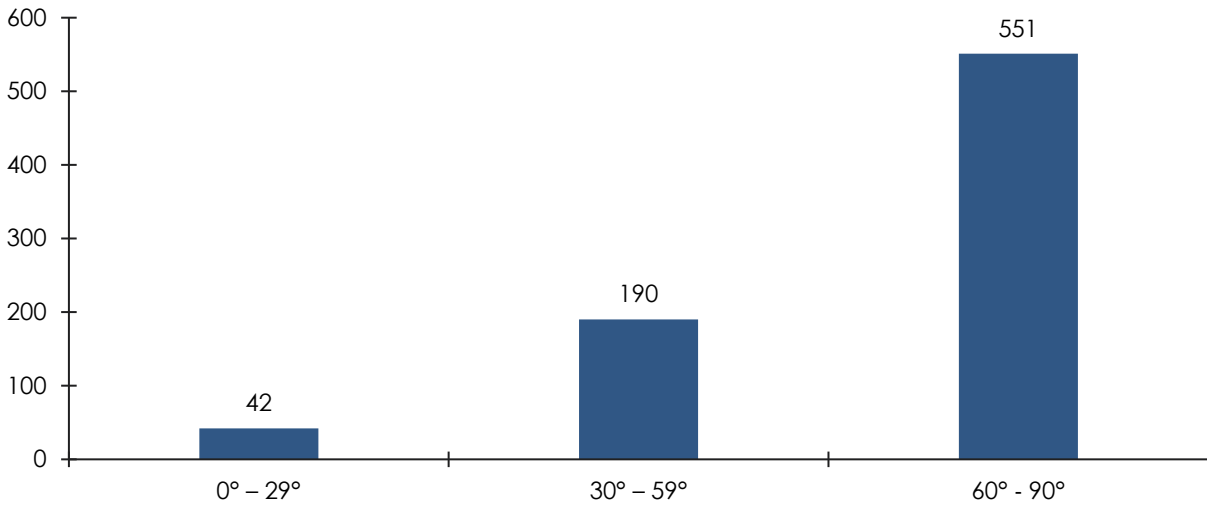


Source: Maine Grade Crossing SAP; FRA.

- » **Roadway geometry.** According to the FRA, the ideal crossing geometry is a 90-degree intersection of track and highway with slight-ascending grades on both highway approaches to reduce the flow of surface water toward the crossing.⁶ Topography or right-of-way (ROW) considerations often limit the ability to achieve this ideal geometry. At crossings with higher skew, or variation from this 90-degree ideal, motorists at one-half of the crossing quadrants have decreased visibility and must look over their shoulders to peer down the tracks. Most crossings in Maine lack extremely challenging roadway geometry, with 70 percent characterized by a 60- to 90-degree crossing angle. The crossing angles at public road crossings are shown in Figure 3.6.

⁶ https://safety.fhwa.dot.gov/hsip/xings/com_roaduser/fhwasa18040/chp2c.cfm.

Figure 3.6 Smallest Crossing Angle, Public Road Crossings

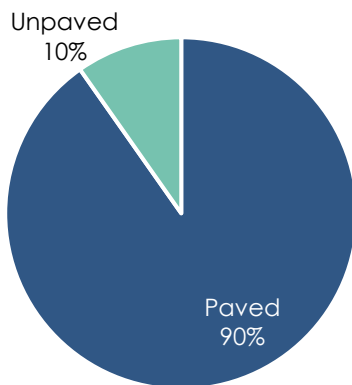


Source: Maine Grade Crossing SAP; FRA.

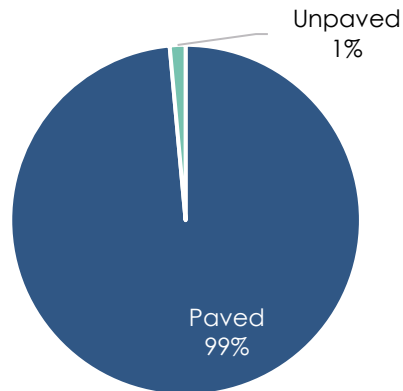
» **Pavement condition.** Among public grade crossings in Maine, 92 percent are paved. Most unpaved crossings are located in rural areas, likely experiencing low levels of vehicular traffic. About 90 percent of rural crossings are paved, while 99 percent of all urban crossings are paved. Paved and unpaved crossings are shown in Figure 3.7.

Figure 3.7 Pavement Conditions in Rural versus Urban Areas

Paving at Public At-Grade Crossings in Rural Areas



Paving at Public At-Grade Crossings in Urban Areas



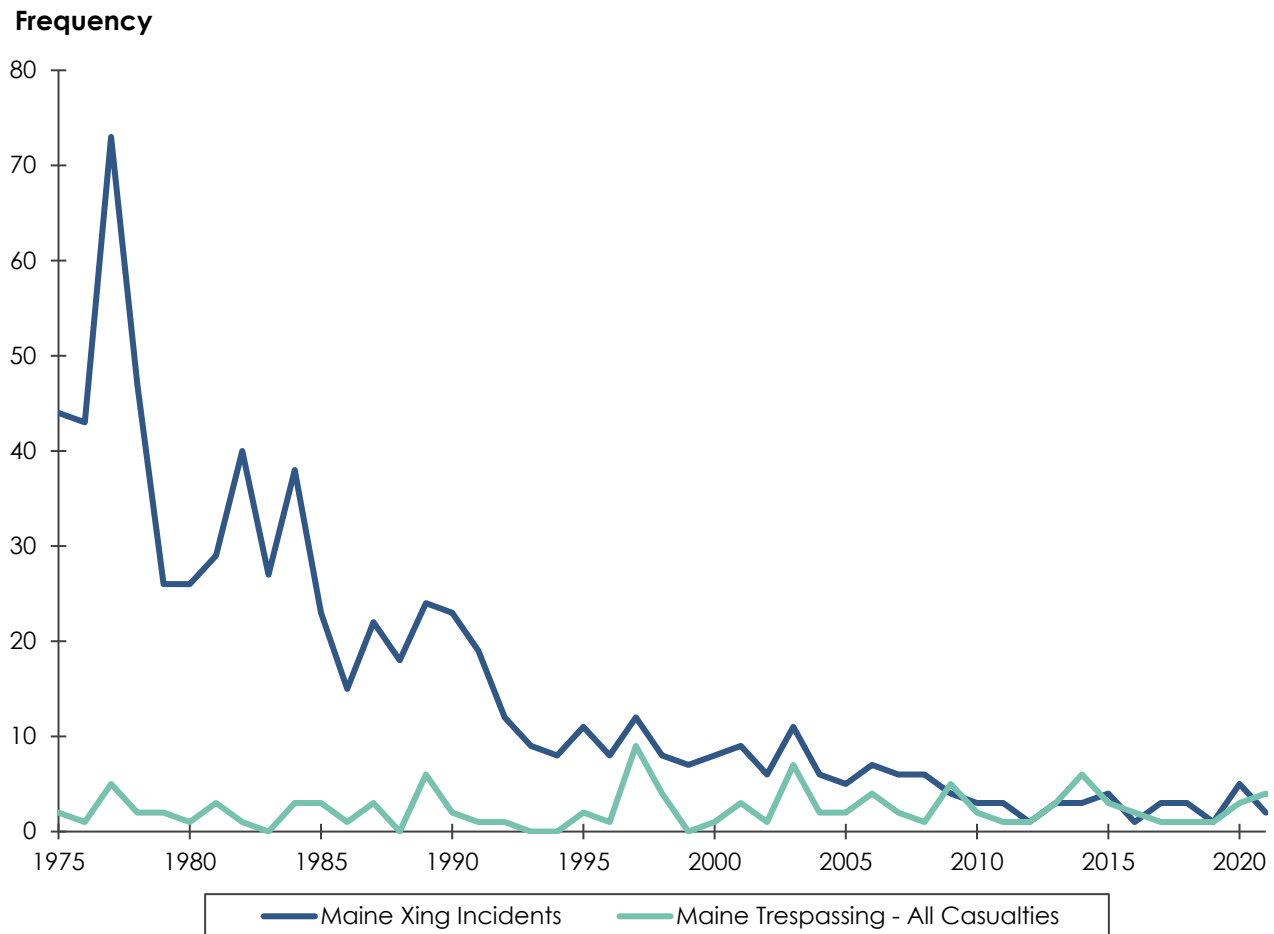
Source: Maine Grade Crossing SAP; FRA.

Highway-Rail Grade Crossing Accidents

After steadily declining during the 1990s and 2000s, the number of annual crossing incidents across the US, including those with injuries and fatalities, has plateaued. There are several reasons for the declines occurring through the 2000s, including crossing upgrades, improved vehicle technology, and driver education. Maine's crossing and trespasser history aligns with these national trends with both having decreased precipitously since 1975 (Figure 3.8).

In Maine, there have been 26 incidents reported in the FRA database for the most recent 10-year period of 2012 to 2021. Of those incidents, 21 occurred at public crossings. Of the 26 incidents that did not occur at public crossings, 5 incidents were located at private highway crossings. The higher number of incidents at public crossings is expected, given the typically higher volume of motor vehicle traffic on public compared to private property.

Figure 3.8 Crossing and Trespasser History, 1975 to 2021



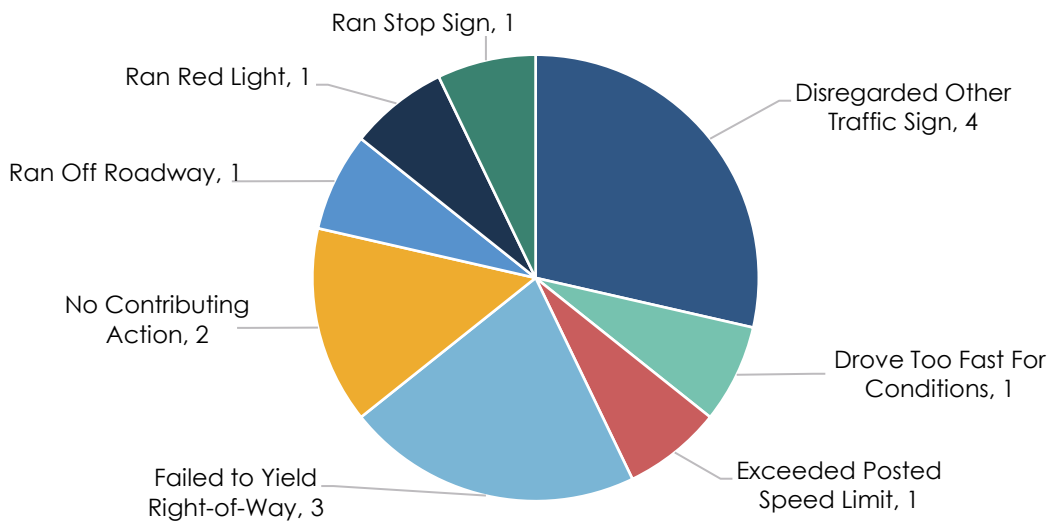
Source: FRA

Serious incidents at grade crossings in Maine are rare. Of the incidents reported in the FRA database over the 10-year period from 2011 to 2021, only 9 incidents involved any injuries and 2 incidents were fatal.

There are three general types of crashes at Maine's grade crossings:

- » **Rear-End/Sideswipe, Low Injury.** This category of crashes encompasses 59 percent of crashes. These crashes were mostly minor in nature, with 72 percent entailing property damage only and only one suspected serious injury. The bulk of these crashes occurs within the jurisdiction of the Portland Area Comprehensive Transportation System (PACTS) region or in rural areas.
- » **Train-Involved, With Injuries.** There were just 13 crashes involving trains with injuries, and these incidents occurred across a range of road types. For all but one of these crashes, the sole traffic control device recorded for the crossing was a railroad crossing device, typically a passive indication like a cross-buck, or an active system like lights and gates.

Figure 3.9 Driver Contributing Action, Train-Involved No Injury

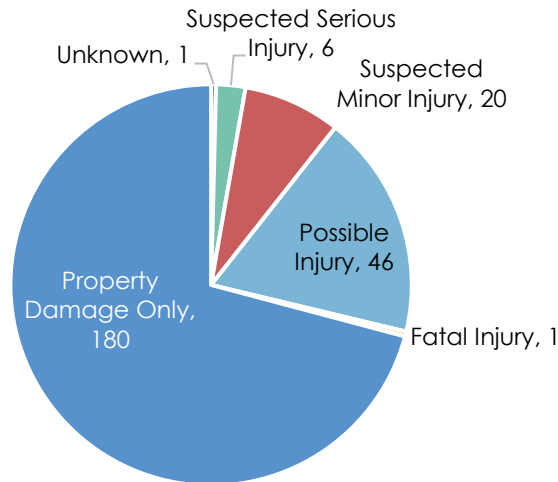


Source: FRA

- » **Train-Involved, Without Injuries.** There are several traffic control devices associated with the crossings in this category; unlike the train-related injury crashes, several crossings among the 14 no-injury crossings are equipped with stop signs and traffic signals. The top two driver behaviors associated with incidents were disregard for traffic signs and failing to yield the right-of-way (Figure 3.9).

MaineDOT crash data provide additional detail on crash types that do not involve trains. the majority of crashes recorded in Maine's state data is categorized as property damage only; of the 254 crashes, 180 of them (71 percent) are property damage only (Figure 3.10).

Figure 3.10 Injury Level By Incident, State Crash Data



Source: FRA

SAP Proposed Actions

Maine's Grade Crossing State Action Plan (2021) identifies a series of action steps to address these challenges. Strategies and action steps are organized by the plan's objective areas, which were defined by areas of specific crossing safety importance in Maine.

- » **Active and passive crossings.** For both crossing types, strategies entail site and operational/maintenance improvements; conducting coordinated outreach and education to railroads and the public, and improving MaineDOT's data inventory (e.g., AADT and train volumes). In the case of passive crossings, additional steps include increasing the number of locations with active warning devices and reducing the overall number of grade crossings in Maine. For both crossing types, site improvement action items included developing a prioritized list of crossings that could be addressed systematically through the risk model as well as coordination around signage, sight distance, pavement markings, and other features. Active crossing action steps included additional steps such as consolidation of curbs and cameras, upgraded equipment, signal preemption, and ensuring that active systems are working properly.

- » **Local road crossings.** Strategies included site and operational/maintenance improvements; conducting coordinated outreach and education to railroads and the public, and improving MaineDOT's data inventory. For the data inventory strategy, the action step was to develop a process to capture complaints in location prioritization process from risk model. Coordinated outreach and education action steps included engagement through Operation Lifesaver (OLI), public-private partnerships for rail improvements, training with local agencies on responsibilities at crossings, and information distribution through social media and other channels.
- » **Trespassing at grade crossings and trespassing at railroad right-of-way.** For both trespassing types, strategies included increasing enforcement efforts in areas with high/repeat trespassing incidences; using smart technologies or physical barriers to deter or detect trespassing; and conducting coordination and outreach to railroads, local law enforcement agencies, and the public. Engagement and coordination action items involve engagement with local police on enforcement challenges and the need for consistent police enforcement, while smart technologies implementation included the use of fencing, signage, and cameras or, in the case of trespassing at grade crossings, the use of grid smart technology and cameras that set off trespassing alarms.

3.5 Safety Programs and Projects

Operation Lifesaver

Operation Lifesaver is a nationwide non-profit public education and information program with a mission to end collisions, injuries, and fatalities at, on, and around railroad tracks and at highway-rail grade crossings. The program coordinates a nationwide network of volunteers who work to educate people about rail safety. Operation Lifesaver, Inc. partners with federal transportation agencies, national transportation organizations, railroads, and safety engineering and rail supply companies to achieve its mission.

In an effort to reduce the number of collisions, injuries and fatalities at railroad crossings and along Maine's nearly 1,200 miles of active rail lines, the state has been very active in OLI, which is a nonprofit public education and information program. Maine OLI engages in various outreach efforts to raise safety awareness, especially in neighborhoods adjacent to railroad corridors, and to educate the general public of the danger of being on or too close to the tracks. Members of the state committee include officials representing Maine's

railroads, private industry, MaineDOT, and FRA. Operation Lifesaver safety information is available at <https://community.oli.org/state/me>.

MaineDOT Grade Crossing Safety Improvement Program (Section 130 Funds)

MaineDOT manages the Grade Crossing Safety Improvement Program which funds safety projects at railroad grade crossings with public roads. This program provides funds for signal installation/upgrades to enhance safety at grade crossings. The state share of funding for this program is provided through the FHWA's Railway-Highway Crossings Program biennial appropriations process, also known as the Section 130 Program.

The Section 130 Program provides funds for the elimination of hazards and the improvement of safety at railway-highway crossings. As a requirement of the program, states must submit an annual report on the progress and effectiveness of program implementation. The report includes the number of projects undertaken, the nature of each improvement, and an assessment of the effectiveness of each safety improvements. FHWA allocates \$1.2 million in Section 130 funds to MaineDOT each year for safety improvements at Maine's rail/highway crossings. Traditionally, these funds have been used for improvements to signals and roadway surfaces. MaineDOT Section 130-apportioned funds provided funding in part or full for nine projects in Fiscal Year 2022.

4. RAIL NEEDS AND OPPORTUNITIES

This chapter describes the known and proposed improvements and investments which were prioritized to address challenges or deficiencies in Maine's rail system. An overview of projects identified by Maine railroads and other participants in the outreach activities conducted during the development of this State Rail Plan is provided.

4.1 Rail Improvement Opportunities

The list of known and potential rail projects was developed based on input from the stakeholder engagement. These potential improvements were categorized separated into freight and passenger categories. The projects themselves are listed in Appendix A with a project description, project type, rail carrier(s) on which the improvement will occur, and the

estimated costs, where available. Details on short-term (2023-2026) and long-term projects (2027-2042) are presented in the investment plan Section 5 of this Technical Memorandum. It is important to note that the freight railroads regularly undertake capital projects on their own behalf to address state of good repair, capacity, and customer needs. Since these investments do not involve public funding, quite often the cost, scope and timing are not shared with MaineDOT or the public more generally. Thus, only the subset of those projects that have been publicly identified are discussed below.

Passenger Rail Improvement Opportunities

The passenger rail improvement opportunities were organized into five categories: safety, passenger service improvement, passenger service expansion, corridor preservation, and multimodal connectivity. These passenger rail project categories are described below.

- » **Safety.** Positive train control (PTC) is a federally mandated railroad safety improvement that is capable of reliably and functionally preventing train-to-train collisions, over-speed derailments, incursions into established work zone limits, and the movement of a train through a main line switch in the improper position. As of 2022, none of Maine's rail network is equipped with PTC, nor is it required under current federal regulation on the basis of freight traffic density, hazardous materials (HAZMAT) risk, and passenger train traffic. The implementation of PTC on the *Downeaster* route is a critical step to increasing the frequency and speed of the *Downeaster* service. The installation of PTC removes the frequency limitations (six daily roundtrips) applied to passenger services which operate across routes lacking the technology. Additionally, the installation of PTC may permit speeds beyond today's maximum of 79 mph at locations along the route where conditions permit. Amtrak and CSX have entered into an agreement for the design of the system. Safety at grade crossings also is a concern for passenger trains. Grade crossing safety needs are discussed in the following Section *Freight Rail Improvement Opportunities*.
- » **Passenger Service Improvement.** Passenger rail service is examined to determine how the operations and effectiveness of existing routes can be improved. Adding, improving, or relocating stations can improve ridership through increased connectivity to population and employment hubs and can improve train operations by avoiding time-consuming movements. Adding or improving platforms can increase capacity for operations and

passengers by increasing the number of simultaneous train boardings and alightings. Additional track capacity such as siding extensions and double-track extensions can improve the service reliability and schedule flexibility of both passenger and freight trains by allowing for increased passenger train frequency and reducing conflict with freight traffic. NNEPRA has an agreement with the host railroad, CSX, to fund capital maintenance and SOGR projects on the *Downeaster* corridor. Workplans are established each year based on need. NNEPRA and CSX continue to collaborate to determine other infrastructure project work needs, including possible double-track extensions for strategic improvements to service reliability. Improvements to rolling stock and equipment can both improve the reliability of the equipment and improve comfort for riders, which can help improve ridership. The replacement of the *Downeaster* rolling stock fleet to support existing and potential additional service is not part of this Rail Service and Investment Program (RSIP). The new fleet is scheduled to be delivered in 2030 and is part of a larger Amtrak procurement that is being fully paid for by Amtrak using federal funds.

- » **Passenger Service Expansion.** Passenger service expansion extends existing passenger rail lines to service new areas. Access to multimodal transportation options helps ensure equity for those who cannot or do not own a personal vehicle to access education, jobs, housing, healthcare, and other destinations.
- » **Corridor Preservation.** Dormant rail corridors offer significant potential for other transportation uses; historically, once a rail corridor is converted into a different use, it does not return to rail use. Preserving abandoned rail corridors for possible future rail usage is vital to ensuring that vast regions of the state do not lose access to the efficiencies, economies, and environmental benefits of rail service. For passenger rail, these corridors also ensure that future generations will have the option to expand or implement passenger rail in their area. MaineDOT must continue to preserve its rail corridors under the Maine Rail Preservation Act so that rail service can return when viable to state-owned rail corridors.

The RSIP consists of 11 passenger rail projects that were organized as either short-term (2023–2026) (Table 4.1) or long-term (2027–2042) (Table 4.2) projects.

Table 4.1 Short-Term 2023–2026 Passenger Rail Program

Project Name	Carrier(s)/ Sponsor(s)	Project Description	Project Type
Downeaster Wells Station Double Track and Platform	NNEPRA, CSX, Amtrak	Extend double track and add passenger platform at Wells Station.	Passenger Service Improvement
Positive Train Control (PTC)	CSX, Amtrak	The implementation of PTC on the <i>Downeaster</i> service is a critical step to continued growth in <i>Downeaster</i> service. Amtrak and CSX have entered into an agreement for system design. The installation of PTC removes the frequency limitations (maximum of six daily roundtrips) applied to passenger services that operate across routes lacking the technology. Additionally, the implementation of PTC may permit speeds beyond today's maximum of 79 mph at locations along the route where conditions permit.	Safety
Portland Station Relocation	NNEPRA	Relocate the <i>Downeaster</i> Station in Portland to the main line to avoid time-consuming back-up moves. This move will improve travel times through Portland, increase connectivity to population and employment hubs, and fully realize ridership potential within Maine as well as along the entire corridor between Maine and Boston.	Passenger Service Improvement
New West Falmouth Station	NNEPRA	NNEPRA, in collaboration with the Town of Falmouth, MaineDOT, and MTA, is exploring adding a <i>Downeaster</i> passenger platform in West Falmouth at Exit 53. This location would improve connectivity to/from the I-95 corridor.	Passenger Service Improvement
Rockland Branch Coastal Connection Service Extension Pilot	MaineDOT, NNEPRA, Midcoast Rail, Amtrak	Pilot connecting passenger rail service between Brunswick and Bath, Wiscasset, Newcastle, Waldoboro, and Rockland.	Passenger Service Expansion
Commuter Bus Connection between Lewiston-Auburn and Portland	MaineDOT, NNEPRA, Amtrak	Pilot commuter bus connection between <i>Downeaster</i> service and Lewiston-Auburn.	Multimodal Connectivity
Passenger Rail Service Evaluation and Financial Analysis	Varies	Continue passenger rail planning expansion/connectivity efforts based on results of ongoing and future feasibility/propensity studies (e.g., Portland-Lewiston-Auburn, Brunswick-Augusta-Waterville-Bangor).	Passenger Service Expansion
Preservation of Rail Corridors	Varies	Continue to protect integrity of rail corridors for future freight and passenger transportation needs using Maine's Rail Preservation Act	Corridor Preservation

Table 4.2 Long-Term 2027–2042 Passenger Rail Program

Project Name	Carrier(s)/ Sponsor(s)	Project Description	Project Type
CSX Mainline Double-Tracking to Accommodate Downeaster Operations	CSX, NNEPRA, Amtrak	Long sections of single track restricts efficient movement of trains. Additional double track/siding extensions are being evaluated to improve reliability and schedule flexibility.	Passenger Service Improvement
Continue Passenger Rail Service Evaluation and Financial Analysis	Varies	Continue passenger rail planning expansion/connectivity efforts based on results of ongoing and future feasibility studies (e.g., Portland-Lewiston-Auburn, Brunswick-Augusta-Waterville-Bangor).	Passenger Service Expansion
Preservation of Rail Corridors	Varies	Continue to protect integrity of rail corridors for future freight and passenger transportation needs using Maine's Rail Preservation Act	Corridor Preservation

Freight Rail Improvement Opportunities

The freight rail needs were organized into five categories as described below. Many of these rail projects would also benefit passenger rail by improving the reliability, safety, and efficient operation of both passenger and freight trains.

- » **State of Good Repair (SOGR)/Infrastructure Upgrade.** SOGR/infrastructure upgrades entail improvements to infrastructure to meet market demands now and in the future and maintain competitive rail service and market relevance. Freight infrastructure needs include removing vertical, horizontal, and weight restrictions; improving train capacity; and reopening out-of-service rail lines. Upgrading track and structures to handle 286,000-pound (286k) freight cars, double-stacked containers, and oversize loads, is necessary for railroads to remain profitable and competitive. Capacity projects such as double tracking, adding sidings, rehabilitating existing track, reconstructing segments, raising line speeds, and expanding capacity at interchanges improve the reliability and resiliency of rail service. Reopening out-of-service rail lines based on market demand increases opportunities for more customers to access freight rail service, which improves the economic success of businesses by providing them with multimodal connections and options for moving their goods to market. Rail infrastructure repair and upgrades ensure the continued function of the state's rail network for both freight and passenger rail service.

- » **Customer Access.** Customer access to rail service is a critical part of ensuring the future viability of rail transportation and business. Customer access can be improved by providing rail access to existing or new customers with new or improved connections to commercial and industrial developments, ports, intermodal, and transload facilities. Specific freight that currently is not being shipped by rail could be diverted to rail by constructing or rehabilitating a rail spur or enhancing or rehabilitating rail access to the state's transload and intermodal facilities. Customer access projects are commonly administered under MaineDOT's Industrial Rail Access Program (IRAP), which is projected to invest \$4 million (\$2 million from state funds and \$2 million from matching private funds) annually over the near term. IRAP provides financial assistance to businesses and shippers for investment in rail or freight rail-related infrastructure located on, within, or adjacent to the general railroad system.

- » **Grade Crossing Safety.** Highway-rail grade crossings are a potential conflict point between highway traffic, pedestrians, bicyclists, and trains. A grade crossing crash has the potential to injure pedestrians, cyclists, highway-vehicle occupants, train crews, passengers aboard the train, and anybody in the vicinity. Fast moving trains need thousands of feet to come to a complete stop, and crashes with vehicles or trains carrying HAZMAT can have catastrophic results. The best approach to addressing grade crossing safety needs is closing crossings— since this has negative effects on roadway network connectivity, this is not always an option. Grade separations also are helpful for removing the highway-rail conflict but are very expensive. Installing active warning devices and improving signage and markings at passive crossings also are helpful but depend on the cooperation of the public to be effective—and many crashes occur when drivers drive around the crossing gates despite being warned of an oncoming train. Other actions to reduce public safety risks include crossing profile improvements which can improve visibility for drivers and pedestrians and reduce the number of vehicles that get stuck or pinned on a crossing. Lighting also is helpful to increase visibility at the crossing and prevent drivers from driving off the crossing itself and onto the tracks which can cause low-clearance vehicles such as passenger cars to get stuck between the rails. A primary focus of Maine's railroad safety efforts entails reducing the frequency and severity of incidents at highway-rail grade crossings through the installation or improvement of warning systems. Managed through MaineDOT's FHWA Section 130 program, typical investments include installation of warning devices such as lights and gates, LED flasher upgrades, circuitry upgrades, and crossing profile improvements.

- » **Rolling Stock.** While railroads generally acquire rolling stock through private funding, there is a role for public support in some areas, particularly in the realm of locomotives. With the lifespan of locomotives measured in decades and costs for new ones in the millions, smaller railroads typically utilize power that does not meet current emissions standards. Thus, significant and cost-effective reductions in emissions can be gained by providing support to acquire new low-emission switching locomotives or retrofitting existing locomotives with auxiliary power units, which allows idle units to be shut down and readily restarted in cold weather. Locomotive modernizations also allow railroads to use locomotives with higher tractive effort, thereby reducing overall fleet requirements, reducing fuel consumption, and increasing reliability. Rolling stock improvements also include the acquisition of new or rehabilitated freight railcars such as cars specific to commodities that need to be moved. Maine has a robust market for timber shipments. Chip and log fiber cars, box cars, center beam cars, and other such railcars are useful for moving commodities to and from mills. The acquisition of new railcars specific to common commodities in Maine will accommodate growth in rail shipments and give business owners more modal options, which will help to relieve shipping restrictions related to truck driver shortages, demand of specific products (such as refrigerated products), and changing traffic patterns related to droughts in the Pacific Northwest.
- » **Multimodal Connectivity and Terminal Improvements.** Terminals allow for goods to transfer between transportation modes such as rail freight, air cargo, water shipments, and trucks. Addressing the needs at terminals helps to support the shifting of goods between modes and enhances the overall capacity and reliability of the transportation system. By enabling the free flow of goods between different transportation modes, the resiliency of the system is enhanced and enabled to mitigate potential disruptions due to flooding and natural disasters. Terminals can be improved by enhancing capacity to handle more overall traffic. Capacity can be expanded by adding or improving transload sites, building or upgrading terminal trackage, and improving the amenities at the facilities. Terminal improvements support existing customers and attract new customers.

The Maine RSIP consists of 33 freight projects that were organized as either short-term (2023–2026) (Table 4.3) or long-term (2027–2042) (Table 4.4) projects.

Table 4.3 Short-Term 2023–2026 Freight Program Investments

Project Name	Railroad	Project Description	Project Type
Improve tie conditions	CP	Improve tie conditions along former CMQ route to support higher speeds and ensure reliable operation.	SOGR / Infrastructure Upgrade
Upgrade trackage from Bangor through Moosehead	CP	Rehabilitate recently acquired trackage between Bangor and Moosehead to achieve SOGR.	SOGR / Infrastructure Upgrade
Maintain and expand freight car fleet in Maine and beyond to meet customer needs	CP, CSX, EMRY, MNR	Acquisition of chip and log fiber cars, box cars, center beam cars, etc. to move commodities to and from customers. Needed to accommodate market growth and replace cars subject to mandatory retirement.	Rolling Stock
Increase Rigby Yard capacity.	CSX	Increase rail capacity and trackage at Rigby Yard in South Portland to reduce congestion.	Multimodal Connectivity & Terminal Improvements
Waterville-Mattawamkeag 286k capacity and safety improvements	CSX	Replace approximately 75 miles of rail, replace approximately 55,000 ties, upgrade 72 grade crossings, and reinforce five bridges in central Maine between Waterville and Mattawamkeag. Improvements needed to accommodate 286k freight cars and increase speeds from 10 to 25 mph.	SOGR / Infrastructure Upgrade
Waterville-North Yarmouth upgrades and rail crossing safety improvements	CSX	Rehabilitate and modernize 75 miles of mainline track, eight bridges, and 89 rail crossings on CSX main line between Waterville and North Yarmouth.	SOGR / Infrastructure Upgrade
Rockland Branch bridge improvements – feasibility and engineering	Midcoast Rail	Feasibility and engineering for bridge improvements on the Rockland Branch to achieve state of good repair.	SOGR / Infrastructure Upgrade
Maine Northern Rail Improvements Project (2022 CRISI)	MNR	Provide rehabilitation and betterment to more than 138 miles of track in northern Maine. The improvements will increase reliability and allow for Class 2 (25mph track speeds) on four lines that are all owned by the State of Maine and operated by MNR: the Madawaska Subdivision, the Houlton Subdivision, the Presque Isle Subdivision, and the Fort Fairfield Subdivision.	SOGR / Infrastructure Upgrade

Project Name	Railroad	Project Description	Project Type
Maine Woods to Water Rail Connection Project (2023 CRISI Application)	MNR, CP	MaineDOT; MNR; CP; Our Katahdin; and Highland Pellets, LLC intend to make numerous railroad infrastructure improvements to support freight railroading in Maine and a \$300-million sustainable wood pellet plant. The rail grant would fund mainline, railyard, port, and spur track improvements leading to Our Katahdin's One North industrial site. Located on the site of the former Great Northern Paper Mill in Millinocket, the pellet plant will be one of the largest rail shippers to locate in Maine, attracting family-wage jobs and generating environmental benefits. The plant will utilize scrap timber, sawmill residuals, thinnings, and other sustainable wood fiber sourced throughout the North Maine Woods to create renewable carbon sources for electrical and industrial applications. Finished pellets will ship on rail through Brownville Junction to Searsport for transload to ships destined to foreign markets.	Multimodal Connectivity & Terminal Improvements
Upgrades of trackage from Houlton to Brownville	MNR, EMRY	Improve track safety standards, SOGR, and capacity on in the corridor to prepare for significant increases in traffic related to movements of wood fiber and finished goods in the corridor related to significant plant expansions in the region.	SOGR / Infrastructure Upgrade
Bridge upgrades	Multiple	Subject to development of both freight and passenger service needs, continue to extend rail restoration.	SOGR / Infrastructure Upgrade
Various, 286k rail car capacity	Multiple	Initiate ongoing program to accommodate 286k rail cars, subject to needs analysis.	SOGR / Infrastructure Upgrade
286k capacity	SLR	Rail replacement, tie renewal, ballast, and surfacing to achieve 286k capacity on the SLR.	SOGR / Infrastructure Upgrade
SLR Locomotive Modernization	SLR	Upgrade to modern locomotives for more tractive effort to reduce fleet requirements, reduce fuel consumption and emissions, and increase reliability.	Rolling Stock
Industrial Rail Access Program	Varies	IRAP provides financial assistance to businesses and shippers for investment in rail or freight rail-related infrastructure located on, within, or adjacent to the general railroad system.	Customer Access
Rail bridge improvements, state-owned	Varies	Ongoing improvements and upgrades to state-owned railroad bridges to accommodate railcars loaded up to the industry standard of 286,000-pound gross vehicle weight.	SOGR / Infrastructure Upgrade
Rail Highway Crossing Safety Program	Varies	The Railway-Highway Crossings (Section 130) Program provides funding for the elimination of hazards at railway-highway crossings.	Grade Crossing Safety

Table 4.4 Long-Term 2027–2042 Freight Program Investments

Project Name	Railroad	Project Description	Project Type
Propane storage tracks at Hampden	CP	Add storage track for propane cars to accommodate growth of the commercial market for propane in Maine.	Customer Access
Upgrade trackage from Bangor through Moosehead	CP	Rehabilitate recently acquired trackage between Bangor and Moosehead to achieve SOGR.	SOGR / Infrastructure Upgrade
Maintain and expand freight car fleet in Maine and beyond to meet customer needs	CP, CSX, EMRY, MNR	Acquisition of chip and log fiber cars, box cars, center beam cars, etc. to move commodities to and from customers. Needed to accommodate market growth and replace cars subject to mandatory retirement.	Rolling Stock
Add/expand sidings between Waterville and Portland	CSX	Add/expand sidings between Waterville and Portland to accommodate additional traffic.	SOGR / Infrastructure Upgrade
Improvements at Waterville	CSX	Improvements at Waterville as needed.	Multimodal Connectivity & Terminal Improvements
Increase usage of International Marine Terminal in Portland	CSX	Coordinate with MPA, EIMSKIP, and CSX to increase usage and establish regular intermodal service at IMT.	Multimodal Connectivity & Terminal Improvements
Woodland pulp mill bridge improvements	EMRY	Strengthen bridges to Woodland pulp mill to accommodate 286k railcars.	SOGR / Infrastructure Upgrade
Rockland Branch bridge improvements – continue construction	Midcoast Rail	Continue construction for bridge improvements on the Rockland Branch to achieve state of good repair.	SOGR / Infrastructure Upgrade
Add loading site at Skyway Industrial Park, Presque Isle	MNR	Provide loading site for grain and starch products.	Customer Access
Propane storage tracks at Millinocket	MNR	Add storage track for propane cars to accommodate growth of the commercial market for propane in Maine.	Customer Access
Propane storage tracks at Presque Isle	MNR	Add storage track for propane cars to accommodate growth of the commercial market for propane in Maine.	Customer Access
Upgrade 1,800-foot rail spur at Skyway Industrial Park, Presque Isle	MNR	Upgrade 1,800-foot spur for railcar storage and transload site.	Customer Access
Double-stack clearances on main lines	Multiple	Subject to needs analysis, initiate ongoing program to upgrade principal rail lines to accommodate double-stack trains.	SOGR / Infrastructure Upgrade

Project Name	Railroad	Project Description	Project Type
Improvements at Auburn Intermodal Facility	SLR	Improvements at Auburn intermodal facility as needed	Multimodal Connectivity & Terminal Improvements
Propane storage tracks at Auburn	SLR	Add storage track for propane cars to accommodate growth of the commercial market for propane in Maine.	Customer Access
Rail Highway Crossing Safety Program	Varies	The Railway-Highway Crossings (Section 130) Program provides funding for the elimination of hazards at railway-highway crossings.	Grade Crossing Safety

5. RAIL SERVICE AND INVESTMENT PROGRAM

This chapter describes Maine's RSIP by summarizing the rail investment priorities. This RSIP presents the investments necessary to achieve the state's passenger and freight rail vision.

5.1 Passenger and Freight Rail Capital Program

Short-term (2023–2026) and long-term (2027–2042) capital expenditures are summarized in Table 5.1, below. The total short-term capital program for freight and passenger rail projects envisions expenditures of \$387.6 million in known costs. Approximately \$187.2 million and roughly 48 percent of the total short-term planned investments, with known costs, are for the passenger rail network, with significant investments in safety and passenger service improvements. The projects themselves are listed in Appendix B with a project description, project type, rail carrier(s) on which the improvement will occur, and the estimated costs, where available.

Table 5.1 Summary of Passenger and Freight Rail Capital Program

Category	Short-Range 2023–2026		Long-Range 2027–2042	
	Projects	Cost (\$Million)	Projects	Cost (\$Million)
Passenger Rail Element:				
Safety	1	\$100.00	0	-
Passenger Service Improvement	3	\$81.00	1	TBD
Passenger Service Expansion	2	\$3.00	1	TBD
Corridor Preservation	1	\$3.20	1	\$12.80
Multimodal Connectivity	1	TBD	0	-
Passenger Rail Total	8	\$187.20	3	\$12.80
Freight Rail Element:				
SOGR/Infrastructure Upgrade	11	\$122.61	5	\$131.00
Customer Access	1	\$16.00	6	TBD
Grade Crossing Safety	1	\$4.80	1	\$19.20
Rolling Stock	2	TBD	1	TBD
Multimodal Connectivity and Terminal improvements	2	\$57.00	3	TBD
Freight Rail Total	17	\$200.41	16	\$150.20
Total Rail Program	25	\$387.61	19	\$163.00

Note: Costs are not complete as only 18 projects have estimated costs. See Appendix B for details.

Funding for railroad projects and programs originates from a variety of sources, including federal, state, local, and private sources. In Maine, state funding has been made available for railroad improvements, but is subject to appropriations and voter-approved bond funds. Private railroad investment has been the primary source of funding for freight projects, while public funding is the primary source for passenger projects.

Highway-rail grade crossing improvements are funded principally through the federal Section 130 program that is managed by MaineDOT. The State of Maine has been proactive in providing funds for acquisition of railroad corridors as well as with infrastructure investments targeted to specific service needs. Federally funded initiatives encompass a range of federal grant and loan programs. In recent years, Maine applicants have been successful in securing federal grants through a range of programs such as BUILD, INFRA, and CRISI. These competitive grant programs, which allow the investment of public funds in private facilities, have proven to be popular and are expected to continue in some form in the future.

5.2 Program Effects

The investment program will result in a range of impacts to the State of Maine's residents, visitors, and economy. Depending on the proposed improvement, the range of impacts will vary, resulting in benefits to both the broader public as well as private enterprise. For both passenger and freight initiatives, the principal requirement is that they produce compelling public benefits, which can be either direct and/or indirect. The initiatives identified in this rail plan are expected to produce a range of such benefits with broad public impacts, including increased safety, better air quality through improved competitiveness of rail versus highway transport, economic development potential, and improved financial viability of the state's rail service.

The potential impacts and examples by improvement type are presented in Table 5.2. The benefits and examples are not exhaustive but rather illustrative in nature.

Table 5.2 Potential Program Effects by Improvement Type

Improvement Type	Potential Benefits	Example(s)
Passenger Rail Elements		
Safety	Decrease risks, improve operational efficiency	Installation of Positive Train Control
Passenger Service Improvement	Increase utilization of passenger service, improve financial performance, reduce highway VMT and associated collateral impacts	Increased frequencies, faster scheduled running times, better access with additional stops, improve customer experience through station modernization and new rolling stock
Passenger Service Expansion And Connectivity	Improve mobility options for travelers, reduce VMT, reduce GHG emissions, reduce highway congestion, improve safety	Implement a pilot service or improved connections to regions not presently served by the <i>Downeaster</i>
Corridor Preservation	Ensure potential future utility for passenger (and freight) service, manage risks associated with dormant corridors	Preserve out-of-service or underutilized corridors with potential for future rail use
Multimodal Connectivity	Expand mobility options for travelers, improve travel experience, reduce environmental impact from travel	Relocation of Portland Transportation Center

Improvement Type	Potential Benefits	Example(s)
Freight Rail Elements		
SOGR/Infrastructure Upgrade	Ensure that rail service is competitive and market relevant, improve safety, enhance resilience, enhance operational performance, and reduce ongoing maintenance costs	Rail and tie replacement projects, bridge rehabilitation, construction of passing sidings, double-stack clearance, improvements to accommodate 286k freight cars
Customer Access	Increase competitiveness of Maine industry by expanding market options, reduce transportation costs, reduce truck VMT and associated impacts, advance economic development efforts	New/improved track linking rail network to current or new customers
Grade Crossing Safety	Improve road and rail safety	Installation/upgrade of lights, gates, signage, crossing surface replacement, etc.
Rolling Stock	For freight rail cars, ensure supply of market-responsive rolling stock for Maine industry, reduce truck VMT. For locomotives, improve operational efficiency and productivity, reduce greenhouse gas emissions, improve reliability.	Assist in acquisition of rolling stock not available from other sources, such as log cars facing mandated retirement
Multimodal Connectivity and Terminal improvements	Increase competitiveness of Maine industry by improving modal access, reduce transportation costs, reduce truck VMT, improve rail operational efficiency, support economic development	New/improved intermodal (rail/highway or rail/water) terminals, bulk transload and carload facility improvements

A. PASSENGER AND FREIGHT RAIL PROGRAM OF PROJECTS

The tables on the following pages contain detailed listings of the passenger and freight rail projects. Separate tables are provided for short- and long-term initiatives, with projects for which timing has not yet been determined included in the long-term listing. Within each table, projects are sorted by railroad and project name, and include a brief description, the project type, time horizon, and projected implementation cost. For safety investments, projected FHWA Section 130 program expenditures are summarized by short- and long-term, with non-program initiatives listed individually for each project. Costs were identified using various sources.

Table A.1 Short-Term 2023-2026 Passenger Rail Program

Project Name	Carrier(s)/ Sponsor(s)	Project Description	Project Type	2022 Cost (\$ Millions)
Downeaster Wells Station Double Track and Platform	NNEPRA, CSX, Amtrak	Extend double track and add passenger platform at Wells Station.	Passenger Service Improvement	\$31.00
Positive Train Control	CSX, Amtrak	The implementation of PTC on the <i>Downeaster</i> service is a critical step to continued growth in <i>Downeaster</i> service. Amtrak and CSX have entered into an agreement for system design. The installation of PTC removes the frequency limitations (maximum of six daily roundtrips) applied to passenger services which operate across routes lacking the technology. Additionally, the implementation of PTC may permit speeds beyond today's maximum of 79 mph at locations along the route where conditions permit.	Safety	\$100.00
Portland Station Relocation	NNEPRA	Relocate the <i>Downeaster</i> station in Portland to the main line to avoid time-consuming back-up moves. This move will improve travel times through Portland, increase connectivity to population and employment hubs, and fully realize ridership potential within Maine as well as along the entire corridor between Maine and Boston.	Passenger Service Improvement	\$35.00
New West Falmouth Station	NNEPRA	NNEPRA, in collaboration with the Town of Falmouth, MaineDOT, and MTA, is exploring adding a <i>Downeaster</i> passenger platform in West Falmouth at Exit 53. This location would improve connectivity to/from the I-95 corridor.	Passenger Service Improvement	\$15.00
Rockland Branch Coastal Connection Service Extension Pilot	MaineDOT, NNEPRA, Midcoast Rail, Amtrak	Pilot connecting passenger rail service between Brunswick and Bath, Wiscasset, Newcastle, Waldoboro, and Rockland.	Passenger Service Expansion	\$3.00
Commuter Bus Connection to Lewiston-Auburn	MaineDOT, NNEPRA, Amtrak	Pilot a commuter bus connection between <i>Downeaster</i> service and Lewiston-Auburn.	Multimodal Connectivity	TBD
Passenger Rail Service Evaluation and Financial Analysis	Varies	Continue passenger rail planning expansion efforts based on results of ongoing and future feasibility/propensity studies (e.g., Portland-Lewiston-Auburn, Brunswick-Augusta-Waterville-Bangor).	Passenger Service Expansion	TBD
Preservation of Rail Corridors	Varies	Protect integrity of rail corridors for future freight and passenger transportation needs using Maine's Rail Preservation Act.	Corridor Preservation	\$3.20

Table A.2 Long-Term 2027-2042 Passenger Rail Program

Project Name	Carrier(s)/ Sponsor(s)	Project Description	Project Type	2022 Cost (\$ Millions)
CSX mainline double-tracking to accommodate Downeaster operations	CSX, NNEPRA, Amtrak	Long sections of single track restricts efficient movement of trains. Additional double track/siding extensions are being evaluated to improve reliability and schedule flexibility.	Passenger Service Improvement	TBD
Preservation of Rail Corridors	Varies	Protect integrity of rail corridors for future freight and passenger transportation needs using Maine's Rail Preservation Act.	Corridor Preservation	\$12.80
Continue Passenger Rail Service Evaluation and Financial Analysis	Varies	Continue passenger rail planning expansion efforts based on results of ongoing and future feasibility studies (e.g., Portland-Lewiston-Auburn, Brunswick-Augusta-Waterville-Bangor).	Passenger Service Expansion	TBD

Table A.3 Short-Term 2023-2026 Freight Program Investments

Project Name	Railroad	Project Description	Project Type	2022 Cost (\$ Millions)
Improve tie conditions	CP	Improve tie conditions along former CMQ route to support higher speeds and ensure reliable operation.	SOGR / Infrastructure Upgrade	TBD
Upgrade trackage from Bangor through Moosehead	CP	Rehabilitate recently acquired trackage between Bangor and Moosehead to achieve SOGR.	SOGR / Infrastructure Upgrade	TBD
Maintain and expand freight car fleet in Maine and beyond to meet customer needs	CP, CSX, EMRY, MNR	Acquisition of chip and log fiber cars, box cars, center beam cars, etc. to move commodities to and from customers. Needed to accommodate market growth and replace cars subject to mandatory retirement.	Rolling Stock	TBD
CSX Waterville-Mattawamkeag 286k capacity and safety improvements	CSX	Replace approximately 75 miles of rail, replacing approximately 55,000 ties, upgrade 72 grade crossings, and reinforce five bridges in central Maine between Waterville and Mattawamkeag. Improvements needed to accommodate 286k freight cars and increase speeds from 10 to 25 mph.	SOGR / Infrastructure Upgrade	\$42.00

Project Name	Railroad	Project Description	Project Type	2022 Cost (\$ Millions)
CSX Waterville-North Yarmouth upgrades and rail crossing safety improvements	CSX	Rehabilitate and modernize 75 miles mainline track, eight bridges, and 89 rail crossings on CSX main line between Waterville and North Yarmouth.	SOGR / Infrastructure Upgrade	\$35.51
Increase Rigby Yard capacity	CSX	Increase rail capacity and trackage at Rigby Yard in South Portland to reduce congestion.	Multimodal Connectivity & Terminal Improvements	TBD
Rockland Branch bridge improvements – feasibility and engineering	Midcoast Rail	Feasibility and engineering for bridge improvements on the Rockland Branch to achieve state of good repair.	SOGR / Infrastructure Upgrade	\$15.00
Maine Northern Rail Improvements Project (2022 CRISI)	MNR	Rehabilitate and improve more than approximately 138 miles of track in northern Maine. The improvements will increase reliability and allow for Class 2 (25-mph track speeds) on four lines that are all owned by the State of Maine and operated by MNR: the Madawaska Subdivision, the Houlton Subdivision, the Presque Isle Subdivision, and the Fort Fairfield Subdivision.	SOGR / Infrastructure Upgrade	\$20.50
Maine Woods to Water Rail Connection Project (2023 CRISI Application)	MNR, CP	MaineDOT; MNR; CP; Our Katahdin; and Highland Pellets, LLC intend to make numerous railroad infrastructure improvements to support freight railroading in Maine and a \$300-million sustainable wood pellet plant. The rail grant would fund mainline, railyard, port, and spur track improvements leading to Our Katahdin's One North industrial site. Located on the site of the former Great Northern Paper Mill in Millinocket, the pellet plant will be one of the largest rail shippers to locate in Maine, attracting family-wage jobs and generating environmental benefits. The plant will utilize scrap timber, sawmill residuals, thinnings, and other sustainable wood fiber sourced throughout the North Maine Woods to create renewable carbon sources for electrical and industrial applications. Finished pellets will ship on rail through Brownville Junction to Searsport for transload to ships destined to foreign markets.	Multimodal Connectivity & Terminal Improvements	\$57.00
Upgrades of trackage from Houlton to Brownville	MNR, EMRY	Improve track safety standards, SOGR, and capacity on the corridor to prepare for significant increases in traffic related to movements of wood fiber and finished goods related to plant expansions in the region.	SOGR / Infrastructure Upgrade	TBD

Project Name	Railroad	Project Description	Project Type	2022 Cost (\$ Millions)
Bridge upgrades	Multiple	Subject to development of both freight and passenger service needs, continue to support bridge upgrades.	SOGR / Infrastructure Upgrade	\$2.00
Various, 286k rail car capacity	Multiple	Initiate ongoing program to accommodate 286k rail cars, subject to needs analysis.	SOGR / Infrastructure Upgrade	Varied
SLR 286k capacity	SLR	Rail replacement, tie renewal, ballast, and surfacing to achieve 286k capacity on the SLR.	SOGR / Infrastructure Upgrade	\$7.60
SLR Locomotive Modernization	SLR	Upgrade to modern locomotives for more tractive effort to reduce fleet requirements, reduce fuel consumption and emissions, and increase reliability.	Rolling Stock	TBD
Industrial Rail Access Program	Varies	IRAP provides financial assistance to businesses and shippers for investment in rail or freight rail-related infrastructure located on, within, or adjacent to the general railroad system.	Customer Access	\$16.00
Rail bridge improvements, state-owned	Varies	Ongoing improvements and upgrades to state-owned railroad bridges to accommodate railcars loaded up to the industry standard of 286,000-pound gross vehicle weight.	SOGR / Infrastructure Upgrade	TBD
Rail Highway Crossing Safety Program	Varies	The Railway-Highway Crossings (Section 130) Program provides funding for the elimination of hazards at railway-highway crossings.	Grade Crossing Safety	\$4.8

Table A.4 Long-Term 2027-2042 Freight Program Investments

Project Name	Railroad	Project Description	Project Type	2022 Cost (\$ Millions)
Propane storage tracks at Hampden	CP	Add storage track for propane cars to accommodate growth of the commercial market for propane in Maine.	Customer Access	TBD
Upgrade trackage from Bangor through Moosehead.	CP	Rehabilitate recently acquired trackage between Bangor and Moosehead to achieve SOGR.	SOGR/ Infrastructure Upgrade	Varied

Project Name	Railroad	Project Description	Project Type	2022 Cost (\$ Millions)
Maintain and expand freight car fleet in Maine and beyond to meet customer needs	CP, CSX, EMRY, MNR	Acquisition of chip and log fiber cars, box cars, center beam cars, etc. to move commodities to and from customers. Needed to accommodate market growth and replace cars subject to mandatory retirement.	Rolling Stock	TBD
Add/expand sidings between Waterville and Portland	CSX	Add/expand sidings between Waterville and Portland to accommodate additional traffic.	SOGR/ Infrastructure Upgrade	TBD
Improvements at Waterville	CSX	Improvements at Waterville as needed.	Multimodal Connectivity & Terminal Improvements	TBD
Increase usage of International Marine Terminal in Portland	CSX	Coordinate with MPA, EIMSKIP, and CSX to increase usage and establish regular intermodal service at IMT.	Multimodal Connectivity & Terminal Improvements	TBD
Woodland pulp mill bridge improvements	EMRY	Strengthen bridges to Woodland pulp mill to accommodate 286k railcars.	SOGR/ Infrastructure Upgrade	TBD
Rockland Branch bridge improvements – continue construction	Midcoast Rail	Continue construction for bridge improvements on the Rockland Branch to achieve state of good repair.	SOGR / Infrastructure Upgrade	\$131.00
Add loading site at Skyway Industrial Park, Presque Isle	MNR	Provide loading site for grain and starch products.	Customer Access	TBD
Propane storage tracks at Millinocket	MNR	Add storage track for propane cars to accommodate growth of the commercial market for propane in Maine.	Customer Access	TBD
Propane storage tracks at Presque Isle	MNR	Add storage track for propane cars to accommodate growth of the commercial market for propane in Maine.	Customer Access	Varied
Upgrade 1,800-foot rail spur at Skyway Industrial Park, Presque Isle	MNR	Upgrade 1,800-foot spur for railcar storage and transload site.	Customer Access	TBD
Double-stack clearances on main lines	Multiple	Subject to needs analysis, initiate ongoing program to upgrade principal rail lines to accommodate double-stack trains.	SOGR/ Infrastructure Upgrade	TBD
Improvements at Auburn	SLR	Improvements at Auburn intermodal as needed by business demand.	Multimodal Connectivity & Terminal Improvements	TBD

Appendix A. Passenger and Freight Rail Program of Projects

Project Name	Railroad	Project Description	Project Type	2022 Cost (\$ Millions)
Propane storage tracks at Auburn	SLR	Add storage track for propane cars to accommodate growth of the commercial market for propane in Maine.	Customer Access	TBD
Rail Highway Crossing Safety Program	Varies	The Railway-Highway Crossings (Section 130) Program provides funding for the elimination of hazards at railway-highway crossings.	Grade Crossing Safety	\$19.2