

Outcome Criteria Narrative

This Project is being submitted not only due to the numerous benefits of modernizing two of the last remaining four sections of US 1 in Aroostook County but also for the substantial regional importance. The modernization of US 1 will result in clear and direct benefits supporting the following Outcome Criteria:

- Safety
- State of Good Repair
- Economic Impacts
- Freight Movement, and Job Creation
- Climate Change, Resiliency, and the Environment
- Equity, Multimodal Options, and Quality of Life
- Innovation Areas: Technology, Project Delivery, and Financing

Maine believes that infrastructure investment will help attract a more racially and ethnically diverse population and the value and vibrancy that it brings. Focused on one of the most rural portions of the state, the Project is regionally significant and addresses past underinvestment and aging transportation infrastructure that has allowed a slow and steady decline in connecting rural Americans to each other and to resources. The Project improves transportation access and reliability for motorists, trucks, and active transportation users, enhances safety, creates a better road as the EV revolution approaches, and improves the quality of life in the region. Also consistent with USDOT, MaineDOT recognizes the need to grow economies by strengthening the movement of job-supporting freight, improving reliable and affordable transportation, and enhancing health and safety.

As mentioned above the Project is of substantial regional importance. This is the connecting route of two service centers for the area, Fort Kent and Madawaska. One, Fort Kent, providing the only regional hospital for the area. The next closest hospital is about an hour away in good driving conditions. In addition to the regional hospital, Fort Kent is also home to the only university in the region, University of Maine – Fort Kent. Additionally, the completion of the Project will provide benefits listed in the outcome criteria to the region’s emergency services, regional local traffic, tourists, commercial motor vehicles, bicycles, and pedestrians, all those who utilize this route and enjoy the natural beauty of Northern Maine.

The completion of this project will provide benefits to the region’s emergency services such as EMS, fire, and address the outcome criteria, listed above, to emergency services such as EMS, Fire, and Law enforcement, local/regional traffic, tourist, commercial traffic, all who chose to use this route and enjoy the natural beauty of Northern Maine.



Figure 1: US 1 West of Frenchville.

I. Safety

The number of crashes on this very rural stretch of road has been on the rise. Over the last 10 years, there has been at least one accident monthly on this 10-mile stretch of US 1. The average annual daily traffic count on this section of US 1 between Madawaska and Fort Kent is 2,315 vehicles. Excluding the effect of COVID-19, which diminished traffic volume and corresponding accident rates, the most recent four years (2016–2019) averaged 29 percent more crashes than the five years prior to that. As might be expected where winters are extreme, crashes are concentrated during months of bad weather (November–March) when 60 percent of the crashes occurred.

The safety features to be added or upgraded are designed to provide clear and distinct improvements to safety by preventing crashes and their severity. By implementing the Safer Roads element of the National Roadway Safety Strategy, this Project targets well known safety problems on rural roadways that presently exist on this section of US 1; narrow lanes, soft and narrow shoulders, minimal guard rails, sharp curves, frequently exposed hazards, pavement drop-off areas, and extreme curves and hills. The current guardrails have been compromised from years of previous crashes, erosion issues, and the damaging freeze/thaw cycle in the region. Shoulders are narrow and soft and make biking and walking along the road dangerous for vulnerable road users. Some sections of the road sit high above a rail line and the bluff of the Saint John River. The soil helping hold the road up has been eroding away over the years.

The road's gravel shoulders will be replaced by asphalt and widened to provide a significantly safer paved path for vehicles and cyclists. That's important for driver comfort and confidence, especially in the winter when ice and snow make the road slick and a wide shoulder provides an extra degree of safety and comfort. As a *U.S. Bicycle Route* designee, the road will be upgraded with safe and lengthy bike journeys in mind. Shoulders will be paved and wide enough to bike comfortably. These features benefit pedestrians as well. With no area sidewalks, it is common

for people to go for a walk or walk their dogs along the road's shoulders.

A safe road is also one that's modern and comfortable to use. Improving the road's geometry will help drivers access it to/from intersecting roadways. That will be a big help for large trucks, including commercial truck traffic that currently must encroach into adjacent lanes to make a turn onto the road.

The combined new and improved safety features, increased pavement and shoulder widths, as well as geometric improvements to the roadway as outlined in the Project Description section added to this 10 mile stretch of US 1 yields \$2.81 million in safety benefits to the region as a result of reduced crashes and severity on a discounted basis over the 30-year analysis period.

II. State of Good Repair

This Project sustainably improves and modernizes the resilience of US 1 and the transportation system in Aroostook County by rehabilitating the roadway pavement structure (pavement, base and subbase gravel), all the drainage facilities (including environmental fish passages locations), improving access to/from intersecting roadways and abutting driveways, and improving roadside safety features such as guardrails and side slopes. The result of these improvements will be significant long-term maintenance cost savings.

Current Condition

The Reason Foundation, a nonpartisan public policy research group, found in 2018 that “Maine declined 21 positions from 4th to 25th in the overall [highway performance] rankings, as the state saw dramatic drops of 26, 40, and 26 positions for rural Interstate pavement, rural arterial pavement, and urbanized area congestion rankings, respectively. Maine’s ranking in 2020 may have been an aberration, as the year prior the state was 23rd in the overall ranking.”

Nearly all of the US 1 Houlton to Madawaska corridor has been built to modern standards and the majority of that work was completed by 1996. This section is part of the NHS. Meanwhile, the Madawaska to Fort Kent section, which includes the Project, has lagged considerably behind. Slightly less than half of the section has been built to modern standards; that work was performed between 1987 and 2009.

Based on a 2016 Existing Payment



Figure 2: (left) Road surface cracking and breaking apart near edge, creating instability for vehicles, bicycles, and pedestrians using shoulder. (Right) Gravel shoulder compromised by erosion, wash boarding, and pavement cracking.

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Condition Data Collection Memo¹ on the conditions for the segment west of Frenchville, depending on subgrade conditions at the time of construction, the existing roadway structure may have difficulty supporting vehicle traffic if the existing pavement is removed. The memo goes on to note that it is important that these areas be well drained as well as highlighting much of the segment is comprised of soils that are highly frost susceptible and are not free draining. Currently surficial and subsurface drainage is marginal to non-existent throughout the segment area while existing ditches are shallow and overgrown.

Now is the time to strengthen the final links in the chain and bring the entire road to a state of good repair.

How Project Improves Asset Condition

It's important that rural roads such as this one be just as safe and comfortable to use as roads in more populated areas. Poor

pavement conditions, compromised guardrails, and shoulders that have pieces of asphalt and sparse gravel in them need repair so that this entire stretch of road is safe and reliable. Using guardrails that meet today's height and strength standards to withstand impacts from larger and heavier vehicles improves the

condition and safety of the roadway. The new roadway pavement will have a 20-year design life. The design of the new road surface and selection of surface materials includes material most capable of withstanding snowplow activity and road salt applications. The project restores and modernizes the roadway by addressing many of the current design deficiencies.

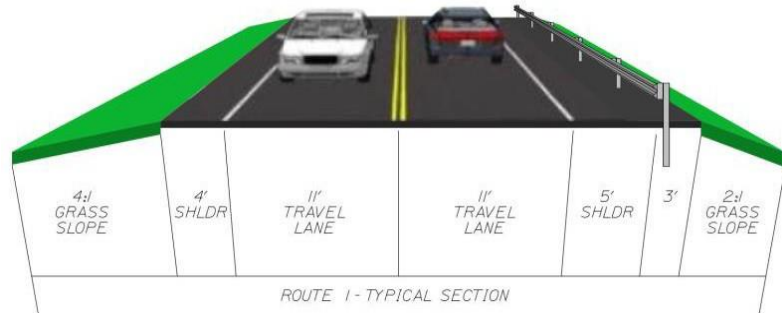


Figure 3: A rendering of a typical section of the reconstructed

Additionally, current and projected vulnerabilities that if left unaddressed will impact the mobility of people and commerce in the region will be improved such as slope condition and drainage to maximize the life of the roadway and significantly reduce maintenance costs in the future. Drainage improvements include replacing 42 culverts and adding approximately 6,000 feet of closed drainage to freely drain the roadway base and ensure longevity of the pavement. The slope stabilization to protect the road will reduce potential erosion into the nearby river and ensure a stable road surface for decades.

Impacts on Long Term Costs

This Project is the most economically efficient means of upkeep for this roadway. It addresses current and projected vulnerabilities that if left unaddressed will threaten mobility on the US 1 corridor creating long detours and road closures to fix. *By completing the Project and avoiding repeated, more modest but expensive pavement preservation projects and an inevitable slope repair, MaineDOT saves over \$33.2 million on a discounted basis over the 30-year analysis*

¹ Memorandum dated 1/12/16 Existing Payment Condition Data Collection Win 022656.00 Frenchville- Ft. Kent, Route 1

period.

III. Economic Impacts, Freight Movement, and Job Creation

Highways are the nation’s primary means of rapidly moving goods and people far distances in a cost- effective manner. Highways help connect families and communities, deliver medical supplies, and keep store shelves stocked. An efficient transportation network helps keep prices low and product availability high. Long periods of challenging weather make roads even more crucial to connecting goods and services and the people who need them. In northern Maine, there is but one primary highway—US 1—and two primary economic drivers: farming and lumber.

Economic Impacts

The diverse crops of northern Maine include potatoes, broccoli, canola, and grains. Maine ranks 3rd in the U.S. for maple syrup production and 10th nationwide for potatoes. These crops are shipped throughout New England and eastern Canada. Some remain in the state, such as potatoes for processing, in this case into French fries, before being shipped out once packaged which requires some crops to access US 1 twice. This broad reliance on US 1 means it needs to be as safe and efficient as possible.



Figure 4: Potato farming in the region.

Farms and forests can be more productive through efficiently moving products to market. That is an important impact to make a region more competitive in a global economy. In fact, efficient transportation is a requirement for the perishables that are grown throughout the region. Fast transportation cycles help companies and farmers turn their assets such as trucks and trailers more efficiently, thus reducing costs. Improved cycle times mean increased labor productivity because drivers can cover more miles and make more money – an important factor considering the challenges facing driver hiring and retention. A faster, safer and more efficient link between rural and urban communities is critical to daily life in remote parts of the U.S., especially those facing harsh weather. Roads such as US 1 provide the vital connection to food, shopping, medical needs, employment, education and entertainment – facets that create a thriving local economy. Given the proximity of two international border crossings with Canada, the importance of an improved roadway to deliver savings to manufacturing and agricultural goods is multiplied.

Freight Movement

The forest products industry has long been an economic driver in Northern Maine. With one of the strongest mills in Madawaska, these improvements create a more reliable and efficient connection between the forest and the mill. The Project will modernize two segments of US 1

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critical to freight movement between Fort Kent and Madawaksa improving the reliability and efficiency of goods movement in the region.

Transportation costs are a key element to keeping Maine wood products competitive and disjointed two-lane routes through rural areas don't make transportation as efficient as it needs to be. Like Maine's lumber industry, the paper industry has also suffered as demand for newsprint dwindled. Food containers and cardboard have helped the industry turn the corner a bit as take-out food and online retail rose during the pandemic. Twin Rivers Paper Company in Madawaska is the only paper mill in northern Maine. US 1 is the primary truck route for logs moving to this important mill as well as to Canadian lumber mills east of Maine. It's also a primary truck route for finished paper products traveling from mill to market. Northern Maine is also home to limestone quarries that move their product from quarry to market via US 1. The project will compliment the improvements to the existing state-owned rail line running parallel to the project that includes a \$1.3 million slope stabilization between the St. John River and the railroad tracks.

Without the improvements outlined in the Project, costly detours will arise that will inhibit freight movement via truck in the region as MaineDOT addresses pavement condition and slope repairs over the next 30 years.

Job Creation

Of all the states in the U.S., Maine has the highest proportion of residents living in rural areas, some 61.3 percent according to Census Bureau data compiled by the website *stacker*.² The rural nature of the state is exhibited by the fact that 89 percent of the total land in Maine is forestland.³ As baby boomers age and exit the workforce, Aroostook County is looking to diversify its workforce while also

turning the tide and increasing the population. Employers in manufacturing and trades are actively seeking women to enter careers they may not have previously considered including agriculture, heavy machinery operation, lumber mill work, and truck driving. Many see it as a win-win because it helps the local economy

	Unites States	Maine	Aroostook County
Population, percent change	6.30%	1.20%	-6.70%
Persons 65 years and over	16.50%	21.20%	24.90%
White	76.30%	94.40%	94.80%
Median home value	\$217,500	\$190,400	\$99,600
Household with broadband internet	82.70%	82.10%	69.20%
Persons with bachelor's degree, age 25+	32.10%	31.80%	19.20%
Persons with a disability, under age 65	8.60%	11.70%	16.50%
Persons without health insurance, under age 65	9.50%	10.10%	13.80%
Median household income	\$62,843	\$57,918	\$41,123
Persons in poverty	10.50%	10.90%	15.50%
Population per square mile	87.4	43.1	10.8

Figure 5: Demographic comparison of Aroostook County to US

grow and provides good wages in a county where the cost of living is generally low. Good roads are critical component to many of these jobs, for the safety and livelihood of workers. As the state looks to replace lost lumber-related jobs in the region, US 1 will be host to the workforce of today. The speed improvements described in quality of life also create savings for the regional

² <https://stacker.com/stories/2779/states-biggest-rural-populations>

³ https://www.maine.gov/dacf/mfs/forest_health/documents/2021-maine-forest-health-highlights112321.pdf

economy.

IV. Climate Change, Resiliency, and the Environment

When planning infrastructure improvements in a state that sees between 50 and 90 inches or more of average annual snowfall between the southern parts of the state and the northern parts of the state, respectively, MaineDOT has always thoroughly considered the impact a changing climate has on mobility and the environment. MaineDOT's Climate Initiative is laid out on their website⁴ and is a key partner in the *Maine Climate Council*. MaineDOT also realizes weather events that include large amounts of rainfall occur more frequently than in past years. That's why roads and bridges are designed to withstand the effects of 100-year storms. MaineDOT also considers *more frequent* freeze-thaw cycles, which can degrade pavement, pipes, and culverts more rapidly than simply freezing temperatures.

Expected Reduction of Air Pollution and Greenhouse Gas Emissions

As noted in the Benefit Cost Analysis, by modernizing this stretch of US 1 with few practical reroute options and avoiding numerous future pavement preservation projects, the Project saves \$238,000 in emissions on a discounted basis over the analysis period. The total amount of emissions reductions by type over the 30-year analysis period the Project is expected to generate are:

- 3,037.08 Annual Metric Tons of Carbon Dioxide Emissions avoided;
- 2.76 Annual Metric Tons of NOx Emissions avoided;
- 0.112 Annual Metric Tons of Particulate Emissions avoided;
- 0.017 Annual Metric Tons of Sulfur Dioxide Emissions avoided.

Expected Increase use of Active Transportation

With the planned upgrades to the shoulder area to better accommodate bicyclists and pedestrians, it is expected that there will be an increase in active transportation because of the Project. As noted in the Project Description, the Project was recently designated a part of U.S. Bicycle Route 501 (*USBR 501*). The 327-mile route follows parts of the Katahdin Woods and Waters Scenic Byway and passes near Maine's tallest peak, Mount Katahdin—part of the newly designated Katahdin Woods and Waters National Monument, site of the north end of the Appalachian Trail.

“The designation of USBR 501 in northern Penobscot and Aroostook counties will attract visitors to this largely rural region of Maine, showcasing a wide cross section of Maine's geographical, natural, historical, and cultural offerings.”

-Jay Kamm, Senior Planner at Northern Maine Development Commission.⁵

Improve the Resiliency of At-Risk Infrastructure

The threat that a structural or safety component of the road will fail is ongoing. Given the remote area and lack of roads in the region, there are few opportunities for reroutes or detours. And in the years ahead, repaving will be required more frequently as the base of the road continues to

⁴ <https://www.maine.gov/mdot/climate/>

⁵ <https://www.adventurecycling.org/about-us/media/press-releases/the-u-s-bicycle-route-system-expands-to-27-states-and-14-000-miles/>

deteriorate under the road surface. Repaving would cost several million dollars for the full 10-mile section each time it is required, every seven years. And it would only be a “band-aid” repair, a wasteful use of funds and a frequent interruption for users. If the Project is completed, then repaving will only need to take place once in the middle of the 30-year analysis period.

How the Project will Prevent Stormwater Runoff

Water run-off can deteriorate the shoulder, sideslopes, and reduce the effectiveness of safety hardware (guardrails, sign posts, etc.). By replacing and upgrading ditches, pipes, and culverts, the Project will ensure stormwater and ice is managed properly. Water and snow melt will be drawn away from the road surface, away from the subsurface, and allowed to flow rapidly away from US 1. This preserves the road surface and the layer beneath it as well as improving safety by reducing hydroplaning under water conditions and skidding under icing conditions.



Figure 6: Existing slope condition on section East of Frenchville

Incorporate Electrification or Zero Emission Vehicle Infrastructure

Despite being a remote region, US 1 through Frenchville connects Fort Kent and Madawaska which are both community service centers. In fact, as a priority service center in Northern Maine, Madawaska is being considered in the state plan for EV infrastructure expansion.⁶ The two maps on the following page highlight the existing and planned EV infrastructure in Fort Kent as well as the identification of Fort Kent and Madawaska as Priority Service Centers. The Project would connect these two centers with a modern roadway.

MaineDOT is currently working on revising a strategic vision for rural transit to identify gaps and needs in the existing programs as well as an electric vehicle replacement plan. Additionally, MaineDOT will be re-acquiring and expanding the GO Maine rideshare program in 2022 to enable users to travel from origin to destination safely and efficiently across modes and providers, regardless of location, income, and disability. As Maine continues to reduce emissions in the transportation sector by way of fleet electrification, there will be significant changes in driver preferences and needs. That’s why MaineDOT has been planning for these changes.

⁶ In June 2019, Governor Janet Mills signed a law to create the *Maine Climate Council* to combat climate change. The Council developed a four-year plan for climate action titled *Maine Won’t Wait* to help the state meet its greenhouse gas emission reductions goals. Electrification of the transportation sector was identified in the plan as one of the most effective emission reduction strategies for Maine. It involves expanding both the number of electric vehicles on the road along with available charging stations.

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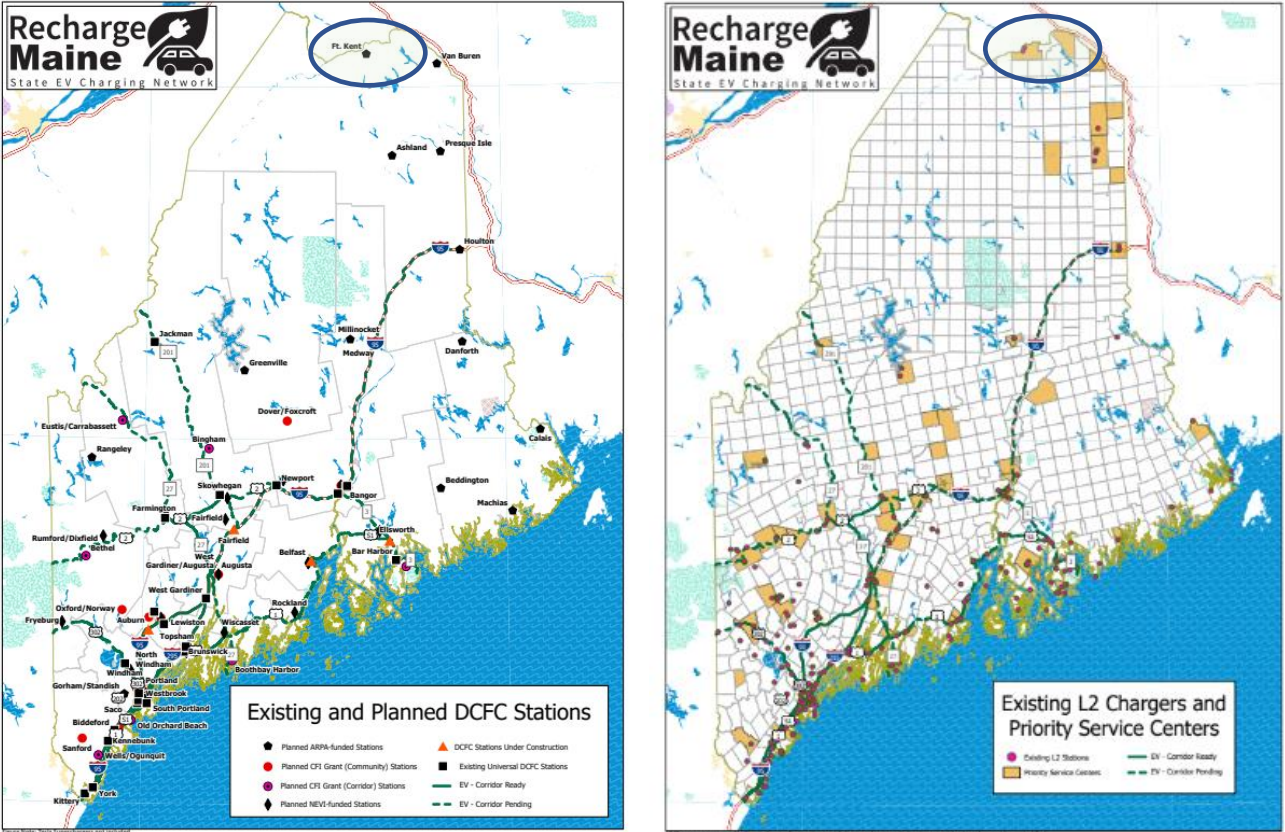


Figure 7 (Left Map): Existing and Planned Existing DCFC Stations with Fort Kent labeled as planned
 Figure 8 (Right Map): Orange Area highlights Priority Service Centers of Fort Kent and Madawaska with red dots noting Existing L2 Chargers in Fort Kent

V. Equity, Multimodal Options, and Quality of Life

Since Maine has the nation’s largest percentage of residents living in rural areas, the need to have strong and reliable connections to a town service center is important for people’s quality of life. US 1 connects individuals to jobs, healthcare, essential services, retail, restaurants, and tourism.

According to U.S. Census Block Data, the Town of Frenchville has 34.46 percent of the population in the tract at or below 200 percent of the federal poverty line.⁷ census blocks with 9-20 percent of population low- income along the Project area. People of Color blocks range from 2-6 percent.⁸ The Project will not require any relocations and will not have significant environmental impacts. The Project will improve an existing road and reduce safety risks for all users of the transportation system, including vehicles, pedestrians, and bicyclists. It will improve safety and quality of access to rural community service centers and jobs for bike and pedestrians by creating a safer, paved shoulder than the gravel one that exists currently.

⁷ <https://experience.arcgis.com/experience/0920984aa80a4362b8778d779b090723/page/ETC-Explorer---State-Results/>

⁸ <https://screeningtool.geoplatform.gov/en/#11.15/47.2411/-68.5034>

MaineDOT recently updated its *Public Involvement Plan*⁹ which outlines the department's efforts to ensure disadvantaged populations are afforded meaningful opportunities for public involvement. Additionally, this Project ensures safe, efficient access for all users of the transportation system and by extending the service life of the existing infrastructure it avoids impacts outside the existing right-of-way, which have the potential to disproportionately impact disadvantaged populations.

Furthermore, MaineDOT has initiated communication with environmental agencies and baseline data has been collected to identify natural and cultural resources potentially affected by the Project. This information will be refined during design and will be used to avoid and minimize impact while meeting the purpose and need of the Project.

The Project creates wider lanes and shoulders as well as improved topography allowing an increase to the posted speed limit by five miles per hours in most places. *This travel time savings for residents and commerce of the region and those traveling through it yielding motorists \$6.22 million in savings on a discounted basis over the 30-year analysis period.*

VI. Innovation Areas: Technology, Project Delivery, and Financing

(1) Accelerated deployment of innovative and secure-by-design technology, including expanded access to broadband.

Given the nature of this project, it does not include any deployment of innovative technologies.

(2) Use of innovative permitting, contracting, and other project delivery practices.

Further mitigating any Project delay, MaineDOT and various other state and federal departments have executed agreements to review environmental impacts expeditiously but thoroughly. MaineDOT will take advantage of the following innovative agreements with FHWA where applicable to streamline the environmental review and approval process:

- Programmatic Agreement between the Federal Highway Administration, Maine Division and the Maine Department of Transportation Regarding the Processing of Actions Classified as Categorical Exclusions for Federal-Aid Highway Projects.
- Programmatic Agreement among Federal Highway Administration, Federal Transit Administration, the Advisory Council on Historic Preservation, the Maine State Historic Preservation Officer, and Maine Department of Transportation Regarding Implementation of the Federal Aid Highway and Federal Transit Programs in Maine.
- Cooperative Agreement between U.S. Department of the Interior Fish and Wildlife Service (USFWS), FHWA and the MaineDOT for State Transportation Reviews by the USFWS in Maine 2015-2020 and 2016-2021
- Maine Atlantic Salmon Programmatic Consultation finalized January 23, 2017.
- Programmatic Agreement for the State of Maine concerning identification of listed and

⁹ <https://storymaps.arcgis.com/stories/8f175ebd865c4dd9ba55bcc15cfe3b3d>

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proposed species and designation of non-federal representative under the Federal Endangered Species Act between FHWA, Maine Division USACE, & MaineDOT.

- USFWS, NOAA's National Marine Fisheries Service Programmatic Agreement for the State of Maine Between MaineDOT, FHWA Maine Division, USFWS Regarding Endangered Species Act Section 7 Consultation for Canada Lynx.
- Memorandum of Agreement for Stormwater Management Between the MaineDOT, MTA and Maine Department of Environmental Protection.
- Nationwide Programmatic Section 4(f) Evaluation for use of Historic Bridges.

(3) Innovative Financing

Given the nature of this project, there is no innovative financing involved in its delivery. The non-rural funding will be available as is included in the STIP and is consistent with MaineDOT's long-range plan. MaineDOT is committed to providing matching funds from available funding as indicated by the match commitment letter.