Public and Agency Information Document

Machias, Bridge #2246, U.S. Route 1

Federal ID: BR-1671(400)X, MaineDOT WIN: 16714.00

November 2024

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List of Frequently Referenced Acronyms

APE	Area of Potential Effect
ACOE	Army Corps of Engineers
AMMs	Avoidance, Minimization, and Mitigation
BFE	Base-Flood Elevation
BA	Biological Assessment
CEQ	Council on Environmental Quality
DEP	Department of Environmental Protection
DMR	Department of Marine Resources
DPS	Distinct Population Segment
SHRU	Salmon Habitat Recovery Unit
ESA	Endangered Species Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EFH	Essential Fish Habitat
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
GOM	Gulf of Maine
HAPC	Habitat Area of Particular Concern
MaineDOT	Maine Department of Transportation
MHPC	Maine Historic Preservation Commission
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
SLR	Sea Level rise
USFW	US Fish and Wildlife Service
WSELs	Water Surface Elevations

1. Introduction

The Maine Department of Transportation (MaineDOT) is taking the opportunity to provide information on work completed to date on the U.S Route 1, Machias Bridge #2246, gathered during the ongoing National Environmental Policy Act (NEPA) process.

While much of the information gathered to date will be carried forward, the results of recent federal consultations on Alternative 1, the fully gated alternative (previously identified as preferred) will require MaineDOT and FHWA to step back from decisions made. FHWA and MaineDOT will formally re-engage stakeholders.

2. Background

The Machias Bridge #2246 carries US Route 1 over the Middle River in the Town of Machias, Maine. The Middle River joins the tidal portion of the Machias River immediately downstream of the bridge and causeway. The Stride Bridge (#3973) crosses the Middle River in the Town of Marshfield approximately 3 miles upstream from Bridge #2246. See Figure 1 for a general project location map.

The Bridge #2246 consists of four box culverts within an embankment structure (manmade causeway). The culverts are constructed of timber and stone masonry and are approximately 130 feet long, 6 feet wide and 5.5 feet high. Each culvert has a top-hinged flap gate installed on its seaward side (see Figure 2). The flap gates close during incoming (flood) tides to prevent tidal waters from moving upland. They open during outgoing (ebb) tides to allow upland water to flow through the culvert and into the Machias River. The causeway width varies from 85 to 94 feet, is constructed of timber cribbing with rubble and earthen fill and is over 1,000 feet long. The slopes of the causeway are lined with riprap. On the upstream side, riprap is interspersed with shrubs and herbs and borders an intertidal zone. Salt marsh occupies the area to the east. On the seaward side, vegetation is sparse, and the intertidal zone is dominated by mudflats.

Route 1 is a critical commercial, commuter, and tourism corridor in Downeast Maine (Washington and Hancock Counties) and is classified as a highway corridor priority 2, a minor arterial, and carries approximately 9,530 vehicles per day. Route 1 over the causeway consists of two 12-foot travel lanes, two 8-foot shoulders, and a 20-foot-wide public parking area that is regularly used for local markets and trade events. In addition, the causeway carries the Calais Branch Rail Corridor and a section of the 87-mile off-road, multi-use Down East Sunrise Trail. A municipal boat launch is located at the southwest corner of the causeway. Both ends of the causeway are surrounded by commercial properties including Helen's Restaurant, Machias River Inn, and the Machias Bay Chamber of Commerce (located in the Machias Historic Railroad Station) in the west approach; and Dunkin', Pat's Pizza, and the Inn at Schoppee Farm in the east approach. The Machias Wastewater Treatment Plant and a private residence are located at the northwest corner of the project, along with a buried sewer force main and pumping station located just north of the causeway. A National Historic Register Eligible Trotting Track is located to the northeast of the causeway.

Figure 1: Location Map

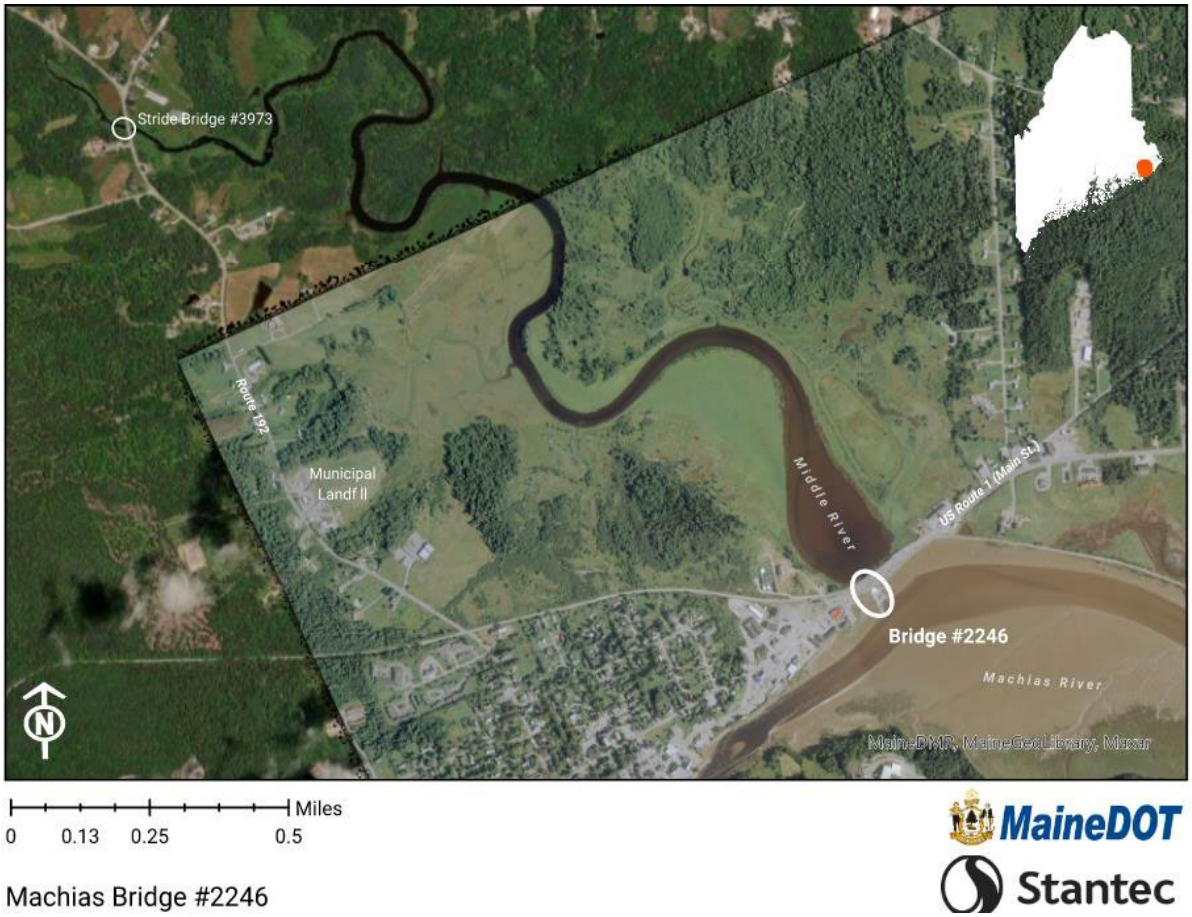


Figure 2: Seaward Culverts with Flap Gates during Low Tide

Figure 3: Bridge #2246 Project Vicinity

MaineDOT has spent more than a decade reviewing alternatives for the current structure. Since 2020, MaineDOT has actively engaged with State and federal agencies and the public to understand and balance interests, guided by FHWA NEPA regulations at 23 CFR 771.123 -771.127. In May of 2022, MaineDOT and FHWA initiated an Environmental Assessment under the National Environmental Policy Act. In May 2022, the Maine Department of Transportation (MaineDOT) publicly announced that a bridge to replace the existing four box culverts on the Machias Dike Bridge #2246, was selected as the preferred alternative. MaineDOT stated that a bridge as the preferred alternative would be carried forward into an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA).

The decision to choose a bridge as the preferred alternative was mainly based on information received during Technical Assistance from the National Marine Fisheries Service (NMFS) regarding potential effects under the Endangered Species Act and information gained during the public involvement process.

MaineDOT and FHWA held a public meeting in Machias on June 28, 2022. MaineDOT heard from numerous members of the public in opposition to a bridge, specifically those that would be impacted by restoring tidal exchange upstream of the dike and causeway. In addition, MaineDOT and FHWA heard concerns regarding the potential impacts of inundating a municipal landfill located on the northwest bank of the Middle River.

In response to the June 28th public meeting, MaineDOT further investigated and analyzed the impacts of the bridge and culvert alternatives on the endangered Atlantic salmon, the National Register eligible Machias/Riverside Park Trotting Track, the landfill, and property impacts.

Informed by the additional analysis, in November 2023, MaineDOT changed the preferred alternative from a bridge to a fully gated culvert replacement. MaineDOT and FHWA then initiated the Endangered Species Act and Essential Fish Habitat (EFH) Consultation on the fully gated alternative as required by Federal laws and NEPA.

In June, the National Marine Fisheries Service (NMFS) noted in a June 14, 2024, letter to the Federal Highway Administration (FHWA) that the impacts from a replacement of the Dike Bridge with a similar structure that continues the use of fully gated culverts result in "significant adverse impacts to [NMFS] managed species, their designated EFH, as well as a number of NOAA trust resources." FHWA has notified MaineDOT that NMFS identification of a potential "significant impact" requires an Environmental Impact Statement (EIS) to move forward in accordance with NEPA regulations. MaineDOT has assembled this document to provide the public with information on the work that has been completed to date in anticipation of this process.

1. Bridge History

A private toll bridge was in operation at the site in 1835. The private bridge was purchased by the Town of Machias in 1845. In 1866, the State legislature authorized the Town of Machias to build a causeway across the Middle River. Following that decision, Bridge #2246 was completed in 1868, and enlarged in the 1890s for the Washington County Railroad. In 1930, the roadway portion of the bridge was reconstructed due to failing timber cribbing in the embankment. The structure and embankment were further widened in the seaward direction in 1944, and flap gates were added. A buried concrete slab was placed over the culverts to support the roadway in 2008. This repair was necessary as material loss through the timber culverts was causing the roadway to settle. In addition, the MaineDOT replaced the broken flap gates in 2012, and repaired pavement in 2017. MaineDOT completed an underwater inspection of Bridge #2246 in September 2023 and routine inspections in May and October 2023. The inspections indicated large spalls, heavy scaling, wide cracks, loss of rotten timber members, roadway settlement, and deteriorated culverts and flap gates. The routine inspection cycle for Bridge #2246 is every six (6) months rather than the standard two (2) years due to advanced deterioration of the structure. The flap gates require frequent maintenance. The structure is not currently load posted and is open to all vehicles. During a routine bridge inspection in October 2023, additional roadway settlement was observed and MaineDOT conducted an additional dive inspection in November 2023. There were new areas of deterioration and soil loss noted during the inspection which resulted in the closure of a portion of the shoulder and parking area on the southbound side of the bridge. MaineDOT constructed a temporary bridge over the existing structure in December 2023 to maintain traffic on the bridge and the adjacent Sunrise Trail until the current project is completed.

2. Previous Studies

In 2009, MaineDOT initiated a bridge improvement project and hosted its first public meeting (Appendix 11, Dec. 16, 2009). The purpose of the meeting was to discuss the bridge condition and introduce potential alternatives. While some spoke in favor of the possibility of restoration of saltwater flows and improved fish passage, solutions that would remove the flap gates and increase the extent of tidal inundation upstream of the causeway was a serious concern for upstream property owners at this meeting. MaineDOT recognized that some of the potential solutions had flooding impacts to upstream properties that warranted further study.

In 2015, MaineDOT completed a tidal hydraulic and alternatives analyses study, "Technical Report: Middle River Hydrologic and Alternatives Analyses" (referenced as "2015 hydraulic study" herein). (Appendix 5, June 30, 2015). The 2015 hydraulic study evaluated bridge and culvert alternatives at both Bridge #2246 and Stride Bridge. At Bridge #2246, the study considered the effects of different structure types and opening sizes and the following factors: conveyance of tidal flows under existing conditions, fish passage, potential inundation of landward areas resulting from increased tidal exchange, and potential sea level rise (SLR) impacts. The 2015 hydraulic study concluded that only a fully gated culvert replacement would completely avoid increased landward inundation. If a culvert alternative was modified to include some open culverts, it could improve fish passage and limit landward inundation. A bridge alternative would provide full tidal exchange but would result in substantial inundation of the land upstream of Bridge #2246 and would require improvements at Stride Bridge.

Based on this information, in 2018, MaineDOT initiated a bridge culvert replacement project and presented a fully gated replacement culvert alternative as the preferred alternative at a public meeting due to concerns for inundating the National- Register eligible Trotting Park at the northeast corner of the project. This alternative was received favorably by meeting attendants.

As preliminary design moved forward and time elapsed, three major factors changed that led to re-evaluation and further study of bridge and culvert alternatives beginning in 2020 ("Environmental Evaluation"):

- **Fish passage and Endangered Species**: Bridge #2246 does not currently allow landward flow of tides into the Middle River except by leakage through the flap gates and the causeway during flood tides. Residents have indicated anecdotally that some fish passage occurs at the bridge, however it is generally considered a barrier to fish passage. In June 2020, the National Oceanic and Atmospheric Administration (NOAA) fisheries, the Coordinator of the Downeast Salmon Habitat Recovery Unit (SHRU) expressed concerns that the replacement with a fully gated culvert option would further inhibit fish passage between the Middle River and Machias River, particularly for the endangered Atlantic Salmon. Additional comments from NOAA in September 2020 stated that the project "would provide even less opportunity for fish passage than exists now and will not remedy ongoing impacts," suggesting that a fully gated culvert alternative may not meet the requirements of the Endangered Species Act.
- **Machias Flood Protection Project:** MaineDOT learned that the Town of Machias was planning a flood protection project along the Machias River in the downtown area west of the causeway (Town Flood Protection Project) that would be located immediately adjacent to the MaineDOT Bridge #2246 project. This effort would likely include improvements to the municipal boat launch at the southwest corner of the causeway. The Town Flood Control Project is anticipated to primarily be a sea wall that may be phased and increased in height overtime. The Town flood protection project is still in the planning phase meaning the scope could continue to be modified, it needs formal municipal approval and implementation funding. MaineDOT has been meeting regularly with the Town of Machias and this coordination will continue as the Bridge #2246 project moves forward into design and construction.
- **Maine Climate Council:** In 2020, the Maine Climate Council published its Climate Action plan, that included guidance for the State to manage for 1.5 feet of relative sea level rise by 2050 and to assess 3.9 feet of sea level rise by the year 2100.

3. Environmental Evaluation (2020) Purpose and Need for Action

The following Purpose and Need was drafted, published, and revised in response to comments from the public and agencies in 2021:

The purpose of the project was to achieve an overall structure condition rating of Good (a rating of 7 or better on a scale of 0-9); and to preserve the Calais Branch Rail Corridor in the area in accordance with the State Railroad Preservation Act.

The need for the project is based on its structural condition. The desired structural condition rating of at least a 7 indicates there are no noticeable or noteworthy deficiencies which affect the condition of the structure. This is in accordance with FHWA's Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges. The structure alignment item evaluates the alignment, settlement, joints, structural condition, scour, and other items associated with the structure. The rating code is intended to be an overall condition evaluation of the structure. A score of zero indicates failure; a score of 9 is an excellent condition.

The widened Bridge #2246 is over 92 years old and has a current structure rating of 4 on a scale of 0-9 based on routine inspections conducted in May [and October] 2023. The inspection indicated large spalls, heavy scaling, wide cracks, loss of rotten timber members, roadway settlements, and the need for numerous urgent and unscheduled repairs. A dive inspection was also conducted in September 2023, that supported the rating.

MaineDOT and FHWA included secondary goals:

- To improve fish passage through the transportation asset
- Consistent with surrounding infrastructure, to account for Sea Level Rise (SLR) in accordance with Maine's Climate Council guidance to manage for 1.5 feet of relative sea level rise by 2050 and to assess 3.9 feet of sea level rise by the year 2100.
- Consistent with other goals, to minimize inundation of land upstream from Bridge #2246 that may result from increased tidal exchange from the Project.

- To accommodate existing transportation uses of the causeway (trail).
- To accommodate existing community uses of the causeway (parking/local markets and trade).
- To coordinate with the ongoing Town of Machias flood protection project.

See Appendix 1 for the complete 2021 Purpose and Need Statement.

4. Alternatives studied to date

Alternatives were previously developed and reviewed by the public and agencies. The current alternatives are as follows:

Throughout the course of the 2015 hydraulic study and pre-environmental evaluation effort, MaineDOT considered a total of 21 alternatives. This included variations of a no build; fully gated replacement with culverts; partially gated replacement with culverts; rehabilitation; and replacement with an at-grade bridge span. At the start of the Environmental Evaluation (2020), 15 alternatives were identified to address the project Purpose and Need. The alternatives were refined and expanded based on input from the public, environmental agencies, and the Section 106 Consulting Parties. A description of each alternative is provided below, and a detailed Alternatives Matrix that summarizes all the alternatives considered, including during the 2015 hydraulic study, is provided in Appendix 2.

The Environmental Evaluation (2020) involved a wider range of alternatives; evaluated a more comprehensive set of criteria and impacts; included additional study of fish passage and landward inundation; considered sea level rise; and increased public and stakeholder involvement. The Environmental evaluation considered over a dozen short and long-term alternatives including rehabilitation, various box culvert configurations, various sizes of bridges, and combinations of culverts and bridge as described in more detail in Section 3. Some of the alternatives were also included in the 2015 hydraulic study. The initial phase of the Environmental evaluation analyzed five (5) primary alternatives (Alternatives 1, 4, 4m, 9, and 10/10A) that were deemed representative of the full spectrum of alternatives, particularly from a fish passage and landward inundation standpoint under normal daily riverine and tidal conditions. The second phase of the Environmental evaluation further analyzed two (2) refined alternatives (Alternatives 4m and 10) which were identified as the alternatives that best met the project purpose and need and focused on more extreme riverine and tidal storm events.

NOTE: In the alternative descriptions below, the following terms are used to describe fish passage:

- Fish Passage – Improved passage landward of the causeway.
- Advection – Landward fish passage with the incoming tide, not against it.
- Volitional – Fish may swim landward against flows, similar to natural conditions.
- Tidal Improvement – Improved landward flow; increased landward normal tidal range.
- Tidal Restoration – Full landward tidal flow; substantial removal of the tidal restriction.

A. No Build Alternative

The No Build Alternative presumes the existing structure remains unchanged except for required regular maintenance activities. The No Build Alternative serves as the baseline for which other alternatives can be compared. The No Build Alternative does not meet purpose and need. The Bridge requires a temporary bridge over Bridge #2246. Route 1 would eventually be closed, and traffic would be required to detour around the causeway on existing local roads. The bridge would eventually fail.

B. Alternative 1 – Replacement Culverts –fully gated

Alternative 1 is replacing the existing culvert system with a fully gated culvert system. Alternative 1 focuses on four (4) 5-foot x 5-foot precast concrete box culverts with flap gates that prevent landward (“upstream”) flow, but the fully gated alternative could have a different culvert size span arrangement after final design. Replacement with fully gated culverts does not improve fish passage but buried structures more easily accommodate increased roadway surface elevations for sea-level rise and do not restrict amenities such as allowing for existing uses such as vending and parking and the consideration of enhancements such as green space, benches, and improved lighting. Fully gated replacement culverts have a low impact on landward inundation from normal water levels for normal tides and normal riverine flow.

C. Alternative 2 – Replacement Culverts-partially gated with one open culvert of same elevation

Alternative 2 is five (5) 5-foot x 5-foot precast concrete box culverts with flap gates that prevent landward ("upstream") flow on four (4) culverts and one (1) open culvert. All culverts are set at the same invert (bottom) elevation of -4.05 feet[1]. Alternative 2 improves fish passage by advection. Buried structures more easily accommodate increased roadway surface elevations for sea-level rise and do not restrict amenities on the causeway. Partially gated replacement culverts have a low impact on landward inundation from normal water levels for normal tides and normal riverine flow.

D. Alternative 3 – Replacement Culverts-partially gated with one open culvert of lower elevation

Alternative 3 is five (5) 5-foot x 5-foot precast concrete box culverts with flap gates that prevent landward ("upstream") flow on four (4) culverts and one (1) open culvert. The four gated culverts are set at the same invert elevation of -4.05 feet[2] and the fifth open culvert is set lower with an invert elevation of -6.05 feet[2]. The lower invert elevation of the open culvert provides more of an opportunity for fish passage during a wider range of the tidal spectrum. Alternative 3 improves fish passage by advection. Buried structures more easily accommodate increased roadway surface elevations for sea-level rise and do not restrict amenities on the causeway. Partially gated replacement culverts have a low impact on landward inundation from normal water levels for normal tides and normal riverine flow.

E. Alternative 4 – Replacement Culverts – partially gated lower elevation culverts with one open

Alternative 4 is five (5) 5-foot x 5-foot precast concrete box culverts with flap gates that prevent landward ("upstream") flow on four (4) culverts and one (1) open culvert. All culverts have an invert elevation of -6.05 feet[1]. The lower elevation of the inverts in Alternative 4 provides more of an opportunity for fish passage during a wider range of the tidal spectrum. Alternative 4 improves fish passage by advection. Buried structures more easily accommodate increased roadway surface elevations for sea-level rise and do not restrict amenities on the causeway. Partially gated replacement culverts have a low impact on landward inundation from normal water levels for normal tides and normal riverine flow.

F. Alternative 4 Modified (4m) – Replacement Culverts – three larger partially gated culverts with one open and lower

Alternative 4m is three (3) larger precast concrete culverts (10-foot span x 5-foot rise) with flap gates that prevent landward ("upstream") flow on two (2) culverts and one (1) open culvert. The two gated culverts are set at an invert elevation of -4.05 feet[1], and the open culvert is set lower with an invert elevation of -6.05 feet[1]. The larger culverts in Alternative 4m allow for more tidal exchange and the lower invert elevation of the open culvert provides more of an opportunity for fish passage during a wider range of the tidal spectrum. Alternative 4m improves fish passage by advection. Buried structures more easily accommodate increased roadway surface elevations for sea-level rise and do not restrict amenities on the causeway. Partially gated replacement culverts have a low impact on landward inundation from normal water levels for normal tides and normal riverine flow.

G. Alternative 5 – Rehabilitation (15-year)

Alternative 5 is a short-term rehabilitation alternative involving additional buried concrete roadway slab over the existing culverts. Alternative 5 does not improve fish passage, does not provide sea-level rise accommodation but maintains existing parking and uses on the causeway. Rehabilitation does not affect landward inundation from normal water levels for normal tides and normal riverine flow. This alternative does not meet the purpose and need.

H. Alternative 6 – Rehabilitation (30-year) – Slip-lining with new flap gates

Alternative 6 is a longer-term rehabilitation alternative involving slip-lining the existing culverts with new flap gates and adding two (2) new culverts with flap gates to offset the reduction in the existing culvert opening. Alternative 6 does not improve fish passage, does not provide sea-level rise accommodation as increasing the roadway surface elevation on rehabilitated culverts is not cost-effective on structures that do not provide an expected full design service life of 75 years. Alternative 6 does maintain existing parking and uses on the causeway. Rehabilitation does not affect landward

[1] Elevations are referenced to the North American Vertical Datum of 1988 (NAVD 88)

inundation from normal water levels for normal tides and normal riverine flow. This alternative does not meet the purpose and need.

I. Alternative 7 – Rehabilitation (30-year) – Slip-lining without flap gates

Alternative 7 is a longer-term rehabilitation alternative involving slip-lining the existing culverts without flap gates and adding two (2) new culverts without flap gates to offset the reduction in the existing culvert opening. Alternative 7 improves fish passage by advection, does not provide sea-level rise accommodation as increasing the roadway surface elevation on rehabilitated culverts is not cost-effective on structures that do not provide an expected full design service life of 75 years. Alternative 7 does maintain existing parking and uses on the causeway. Alternative 7 has low impact on landward inundation from normal water levels for normal tides and normal riverine flow. This alternative does not meet the purpose and need.

J. Alternative 8 – Phased Alternative – New culverts now then future bridge

Alternative 8 is a phased approach with construction of five (5) 5 -foot x 5-foot precast concrete box culverts with flap gates that prevent landward ("upstream") flow on four (4) culverts and one (1) open culvert. The new culverts would be constructed first on the eastern portion of the causeway to allow for a future bridge to be built to the west. Alternative 8 improves fish passage by advection now with the culverts, then by volitional fish passage later with the bridge. A phased alternative allows for sea-level rise accommodation but may alter amenities on the causeway with a future bridge. A phased alternative has a low impact on landward inundation from normal water levels for normal tides and normal riverine flow now and high impact on landward inundation later when a bridge is in service.

K. Alternative 9 – Replacement Culverts - open

Alternative 9 is four (4) 5-foot x 5-foot precast concrete box culverts without flap gates to provide unrestricted landward flow through the culverts. This alternative would require increasing the hydraulic opening with a larger structure at Stride Bridge at some time in the future. Alternative 9 improves fish passage by advection. Buried structures more easily accommodate increased roadway surface elevations for sea-level rise and do not restrict amenities on the causeway. Open culverts have a medium to high impact on landward inundation from normal water levels for normal tides and normal riverine flow.

L. Alternative 10 – Replacement of Bridge #2246 and Stride Bridge (Single Span)

Alternative 10 is replacing the existing Bridge #2246 culvert system with a bridge. This alternative would also involve the replacement of Stride Bridge in the same timeframe. Bridge #2246 would be a single span of 120 to 150 feet long, two-lane highway bridge. There would be a separate bridge for the Sunrise trail. There would not be parking on the bridge structure, but parking would be maintained on the highway approaches to the bridge. Alternative 10A is a sub alternative that would include parking on the bridge structure. A single span bridge has a high impact on landward inundation from normal water levels for normal tides and normal riverine flow.

M. Alternative 11 – Replacement of Bridge #2246 and Stride Bridge (Two-Span)

Alternative 11 is replacing the existing Bridge #2246 culvert system with a larger bridge. This alternative would also involve the replacement of Stride Bridge in the same timeframe. Bridge #2246 would be a two-span 150 to 250 feet long, two-lane highway bridge. There would be a separate bridge for the Sunrise trail. There would not be parking on the bridge structure, but parking would be maintained on the highway approaches to the bridge. Alternative 11A is a sub alternative that would include parking on the bridge structure. A two-span bridge has a high impact on landward inundation from normal water levels for normal tides and normal riverine flow.

N. Alternative 12 – Replacement of Bridge #2246 and Stride Bridge (Multi-Span)

Alternative 12 is replacing the existing Bridge #2246 culvert system with a very large multi-span bridge, as well as replacing Stride Bridge in the same timeframe. Bridge #2246 would be a 400 to 700 feet long, two-lane highway bridge. There would be a separate bridge for the Sunrise trail. There would not be parking on the bridge structure, but parking would be maintained on the highway approaches to the bridge. A sub alternative that would include parking on the bridge has not been carried forward due to the increased cost associated with accommodating parking on the bridge structure. This alternative represents a structure that would fully mimic the natural channel and bank conditions landward and seaward of the causeway. A multi-span bridge has a high impact on landward inundation from normal water levels for normal tides and normal riverine flow.

O. Additional Alternatives Considered

The 2015 hydraulic study evaluated some alternatives that were not considered in the Environmental evaluation (2020). The 2015 hydraulic study evaluated two (2) concrete box culvert alternatives, Variation 2B & 2C, that contained four (4) culverts with various flap gate arrangements that were not advanced to the Environmental evaluation due to inadequate hydraulic conveyance capacity. Culvert alternatives with larger overall opening areas were advanced to the Environmental evaluation. The 2015 hydraulic study considered replacement culverts that would have self-regulating tide gates (SRTs) which could improve tidal exchange relative to traditional tide flap gates. While some SRTs are identified as "fish-friendly" by manufacturers, it was determined that the large differential in water surface elevations on the landward and seaward sides of the Bridge #2246 would have a negative effect on SRT operation and maintenance and would not result in improved upstream fish passage. SRTs were not considered further in the Environmental evaluation (2020). The 2015 hydraulic study also considered a small single span bridge in combination with relief culverts at a higher elevation, for additional hydraulic capacity during high flows, in the causeway embankment. This option was not carried forward in 2020 because it was identified that this alternative was less feasible than a stand-alone single-span bridge. Additional information on the 2015 hydraulic study alternatives is provided in the full alternative matrix in Appendix 2.

The 2015 hydraulic study considered what effects the Bridge #2246 alternatives would have on Stride Bridge (3973), which is a 12.5-foot corrugated steel plate pipe arch culvert in the Middle River approximately 3 miles upstream from Bridge #2246 (Figure 1). The 2015 hydraulic study and subsequent evaluation during the Environmental evaluation (2020) by MaineDOT identified that increased tidal exchange at Bridge #2246 would expedite the need for a replacement structure at the Stride Bridge location due to increased tidal water surface elevation, increased salinity, and potential for ice floes. Several options were considered in tandem with the Bridge #2246 alternatives to identify potential impacts of changes at Bridge #2246. The Stride Bridge alternatives ranged from Do Nothing, replacement-in-kind culvert, and full bridge replacement with various single spans to restore natural riverbank conditions through the structure.

P. Alternatives Considered but not carried forward in Environmental Evaluation (2020)

The culvert rehabilitation alternatives (Alternatives 5, 6 and 7) did not meet the project's purpose and need because they did not provide a 'good' or better structure condition rating and were therefore dismissed from further study early in the alternatives analysis. Alternative 8, the phased alternative, was dismissed from further study because it was more feasible to select either culverts or a bridge. While bridge alternatives 11 and 12 met the project's purpose and need and the secondary project goals, the longer span bridges in these alternatives were not anticipated to provide much of an increase in tidal exchange over Alternative 10 (a single span bridge) but did have greater environmental impacts and cost. Alternatives 11 and 12 were not further investigated because Alternative 10 optimized the bridge size while approaching full tidal restoration.

Q. Primary Alternatives studied in Environmental Evaluation 2020

Five (5) primary replacement alternatives were considered in the Environmental Evaluation (2020). The primary replacement culvert alternatives (Alternatives 2, 3, 4, 4m, and 9) and bridge alternative (Alternative 10) met the purpose and need as well as the secondary project goals of improving fish passage and providing for sea level rise accommodations consistent with the Machias flood protection project and the Maine Climate Council's guidance. The bridge alternative (Alternative 10) had potential for nuisance flooding with water levels reaching the bottom of the proposed structure near the end of its designed service life, but the structure would remain open to traffic under SLR scenarios.

All the primary replacement culvert alternatives (Alternatives 1, 2, 3, 4, 4m, and 9) and bridge alternative (Alternative 10) maintained or improved the current public uses and amenities on the causeway. The culvert replacement alternatives made improvement of the causeway amenities easier and less costly than the bridge alternatives. However, causeway amenity improvement would still have been possible with the bridge alternatives. All the primary culvert and bridge replacement alternatives located the proposed structure 60 to 75 feet to the east of the existing culverts to maintain water flows through the existing structure during construction.

An abbreviated Alternatives Matrix that summarizes the five (5) primary alternatives (Alternatives 1, 4, 4m, 9, and 10/10A) included in the Environmental Evaluation (2020) is included below:

Figure 4: Summary Alternatives Matrix

ALTERNATIVE CONFIGURATION		ALTERNATIVE EVALUATION								LANDWARD IMPACTS				
		PURPOSE AND NEED		SECONDARY GOALS			OTHER			Landward Water Surface Elevation (WSEL) (NAVD88)	Increased Acreage Impact	Number of Properties	Hazardous Waste Sites	Wells/ Septic
		Overall Structure Rating	Railroad Corridor	Fisheries (passage)	Sea Level Rise (SLR)	Transpo. & Community Uses	Impacts to Tidal Regime	Constructability & Maintenance	Stride Bridge (#3973)	NOTE: Impacts noted are from differences in normal water levels for normal tides and normal riverine flow (non-flood events)				
Alt. No.	Culvert or Bridge, Span and Size	'Good'	Preserves railroad corridor	Improvement (Yes/No) & Monitoring	Consistent w/ Town & State Climate Council Guidance	Maintains current public uses of the causeway	Ranges from No change to full restoration	Water management, dredging, and future maint.	1948 ~ 12.5 ft span culvert located upstream	MHW WSEL LOW (<2') MEDIUM (2' to 4') HIGH (>4')	Acreage impacts due to change in WSEL	Parcels impacted by change in WSEL	Hazmat sites impacted by change in WSEL	Parcels w/ wells & septic impacted by change in WSEL
-	No Build	No	Yes	No	No	No	No Change	N/A	No Change	N/A	N/A	N/A	N/A	N/A
1	Fully Gated Culverts	Yes	Yes	No	Yes	Yes	No Change	• Difficult dewatering	No Change	LOW (EL. -2.5' Change = -1.7')	N/A	N/A	N/A	N/A
4	5 culverts, 4 gated, 1 open, all at EL-6.05	Yes	Yes	Yes (w/incoming tide) fish monitoring & long term take of Endangered Atlantic Salmon anticipated	Yes	Yes	Improvement 40 intertidal habitat acres	• 1,000± CY of dredging • Difficult dewatering	No Change	LOW (EL. 0.8' Change = +1.5')	40	10	0	0
4 MOD	3 larger culverts, 2 gated @-4.05, 1 open @-6.05	Yes	Yes	Yes (w/incoming tide) fish monitoring & long term take of Endangered Atlantic Salmon anticipated	Yes	Yes	Improvement 86 intertidal habitat acres	• 1,000± CY of dredging • Difficult dewatering	No Change	MEDIUM (EL. 2.1' Change = +2.8')	86	28	1 municipal landfill (needs further study)	0
9	4 open box culverts	Yes	Yes	Yes (w/incoming tide) fish monitoring & long term take of Endangered Atlantic Salmon anticipated	Yes	Yes	Improvement 168 intertidal habitat acres	• No flap gates to maintain • Difficult dewatering	• Requires replacement sooner	MEDIUM/HIGH (EL. 4.1' Change = +4.8')	168	38	1 municipal landfill (needs further study)	1
10	120 to 150 ft bridge, parking in bridge approaches only	Yes	Yes	Yes (conditions replicate natural fish passage, but no fish monitoring)	Yes	Yes	Restoration; 398 intertidal habitat acres	• 6,000± CY of dredging • Landward sediment scour & seaward shoaling needs further study	• Requires replacement now due to increased hydraulic opening, salinity and ice floes	HIGH (EL. 7.9' Change = +8.6')	398	54	1 municipal landfill (needs further study)	5
10A	120 to 150 ft bridge, w/parking on bridge & approaches	Yes				Yes								

In May 2022, the MaineDOT publicly announced that a bridge to replace the existing four box culverts on #2246, was the preliminary preferred alternative. The decision to choose a bridge as the preferred alternative was mainly based on information received during Technical Assistance from the National Marine Fisheries Service (NMFS) regarding potential effects under the Endangered Species Act; and information gained during the public involvement process.

MaineDOT and FHWA held a public meeting in Machias on June 28, 2022, to discuss the preferred alternative. MaineDOT heard from numerous members of the public in opposition to a bridge, specifically those that would be impacted by restoring tidal exchange upstream of the dike and causeway. In addition, MaineDOT and FHWA heard concerns regarding the potential impacts of inundating a municipal landfill located on the northwest bank of the Middle River.

In response to the June 28th public meeting, MaineDOT further investigated and analyzed the impacts of the bridge and culvert alternatives on the endangered Atlantic salmon, the National Register eligible Machias/Riverside Park Trotting Track, the landfill, and property impacts. Based on the additional analysis, In November of 2023, the preferred alternative changed from a bridge to a fully gated culvert replacement. The decision was based on the following:

- MaineDOT heard from the public and abutters at the June 28th meeting and after the meeting that a bridge alternative would have a large impact on them (regular tidal inundation where it does not exist today), and most people that spoke were opposed to the bridge alternative. The property impacts under the bridge alternative would be approximately 400 acres on approximately 54 properties (permanent and temporary rights). The impacts to property under the fully gated culvert replacement would be minor (possible temporary construction rights).

- It appeared that the fully gated culvert alternative would not result in jeopardy to Atlantic salmon or adverse modification of its Critical Habitat.

- Improvements to fish passage from the culvert alternative would have property impacts and still result in intense monitoring and future uncertainty regarding fish passage requirements.

- MaineDOT/FHWA determined, and the State Historic Preservation Officer (SHPO) concurred on effects to Section 106 properties from the bridge and culvert alternatives. The bridge alternative and all other open culvert variation alternatives were determined to have an adverse effect on the Machias/Riverside Park Trotting Track due to regular tidal inundation where it does not exist today. The fully gated culvert replacement would not inundate the Trotting Track and will not have an adverse effect on the National Register-eligible Machias/Riverside Park Trotting Track and National Register-listed Machias Railroad Station.

- Section 4(f) of the U.S. DOT Act requires the assessment of prudent and feasible alternatives that avoid a "use" on Section 4(f) properties. The Machias/Riverside Park Trotting Track and Machias Railroad Station are Section 4(f) properties. The fully gated culvert replacement will avoid a "use" on both 4(f) properties. All other alternatives will have a "use" on the Machias/Riverside Park Trotting Track. It appears currently that the fully gated culvert replacement is the only prudent and feasible avoidance alternative.

- Section 4(f) states that if, after reasonable mitigation, the project still causes severe environmental impacts or severe impacts on environmental resources protected under Federal statutes, it is not prudent. Consultation under Section 7 of the Endangered Species Act is most relevant to this determination. MaineDOT/FHWA initiated and completed a Formal Consultation under the Endangered Species Act for the potential effects of the fully gated culvert replacement alternative, which informed decision-making.

After the initial identification of the preferred alternative, MaineDOT and FHWA continued to evaluate the alternatives and their relative impacts considering engineering feasibility, cost, constructability, interface with adjacent projects, right-of-way (ROW) impacts, and environmental impacts.

5. Environmental Evaluation 2020

The sections below summarize the environmental resources and the impacts to those environmental resources that were identified in the 2020 Environmental Evaluation.

A. Endangered and Threatened Species

Section 7 of the Endangered Species Act requires each Federal agency to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. According to the National Marine Fisheries Service (NMFS) (2023) and the Maine Department of Marine Resources (DMR; 2022), the potential exists for three Federally listed threatened and endangered species under the jurisdiction of NMFS to be present in the project action area: the endangered shortnose sturgeon (*Acipenser brevirostrum*); the threatened Gulf of Maine (GOM) Distinct Population Segment (DPS) of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*); and the endangered GOM DPS of Atlantic salmon (*Salmo salar*). The action area is also within NMFS-designated critical habitat for the GOM DPS of Atlantic salmon. A project's action area is defined as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area (project area) involved in the proposed action" (50 CFR 402.02). The action area for this project, shown in Figure 5, includes both the surrounding area affected by construction of the project and the area affected temporarily and permanently by the operation of the project (e.g., the Middle River and its tributaries upstream of the Bridge #2246.

Figure 5: Bridge #2246 ESA Consultation Area

Potential project impacts on threatened and endangered species and critical habitat under the jurisdiction of NMFS are summarized in this section. Federally listed species under USFWS jurisdiction are discussed in section 3.

1. Listed Species and Designated Critical Habitat

Shortnose Sturgeon

The project area contains potential migrating and foraging habitat for adult shortnose sturgeon. Shortnose sturgeon have not been documented in the Machias estuary or Machias River. They have been documented in the Saint John River estuary in New Brunswick, the Penobscot River, and the Union River estuary. The species could potentially use the river for short periods of time (<24 hours) in between spring and fall.

GOM DPS Atlantic Sturgeon

The project area contains potential migrating and foraging habitat for adult and subadult Atlantic sturgeon. Atlantic sturgeon have not been documented in the Machias estuary or Machias River. The nearest population of Atlantic sturgeon occurs in the Saint John River in New Brunswick. Atlantic sturgeon use the Penobscot River and estuary from spring into fall. Sturgeon tagged in the Penobscot estuary have been detected in the Saint John River, New Brunswick, Minas Passage, Bay of Fundy, and off the coast of Halifax, Nova Scotia. Therefore, it is reasonable to assume that Atlantic sturgeon could be present in the project area, despite the lack of documentation. As such, Atlantic sturgeon are anticipated to occur in the project area when making migratory movements in early-spring or fall.

GOM DPS Atlantic Salmon

The project area contains migrating and foraging habitat for adult and smolt (juvenile) Atlantic salmon. Adult Atlantic salmon are likely to occur in the action area when migrating up the Machias River and again when returning to the ocean after spawning. Atlantic salmon migration is generally thought to last between 1 and 5 weeks, depending on river conditions, from mid-April to mid-June. Adult salmon can occur in rivers from April through October. Adults migrating up the Machias River need to reach and climb Bad Little Falls (approximately 0.5 mile southwest of the project area) when river conditions are ideal during spring flows. Otherwise, individuals may rest or hold in the Machias River below the falls. Atlantic salmon smolt may occur in the action area during their outward (i.e., downriver) migration mid-April through mid-June. Atlantic salmon smolt in the project area would likely be individuals that are actively migrating, as opposed to resting or holding.

GOM DPS Atlantic Salmon Critical Habitat

Full surveys of the Middle River for Atlantic salmon critical habitat have not been completed. However, anecdotal information indicates the action area contains the full suite of Essential Physical and Biological Features (PBFs) defined for the spawning and rearing (SR) and migration (M) primary constituent elements (PCEs) of GOM DPS Atlantic salmon critical habitat effects analysis.

MaineDOT received a letter from the National Marine Fisheries Service (NMFS) on September 30, 2020, that outlined substantial concerns with the September 2020 preferred alternative of fully gated replacement culverts (Alternative 1). NMFS stated that the preferred alternative "would provide even less opportunity for fish passage than exists now and will not remedy ongoing impacts to our trust resources.…The project site is within or near areas that support a number of NOAA trust resources, including designated critical habitat for the endangered Gulf of Maine Distinct Population (GOM DPS) of Atlantic salmon, Essential Fish Habitat (EFH), and habitat for a range of diadromous fish species. In addition, this project area contains salt marsh, intertidal mudflats, and other important habitats that provide important ecosystem services. A replacement [consisting of fully gated replacement culverts] would negatively affect these public resources and would reduce opportunities to restore functions in the watershed." MaineDOT replied to NMFS on October 20, 2020, informing NMFS of MaineDOT's decision to re-evaluate.

Based on this guidance from NMFS, MaineDOT and FHWA re-evaluated the alternatives and determined that the preferred alternative to carry forward in the Environmental evaluation that began on May 6, 2022, would be a bridge alternative (i.e., Alternative 10). This alternative was presented at a public meeting on June 28, 2022 (meeting transcript provided in Appendix 11).

MaineDOT and FHWA received comments (Appendix 11, June 28, 2022) from numerous members of the public opposed to Alternative 10 and any alternative that would flood property upstream of the Bridge #2246. MaineDOT and FHWA once again determined that further analysis of alternatives was required.
MaineDOT prepared a Biological Assessment (BA) and FHWA initiated consultation with NMFS on September 20, 2023, pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C 1531 et seq) for a bridge replacement project that proposes to remove and replace Bridge #2246 (Br. No. 2246) in Machias, Maine (see Appendix 3). MaineDOT and FHWA announced on November 7, 2023, that the preferred alternative to carry forward in the Environmental evaluation and the public comment period was Alternative 1 (Replacement Culverts – fully gated).

As determined in the BA, impacts on the shortnose sturgeon, Atlantic sturgeon, Atlantic salmon, and Atlantic salmon designated critical habitat could occur during both the construction and operation phases of the project. Impacts on the protected species and designated critical habitat during the construction phase could occur due to increased turbidity and sedimentation in the water column related to cofferdam installation and removal, riprap placement, and land-based soils destabilized by construction equipment; elevated underwater sound related to impact pile driving to install steel bent piles for the temporary bridge and vibratory pile driving to install and remove steel sheet piles to construct the cofferdams; entrapment and resulting injury or death during dewatering of individual fishes within cofferdams during their construction or after high river flows; and temporary loss of aquatic habitat resulting from placement of temporary structures or fill. Impacts during the operation of the Alternative 1 would include false attraction to water flow through the culverts, which could misdirect adult salmon migrating up the Machias River and cause them to unnecessarily expend additional energy or expose them to increased predation risk; increased risk of lost spawning opportunity through incidental passage of Atlantic salmon through the replaced culverts without

other salmon to spawn with; and general impediment of fish passage for salmon to reestablish the Middle River as active spawning habitat or other species of fish that serve as a prey buffer for Atlantic salmon.

2. Effects Determinations

MaineDOT, on behalf of FHWA, has analyzed the effects of the Bridge #2246 replacement project on the endangered shortnose sturgeon, threatened GOM DPS of Atlantic sturgeon, endangered GOM DPS Atlantic salmon, and designated critical habitat for the GOM DPS Atlantic salmon. MaineDOT has determined that construction of Alternative 1 (fully gated replacement culverts) is ***not likely to adversely affect*** shortnose sturgeon and Atlantic sturgeon but ***is likely to adversely affect*** Atlantic salmon that may occur in the action area. Additionally, Alternative 1 is ***likely to adversely affect*** designated critical habitat for Atlantic salmon in the action area.

Table 1. Effects Determinations for the Threatened and Endangered Species and Designated Critical Habitat in the Project Action Area

Species	Distinct Population Segment	Federal Listing Status	Effect Determination
Shortnose sturgeon *Acipenser brevirostrum*	N/A	Endangered	Not likely to adversely affect
Atlantic sturgeon *Acipenser oxyrinchus*	Gulf of Maine	Threatened	Not likely to adversely affect
Atlantic salmon *Salmo salar*	Gulf of Maine	Endangered	Likely to adversely affect
Critical habitat for Atlantic salmon	Gulf of Maine	N/A	Likely to adversely affect

Alternatives 4, 4m, and 9 would have an adverse effect on Atlantic salmon population as these alternatives would limit the opportunity for fish passage by only allowing passage during incoming tides. Culverts in a submerged condition also may have unknown effects on fish passage efficacy during high tide cycles. These alternatives would offer no upstream fish passage during outgoing tides for weak and moderate swimming fish due to the high velocity at which water would pass through the culverts during this portion of the tidal cycle. Ultimately, these alternatives would provide improvement for fish passage conditions and some increase of upstream intertidal habitat due to increased tidal flow. However, the fish passage efficacy is unknown and unpredictable, and they will not result in full restoration of the upstream marsh and intertidal habitat. MaineDOT cannot confirm that these alternatives will meet the NMFS threshold for safe, timely, and efficient fish passage for target endangered species or other important coevolved species of fish. Long-term monitoring will be required if Alternative 4, 4m or 9 is selected. Monitoring is likely to be completed over a 3–5-year period. Monitoring will include tagging of fish species and utilizing multiple methods of telemetry to understand the behavioral aspect of passage through the culvert. Alternative 10 (the bridge alternative) would have no adverse effect on the listed species of fish, except during the construction phase. The bridge alternatives would create tidally transparent conditions that are most closely approximate natural tidal conditions; and would provide fish passage conditions similar to a natural estuary. The No Build alternative would have an adverse effect on listed species and critical habitat. Alternative 1 Replacement Culverts-fully gated would have an adverse effect on listed species and critical habitat, including during the construction phase, and require 1 to 2 years of monitoring water depth and velocity for a range of flow and tidal conditions.

C. Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act requires projects that are funded, permitted, or implemented by federal action agencies to consult with NMFS regarding potential adverse impacts to Essential Fish Habitat (EFH).

In a letter dated September 2, 2017, NOAA commented that the Machias Bay is EFH for "a number of federally managed species, including all life stages of winter flounder, windowpane flounder, and Atlantic cod. In addition, Machias Bay and Machias River are EFH for Atlantic salmon that may use the project area as a migratory pathway and for foraging before and after spawning." "The Machias River is also one of eleven rivers in Maine designated as a Habitat Area of Particular Concern (HAPC) for Atlantic salmon because it supports some of the only remaining U.S. populations of naturally spawning Atlantic salmon that have historic river-specific characteristics. These river populations harbor an important genetic legacy that is vital to the persistence of these populations and to the continued existence of the species in the United States. Furthermore, the Middle River contains historic spawning habitat for a number of other diadromous fish species, including rainbow smelt, blueback herring, alewife, and American eel. These species are important prey for federally managed species and, therefore, are considered a component of EFH pursuant to the MSA."

MaineDOT's EFH assessment (Appendix 4) found there is habitat in the action area for Winter Flounder, Little Skate, Ocean Pout (juveniles only), Pollock (juveniles only), Silver Hake, Windowpane Flounder, Winter Skate, and White Hake (juveniles only), and Atlantic salmon. Coastal EFH in the action area consists of mudflat and fines substrate at depths of 0 to 4 meters and a salinity mixing zone of 5 to 25 parts per thousand. Additionally, it is likely that multiple NOAA Trust Species (e.g., alewife, blueback herring, rainbow smelt, striped bass, American eel, sea lamprey, and American shad) occur in the Machias Estuary portion of the action area and have historic spawning habitat in the Middle River, as noted by NOAA.

Although the Machias River and East Machias River, which are listed as HAPC for Atlantic salmon, are both adjacent to the project, the project action area, including the Middle River, is not within the extents of the HAPC of either river. The Bridge #2246 replacement project will not affect Atlantic salmon HAPC.

The No Build alternative would have adverse effects on EFH. Alternative 1 would have adverse effects on EFH. MaineDOT has proposed avoidance and minimization measures (AMM) to minimize impacts on EFH and NOAA trust species during project construction (Appendix 4). However, construction would cause temporary loss of approximately 44,000 square feet of EFH resulting from placement of cofferdams and temporary fill associated with construction of the wet (rock) road for traffic to access the temporary bridge. The project would cause permanent loss of approximately 17,000 square feet of EFH due to the proposed widening of the causeway and placement of riprap. Additionally, Alternative 1 would not restore fish passage or landward tidal flow into the Middle River.

Alternatives 4, 4m and 9 would have similar adverse effects on EFH as Alternative 1. Construction impacts and permanent habitat displacement from widening of the causeway and placement of riprap would be comparable across culvert replacement alternatives. Likewise, as noted in Section 1, each of the culvert replacement alternatives would limit the opportunity for fish passage by only allowing passage during incoming tides. These alternatives would offer no upstream fish passage during outgoing tides for weak and moderate swimming fish due to the high velocity at which water would pass through the culverts during this portion of the tidal cycle. Alternatives 4, 4m, and 9 would allow some increased tidal flow into the Middle River because of the non-gated culverts. However, these alternatives would only provide marginal improvement for fish passage and restoration of upstream marsh and intertidal habitat.

Alternative 10 would have construction impacts and some permanent habitat displacement from widening of the causeway and placement of riprap but would likely result in a net increase in EFH with the removal of the culverts and construction of a bridge span. Additionally, the unrestricted tidal flow associated with alternative 10 would restore fish passage into the Middle River and promote restoration of the upstream marsh and intertidal habitat. EFH and NOAA Trust species would regain access to historic spawning habitat after construction of the bridge alternative.

In the June 14, 2024, EFH Consultation Letter, NMFS stated that Aternative 1 would have significant adverse effects on EFH.

D. Wetlands and Waterbodies

The Middle River flows under the Dike Bridge at its confluence with the Machias River. The watershed area is ~13.2 square miles. The watershed includes Marks, Second Marks, Six Mile, and Seavey lakes. Heading upstream, the river flows through marsh, small agricultural fields, low-density development, and forests that experience some logging. The bridge's gated culverts and causeway both affect hydrologic conditions in the Middle River. However, leakage through the culvert flap gates and the causeway contributes to landward flow during semi-diurnal flood tides.

The Middle River is tidal with flows affected by the US Route 1 causeway (embankment) and four tide gate structures. Upstream of the crossing, the river is an intertidal impoundment (Photo 2). Shoreline substrates consist of boulders, cobble, gravel, sand, and silt and wetland plants are present along the north side of the Dike Bridge embankment (Photo 3).

The embankment and tide gate structures are barriers to aquatic organism passage. However, the tide gates are in poor condition, and tidal flows enter the upstream impoundment. Mudflats are exposed at low tide (Photo 8), but the tidal range is <3 feet in the impoundment. The marsh bordering the impoundment is vegetated predominately by freshwater cordgrass (Spartina pectinata; Photo 4). Other species observed included saltmeadow cordgrass (S. patens), seaside plantain (Plantago maritima), seaside goldenrod (Solidago sempervirens), black grass (Juncus gerardii), sea lavender (Limonium carolinianum), and silverweed (Argentina anserina). Approximately 32 acres of tidal freshwater marsh is present upstream of the causeway.

Photo 1. Middle River box culvert and riprap shoreline during rising tide

Photo 2. Shoreline of Middle River and embankment of Bridge #2246 looking east

Photo 3. Looking northeast along embankment of Bridge #2246

Photo 4. Marsh dominated by freshwater cordgrass (*Spartina pectinata)* north of Bridge #2246 along the Middle River

Permanent Wetland and Waterbody Impacts

The No Build alternative would not result in direct permanent impacts. All the primary replacement alternatives would result in direct permanent impacts from raising the causeway to improve resiliency and accommodate the proposed roadway elevation for SLR. The widened causeway will have riprap slopes extending beyond the existing toe of slope.

Alternatives 1, 4, 4m and 9 would have similar permanent impacts and riprap slope limits. Alternative 10 would have additional permanent impacts due to an expanded riprap area in front of the abutments and more landward dredging.

In addition to direct impacts from construction, potential impacts from wetland conversion upstream of the dike were considered. A bridge or culvert alternative (Alternatives 4, 4m, 9, and 10 would change the tidal regime and replace the 32 acres of freshwater tidal marsh with more coastal wetland species. The No Build Alternative and the fully gated

culvert alternative (Alternative 1) would result in little to no wetland conversion. Stantec completed a study (11/8/21: Memo: Estimated Elevation Ranges of Intertidal Habitats for Middle River / Bridge Alternatives, Appendix 5) to estimate potential elevation ranges for three habitat types of high marsh, low marsh, and unvegetated intertidal areas, for a representative bridge (Alternative 10) and culvert (Alternative 4m). The corresponding acreages are presented in Table 2.

Table 2: Approximate Coastal Marsh Conversion based on Estimated Water Elevations (North American Vertical Datum of 1988, NAV88)

	Alternative 4m	Alternative 10
High Marsh (EL 1.9' to 2.0')	2 acres	17 acres
Low Marsh (EL).8' to 1.9')	19 acres	208 acres
Unvegetated Intertidal/Subtidal (EL 0.8')	100 acres	191 acres

Temporary Wetland and Waterbody Impacts

The No Build Alternative would not have temporary impacts. All the primary replacement alternatives would include temporary fill and piles to construct the temporary on-site detour bridge. The temporary impacts estimate for the Alternative 1 and other buried structure alternatives (Alternatives 4, 4m and 9) included approximately 25,000 square feet of temporary fill and 20,000 square feet for cofferdams. Cofferdams were anticipated during the construction of the proposed structure and removal of the existing. Alternative 10 was anticipated to have similar temporary impacts from the cofferdams and slightly less temporary fill for the temporary on-site detour bridge. The bridge span replacement assumed a maximized temporary detour span to reduce the required approach length and temporary fill.

Impacts on wetlands and waterbodies are regulated by two major federal laws, described further below.

1. Clean Water Act

Section 401 of the Clean Water Act (CWA) prohibits Federal permitting or licensing agencies from issuing authorizations for construction activities having discharges into navigable waters, until the appropriate water quality certifying agency has issued a water quality certification (WQC), or waiver procedures have been satisfied.

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States unless the activity is exempt from Section 404 regulation.

The Maine Department of Environmental Protection (DEP) has combined the decision concerning WQC with the review of an application for a state permit that already requires compliance with state water quality standards. Compliance with Section 401 is through the issuance of WQC with a state permit or by meeting an exemption.

Since all the alternatives would involve in-water work, all the alternatives would require coordination with the Maine DEP to discuss impacts and issuance of a Section 401 WQC with a state permit or by meeting an exemption. Final impacts and any required mitigation will be incorporated in an application and discussed with the U.S. Army Corps of

Engineers to obtain a permit which will satisfy Section 404 of the Clean Water Act[2]. MaineDOT and FHWA anticipate that Alternative 1would require an Individual Permit because of its potential adverse effects to endangered and threatened species and critical habitat.

2. Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the Secretary of the Army, acting through the USACE, for the construction of any structure in or over any navigable water of the United States.

[2] The Section 404 permit is typically obtained after the NEPA process.

Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work affects the course, location, or condition of the water body. The law applies to any dredging or disposal of dredged materials, excavation, filling, re-channelization, or any other modification of a navigable water of the United States and applies to all structures.

Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946 require authorization from the U.S. Coast Guard (USCG) to construct a new bridge or causeway or reconstruct or modify an existing bridge or causeway across navigable waters[3] of the United States. MaineDOT has requested an exemption under Title 23 U.S.C. Section 144(h) and Title 23 C.F.R. 650.805 "Bridges not requiring a USCG Permit".

For any of the alternatives, final impacts and any required mitigation would be incorporated in an application and continued coordination would occur with the USACE and/or the USCG to obtain a permit or confirm an exemption in accordance with Sections 9 and 10 of the Rivers and Harbors Act.

E. Floodplains & Hydraulics

Executive Order 11988 requires Federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development whenever there is a practicable alternative.

The following studies were performed to address hydraulic conditions and potential flooding impacts as part of the Environmental evaluation (2020):

1. Phase 1 Hydraulic Analysis for Machias Bridge #2246 (#2246) Planning Phase Support Services, September 16, 2021 (Phase 1 Study).
2. Phase 2 Hydraulic Analysis for Machias Bridge #2246 (#2246) Planning Phase Support Services, December 20, 2021 (Phase 2 Study).

The focus of these studies was evaluation of potential alternatives at Bridge #2246 and associated impacts on the upstream (landward) reach of the Middle River. Additional hydraulic studies were performed to address project-specific issues that were identified during ongoing development of the project. These studies include:

1. Bridge Opening Geometry Hydraulic Analysis for Machias Bridge #2246 (#2246) Planning Phase Support Services. December 7, 2021 (Bridge span study).
2. DRAFT Preliminary Municipal Landfill Impact Evaluation; Machias – Bridge #2246 (#2246) Planning Phase Support Services Amendment #2. August 26, 2022. (Landfill Impact Study).

The Phase 1 Study (Appendix 5) was completed on September 16, 2021, to assess hydraulic conditions associated with the primary replacement alternatives for the Bridge #2246 culvert. The existing structure restricts tidal flow, but the culvert is adequate to drain upland floods without overtopping the bridge or the adjacent approach embankments. There is no apparent flood history associated with the conveyance of the existing culverts or a need to increase the hydraulic opening. However, freeboard may be inadequate to prevent overtopping of the roadway during the 100-year tidal flood event. The Phase I Study included hydraulic evaluation of the existing culverts with leaks associated with deteriorated tide gates and conditions with fully-functioning (i.e., no leakage) tide gates. The later condition (tide gates without leakage) was evaluated as Alternative 1. Anecdotal information indicates that fish in the Machias River can pass upstream (landward) through the existing culvert.

The Phase 1 Study included:

1. Unsteady-state model analysis of conditions with normal tide data as represented by tidal stage data collected by MaineDOT in 2011 with the 50th percentile (median) flow in the Middle River; and
2. Steady-state model analysis of the 100-year peak flow in the Middle River with mean high water (MHW) and mean low water (MLW) downstream boundary conditions.

[3] For U.S. Coast Guard bridge permitting purposes, a navigable water is defined at 33 CFR, Subpart 2.05-25. It includes any waterway which is subject to the ebb and flow of the tide; or any waterway which is presently used and/or is susceptible to use in its natural condition, or by reasonable improvement, as a means to transport interstate or foreign commerce.

Item (1) above reflects typical hydraulic conditions at the bridge and was used to evaluate potential changes to areas subject to regular tidal inundation along the Middle River landward from Bridge #2246. Item (2) is a check of the peak water surface elevations (WSELs) as represented by the Federal Emergency Management Agency (FEMA) Base Flood Elevation (BFE). The Phase 1 Hydraulic Analysis also included unsteady-state flow analysis of a 1.1-and 10-year riverine flow condition for the bridge replacement alternative only (Alternative 10). Information developed as part of the Phase 1 study was also used to evaluate the upstream (landward) fish passage.

The Phase I Study evaluated culvert-based alternatives and a single bridge alternative. The evaluated culvert alternatives (Alternatives 1, 4, 4m and 9) varied in configuration (e.g., size and number), invert elevations, and inclusion (or exclusion) of flap-gates. The evaluated bridge alternative (Alternative 10) is a bridge structure with a deck and roadway. The preliminary bridge low-chord elevation of 13.1 feet was selected to match the Town of Machias' Phase 1 sea-level rise protection plans (see Section K). The bridge span alternative included modification of the Middle River to reflect expected erosion of sediment if a bridge were installed at Bridge #2246.

Based on the results of the Phase 1 Study steady-state simulation results, the evaluated primary alternatives do not increase the existing FEMA BFE. While Alternatives 4, 4m, 9 and 10 result in higher WSELs upstream from Bridge #2246 during normal tidal and riverine flow conditions relative to existing conditions, the higher WSELs are lower than the FEMA BFE.

Alternative 1 (referred to as Alternative 1 Replacement in Kind in the Phase 1 Hydraulic Analysis) does not provide opportunities for upstream fish passage. Alternative 1 also represents conditions in which the upstream maximum and minimum WSELs for the typical tidal conditions are -2.5 ft and -3.4 ft, respectively, and are the lowest compared to the other evaluated alternatives. In contrast Alternative 10 has volitional, unrestricted fish passage but represents the conditions for which the upstream maximum WSEL is the highest (8.6 ft) and the minimum WSEL is the lowest (-7.0 ft). This is due to the large hydraulic capacity of the bridge and the ability for this alternative structure to provide full tidal exchange with minimal losses through the bridge opening. As such, Alternative 10 would also result in the regular inundation of approximately 412 acres of land that is not currently inundated on a regular basis including the historic Trotting Track (see Section F.1).

In December 2021, a Bridge Span Study was prepared to identify a bridge span for providing flow speeds that allow for volitional fish passage and evaluated the sensitivity of the opening width to flow speed to carry forward to Phase 2 Study. The bridge spans that were evaluated were variations of the Alternative 10 geometry from the Phase 1 Hydraulics Study and included opening spans of 116.5 ft (Alternative 10), 150 ft, 200 ft and 300 ft. Each bridge span alternative geometry was identical except for the opening spans. In general, the evaluated bridge span alternatives resulted in maximum and minimum upstream WSELs that are within 0.3 ft and 0.5 ft respectively. Alternative 10 and any other bridge alternative with a clear span greater than 116.5 ft has volitional, unrestricted fish passage, since the full tidal exchange is occurring at Bridge #2246 (see Bridge span study memo in Appendix 5).

The Phase 2 Study was completed on December 20, 2021, and included evaluation of hydraulic performance across a wider range of conditions for Alternative 4m (larger and partially gated box culverts) and Alternative 10 (120 ft bridge). The Phase2 Study included updates to the normal tidal regime used for Phase 1 Study, which was based on 2011 tidal data collected by MaineDOT, with tidal data collected by MaineDOT in 2021 (note the tidal data from 2021 has lower maximum WSELs compared to data collected in 2011). The normal tidal regime data was used in both the Phase 1 Study and Phase 2 Study for establishing a baseline for existing conditions and for simulation of the evaluated alternatives. Interim repairs to the Bridge #2246 culvert flap gates by MaineDOT in August 2021 prompted MaineDOT to collect updated tidal stage data in the Middle River upstream and in the Machias River downstream (seaward) from Bridge #2246. The tidal stage data collected by MaineDOT in 2021 was used to recalibrate the existing conditions Phase 2 Study hydraulic model to establish baseline conditions across the model simulation scenarios. The objective of the Phase 2 Study was to build on the work completed in the Phase 1 Study and include an assessment of the refined alternatives for the following:

1. Potential improvements to upstream fish passage to Bridge #2246.
2. Changes in WSELs landward from Bridge #2246.
3. Hydraulic performance for the 100-year high tide surge scenario (e.g., overtopping, freeboard).
4. Changes in hydraulic characteristics and performance as a result of 1.5 ft and 3.9 ft of SLR (e.g., upstream fish passage criteria, changes in WSELs landward from Bridge #2246, overtopping and freeboard).
5. Preliminary scour countermeasures design (e.g., stable riprap sizing).
6. Potential impacts and preliminary sediment management approaches related to the development of a new channel in the landward area for the bridge alternative as well as considerations for the area immediately seaward of the proposed bridge location.

Phase 2 Study unsteady-state maximum WSELs upstream of Bridge #2246 for normal conditions are -0.5 ft, 2.1 ft and 7.9 ft for existing conditions, Alternative 4m and Alternative 10 respectively. The resulting increase in inundated areas upstream of Bridge #2246 are 86 acres and 398 acres for Alternative 4m and Alternative 10 compared to existing conditions. Apparent differences in reported values between the Phase 1 Hydraulic Analysis and the Phase 2 Hydraulic Analysis modeling are due to a recalibrated existing conditions model, updated bathymetric data and more extensive use of ineffective flow areas landward of Bridge #2246 along the Middle River identified during the Phase 2 Hydraulic Analysis to improve model stability and accuracy. In general, these variations are minor and do not appear to represent significant deviations from the Phase 1 Study findings. See Table E-7 and Figure 5 for comparative landward water surface levels for typical tides and river flows for Alternative 1 and Alternatives 4, 4m, 9 and 10.

Table 3: Summary of Landward Water Surface Elevations for Typical Tides and River Flows

Alternative	Description	Maximum Water Surface Elevation (WSEL) (ft)	Increased Inundation Area due to WSEL (acre)	Hydraulic Data Source
Existing Conditions	No Build	-0.5	N/A	Phase 2 Study
Alternative 1	Fully-Gated Culvert Replacement	-2.5	N/A	Phase 1 Study
Alternative 4	Partially-Gated culvert Replacement	0.8	40	Phase 1 Study
Alternative 4m	Partially-Gated culvert Replacement	2.1	86	Phase 2 Study
Alternative 9	Open Culvert Replacement	4.1	168	Phase 1 Study
Alternative 10	Bridge Replacement	7.9	398	Phase 2 Study

Upstream fish passage was preliminarily assessed for the refined alternatives (4m and 10). Alternative 1 does not allow for upstream fish passage, Alternative 4m allows for bi-directional flow where there is opportunity for upstream fish passage via advection through the ungated culvert when the seaward tide WSEL is greater than the landward WSEL (53% of the time), and Alternative 10 allows for unrestricted fish passage. Headwater and tailwater differentials and flow speed were evaluated for Alternative 10. The objective of the flow speed evaluation through the Alternative 10 bridge opening was to identify flow speeds that may allow for volitional fish passage. Information on fish passage criteria was provided by stakeholders (see NMFS Technical Assistance Letter dated November 22, 2021 letter in Appendix 9) and included a flow speed criterion of 0.75 ft/s. Information obtained from the HEC-RAS model in the Middle River at a cross-section approximately 2,500 ft upstream from Bridge #2246 indicates that ebb tide (seaward) flows exceed this value and exceeds 3 ft/s during regular tidal conditions. In addition, the depths of water at this cross-section are approximately 1 ft except during higher low tides when depths approach up to approximately 2 ft which do not meet the criteria outlined in the technical assistance letter.

SLR downstream boundary conditions results in higher maximum and minimum WSELs landward from Bridge #2246. For the existing-conditions simulations, the maximum landward WSELs increases from approximately -0.5 ft to 0.1 ft, representing an increase of approximately 0.6 ft, for the 1.5-ft SLR increase to the normal tidal range under median flow conditions. Similarly, 1.5 ft of SLR under median flow conditions also results in approximately 0.6 ft of increase in the landward maximum WSELs for Alternative 4m. The Alternative 10 bridge approaches tidal transparency and

consequently results in a comparatively greater increase in landward maximum WSELs as a result of SLR (i.e. 1.5 ft of SLR results in an increase from a maximum landward WSEL of 7.9 ft to 9.3 ft (1.4-ft increase) for Alternative 10 under median riverine flow conditions).

The maximum tidal stage for the normal tide with 3.9 ft of SLR was approximately 12.1 ft, which was above the top elevation of the existing Bridge #2246 roadway. Therefore, under the existing conditions simulations, it is expected that the existing Bridge #2246 would be overtopped and that landward WSELs and resulting flooding would occur under this SLR scenario. However, it is unlikely that the existing configuration at Bridge #2246 would be present under the 3.9-ft SLR scenario, which is based on potential end-of-century climate change scenarios and is included to provide approximate relative comparisons between alternatives. Note that the refined alternatives evaluated assume that the top of the roadway would be greater than the maximum tidal stage for SLR boundary conditions and no overtopping would occur.

Preliminary scour countermeasure design calculations suggest that stable rock armor sizes would have a nominal diameter of approximately 3 ft (heavy riprap). The relatively large size of this preliminary scour countermeasure rock size is due to periods during the tidal cycle where the depths of flow are shallow, and the flow speeds are the greatest.

Alternative 10 would result in development of a larger channel morphology through the reach landward of the Bridge #2246 in the Middle River due to the larger span and lower invert compared to Alternative 4m (and other culvert alternatives). Greater than 20,000 CY of sediment is estimated to be mobilized landward of the estimated near-field dredge and riprap apron area. Upstream mobilization of sediment for Alternative 10 would likely have implications on the downstream USACE navigation channel in the Machias River where shoaling already exists adjacent to the boat launch. (See December 2021 Phase 2 Study Memo in Appendix 5).

Following the hydraulics analysis done in the Phase 1 Study and Phase 2 Study, additional concerns were raised by the public related to the potential impacts of the municipal landfill located upstream of the Bridge #2246 if a proposed bridge replacement alternative was selected. The Landfill Impact Study was completed August 26, 2022, to compare simulated hydraulic conditions upstream of Bridge #2246 for the refined alternatives to existing conditions based on the Phase 2 Study model simulations. The results from the Phase 2 Study and Landfill Impact Study suggest that the extent of daily inundation associated with regular tides are to be more pronounced for the bridge alternative (Alternative 10) compared to partially gated culverts (Alternative 4m). This would result in a reduced wetland buffer between the municipal landfill and the Middle River on a daily basis and the normal daily wetted area of the Middle River being in closer proximity to the toe of slope and the groundwater/surface water interface. Additionally, based on the steady-state simulation results for the 100-year riverine flow with mean high water downstream boundary conditions and the regulatory FEMA BFE of 11 ft, it appears the toe of the municipal landfill slope may be subject to inundation and flooding under existing conditions. Sea Level Rise is expected to increase the likelihood of increased inundation at the location of the municipal landfill under existing and proposed conditions (see Section E.9 for further municipal landfill discussion and Appendix 6 for the August 2022 Landfill Impact Study memo).

Based on its design, Bridge #2246 was constructed to provide a transportation route for railroads and motor vehicles across the Middle River at its confluence with the Machias River. Bridge #2246 was not constructed, operated, or maintained as a flood control structure. Additionally, Alternative 1 or a bridge alternative does not constitute a "significant encroachment". (Appendix 5, September 6, 2023. Memo: "16714 Machias Bridge #2246 #2246 – Flood Control Structure" and September 6, 2023. Memo: "16714 Machias Bridge #2246 #2246 – Encroachment Determination").

1. Sea-Level Rise

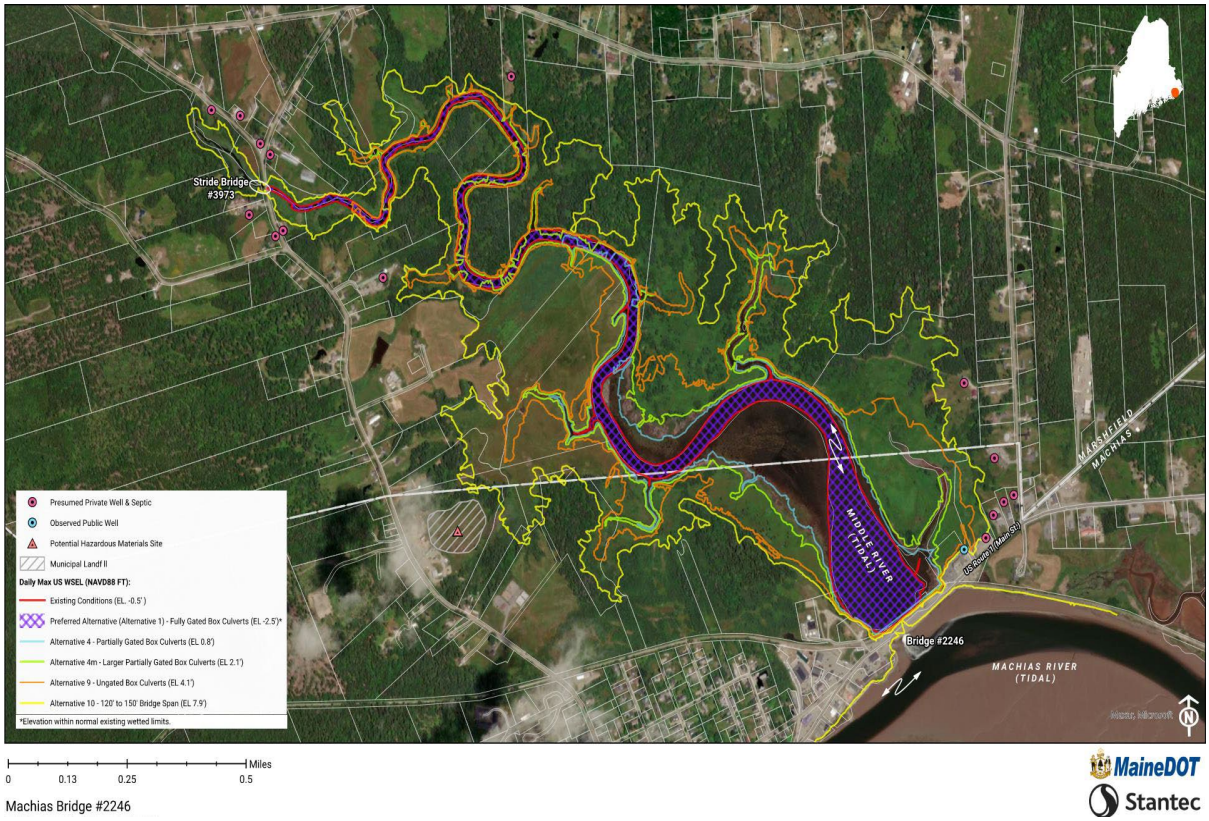
As Maine's relative sea level rises, infrastructure in Machias will see increased frequency of flooding and inundation of lowlands. The Scientific and Technical Subcommittee (STS) of the Maine Climate Council recommends adopting a scenario-based approach to consider a range of potential future sea levels in Maine. As such, The Maine Climate Council recommends the state commit to manage for 1.5 feet of relative sea-level rise (SLR) by 2050 and assess 3.9 feet of sea level rise by 2100. As part of the secondary goals of the project to account for SLR from the Maine Climate

Council and to coordinate with the ongoing Town of Machias Flood Protection Project (see Section K), the existing Route 1 roadway elevation should be raised. The identified target elevations from the adjacent Town project have been considered in the Route 1 roadway profile to be consistent with surrounding infrastructure and coordinate the adjacent project locations.

The No Build alternative would not accommodate SLR as the length of the existing structures would not allow for higher roadway and longer side slopes. The primary culvert replacement alternatives (1, 4, 4m and 9) more easily accommodate SLR than the primary bridge alternative (Alternative 10, 10a). Adapting the roadway profile of Route 1 in Machias for SLR considers minimum and maximum grade limits for both highway and railroad which have different code design requirements. Culvert design criteria (applicable to Alternative 1, 4, 4m and 9) included 1 foot of clearance above the FEMA BFE to the roadway shoulder finished grade which allows the Route 1 roadway profile to utilize minimum grades for drainage, meet highway and railroad design criteria and accommodate the target SLR elevations. Recognizing SLR is not static, and guidance is likely to be updated, culvert alternatives could be phased to meet initial SLR goals now and the Route 1 roadway profile could be raised in the future to adapt to SLR recommendations.

Bridge design criteria (Alternative 10) include freeboard requirements (clearance from BFE to the structure itself) and the roadway profile must also accommodate the depth of the structure including the girders, deck and wearing surface. To achieve a roadway profile for the bridge alternative that meets SLR target elevations and has adequate freeboard clearance, the approach grades exceed maximum design limits for the railroad when constrained by the approach tie-in locations at businesses on both ends of the project. As such, the Route 1 roadway profile for Alternative 10 is constrained by the railroad approach grade maximums and tie-in locations which results in a lower maximum roadway profile and consequently a lower low-chord elevation of the structure. A lower structure meets initial target SLR elevations and matches into Phase 1 of the Town Flood Protection project but eliminates freeboard clearance. This will likely result in nuisance flooding as the structure is near the end of its useful service life. A bridge alternative (Alternative 10, 10a does not easily accommodate a phased approach to SLR as jacking a bridge is costly and substructure would need to be modified to accommodate the profile raise.

Figure 6: Landward Water Levels for Typical Tides and River Flows



F. Hazardous Materials

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requires an initial site assessment focusing on hazardous materials. This assessment has been completed for the project area and included site visits, interviews, and the review of the following public databases:

- Maine Department of Environmental Protection databases:
  - Spill Reports for Machias, Maine
  - Registered underground storage tanks (USTs) including the TANKSs database
  - National priority list
  - Landfills
  - Department of Defense Sites
  - MDEP Files for Uncontrolled sites, Voluntary Response Action Program (VRAP), Brownfields, and Landfill Closures
  - Active MDEP remediation projects
  - Other active files that MDEP may have for the area

- Environmental Protection Agency (EPA) databases:
  - Active and inactive CERCLA sites (Superfund sites)
  - Resource Conservation Recovery Act (RCRA) sites
  - National pollutants Discharge Elimination System (NPDES) sites
  - Aire Release sites

The Department of Health and Human Services Drinking Water database was also reviewed for any adverse land use activities, location of USTs and public drinking water supplies.

Findings of the assessment suggested there was one environmentally challenged location positioned immediately adjacent to the estuary that will be impacted by rising waters.

1. The Machias Bay Area Landfill Site

The Machias Bay Area Landfill site has been identified as potentially being impacted by the proposed work. The closed landfill is located on the east side of State Route 192 approximately ¾ mile north of the center of Machias. It is co-located with the Machias public works facility which is positioned immediately to the west of the landfill. This facility is a staging area for town road maintenance and includes large, uncovered sand/salt piles for winter road treatment.

The Middle River is approximately ¾ mile to the northeast of the landfill and much of the area between the river and the landfill is low lying floodplain. The landfill is an old municipal landfill that was closed and covered in 1995. Data suggests that the landfill received waste from both residential and commercial entities, was a "burning" landfill until 1986. After 1986, the facility used a large bulldozer to cut parallel trenches in a west to east direction and then fill the trenches with refuse. The bulldozer was used to compact the waste in the individual trenches. The exact nature of the cover is unknown although it appears to be clay-rich soil on the surface. The surface of the landfill is vegetated with tall grass. The landfill forms a topographic mound that rises approximately 50 feet above the low terrain on the north and east side of the site.

MaineDOT has completed an environmental and geotechnical assessment of subsurface conditions at the closed Machias Landfill. The primary objectives of this assessment focused on defining the existing stability of the landfill and current groundwater quality conditions. Additionally, based on findings, an evaluation was performed relative to potential impacts to the landfill associated with rising surface water levels in adjacent wetlands and the nearby Middle River.

Groundwater at the Landfill flows generally from west to east with discharge into the adjacent wetland. Laboratory testing of groundwater samples suggest the Landfill has caused some impact on existing water quality; the most notable concerns are inorganic compounds (dissolved metals) and PFAS compounds found to exceed Maine Department of Environmental Protection (MDEP) Maximum Exposure Guidelines (MEGs) for drinking water.

Engineering calculations and computer modelling indicated the Landfill was stable. Further technical evaluations to determine the sensitivity of the Landfill's global stability relative to increasing surface and groundwater levels were performed. Results of these evaluations indicate that elevated water levels outside the landfill would not negatively impact global stability factors of safety. Elevated water levels within the landfill were found to have a slight negative impact on the factor of safety, but the levels would need to be raised considerably to cause an unsatisfactory factor of safety. Calculations indicate that increasing water levels in the Middle River estuary system associated with the proposed Machias Bridge #2246 alternatives studied would not adversely impact the Machias Landfill. In the existing condition and depending on the alternative, water surface levels in the Middle River are anticipated to increase upwards of 14 feet when considering SLR and 100-year storm events. As discussed previously, any anticipated rise in surface water levels associated with the Machias Bridge #2246 alternatives would not adversely impact the stability of the Landfill (See Figure 6). See Appendix 6 for additional information on the Machias Bay Area Landfill Site.

G. Historic Resources

1. Historic Architectural Resources

Section 106 of the National Historic Preservation Act requires that federal agencies consider the effects of their undertakings on historic properties that are included in the National Register of Historic Places (National Register) or that meet the criteria for inclusion in the National Register.

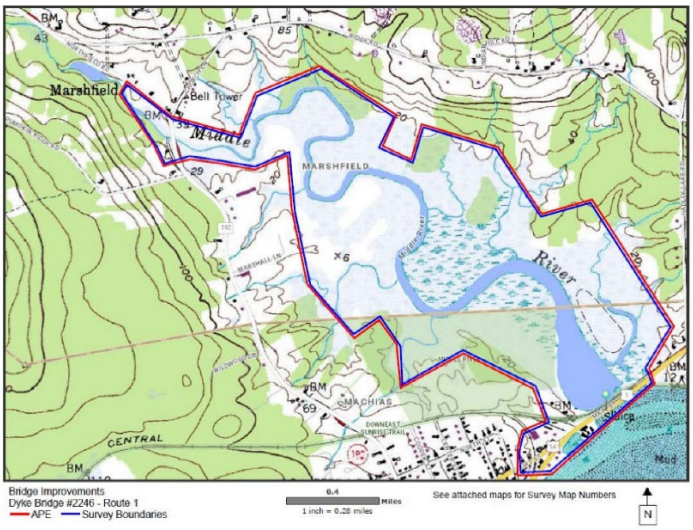
In accordance with 36 CFR Part 800.4, the Area of Potential Effect (APE) included properties/structures adjacent to the bridge and bypass alternative within the project limits. The project limits were defined by the bridge and the immediately adjacent area (see figure 6). Properties/structures adjacent to this project limit are within the APE. The following identification efforts of historic properties were made:

- Review of existing information consisted of researching the National Register and the Maine Historic Preservation Commission (MHPC) survey databases.
- MaineDOT contacted the four federally recognized Native American Tribes in Maine on January 24, 2011. The Penobscot Nation and the Passamaquoddy Tribe replied with no concerns. On July 1, 2022, the Tribes

were provided updates on the project since they received the original notification. No replies were received.

- MaineDOT contacted the Town of Machias on January 25, 2011, regarding the initiation of the Section 106 review.

Figure 7: Section 106 Area of Potential Affect



Historic resources within the project area include the following: the Machias Railroad Station and the Machias/Riverside Park Trotting Track. These resources are described below:

Machias Railroad Station

The Machias Railroad Station (Railroad Station), located on the northern side of Main Street just south of Bridge #2246 (Figure 7), is listed in the National Register under Criteria A and C for Architecture and Transportation (pictured in Figure 7). The Railroad Station is one of five railroad stations built in a specific design for the Washington County Railroad. It is a one-story rectangular building with a side-gabled roof supported by knee braces. The building is covered in clapboard siding and wainscoting. It has four-over-one wood windows in simple wood frames. The northern trackside elevation has a projecting box bay and freight bays. Its period of significance is 1898 – 1942.

Figure 8: Machias Railroad Station

The Machias/ Riverside Park Trotting Track

The Machias/Riverside Park Trotting Track (Track) is located north of Route 1 on the eastern bank of the Middle River (pictured in Figure 8). The Track consists of a grass-covered track bed, the edges of which are covered in thick vegetation. The Track is a rare example of a pear-shaped trotting track. On March 2, 2016, MHPC determined that the Track is eligible for listing in the National Register under Criterion C for Engineering. On September 20, 2021, MHPC noted that pear-shaped tracks of the late 19th and early 20th century required a level of skill and horsemanship that was different from running on a symmetrical oval. Then and now, it is unclear how many pear-shaped tracks still exist in a distinguishable condition. MHPC holds the opinion that even without the historically associated buildings on the site and with much of the Track's surfacing removed, the Track retains sufficient integrity of design, location, setting and association (and possibly materials and workmanship) when compared to other known tracks to merit nomination to the National Register. Its period of significance is c. 1883 – 1887.

Figure 9: Machias/Riverside Trotting Park

2. Alternatives Impacts

To ensure that the final decision is informed by the best available information on Section 106 effects, MaineDOT requested concurrence from the Maine State Historic Preservation Officer (SHPO) on a finding of effect for the no build and all primary replacement alternatives on February 7, 2023 (Appendix 7:2). On March 6, 2023 (Appendix 7:1), SHPO continued consultation and reached the following conclusions:

No Build – SHPO concurred with MaineDOT that *no historic properties would be affected* under this alternative.

Fully-Gated Culvert Replacement (Alternative 1) – SHPO concurred with MaineDOT that *no historic properties would be affected* under this alternative.

Partially-Gated Culvert Replacement (Alternative 4) – SHPO concurred with MaineDOT that this alternative would have *no adverse effect* on the Track. Under normal tides, this alternative would have *no effect* on the Railroad Station. However, when sea level rise (SLR) and an astronomical high tide is taken into consideration, this alternative would have *no adverse effect* on the Railroad Station.

Partially-Gated Culvert Replacement (Alternative 4m) – SHPO concurred with MaineDOT that this alternative would have *no adverse effect* on the Track. Under normal tides, this alternative would have *no effect* on the Railroad Station. However, when SLR and an astronomical high tide is taken into consideration, this alternative would have *no adverse effect* on the Railroad Station.

Open Box Culvert Replacement (Alternative 9) – SHPO concurred with MaineDOT that this alternative would have an ***adverse effect*** on the Track. This alternative would be required to resolve adverse effects in accordance

with 36 CFR 800.6. Hydraulic studies conducted by MaineDOT in 2021 show the landward water levels for typical tides and river flows would exceed current levels under this alternative, thus flooding the Track twice a day at high tide. The regular flooding would cause the Track's natural features to erode and would diminish the historic resource's integrity of design, location, setting, association, materials, and workmanship. Under normal tides, this alternative would have *no effect* on the Railroad Station. However, when SLR and an astronomical high tide is taken into consideration, this alternative would have *no adverse effect* on the Railroad Station.

Bridge Replacement (Alternative 10) – SHPO concurred with MaineDOT that this alternative would have an ***adverse effect*** on the Track. This alternative would be required to resolve adverse effects in accordance with 36 CFR 800.6. Hydraulic studies conducted by MaineDOT in 2021 show the landward water levels for typical tides and river flows would exceed current levels under this alternative, thus flooding the Track twice a day at high tide. The regular flooding would cause the Track's natural features to erode and would diminish the historic resource's integrity of design, location, setting, association, materials, and workmanship. Under normal tides, this alternative would have *no adverse effect* on the Railroad Station. However, when SLR and an astronomical high tide is taken into consideration, this alternative would have an ***adverse effect*** on the Railroad Station.

In summary, the No Build Alternative, and Alternatives 1, 4, and 4m were found to have either no effect or no adverse effect on the Track and/or the Railroad Station. The open box culvert replacement (Alternative 9) would have an adverse effect on the Track, but not the Railroad Station. The Bridge Replacement Alternative (Alternative 10) would have an adverse effect on the Track, and it would have an adverse effect on the Railroad Station when sea level rise and an astronomical high tide is taken into consideration (see Appendix 7).

3. Archaeological Resources

MaineDOT consulted with MHPC regarding potential archaeological resources within the project area.

An archaeological survey for the project was conducted in June of 2021. The goal of the survey was to determine potential effects of increased tidal flow on archaeological sites resulting from work on Bridge #2246. Initial focus was on the site of the former Track where archaeological deposits associated with track construction and use were identified. The deposits were initially determined to maintain the potential to provide information important to the history of the Track, potentially making the site eligible for listing in the National Register under Criterion D. The Track was already determined to be eligible for listing in the National Register under Criterion C due to its unique design. Further assessment of the potential contribution that the archaeological deposits could provide beyond what was historically documented for the Track resulted in a determination that the potential of the deposits to provide additional historic information was minimal. This resulted in a determination that the Track was not eligible for listing in the National Register under Criterion D.

The component of the 2021 archaeological survey that focused on potential impacts to precontact Native American archaeological sites found no evidence for prehistoric occupation within the pre-Bridge #2246 intertidal zone. These findings suggested early Native American sites may have been located along the banks of the Middle River prior to SLR (now inundated) and at upper elevations bordering the intertidal zone prior to construction of the Bridge #2246.

The archaeological survey and follow-up assessment found that no archaeological properties would be affected by the proposed undertaking.

H. Section 4(f) of the U.S. Department of Transportation Act

Section 4(f) of the Department for Transportation Act of 1966 (Section 23 CFR 774) and its revisions protects four types of properties: publicly owned park and recreation areas that are open to the public, publicly owned wildlife and waterfowl refuges, and public or privately owned historic sites. Section 4(f) states that publicly owned parks, recreation lands, wildlife and waterfowl refuge areas, or historic sites of national, state, or local significance may not be used for US DOT funded projects unless there is no feasible and prudent alternative to the use of such property, and such projects include all possible planning to minimize harm to the property resulting from such use.

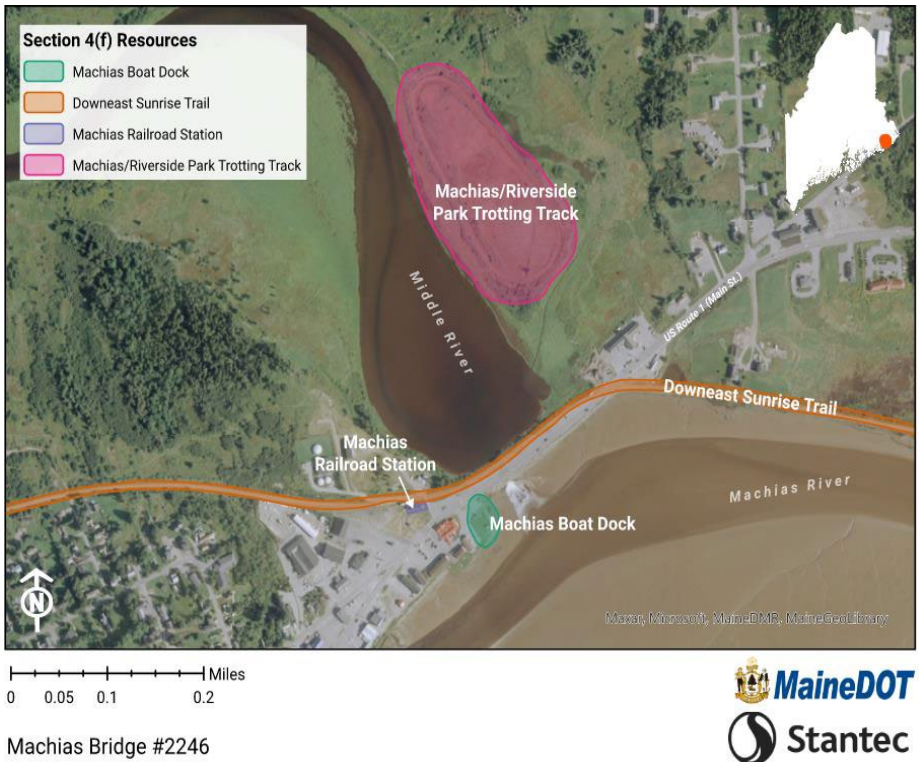
In accordance with Section 23 CFR 774.17, a "use" of a Section 4(f) property occurs when:

1. When land is permanently incorporated into a transportation facility.

2. When there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose as determined by the criteria in § 774.13(d); or
3. When there is a constructive use of a Section 4(f) property as determined by the criteria in § 774.15.

MaineDOT identified four Section 4(f) properties within the vicinity of Bridge #2246: The Machias/Riverside Park Trotting Track, the Machias Railroad Station, the Machias Boat Dock, and the Downeast Sunrise Trail (see Figure 10).

Figure 11: Section 4(f) Resources



The No Build Alternative would be considered an avoidance alternative, but it would not meet the purpose and need of the project and was therefore considered not prudent. The Bridge already requires a temporary bridge over Bridge #2246. Traffic would eventually be required to detour around the causeway on existing roads. The bridge would eventually fail. The primary replacement alternatives 4, 4m, 9, and 10, meet the project purpose and need and would result in varying degrees of impact to the Machias/Riverside Trotting Track, Machias Boat Dock, Downeast Sunrise Trail, and the Machias Railroad Station that would constitute a use under Section 4(f).

All primary replacement alternatives studied would have had a temporary use on the Machias Boat Dock and Downeast Sunrise Trail during construction. It was expected that construction of any alternative would require the boat launch to be temporarily closed during construction.

Alternative 10 would cause regular tidal inundation of the Riverside Trotting Track resulting in an Adverse Effect under Section 106. As discussed in Section g.5, MaineDOT would acquire permanent property rights and pay just compensation to property owners with substantial changes to mean high water (MHW) elevation relative to the MHW condition before the project. Therefore, Alternative 10 (bridge) would have a use on the Section 4(f) Machias/Riverside Trotting Track property.

Alternative 1 would avoid tidal inundation and would have No Adverse Effect to the Track, thus avoiding the use of the Section 4(f) Machias/Riverside Trotting Track property. Alternative 1 would be considered a prudent and feasible avoidance alternative that met the purpose and need of the project. In accordance with 23 CFR 774.3,

FHWA cannot approve any alternatives that have a use on the Machias/Riverside Trotting Track if there is a prudent and feasible avoidance alternative. See Appendix 8 for MaineDOT memo "16714 Machias – Potential Racetrack Inundation Due to Tidal Restoration".

Table 4: Section 4(f) Use Summary

	Machias /Riverside Trotting Park	Machias Boat Dock	Downeast Sunrise Trail	Machias Railroad Station
No Build	No Use	No Use	No Use	No Use
Alternative 1	No Use	Temporary Use	Temporary Use	No Use
Alternative 4	No Use	Temporary Use	Temporary Use	No Use
Alternative 4 m	No Use	Temporary Use	Temporary Use	No Use
Alternative 9	Use	Temporary Use	Temporary Use	No Use
Alternative 10	Use	Temporary Use	Temporary Use	No Use

I. Environmental Justice

Executive Order 12898 requires all Federal agencies to ensure that environmental justice consideration is part of their missions by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations in the United States and its territories and possessions. The FHWA Order 6640.23A defines "low-income" as "a person whose household income is at or below the Department of Health and Human Services poverty guidelines." The guidelines are updated annually and available online at http://aspe.hhs.gov/poverty/.

The definition of an adverse effect under environmental justice is the totality of significant individual or cumulative human health or environmental effects and the definition of disproportionately high and adverse as predominately borne by minority and/or low-income populations that are appreciably more severe or greater in magnitude than adverse effects that will be suffered by non-minority and/or low-income populations.

Machias and Marshfield both contain low-income populations. MaineDOT encouraged meaningful public involvement by providing information virtually and in person throughout the NEPA process leading up to publication of this document. These included an on-demand virtual meeting; an in-person public open house on the causeway adjacent to the bridge; meetings with potentially affected property owners; a formal public meeting; regular meetings with town officials; and press releases.

The causeway is used for a variety of active transportation and community activities. MaineDOT is committed to maintaining and improving facilities to accommodate existing uses.

Alternative 1 would maintain the causeway and bridge structure with minimal changes to abutting properties, the tidal regime, and causeway amenities. It will not result in business relocations, it will not affect community access to shopping, transit, jobs, recreational resources, or community centers. Improvements to the causeway will improve function and accessibility for all users. Based on these facts, in accordance with Executive Order 12898, the direct and indirect effects of Alternative 1 are not expected to cause disproportionately high and adverse human health or environmental effects that will occur on minority populations and low-income populations.

Alternatives 4, 4m, 9, and 10 would result in changes to the tidal regime on abutting properties and would require additional analysis and public involvement to ensure that potential impacts, including potential relocations, would not be disproportionately adverse to minority or low-income populations.

J. Other Environmental Laws

FHWA and MaineDOT have assessed other environmental laws that fall under the NEPA umbrella. These include:

- Bald and Golden Eagles
- Wild and Scenic Rivers
- Coastal Barrier Resources
- Migratory Birds
- Marine Mammals
- Farmland
- Section 6(f) of the Land and Water Conservation Fund Act
- Air Quality
- Noise

K. Bicycle and Pedestrian

The Bridge #2246 carries a section of the Down East Sunrise trail. The Down East Sunrise Trail is 87 miles and is the longest off-road trail on the East Coast Greenway. It is a multi-use trail that is open to bicycles, walking, horses, cross country skiing, ATVS, and snowmobiles. For all alternatives the Sunrise Trail would be maintained in its current location on the proposed structure.

For the replacement structure, the alternatives included an additional sidewalk on the downstream side to accommodate bicycle and pedestrian traffic. The intent was to connect with the Town's planned Flood protection project which incorporates a riverwalk and reduces the number of pedestrians crossing Route 1 at the west end of the causeway.

L. Construction and Traffic

Construction of this project would temporarily disrupt traffic patterns. Access to all residences, the sunrise trail, and businesses would be maintained throughout construction. There will be noise from construction for the duration of the project. Best Management Practices for erosion and sedimentation control will be implemented, and a Stormwater Pollution Prevention Plan detailing the pollutant prevention measured to be employed will be prepared by the Contractor and approved by MaineDOT.

The final detour option was not identified, though a Temporary Bridge Detour was assessed for impacts on natural resources.

Three options were investigated to maintain traffic at this site during construction.

1. **Roadway Closure with a detour.** Close the bridge and detour all traffic around the project site. Detour routes considered the condition of the roadways on the detour, available shoulder widths, and ability to accommodate truck movements at intersections. The potential detour routes near the project site would require the use of State roads and improvements for truck traffic at intersections.

2. **Staged Construction.** This consists of constructing the new bridge and removal of the existing bridge in stages. The traffic and trail will be shifted onto the new section of the bridge as they are built. Staged construction is often slower and relies on the ability to use temporary sheeting to support the roadway adjacent to the excavation during construction. Driving traditional sheeting on the existing causeway is not feasible due to the timber cribbing and rubble infill. Staged construction may require closing the parking and vending area during construction to gain enough width to shift lanes of traffic.

3. **Temporary Detour Bridge On-site.** Construct a temporary detour bridge downstream of the causeway to maintain vehicle and trail traffic during construction. Traffic is only disrupted during the construction of the tie-ins to the existing roadway and the new roadway upon completion of the project. Construction and removal of the temporary bridge will likely extend the total construction duration and are typically the most expensive

option for maintaining traffic. A temporary on-site detour bridge more easily accommodates raising the roadway profile for SLR and would have the most impact on natural resources.

M. Utilities

The existing causeway has aerial utility lines carrying the utilities of Versant, Consolidated Communications, Axiom Technologies, and Spectrum. Consolidated Communications has an underground utility along the north side of the causeway within the existing parking area. There is a 6" diameter force sewer main located upstream of the causeway in the middle river connecting a pump station to the Machias Wastewater Treatment Plant. Alternatives 1, 4, 4m and 9 would require permanent relocation of aerial and buried utilities within the causeway to accommodate the profile rise for sea-level rise and to allow for construction of new culverts. For Alternatives 10 through 12 (bridge alternatives), the buried utilities would need to be permanently relocated to the bridge structure and aerial utilities would need to span the bridge opening which would likely require permanent relocation. Bridge alternatives would likely impact the buried force main within the Middle River due to dredging of the channel for a larger opening and/or sediment transport from the changes in the hydraulic opening. MaineDOT will work with affected utilities during final design to coordinate utility accommodations.

N. Property Impacts

The No Build alternative would not impact properties or require property rights. All the primary replacement alternatives (1, 4, 4m, 9 and 10) would have some impact on properties abutting the bridge and would require acquisition of property rights. The type of rights (temporary and permanent) and the acreage of rights vary between the alternatives.

For Alternative 1, impacts to property owners would be limited to the areas directly impacted by construction and maintenance of the replacement bridge. The type and amount would not be finalized until after NEPA was completed and the project was close to final design; however, impacts were expected to be minor and only along existing Route 1 frontage with no impacts to upstream property owners from tidal inundation. MaineDOT and FHWA anticipated that Alternative 1 would not require permanent property rights but would require temporary rights for construction. Alternative 1 would not require any rights on the Section 4(f) Machias/Riverside Trotting Track.

The analysis completed (provided in Appendix 2) indicated that Alternatives 2, 3, 4, and 4m would impact up to 28 properties and would increase the extent of normal daily high tides and river flows by 100 acres (as determined by hydraulic analysis discussed in Section E.7.). Temporary rights along the existing Route 1 frontage would also be required to construct the project. Alternatives 10, 11, and 12 would impact up to 56 properties and would increase the extent of normal daily high tides and river flows by 400 acres. The tidally inundated area would include the Section 4(f) Machias/Riverside Trotting Track. Temporary rights along existing Route 1 frontage would be required to construct the project.

Alternative 10 would impact water supplies and septic systems positioned immediately adjacent to the Middle River by higher water surface elevations. Based on anticipated daily surface water level increases under normal riverine and tidal conditions and associated localized groundwater changes, MaineDOT noted that 16 properties in the study area have hydrogeologic settings that may be influenced by rising waters. Specific cultural features of these properties such as potable water supplies and subsurface disposal systems could be adversely affected. MaineDOT contacted 16 property owners, conducted several site inspections and some owners allowed for water quality samples which were analyzed for typical residential chemical parameters (See Appendix 5 – Preliminary Assessment – Potable Water Supplies/Septic Systems, Machias Bridge #2246 Project, Machias, Maine.) The existing conditions indicate some properties in the Machias area are experiencing water quality issues that may be related to saltwater intrusion. Anticipated changes in surface and groundwater patterns will most likely exacerbate these issues. See Figure 6 for approximate wells and septic locations. Of the 16 properties assessed, 5 would have adverse impacts to a private well or septic system that would require further investigation to determine options for relocation or acquisition of the entire property.

The Town of Machias comprehensive Plan from 2006 (https://machiasme.org/wp-content/uploads/2006ComprehensivePlanMachias.pdf) focused on implementing shoreland zoning and promoting natural resource conservation, and it is in the process of updating the plan. Additionally, in partnership with the Town, stakeholders, and other non-governmental agencies the project study team coordinated with several adjacent study efforts through monthly coordination meetings. The following adjacent projects are in process within or near the study area:

- Town Flood Protection Project
- Town Boat Launch
- Highway Safety Improvement Project
- Schoppee Marsh Restoration Study
- Wastewater Treatment Plant & Sewer Pump Station

See Section K for additional information on adjacent projects. The Town Flood Protection project would influence the final design of the project related to the finished roadway grade elevation for SLR resiliency.

6. Coordination and Consultation

Coordination with state and federal agencies has occurred throughout the project since the initial 2009 MaineDOT team meeting. Coordination efforts are summarized in Table 5: Coordination with Agencies and Public .

Table 5: Coordination with Agencies and Public

Date	Contact	Topic
12/16/2009	Public - Initial Public meeting	Introduce project and information gathering.
2015	MaineDOT – Bureau of Planning	Planning Feasibility Study initiated to include Hydrologic and Hydraulic analyses to evaluate a range of bridge and/or culvert alternatives to replace the Bridge #2246.
2018	MaineDOT – Bureau of Project Development	Preliminary Design Phase initiated in Bureau of Project Development.
4/2/2018	Public - Preliminary Public Meeting	Summarized results of Feasibility study.
5/8/2018	NOAA/NMFS	Response received based on alternatives presented at the 4/2/2018 Preliminary public Meeting.
2019	Preliminary Design Study of (preferred) Alternatives: Replacement in-kind; 5 culverts with 4 gated and 1 open with 3 variations of invert elevations.	Feedback from NOAA/NMFS and Non-Profits encourage consideration of fish passage improvements.
8/19/2020	NOAA, US Fish and Wildlife Service (USFWS), US Coast Guard (USCG), Army Corps of Engineers (ACOE), Maine Department of Marine Resources (DMR).	Agency meeting to begin coordination on preferred alternative.
9/30/2020	NOAA letter to MaineDOT	Response to the Agency Meeting on 8/19/2020 and concerns with replacement-in-kind.

10/20/2020	MaineDOT letter to NOAA	Informed NOAA of MaineDOT decision to re-evaluate the in-kind alternative and move the project back to the Bureau of Planning to consider a wider range of alternatives.
12/18/2020	Meeting with NOAA, USFWS, ACOE, Maine Department of Environmental Protection (DEP), Maine Department of Inland Fisheries and Wildlife (IF+W), and DMR.	Discussion on a revised Purpose and Need and range of alternatives.
1/4/2021	Meeting with NOAA, USFWS, ACOE, Maine Department of Environmental Protection (DEP), Maine Department of Inland Fisheries and Wildlife (IF+W), and DMR.	MaineDOT circulated a revised Purpose and Need after discussions on 12/18/2020.
1/19/2021	ACOE	ACOE provided MaineDOT with comments on their revised Purpose and Need statement.
1/22/2021	NOAA	NOAA provided MaineDOT with comments on the revised Purpose and Need statement.
3/29/2021	Virtual Public Meeting	Public meeting held to present Purpose and Need, Alternatives, and accept public comments.
3/29/2021-4/30/2021	Virtual Public Meeting	Virtual Public Meeting comment period.
6/24/2021	NOAA	Coordination Meeting.
7/20/2021	NOAA	Technical Assistance Meeting.
8/17/2021	NOAA	Technical Assistance Meeting: MaineDOT presented information regarding fish passage opportunities for various alternatives.
9/14/2021	Public Open House on the Causeway	Meeting to share information on alternatives and preliminary information on potential impacts.
9/21/2021	NOAA	MaineDOT provided information for Technical Assistance coordination on two primary alternatives (Alternative 10 - single span bridge or Alternative 4m – Culverts with flap gates).
10/19/2021	NOAA	Coordination Meeting.
11/22/2021	NOAA letter to MaineDOT/FHWA	Technical Assistance letter in response to information sent on 9/21/2021.
3/21/2022	MaineDOT letter to NMFS	Response to 11/22/21 Technical Assistance letter.
3/31/2022	NOAA	Coordination Meeting.
4/15/2022	NOAA letter to MaineDOT/FHWA	Response to 3/21/2022 letter.
6/9/2022	Public	News release: MaineDOT identifies Preferred Alternative as a bridge span.

6/14/2022	NOAA	Coordination Meeting.
6/28/2022	Open house and public meeting held in Machias	Public meeting announcing preferred alternative and meeting with affected property owners.
7/14/2022	NOAA	Technical Advisory
8/22/2022	NOAA	Technical Advisory
10/12/2022	NOAA	Coordination Meeting.
12/8/2022	State Historic Preservation Officer (SHPO)	MaineDOT request concurrence on finding of effect for each alternative
3/6/2023	SHPO	SHPO concurs with finding of effect for each alternative
3/16/2023	NOAA	Submit Biological Assessment to initiate Section 7 ESA Consultation.
4/14/2023	NOAA	Response to 3/16/2023 BA submission via email.
5/2/2023	NOAA	Meeting to discuss BA consultation and summary email.
5/19/2023	NOAA	Coordination Meeting.
5/26/2023	NOAA	Email response with attached published paper for consideration.
8/10/2023	NOAA	Technical Advisory
8/14/2023	NOAA	Technical Advisory
8/28/2023	NOAA	Coordination Meeting.
9/14/2023	NOAA	Technical Advisory
9/20/2023	NOAA	Submit Revised Biological Assessment to initiate Section 7 ESA Consultation.
11/7/2023	Public	News release: MaineDOT identifies Preferred Alternative as fully gated culverts.
5/5/2024	NOAA	Biological Opinion from NOAA
3/19/2024	NOAA	Letter from FHWA to NOAA to officially initiate EFGH consultation for EFH
6/14/2024	NOAA	EFH consultation conservation recommendation letter from NOAA
11/2024	Public/Agencies	MaineDOT Commissioner sends letter to Municipalities and agencies. Posts letter and Information document on web site.

See Appendix 9 for Agency Coordination documentation, and Appendix 11 for public meeting minutes.

A. Coordination with Adjacent Projects

1. Town Flood Protection Project

In 2018, the Town of Machias, in partnership with the Maine Coastal Program, hired Baker Design Consultants to complete a Waterfront Resilience Study. The catalyst for this study was the periodic flooding that occurs in the

historic Machias Downtown Area, and it recommends a seawall system that protects current businesses and critical infrastructure (Wastewater Treatment Plant) from current and future flood events. The report included a concept design for a seawall system to protect the Downtown area based on research, fieldwork and stakeholder input.

As a result of this study, the Town was awarded a FEMA Pre-Disaster Mitigation Advance Assistance Planning Grant for $200,000 to further advance the project in October 2019. (See Appendix 10)

2. Town Boat Launch

During the evaluation of the Machias Bridge #2246, the Town of Machias approached MaineDOT regarding a partnership to improve the town boat launch at the southwest corner of the causeway. Given that the Machias Bridge #2246 alternatives under evaluation and the municipal flood protection project both could affect the elevation of Route 1 and boat launch access, MaineDOT decided to wait before proceeding with capital improvements associated with the boat launch until more information is known regarding studies underway. Boat launch improvements will be reconsidered as these related efforts are implemented. (See Appendix 10)

3. Highway Safety Improvement Project

MaineDOT is planning to complete Highway Safety and Spot Improvements on Route 1 just east of Bridge #2246. This work is expected to consider adding a turning lane into the Dunkin' Plaza and access management from the plaza's parking lot. The highway work will also extend east to the medical office. The Bridge #2246 and causeway project will coordinate with the Highway Safety and Spot Improvement project throughout design as the project limits are likely to overlap.

4. Schoppee Marsh Restoration study

In late December 2022, the Downeast Salmon Federation received a $1.8 million grant from the National Fish and Wildlife Foundation's Coastal Resilience Fund. This grant will be used to help restore full tidal flows and full fish access to the Schoppee Marsh, a 40-acre salt marsh at the head of Machias Bay. Tidal flows into the marsh were restricted in the early 1900s when a railroad was built between it and the bay. The project will produce a feasibility study and adaptive management strategies in preparation for a full engineering design to restore the salt marsh, provide sea-level rise and storm surge protection, protect habitat for salt marsh fish, wildlife, and plant species, and provide education and outreach opportunities. Currently, the project is on hold pending further coordination with MaineDOT. (See Appendix 10)

5. Wastewater Treatment Plant & Sewer Pump Station

Machias was awarded $787,000 DEP Clean Water Act funding to reduce Combined Sewer Overflow (CSO) events by building a new Sewer Pump Station. Machias has been actively working with engineering firm Olver Associates since 2015 to reduce CSO events, and according to Maine DEP, overall sewer overflow has been reduced by 95% since 2014. Nearly eliminating CSO events is extremely important to the region's clamming industry. A single overflow can shut down clam flats for several weeks. This new pump station is the final piece of the puzzle and will be located on the south side of the river with a forced main across the river. This will move wastewater from the south side of the Machias River to the wastewater treatment facility. Currently, there are three 6-inch siphon lines that run under the river and into Main Street. These lines will remain in place as a backup system. (See Appendix 10)

7. Public Involvement

This project has included a public involvement process both to keep interested parties and the public informed of the project status and to solicit project feedback. MaineDOT has held four public meetings, and a project open house described below. MaineDOT has also maintained a project website www.maine.gov/mdot/projects/machiasbridge/. Additionally, MaineDOT has participated in Machias led Machias Bay Resiliency Project Partners meetings held virtually generally monthly. MaineDOT has also visited Machias and Marshfield to meet municipal representatives associated with the project.

The initial public meeting for the replacement of Bridge #2246 in Machias was held on December 16th, 2009, at the University of Maine Machias Campus. The purpose of this meeting was to notify the public of the proposed project and give the public the opportunity to ask questions and make comments. The scope of this project was to assess the feasibility of a range of alternatives to address the deteriorating bridge condition, from replacing the bridge with something similar to what is there now, so the saltwater will stay out and the freshwater will find its way through at low tide, to putting in a traditional bridge with a regular span and allowing saltwater to freely flow back up into the area where it hasn't been for 80-100 years. MaineDOT explained that this was a complicated project and would require a lot of permitting from federal

agencies. Representatives from the U.S. Fish and Wildlife Service discussed the implications of the Endangered Species Act on this project, and the Department of Marine Resources discussed the many ecological benefits of removing the tide gates. Extensive public input was heard at this meeting on the potential impacts of the project, and the impacts that removing the tide gates would have on upstream property owners.

A preliminary public meeting was held on April 2nd, 2018, after the completion of a feasibility study. At this time the preferred alternative was a replacement in-kind (Alternative 1- Replacement Culverts- fully gated) because it avoids significant impacts to upstream property owners and is the only prudent feasible option that avoids impacts to this historic racetrack. This option was received favorably by the public.

On March 29th, 2021, a virtual public meeting was held to provide a project update and solicit additional public feedback. At this meeting, a status update was provided to explain what had occurred since the preliminary public meeting in 2018. In November 2018 the Town of Machias completed a Waterfront Resilience Study proposing a seawall to prevent coastal flooding. This would have implications that need consideration for the Bridge #2246 project. In September 2020 MaineDOT received comment from the National Marine Fisheries Service stating that they had substantial concerns about Alternative 1 because it would provide even less opportunity for fish passage than exists now between the Middle River and the Machias River. In addition, it would likely have detrimental effects on physical and biological features of critical habitat for endangered Atlantic Salmon. The Endangered Species Act requires federal agencies to ensure that their actions do not jeopardize the continued existence of any listed species. Actions may not destroy or adversely modify any designated critical habitat. Federal agencies are required to seek opportunities to proactively recover listed species. To address the concerns about fish passage and the potential for sea level rise, MaineDOT transferred the project to the Bureau of Planning for environmental review. MaineDOT and FHWA reconsidered alternatives that include options to improve fish passage. At this time, a new preferred alternative had not been selected. All of the comments received are posted on the MaineDOT project website: https://www.maine.gov/mdot/projects/machiasbridge/public/index.shtml.

A public open house was held on September 14, 2021. The open house format was selected to accommodate the preference for an in-person public input opportunity versus a virtual public meeting along with social distance practices during the timing of this meeting. MaineDOT, in cooperation with the Town of Machias, hosted an open house for the study to identify the preferred alternative for the rehabilitation or the replacement of the existing bridge over the Middle River on Route 1 in Machias. The Town of Machias and others also used this open house for input on locally sponsored studies. MaineDOT had not made any decisions regarding which alternative would move forward into design and construction. The purpose of the open house was as follows:

- Solicit Feedback
  - Current and potential future uses of the bridge and causeway
  - Comments, concerns, or questions about the alternatives under consideration
  - Additional considerations
- Educate and Discuss Options
  - Recent project history and status
  - Alternatives under consideration
  - Regulatory and decision-making processes

All Open House informational materials are posted on the MaineDOT project website: https://www.maine.gov/mdot/projects/machiasbridge/public/index.shtml.

The last public meeting was held on June 28, 2022, at the Machias Memorial High School. At this meeting MaineDOT gave an update on what has happened in the previous 18 months. For instance, MaineDOT received correspondence from federal resource agencies indicating that Alternative 1 (Replacement Culverts- fully gated) may no longer be viable. Based in large part on this information, MaineDOT presented that a bridge 120-150 feet long towards the middle of the causeway is what was best to proceed with as the preferred alternative. MaineDOT provided pamphlets and information for property owners directly affected and emphasized they wanted further input and would work with each property owner moving forward through the process. There was extensive public comment, largely in favor of Alternative 1 (Replacement Culverts- fully gated) to protect private property and the clamming industry in the region. All of the comments received are included

in the meeting transcript on the MaineDOT project website: https://www.maine.gov/mdot/projects/machiasbridge/public/index.shtml.

After the June 28, 2022, Public Meeting, MaineDOT continued to receive public and stakeholder input. MaineDOT also investigated of the former municipal landfill site and asked federal resource agencies, including the National Marine Fisheries Service (NMFS), for clarifying information. Community stakeholders and landowners adjacent to the Middle River repeatedly expressed concerns about the flooding that would be associated with a bridge alternative. This flooding would impact private property and the former landfill location. In November 2023, MaineDOT formally revised its preferred alternative from a bridge to a fully gated culvert alternative. MaineDOT announced this change via News Media and communicated directly with major project stakeholders. MaineDOT also met with municipal staff in Machias and Marshfield and collectively decided to wait to hold another public meeting until after this document was published.