ATTACHMENT 1 – MAINEDOT & DMR FY2022 CULVERT AOP APPLICATION
FEBRUARY 6, 2023

SUBMITTED BY MAINE DEPARTMENT OF TRANSPORTATION AND MAINE DEPARTMENT OF MARINE RESOURCES

Basic Project Information

Basic Project Information - Provide a narrative for the below items on basic details pertinent to the project, including project name, description, location, involved parties, etc. Items in this section will be used to determine grant program eligibility as detailed in Section C of the NOFO.		
1	Project Name	MaineDOT & DMR Culvert Aquatic Organism Passage (AOP) Program
Eligibility Criteria		
2	Project Description	The projects included in this Culvert AOP application will directly and significantly contribute to habitat available for endangered anadromous fish species and their prey by removing barriers to fish passage. Existing barriers represented by these crossings include both hydraulic and physical characteristics that prevent fish from accessing or traversing through culverts or existing minor spans during normal or extreme flows (Figure 1).  FIGURE 1: BR.# 6246, RT. 9, AMHERST, MAINE. BEFORE AND AFTER REPLACEMENT IN 2021. Maine's Central region falls within the historic range of federally endangered, anadromous Atlantic Salmon (ATS) as well as designated critical habitat. Access to migration, spawning, and rearing habitats are impeded by stream crossings that are barriers to fish passage for ATS as well as two species of river herring (alewife and blueback herring) rainbow smelt, American shad, American eel, Atlantic tomcod, sea-lamprey, and sea-run brook trout that are critical facultative, cover, and prey species for ATS. These species improve habitat for ATS, serve as a cover species for other species preying on ATS, and/or are direct ATS prey. These projects represent restoring access over 16 miles (26,277 meters) of habitat and 480 100-square meter habitat units by replacing seven

		structures that are barriers to one or more anadromous fish species native to Central Maine, including ATS. MaineDOT recognizes that ensuring sustainability of habitats, ecosystems and transportation infrastructure can occur in concert rather than in conflict. Toward that end, MaineDOT endeavors to exercise reasonable stewardship over both natural resources and transportation infrastructure through its commitment to addressing aquatic organisms, wildlife habitat and fish passage in cooperation with natural resource agencies, while weighing all aspects of a proposed project. A transportation system nexus was another critical component in the decision to include a project in this application. Culverts included in this request are shown in Attachment 2, while socio-economic, geographic, cost, and habitat information are listed in Attachments 3 and 4. All crossings are associated with Maine's state transportation system in that they pass under routes operated and maintained by MaineDOT or the crossing itself will be maintained by MaineDOT in the future due to upsizing. Because historic ranges for the target species are associated with specific river systems that are in less developed areas of the state, many of the projects are associated with rural roads with lower AADT. Road surfaces in good condition due to low traffic volumes are less likely to require heavy maintenance that includes culvert upgrades and as a result, crossing structure replacement in these geographic areas can be deferred. The Culvert AOP Grant Program provides a unique and valuable opportunity to replace rural road stream crossings that are barriers to habitat access. These projects rise to importance due to their location in a watershed and/or association with other planned AOP restoration projects undertaken by other entities focused on anadromous species. Maine's Department of Marine Resources (DMR) is a co-applicant for this funding application. MaineDOT will lead projects falling under state responsibility with support from DMR in the form of AOP review and permitting assistance, as needed. For the culvert replacements in the Towns of Vassalboro, Damariscotta, and Alna, DMR and the town will lead contracting, project development and delivery, while MaineDOT will provide technical assistance throughout, as needed. Over the last decade, MaineDOT and DMR have collaborated with federal fisheries management agencies and non-governmental organizations to create an extensive database of road stream crossings that pose barriers to fish, aquatic organism passage, and habitat connectivity (MaineStreamViewer), with the goal of cooperatively restoring and conserving habitats important to Maine's economy, ecology and way of life. Prioritization of passage restoration through this partnership contributed significantly to developing the list of AOP

		culvert replacement projects included as Attachment 3 to this application. For this funding request, MaineDOT and DMR opted to focus on the Kennebec and Sheepscot River watersheds to maximize cumulative benefits to the target species.
3	Which of the following selection priorities does your project meet?	*(Check all that apply)* ☒ Anadromous fish listed as endangered or threatened under the Endangered Species Act. ☒ Anadromous fish identified by NMFS or USFWS that could reasonably become listed as a federally endangered species or a threatened species. ☒ Anadromous fish identified by NMFS or USFWS as prey for endangered species, threatened species, or protected species. ☒ Anadromous fish identified by NMFS or USFWS as climate resilient stock. See Section H. ☒ Project that opens up more than 200 meters of upstream habitat for anadromous fish before the end of the natural habitat.
4	Which anadromous species does your project propose to benefit by meaningfully improving or restoring fish passage?	Atlantic salmon *(Salmo salar)* Alewife *(Alosa pseudoharengus)* Blueback herring (*Alosa aestivalis)* American shad *(Alosa sapidissima)* Rainbow smelt *(Osmerus mordax)* American eel (*Anguilla rostrata*) Sea-lamprey (*Petromyzon marinus*) Atlantic tomcod (*Microgadus tomcod)* Sea-run brook trout (*Salvelinus fontinalis*)
5	Briefly describe how the proposed project benefits the anadromous species in item 4 above?	These projects will benefit endangered, anadromous ATS and their facultative, cover and/or prey species by restoring access to historic migration, spawning, and rearing habitat through replacement of road crossings that currently act as barriers to these stream reaches.
6	Culvert AOP Program Request amount	Exact Amount in year-of-expenditure dollars: **$8,945,221**
7	Total Project Cost	Estimate in year-of-expenditure dollars: $12,218,920

8	Who is the Project Sponsor?	(*Name and identify which eligible applicant category applies. Select from the below statutory eligible applicants*) ☒ State ☐ Unit of local government ☐ Indian Tribe
9	If a State or a unit of local government, indicate the percentage, type, and source of non-federal match	Percentage: 20%, unless otherwise indicated in Attachment 4. Source: Maine State Highway Funding, unless otherwise indicated in Attachment 4.
10	Eligible Facility Type.	(*Identify which eligible structure does the proposed project addresses. Select from the below statutory eligible applicants*) ☒ Culvert ☐ Weir
Additional Project Information		
11	State(s) and/or Tribal land in which the project is located	Maine
12	If a joint application, please provide organizational names of sub-recipients that will receive funds and other key partners.	Maine Department of Marine Resources (DMR)
13	Identify the Lead Applicant (who will be also the applicant responsible for administration of Culvert AOP Program funds if application is selected and point of contact for the application.)	MaineDOT Contact: Eric Ham MaineDOT, Results & Information Office 16 State House Station Augusta, ME 04333 eric.ham@maine.gov (207) 215-7356

14	What are the proposed design standards and specifications for ensuring resulting infrastructure provides for the safety of the traveling public over the service life of that infrastructure?	The overarching design objective in a MaineDOT project is to construct a safe and cost-responsible structure that meets transportation needs and regulatory requirements. With that in mind, MaineDOT has established a standard for sizing large culvert and minor span crossings that will hold up under a scenario of increasing peak flows. There is real likelihood of increased peak flows over the expected life spans of structures being installed (e.g., 75 to 100 years for concrete structures). The "old" MaineDOT standard for sizing large culverts has a head water over diameter (H_w/D) <= 1.5 at the 50-year peak flow (Q50). This standard was largely functional historically; however, specific extreme weather events and anticipated sea level rise foster concern that this design approach will not suffice under a scenario of increasing peak flows. Therefore, MaineDOT's instream culvert sizing design approach has been intentionally, thoughtfully revised to give preference to sizing for H_w/D equal to 1 at the 100-year peak flow event (Q100). This design approach has been developed to accommodate a level of resiliency into the structure sizing that will protect the infrastructure over the structure life span (75 to 100 years), mitigating damage to structures that endangers the safety of the traveling public.
15	**Location Information**	
A	Location of eligible facility and project area	Locations for proposed projects are shown in Attachment 2 and listed in Attachment 3.
B	Provide name and description of the waterway and watershed.	Waterways and associated watersheds are listed in Attachment 3.
C	Provide Census FIPS codes or other geographic code identifiers for the facility location and project area	*(Provide appropriate code(s))* 23|ME|Maine|01779787
D	Provide geographic coordinates for the project	*(Provide Latitude/Latitude; bundled projects should provide the coordinates of each eligible facility in the bundle)* Latitude and Longitude for each project are listed in Attachment 3.

E	Is the project located (entirely or partially) in federally designated community development zone?	*(Please select one)* ☐ Yes ☒ No If Yes, please describe which of the four federally designated community development zones in which your project is located. ☐ Opportunity Zones: (https://opportunityzones.hud.gov) ☐ Empowerment Zones: (https://www.hud.gov/hudprograms/empowerment_zones) ☐ Promise Zones: (https://www.hud.gov/program_offices/field_policy_mgt/fieldpolicymgtpz) ☐ Choice Neighborhoods: (https://www.hud.gov/program_offices/public_indian_housing/programs/ph/cn)
F	Does the eligible project benefit an economically disadvantaged community or an area of persistent poverty? *(See Section H of the NOFO – Definitions)*	*(Please select one)* ☐ Yes ☒ No None of the proposed culvert replacement projects are located within areas of persistent poverty, further no projects are within locations designated as economically disadvantaged (Attachment 3).
G	Are the eligible facility and project area located on a federally recognized Indian Tribe land?	*(Please select one)* ☐ Yes ☒ No
H	Is the project located in a rural area? *(See Section H of the NOFO – Definitions)*	*(Please select one)* ☒ Yes ☐ No The projects in this bundle are located in a rural area.

Project Costs

Project Costs – Provide information detailing the costs associated with the project. These costs will be used to determine eligible award amount, how the project supports financial goals of the program, and other factors. More information on this section can be found in Section D.2.II of the NOFO.		
1	Culvert AOP Program Request Amount	Exact Amount in year-of-expenditure dollars: $8,945,221
2	Estimated Total of Other Federal funding (excluding Culvert AOP Program Request)	Estimate in year-of-expenditure dollars: $ 1,037,394 MaineDOT will be funding pre-construction activities (design, environmental reviews, right-of-way, etc.) for two projects that are already in the MaineDOT Workplan with FHWA program funding at the typical match of 80% federal and 20% state funds.
3	Estimated Other Federal funding (excluding Culvert AOP Program) further detail	Estimates and sources of non-Federal funding are provided in Attachment 4.
4	Estimated non- Federal funding	$2,365,305 of non-Federal funding will be provided for this project bundle (Attachment 4).
5	Future Eligible Project Cost (Sum of Culvert AOP Program request, Other Federal funds, and non-Federal funds, above.)	Estimate in year-of-expenditure dollars: $ 11,826,527
6	Previously incurred project costs (*if applicable*)	Estimate in year-of-expenditure dollars: $392,393 Any previously incurred project costs are noted in Attachment 4.
7	Total Project Cost (Sum of 'previous incurred' and 'future eligible')	Estimate in year-of-expenditure dollars: $ 12,218,920
8	If more than one culvert or weir, will project bundling be used to deliver the project?	*(Please select one)* ☒ Yes ☐ No Where feasible, bundling projects for design,

		environmental review and construction will result in time (and therefore cost) savings. To minimize design effort, designs will be based on those for recent, successful projects similar in scope, when appropriate. MaineDOT and DMR will use the MAP and HCD methods as a standard to streamline reviews and maximize outcomes for the target species. The parties involved in this grant application are also applying an innovative means with respect to NEPA and permitting for this project through Programmatic Agreements to ensure timely and consistent reviews and accelerate project delivery. A list of applicable streamlining measures associated with environmental review is included as Attachment 6. Other benefits expected from bundling projects are described in Section 9 below.
9	If proposed project utilizes bundling, Cost of Unbundled Projects	Un-bundled Cost Estimate in year of expenditure dollars: $13,440,812 Bundled Cost Estimate in year of expenditure dollars: $ 12,218,920 Bundling of design, environmental reviews, and other project delivery components will be applied to the maximum extent feasible for the projects listed in Attachment 4. To accomplish this, MaineDOT will apply the principals of bridge bundling. FHWA finds that Bridge Bundling is an efficient and effective method for improving bridges. Per FHWA's 2019 Bridge Bundling Guidebook, measurable cost and schedule savings are achievable through well-planned and executed bundling programs. Culvert AOP projects will be bundled based on the construction efficiencies, economies of scale and time savings. In addition to considering structural need and equity, the framework for developing the bundles will consider: • Geographic location and proximity • Road type, geometry, traffic, and work zone control

		• Bridge size • Environmental permitting considerations • Hydrology and Hydraulics • Geotechnical conditions • Utilities • Right-of-way MaineDOT's intent is to create efficiencies based on economies of scale to the extent practical by using repetitive designs and details. These designs will be detailed and summarized on standard design sheets that can then be applied on a project-by-project basis. Case studies have demonstrated the benefits of using bridge bundling in combination with standardized design. For example, a 2012 PennDOT pilot program to replace county-owned bridges reported design savings between 25 and 50%. The pilot also reported construction savings between 5 and 15%. Based on the findings of the PennDOT pilot program, MaineDOT applied a 10% 'discount' to construction estimates to account for bundling efficiencies. This cost differential is reflected in Attachment 4.
10	Amount of Future Eligible Costs by Project Type (*If applicable*)	The estimated cost of replacing the culverts included in the Central project bundle is $12,218920. Estimated bundled and unbundled costs by individual culvert replacement are listed in Attachment 4. Estimates are based on MaineDOT's costing formulas developed from similarly scoped, complete projects. These formulas are included as Attachment 5.

Project Selection Criteria

Project Selection Criteria – Provide narrative response on how the project responds to the selection criteria in Section E.1.a of the NOFO. In responding to Project Selection Criteria, refer to statutory selection priorities included in Section E of the NOFO and address them in the appropriate Project Selection Criteria.

	Criterion #1: Conservation Benefits to Anadromous Fish
1	The proposed projects meet the Conservation Benefits to Anadromous Fish criterion by increasing and enhancing connectivity between ocean and freshwater habitats important to anadromous fish recovery by identifying and replacing key barriers to fish passage along Maine's transportation corridors. Culverts, bridges, and other crossing structures within the jurisdiction of MaineDOT have been long standing barriers to anadromous fish populations. Efforts to reconnect habitats include the expansion of freshwater spawning areas in order to promote and increase adult spawners through the freshwater production of juveniles as well as the interconnection to estuarine habitats for increased access to rearing habitats. Maine is home to 12 diadromous fish species, all of which are directly or indirectly impacted by poor connectivity in freshwater habitats. The waters off of the Gulf of Maine contain the only remaining stock of federally and state endangered, wild ATS in the United States, with both the Long Island Sound and the Central New England populations having been extirpated. Populations of alewives, blueback herring, rainbow smelt, American shad, Atlantic tomcod, American eel, sea-lamprey, and sea-run brook trout have also suffered dramatic declines due to poor or blocked connectivity to historic habitats in Maine. Many of these species have seen dramatic range contractions and could reasonably become listed as an endangered species or a threatened species in the future if proactive recovery efforts are not undertaken. These species also provide forage or buffer against predators of ESA-listed ATS, ESA-listed whale species, and other venerable populations of mammals and bird populations. As populations of some species such as ATS and rainbow smelt, a Species of Concern, have contracted, the importance of these climate resilient habitats for the preservation of these species has increased. Fish passage barriers continue to prevent fish from reaching essential spawning and rearing habitat (https://webapps2.cgis-solutions.com/MaineStreamViewer/). Fish passage impacts include: 1) undersized culverts that create hydraulic barriers; 2) improperly placed culverts that create fish passage barriers through perched outlets, increased water velocities, or insufficient water flow and depth within the culvert; and 3) poorly placed or designed culverts that alter stream processes including transport of sediment. Combined these barriers impair ecological complexity and increase vulnerability of salmon, and other diadromous species, to extinction or at the very least extirpation. The removal of these barriers will promote the conservation of remaining populations and take steps towards the restoration of historic population levels of alewife, blueback herring, American shad, ATS, American eel, sea-lamprey, Atlantic tomcod, and rainbow smelt. <u>Atlantic Salmon</u> The Gulf of Maine (GOM) Distinct Population Segment (DPS) of ATS are listed as endangered under the federal Endangered Species Act. Road stream crossings are identified as a "New and Emerging Significant Threat" in the NOAA & USFWS Recovery Plan for the GOM DPS. ATS are listed as a NOAA "Species in the Spotlight" due to their imperiled state. They are also a species of greatest conservation need in the current Maine Wildlife Action Plan. Improperly placed and undersized culverts present major concerns for this species by limiting access to freshwater spawning habitats and cold water refugia. Poorly-designed culverts can also decrease the suitability

of spawning habitats through the buildup of fine sediment downstream of the structure that can bury gravel, the preferred substrate for salmon spawning.

River Herring and American Shad

River herring (blueback herring and alewife) and American shad are commercially important resources managed under the Magnuson-Stevens Fisheries and Conservation Act. They are also designated as a species of greatest conservation need in Maine's Wildlife Action Plan. In Maine, river herring and shad management must comply with the Atlantic States Marine Fisheries Commission fishery management plan, which highlights improving habitat accessibility and quality as a key objective. Another key goal of the plan is to introduce river herring and shad stocks into waters that historically supported spawning migrations. Many of the culverts included in this application either prevent upstream movement of blueback herring and shad in riverine habitats, or block alewives from reaching the lakes/ponds in which they spawn. Given the opportunity to reach adequate spawning grounds, river herring and shad populations can rebound rapidly as has been shown in similar barrier removal projects. In areas where ATS are present, the restoration of river herring and shad populations will simultaneously benefit salmon populations. Downstream migrating river herring provide a prey buffering effect to out-migrating salmon smolts, reducing predation on smolts by terrestrial and aquatic species. This "prey buffering" benefit is part of the designated critical habitat for ATS.

Rainbow Smelt

In 2004, NOAA listed the anadromous rainbow smelt as a federal species of concern due to dramatic declines over the previous fifteen to twenty years. Smelt are also listed as a species of greatest conservation concern in Maine's Wildlife Action Plan. Unlike many other diadromous fish species, the majority of smelt spawning streams in the Gulf of Maine are small, undammed coastal streams. On these small streams, perched or undersized culverts are the main culprits preventing fish passage. Being a small-bodied fish, smelt do not possess the same energetic abilities as ATS, and thus even slightly problematic culverts can severely impair smelt migrations. For example, smelt cannot pass vertical obstructions over six inches. As such, barrier removal and reducing stream habitat fragmentation are critical for increasing access to spawning habitat and eventual restoration of smelt populations throughout the Gulf of Maine. The range of rainbow smelt has contracted significantly, with most populations in the United States existing from mid-coast to Downeast Maine.

American eel

Like other anadromous species, the abundance of American eel has declined, and the decline has been attributed in part to poor passage at dams and culverts. The species has been considered for listing under the ESA twice, but the USFWS determined in both cases that listing was not warranted at the time. The Atlantic States Marine Fisheries Commission (ASMFC) recently completed a stock assessment for American eel, which used trend analyses and Depletion-Based Stock Reduction Analysis and concluded the stock status is depleted. Two years later Addendum IV reduced the commercial harvest of all life stages of American eel. While eels can sometimes pass structures other anadromous species cannot, this species benefits from improved connectivity and can ascend into the upper watersheds of many systems in abundance if adequate passage is provided.

Sea-Lamprey

Native sea-lampreys are an important component of the riverine ecosystem in Maine that, like other sea run fish species, have been prevented from reaching much of its historic range by barriers to upstream passage. Sea-lampreys are presumed to have a similar range to ATS, which has been

	contracted due to poor connectivity. Lamprey spawning activities condition the habitat for other species, including ATS, by removing fines and reducing substrate embeddedness. Given the high degree of embeddedness in Maine streams due to past land use practices, the role of lamprey as "ecosystem engineers" is particularly important. Sea-lamprey provide an influx of nutrients that may help support stream food webs during a time when nutrients and energy flow might otherwise be limiting, supporting ESA listed and climate vulnerable stocks. <u>Atlantic Tomcod</u> Atlantic tomcod are anadromous species that uses coastal Maine streams. Known as "frost fish", this climate resilient species relies on connected freshwater habitats to survive. Maine DMR has conducted a large citizen science project and demonstrated the presence and importance of coastal streams for this species in Maine. Barriers that prevent tomcod from reaching their spawning habitat have led to population declines and the closure of tomcod fisheries since the 1950's. <u>Sea-run Brook Trout</u> Sea-run brook trout are brook trout that live in coastal streams and routinely migrate between fresh and salt water. Living in coastal streams, these coldwater fish are particularly vulnerable to climate change, and are a species of greatest conservation need in Maine's Wildlife Action Plan. Although there is little information on this specific group of brook trout, barriers to fish passage in coastal streams are a key threat to the species, preventing upstream passage into preferable spawning habitats and important thermal refugia. Populations of sea-run brook trout represent an important recreational fishery in areas of Maine.
	Criterion #2: Regional and Watershed Context
2	These projects contribute to multiple preexisting watershed strategies and regional plans developed to benefit ATS, river herring, rainbow smelt, Atlantic tomcod, American shad, American eel, sea-run brook trout, and sea-lamprey in the Central Maine region. All of the species targeted in this Culvert AOP application have experienced dramatic range contractions and population declines due to blocked passage and poor connectivity to historic habitats in Maine. Restoring access to important habitats for these species will increase climate resiliency through improved access to important spawning habitat, and access to cold water habitats that provide thermal refugia for many diadromous species. In general, road stream crossings are characterized as significant threats to ATS within the entire DPS in the NOAA and USFWS recovery plan ATS and specific to the Merrymeeting Bay Salmon Habitat Recovery Unit. Many of these road stream crossings are located within critical habitat for ATS, and their replacement would restore fish access to 480 habitat units. Two priority threats associated with species conservation are directly addressed under this grant application: high flows through undersized stream crossings during extreme precipitation events and impassable road crossings. These threats are included in within Maine's 2015 Wildlife Action Plan as severe with moderate actionability because high velocity flows following storm events hinder upstream swimming ability, thus reducing the ability for these species to access freshwater spawning habitats easily and consistently. The second severe but actionable item revolves around roads and railroads, because crossings within smelt habitat pose passage problems due to under sizing or hanging during the tide cycle. Replacement with properly sized and placed culverts will increase climate resiliency through improved access to important spawning habitat and access to cold water habitats that provide thermal refugia for many diadromous species as well as assist with flood flow mitigation.

By engaging in projects that benefit multiple species, we will provide synergistic benefits to ATS. Restoring access to multiple species' spawning habitat will improve spawning success and benefit the ATS more than salmon restoration alone. Road stream crossing projects are also important for all species in Maine's Wildlife Action Plan, the Kennebec River Resource Management Plan, and the Regional Conservation Plan for Anadromous Rainbow Smelt in the Gulf of Maine. The 2015 Maine's Wildlife Action Plan lists all species affected by these projects as high or highest priority within the state of Maine. Projects will increase access to Pattee Pond, Three Mile Pond, and Nehumkeag Pond, all of which are areas targeted in Maine's Kennebec River Resource Management Plan as areas to restore alewife runs. Collectively, these projects would help open up 1,962 acres of alewife habitat, which could result in an eventual run of at least 461,000 alewives. Similarly, over 51 miles of blueback herring and American shad spawning habitat will be opened up through this project. Although specific target streams are not mentioned in the Regional Conservation Plan for smelt, it is estimated that two thirds of smelt streams with road stream crossings present passage problems for smelt.

The recovery strategy for the GOM DPS for ATS is outlined in the USFWS and NMFS Recovery Plan (2019) and requires specific actions within three Salmon Habitat Recovery Units (SHRU) to accomplish recovery. Recovery criteria include increasing accessible available habitat (measured in units of 100 m squared) in each SHRU to down-list and de-list the species along with the associated improvements in fish numbers expected from those improvements. Habitat connectivity is a high priority recovery action in the plan and road stream crossings are listed as a major threat to the species across the DPS.

Furthermore, these projects will significantly benefit species that may become endangered or threatened, such as rainbow smelt, alewives, blueback herring, American shad, and American eel. River herring is a collective term that includes both anadromous alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*). River herring are vitally important to the conservation and restoration success of ATS as they provide cover for adults and smolts migrating in streams that would otherwise be preyed upon by eagles, osprey, or other predators. Rainbow smelt (*Osmerus mordax*) are currently undergoing steep population declines, which has already led to, or if unchecked is likely to lead to, local extinction and/or range contraction. The global geographic range of Rainbow smelt is identified to be at least 90% contained within the area defined by USFWS Region 5, Canadian Maritime Provinces, and southeastern Quebec, with their status currently listed as decreasing.

The projects included in this Culvert AOP funding application continue MaineDOT's commitment to restoring and enhancing aquatic organism passage. In 2017, ten years of coordination between MaineDOT, U.S. Fish & Wildlife Service (USFWS), U.S. Army Corps of Engineers, FHWA and the Maine Turnpike Authority (MTA) culminated in a programmatic agreement that created a streamlined and transparent process for ESA, Section 7, consultation for projects affecting ATS and/or their habitats. Through the Maine Atlantic salmon Programmatic agreement (MAP), projects proposed by MaineDOT or MTA that use habitat connectivity design concepts and stream crossing design monitoring to contribute to species survival and recovery can use expedited review and decision consultation processes. To date, MaineDOT has replaced or retrofitted 31 crossing structures under the MAP, restoring access for native anadromous and freshwater species. As a direct result of establishing this ongoing program, MaineDOT was the first DOT in the U.S. to earn a 2016 USFWS Endangered Species Recovery Champion award.

Criterion #3: Ecosystem Benefits

3	These projects contribute to the Ecosystem Benefits criterion by restoring historic upstream passage, enhancing water quality, managing flood flows as well as enhancing several functions and values. Mature salmon bring nutrients that help maintain high productivity levels within the rivers and streams they inhabit. Their marine nutrients help maintain natural diversification of flora and fauna along the banks and floodplains in many of the streams and rivers they inhabit. Further, aging infrastructure can not only be a barrier to many aquatic organisms but can promote the degradation of upstream and downstream habits by causing bank slumping, erosion, and scouring which severely degrades water quality and in stream habitats. Worse yet, many of these consequences of bad culvert design and failing infrastructure don't stay localized and affect habitats downstream. The fragmentation of stream habitats has caused myriad ecosystem level damages throughout Maine. Undersized or perched culverts that block fish passage have ecosystem-wide effects that reach far beyond the scope of a single river system. For example, alewife populations have been reduced by almost 99% from historic levels. This represents a major loss of ecosystem function, impacting birds, sharks and tunas, marine groundfish species in the Gulf of Maine, and charismatic marine mammals. With such wide-ranging ecosystem benefits, the replacement of culverts in this project would continue to increase ecosystem functions that were lost and would enhance overall ecosystem resilience and biodiversity. The removal of barriers to aquatic organism passage will also reestablish physical and biological processes that sustain river ecosystems. Restricted sediment movement is a major concern that is typically coupled with poor passage at road-stream crossings. A lack of sediment movement can fundamentally alter stream channel morphology, structure, and flow patterns, with implications for river ecology and safety as well. Furthermore, intense sedimentation at these barriers can clog gravel habitats that are important for river-spawning anadromous fish, and fill up cold-water pools that provide refugia from warm temperatures. Improperly sized culverts can also block the movement of large wood in these systems, which provides river structure where fish can hide from predators. Large wood can also lower stream temperatures and create pools for fish to rest in during their journey upstream. The projects included in this Culvert AOP application will contribute to other ecosystem benefits, such as reducing scour and erosion by increasing the hydraulic capacity of existing undersized or perched structures. Undersized culvert crossings can result in erosive forces on the downstream end of the culvert, especially during extreme flows that are becoming increasingly common. Undersized outlets often create turbulent, high velocity downstream flows during flood and large storm events that strip soil and vegetation thus eroding stream banks. This erosion can drastically reduce high-quality gravel spawning beds as eroded upstream sediments are deposited in lower velocity reaches downstream. Restoring flow regimes to a wild state promotes the flushing of otherwise trapped sediments according to natural fluvial processes.

4	**Criterion #4: Project Design and Delivery Methods**

MaineDOT is the state agency responsible for managing and funding all transportation modes statewide. MaineDOT employs approximately 1,600 people and its current workplan averages $1.25 billion per year. MaineDOT is an experienced, thorough, and responsible recipient of previous TIGER, FASTLANE, INFRA, CHBP, BUILD and RAISE grant funding.

This project bundle will satisfy the Project Design and Delivery Methods criterion by ensuring that project delivery meets the intent of the MAP User's Guide (https://www.maine.gov/mdot/maspc/). By meeting habitat objectives of the MAP, restoration of access habitat will be accomplished through streamlined ESA Section 7 consultation through the Programmatic Biological Assessment, thereby delivering the projects in a timely manner.

MaineDOT has adopted general concepts from stream simulation methodology when designing culverts for aquatic habitat connectivity. Culverts will be designed and constructed for consistency with natural stream dimensions, profiles and dynamics, in accordance with the following technical references: U.S. Forest Service guide (Forest Service Stream Simulation Working Group 2008), augmented by documents published by the states of Washington (Barnard et al 2013), Vermont (Bates and Kirn 2009), and California (Love and Bates 2009).

Depending on site conditions, emulating natural stream conditions may not always be feasible. In these cases, the references may indicate the need for a geomorphic-based roughened channel design. These following considerations shall guide the use of this approach:

- Geomorphically-based roughened channel designs shall generally be avoided and only be used when site conditions cannot be managed so as to allow for more preferred designs.
- Geomorphically-based roughened channel designs completed under this Programmatic Agreement shall not create barriers to aquatic organism movement.
- Geomorphically-based roughened channel designs will be submitted to USFWS for pre-approval prior to using the Programmatic Agreement.

The design delivery approach under the MAP Users' Guide will: develop design hydrology, assess structure type ("culvert" or "span"), assess structure sizing (1.2xBFW), check hydraulic capacity (Hw/D<=1 at Q100), determine appropriate structure placement (relative to stream profile), and assess structure backfill (creation of a stable, nature-like streambed). Attachment 3 lists the fish passage barriers included in this application and their associated 1.2xBFW, which will drive the anticipated replacement structure size. Each project will be administered following the MaineDOT's project development process, utilizing a skilled engineering team to deliver safe projects for the traveling public. Upon successful completion of construction, the installed structure will follow a regular inspection schedule to ensure satisfactory condition, and future repairs and rehabilitations will be identified prior to adversely affecting the traveling public.

5	**Criterion #5: Project Monitoring and Evaluation**

The proposed Culvert AOP projects will contribute to the Project Monitoring and Evaluation

	criterion by complying with the requirements and guidelines described in the MAP and the MAP Users' Guide (https://www.maine.gov/mdot/maspc/). MaineDOT staff complete monitoring of each of the culvert replacement projects that is constructed pursuant to the MAP. Approximately 10-15 stream crossings annually are monitored using a protocol agreed upon with USFWS, which evaluates the continued function for aquatic organism passage. This protocol includes observations of the geomorphic condition of the stream post construction, the stability of any of the new streambed and its features, and fish passage efficacy. MaineDOT staff also complete post-project longitudinal profiles to ensure the new structure was set properly and any stream adjustment does not result in aquatic organism passage issues. An annual monitoring report of all of these sites is submitted to the USFWS and is reviewed at an annual meeting. The monitoring program is also important for MaineDOT to continue to improve designs and specifications for future stream crossing projects.
6	**Criterion #6: Climate Change, Sustainability, and Resilience**
	MaineDOT has undertaken significant steps to assess risk associated with state transportation system vulnerability to climate change, including sea level rise, storm surge and extreme precipitation events. A GIS based risk evaluation tool, Transportation Risk Assessment for Planning and Project Delivery (TRAPPD) was developed by the MaineDOT Environmental Office. TRAPPD utilizes existing data sources to evaluate multiple risks at the asset level, assigning risk scores to individual assets. Currently this tool is actively utilized in the management of bridge and large culvert assets. The matrix currently consists of 12 questions that span the range of risks including budget, process, schedule, climate-related events, and safety. Scoring is applied to the individual questions and the summation of these scores is used along with asset condition and performance to evaluate the overall priority and risk associated with the asset. These scores are calculated for every structure in the state and accessible through a mapping interface. TRAPPD scores were considered in the prioritization of potential Culvert AOP projects. MaineDOT's Culvert AOP projects meet the Climate Change, Sustainability, and Resilience criterion by benefiting anadromous fish stocks that are capable of resisting, recovering, and adapting to climate change, such as increases in stream temperature or changes in flow. The hydrologic capacity of existing undersized structures will be substantially improved, targeting increased structure widths of at least 1.2 bankfull width. Increased hydraulic capacity more sustainably accommodates higher stream flows associated with increasingly common extreme precipitation events and address scour that threatens substructures in the face of flashy, unprecedented storm flows. Projects currently vulnerable to projected sea level rise will be designed to be resilient to increased tidal flows and elevations, ensuring the safety of the traveling public while increasing access for the target anadromous species. These projects will remove fish barriers that will improve the climate resilience and reduce climate vulnerability of anadromous fish stocks targeted in this funding application and their ecosystems.
7	**Criterion #7: Equity and Barriers of Opportunity**
	MaineDOT's Culvert AOP projects demonstrate a commitment to improving Equity and addressing Barriers to Opportunities for numerous historically disadvantaged communities, underserved communities, and/or areas of persistent poverty. Data review in the screening tools resulted in the finding that none of the proposed culverts and bridges subject to this grant application are located within historically disadvantaged communities, areas of persistent poverty,

	opportunities zones and/or low income areas. These projects will: (1) benefit anadromous fish species that are culturally important to the five federally recognized Native American tribes in Maine and underserved communities and; (2) contribute to the physical sustenance of or economic benefits to the Maine tribes and underserved communities. According to the U.S. Environmental Protection Agency (March 2021), ATS are economically and ecologically valuable, but are also culturally important to Native American tribes in Maine. The five federally recognized tribes have traditionally fished migrating and resident fish species, including ATS, as a key part of their diet. However, over time, these traditional practices have been negatively impacted by industrial development, which has resulted in decreasing water quality, loss of fish habitat, and obstacles to fish migration pathways. The decline, and in some cases the elimination, of these important fish populations has meant the loss of a central component of tribes' traditional diet. NOAA's *Community Social Vulnerability Indicators Toolbox* is currently comprised of a suite of 14 statistically robust social, economic, and climate change indicators that uniquely characterize and evaluate a fishing community's vulnerability and resilience to disturbances. According to NOAA, there are seven historic coastal fishing communities in which projects are located qualify as disadvantaged and underserved communities. These communities along the coast of Maine increasingly face acute threats from harvest fluctuations and gentrification as well as severe storms, flooding, changes in sea level and temperature.

Project Readiness Criteria

Project Readiness Criteria– Submit the requested information in Section E.1.b. for DOT to conduct a review of the project readiness and environmental review and permitting risk criteria for the project and provide a summary. If project includes multiple culverts or weirs, indicate the information for each structure included in the application and what impact would occur on the timeframes if the project were unbundled.		
	Environmental Review and Permitting Risk	
1	During the development of this Culvert AOP funding application, MaineDOT evaluated potential Environmental Review and Permitting Risk for individual projects as well as for the watershed-specific bundle. Collaborative agreements with MaineDOT, USFWS, USACE, and FHWA under the Endangered Species Act resulted in a through environmental review process that expedites endangered species consultations and aims to meet both wildlife, program, and project goals. Specifically, the MAP, implemented in 2017, provides a comprehensive strategy that directly mitigates permitting risk. Standardized review, design and construction best practices included in the MAP streamlines environmental reviews while recognizing the habitat restoration resulting from stream crossing replacements within the GOM DPS. During project scoping and preliminary design, there is close coordination between the design team and the environmental team on every crossing replacement project. This will apply to the Culvert AOP projects, ensuring that the Project goals and community needs can be met while avoiding, minimizing, and mitigating potential environmental impacts. MaineDOT has initiated communication with environmental agencies and interested parties. Preliminary baseline data collection to identify natural and cultural resources potentially affected by the projects is underway. This information will be refined during design and will be used to avoid and minimize impact while meeting the purpose and need of the projects. MaineDOT and various other state and federal departments have executed agreements to review environmental project impacts expeditiously but thoroughly. Maine DOT will take advantage of its programmatic agreements, where applicable, to streamline the environmental review and approval process. Descriptions of environmental review processes relevant to the proposed Culvert AOP projects are included in Attachment 6.	
A	NEPA Status – Indicate if the determination will likely be the result of a Categorical Exclusion (CE), Environmental Assessment (EA), or Environmental Impact Statement (EIS)	The NEPA process will inform design efforts. In the vast majority of cases, past practice indicates that, because the proposed culvert replacement projects will meet the conditions of the MAP, they will be classified as Categorical Exclusion(s) in accordance with 23 CFR 771.117(c) (26) or d(13). MaineDOT will review all projects and prepare NEPA documentation in accordance with *Programmatic Agreement between the Federal Highway Administration, Maine Division and the Maine Department of Transportation Regarding the Processing of Actions Classified as Categorical Exclusions for Federal-Aid Highway Projects*. Should any issues arise, MaineDOT will work

		directly with the respective agencies to quickly resolve them. A schedule for anticipated pre-construction activities, including NEPA, is provided as Attachment 7.
B	Will all necessary environmental approvals and permits meet the project delivery timeline specified in the project schedule?	☒ Yes (Please Provide Documentation) ☐ No As stated in Section 1 for this criterion, collaborative agreements with MaineDOT, USFWS, USACE, and FHWA under the Endangered Species Act will result in a through environmental review process that expedites endangered species consultations and aims to meet both wildlife, program, and project goals. In addition, culvert replacements with a restoration component have historically qualified to use expedited Permit by Rule procedures (Chapter 305, Permit by Rule*) and Maine's General Permit (2020-2025-MaineGeneralPermits.pdf) to receive Maine Department of Environmental Protection (DEP) and U.S. Army Corps of Engineers (USACE) approval, respectively.
C	Are there any prepared environmental studies or documents describing know project impacts and possible mitigation for those impacts?	☐ Yes *(Please provide documentation preferably through a Website link)* ☒ No MaineDOT evaluates potential impacts on a project-specific basis as part of its standard environmental screening process. Each potential impact will include consideration of a comprehensive mitigation strategy, if warranted; however, culvert replacements that restore anadromous fish passage are typically determined to be self-mitigating by state and federal fisheries agencies.

D	Is the project currently programmed in the: • TIP • STIP • MPO Long Range Transportation Plan • State Long Range Transportation Plan	*(Please select one)* ☒ Yes ☐ No This project bundle is consistent with MaineDOT's long range transportation plan and will be added to our STIP should funding be awarded. Replacement of Fish Bridge (Asset ID#0509) in Winslow is included in MaineDOT's 2023/2024 Work Plan Year and STIP as project ID#22268.00. (https://www.maine.gov/mdot/projects/workplan/data/workplan/town/Winslow.pdf) Replacement of Nehumkeag Bridge (Asset ID#5283) in Pittston is included in MaineDOT's 2023/2024 Work Plan Year and STIP as project ID#26162.00. (https://www.maine.gov/mdot/projects/workplan/data/workplan/town/Pittston.pdf)
E	Has there been public engagement opportunities?	☒ Yes *(Provide details including the degree to which public comments and commitments have been integrated into project development and design)* ☐ No For those projects currently included in MaineDOT's current 3-yr work plan, public comment on specific projects has been completed in accordance with MaineDOT Public Involvement Plan (https://www.maine.gov/mdot/publications/docs/2022/pipdraft-02012021.pdf).
F	Will there be public engagement opportunities?	☒ Yes (Please provide details) ☐ No MaineDOT uses an innovative Public Involvement Management Application (PIMA) to provide and track public engagement on projects. PIMA enables both in-person and virtual opportunities for communities to access project information and provide comments. As is standard for all projects, public engagement will be completed in accordance with MaineDOT Public Involvement

		Plan and the MaineDOT NEPA Public Involvement Plan (https://www.maine.gov/mdot/publications/docs/2022/pipdraft-02012021.pdf).
2	Indicate detailed project schedule including all major project milestones	Projects included in this bundle will be kicked off between May 2023 and May 2026, with project construction by the end of 2028. A more detailed schedule of each project and milestones are included in attachment 7.
3	Is right-of-way acquisition necessary?	☒ Yes ☐ No ☐ Not Applicable No full property acquisitions will be required to complete the projects. Current design standards may result in minor property acquisition, primarily for temporary construction access. MaineDOT follows Federal law and guidelines regarding contact, appraisal and acquisition of land. These guidelines are found in MaineDOT's Right of Way Manual (https://www.maine.gov/mdot/rowmanual/). A schedule for anticipated pre-construction activities, including right of way, is provided as Attachment 7.
4	Right-of-way acquisition considerations (*If applicable*)	If right-of-way must be acquired for the project: 1. Would right-of-way acquisition require relocation of any people or businesses? ☐ Yes ☒ No 2. If Yes, are people or businesses being relocated members of traditionally underserved and underrepresented populations (Environmental Justice communities)? No people or business relocations are anticipated given the project locations. 3. If Yes, please describe the required relocation of any people or businesses. None identified.

5	Design Status (*If applicable*)	Planned or actual start of Preliminary Design Date: 2023-2026. Preliminary Design of projects not included in MaineDOT's current 3-year work plan will begin upon Culvert AOP funding approval. Projects already included in the current three year work plan are already undergoing Preliminary Design. A schedule for anticipated pre-construction activities, including design, is provided as Attachment 7.
6	Anticipated Construction Start Date (*If applicable*):	October 2026.
7	Anticipated Project Completion Date (*If applicable)*:	November 2028.
8	Indicate potential project risks and strategies undertaken or that might be taken to mitigate those risks.	Preliminary baseline data collected to identify natural and cultural resources potentially affected by the projects will be refined during design and will be used to avoid and minimize impact while meeting the purpose and need of the projects. In-water work will be minimized; when necessary, this work will comply with time-of-year restrictions included in the MAP. Constructability reviews will be completed during design to ensure the selected alternative is buildable given the various environmental restrictions.
9	The summary on Project Readiness Criteria demonstrates that collaborative agreements with MaineDOT, USFWS, USACE, FHWA and MTA under the Endangered Species Act result in through a process that expedites endangered species consultations and aims to meet both wildlife and Project goals, thereby mitigating risk to project delivery.	