4 Affected Environment, Environmental Consequences, and Mitigation

4.11 Threatened, Endangered, and Protected Species and Habitats

4.11.1 Introduction

This section addresses the potential effects of the No Build and Build Alternatives on federal- and state-protected terrestrial (land)-based and marine-based rare, threatened, or endangered species and their designated critical or priority habitats, including essential fish habitat (EFH). Additionally, it identifies consultation with federal and state agencies and describes required mitigation. This section is supported by **Appendix 4.11, Threatened, Endangered, and Protected Species and Habitats Material**.

4.11.1.1 Regulatory Context

As joint lead agencies for the Cape Cod Bridges Program (Program), the Federal Highway Administration (FHWA) and the Massachusetts Department of Transportation (MassDOT) are required to comply with the federal and state regulatory statutes listed in **Table 4.11-1** for the protection of terrestrial-based and marine-based species and their habitats. Accordingly, consulting with and obtaining approvals from the U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries), and the Massachusetts Division of Fisheries and Wildlife's Natural Heritage and Endangered Species Program (NHESP), as applicable, in coordination with the National Environmental Policy Act review process.

Wildlife and wildlife resources, defined in 16 United States Code (USC) 666b, include birds, fish, mammals, and all other classes of wild animals and all types of aquatic and land vegetation upon which wildlife is dependent. National Oceanic and Atmospheric Administration (NOAA) Trust Resources are defined as living marine resources and their habitats, including, but not limited to, commercial and recreational fishery resources (marine and estuarine fish and shellfish, including diadromous fish species); endangered and threatened marine species (including diadromous fish species) and their designated critical habitats; marine mammals and marine turtles; marshes, mangroves, seagrass beds, coral reefs, and other coastal habitats; areas identified as EFH; and marine habitats and resources associated with national marine sanctuaries, national marine monuments, and other protected places.[1] Designated critical habitats are areas that contain features essential to the conservation and/or recovery of an Endangered Species Act of 1973 (ESA) listed species and may require special management and protection.[2] EFH is defined as waters and substrate necessary to fish for spawning, breeding, feeding, or growing to maturity. Included within EFH are Habitat Areas of Particular Concern (HAPC), which are rare, stressed by development, provide important ecological functions for

[1] NAO 216-123: NOA Mitigation Policy for Trust Resources. https://www.noaa.gov/organization/administration/noaa-administrative-orders-chapter-216-program-management/nao-216-123-noaa-mitigation-policy-for-trust-resources

[2] National Oceanic and Atmospheric Administration's definition of critical habitat. https://www.fisheries.noaa.gov/national/endangered-species-conservation/critical-habitat#definition-of-critical-habitat

federally managed species, and/or are especially vulnerable to anthropogenic (or human impact) degradation.[3]

Table 4.11-1. Federal and State Regulatory Statutes and Requirements

Statute	Regulatory Citation	Description
Federal		
Endangered Species Act of 1973 (ESA)	16 United States Code (USC) 1531-1544; 50 Code of Federal Regulations (CFR) 402	Requires federal agencies to avoid actions that would jeopardize threatened or endangered species or their critical habitats and describes the steps for informal and formal consultation with the U.S. Fish and Wildlife Service (USFWS) for terrestrial and freshwater species or with the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) for marine species and diadromous fish species [ESA Section 7(a)(2)].
Migratory Bird Treaty Act (MBTA)	16 USC 703-712	Prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species (including any part of the bird, active nests, eggs, or its young) without prior authorization (permit) by the USFWS. The regulations governing migratory bird permits are provided in 50 CFR 13 and 21. The list of migratory birds protected under the MBTA, provided as 50 CFR 10.13, was most recently updated in 2023.
Bald and Golden Eagle Protection Act (BGEPA)	16 USC 668-668d	Provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any Bald Eagle [or any Golden Eagle], alive or dead, or any part (including feathers), nest, or egg thereof." The act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The USFWS enforces the BGEPA and issues permits for incidental take in accordance with 50 CFR 13 and 22.
Fish and Wildlife Coordination Act	16 USC 2901-2911	Requires federal agencies to consult with the federal and state agencies responsible for fish and wildlife resource management regarding projects that may affect these resources. For the Cape Cod Bridges Program, these agencies include the USFWS, NOAA Fisheries, and the Massachusetts Division of Fisheries and Wildlife's Natural Heritage and Endangered Species Program (NHESP).

[3] National Oceanic and Atmospheric Administration's Habitat Area of Particular Concern within Essential Fish Habitat. https://www.fisheries.noaa.gov/southeast/habitat-conservation/habitat-areas-particular-concern-within-essential-fish-habitat

Statute	Regulatory Citation	Description
Magnuson-Stevens Fishery Conservation and Management Act	16 USC Chapter 38 Section 1801 et seq.	Requires federal agencies to consult with NOAA Fisheries on any action or proposed action authorized, funded, or undertaken by such agency that may adversely affect designated Essential Fish Habitat (EFH) identified under the Magnuson-Stevens Fishery Conservation and Management Act per 50 CFR 600.905 and 600.920.
Marine Mammal Protection Act	16 USC Chapter 31 Sections 1361–1362	Prohibits take or attempted take of any marine mammal species in U.S. waters per 50 CFR 216. Incidental take may occur during non-fishing activities including construction projects if approved by NOAA Fisheries through issuance of permits and authorizations to ensure mitigation measures are implemented to reduce the impact of the activities and keep track of the activities and how they impact protected species.
State		
Massachusetts Endangered Species Act (MESA)	Massachusetts General Law Chapter 131A	Protects rare species and their habitats by prohibiting the "take" of any plant or animal species listed as Endangered, Threatened, or Special Concern by the Natural Heritage and Endangered Species Program. Take is defined as, "to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct." Proponents with projects or activities within state-listed specie Priority Habitat must file with the NHESP for review and approval before project initiation. Projects resulting in a take of MESA species must meet the performance standards for a Conservation and Management Permit (CMP; 321 Code of Massachusetts Regulations [CMR] 10.23). To do so, an applicant agrees to carry out a Conservation and Management Plan that provides a long-term net benefit to the conservation of the affected MESA-listed species.

Source: Massachusetts Department of Transportation, 2024

4.11.1.2 Methodology and Study Areas

MassDOT initiated early Program coordination in 2018 with NHESP and USFWS to identify concerns for federal- and state-protected species. Since June 2023, USFWS, NOAA Fisheries, and the Massachusetts Department of Fish and Game have participated as Cooperating Agencies for the Program. MassDOT held multiple Cooperating Agencies meetings for the Program in 2023 and 2024, in part to discuss the species protected under the ESA and MESA that the Program would potentially affect.

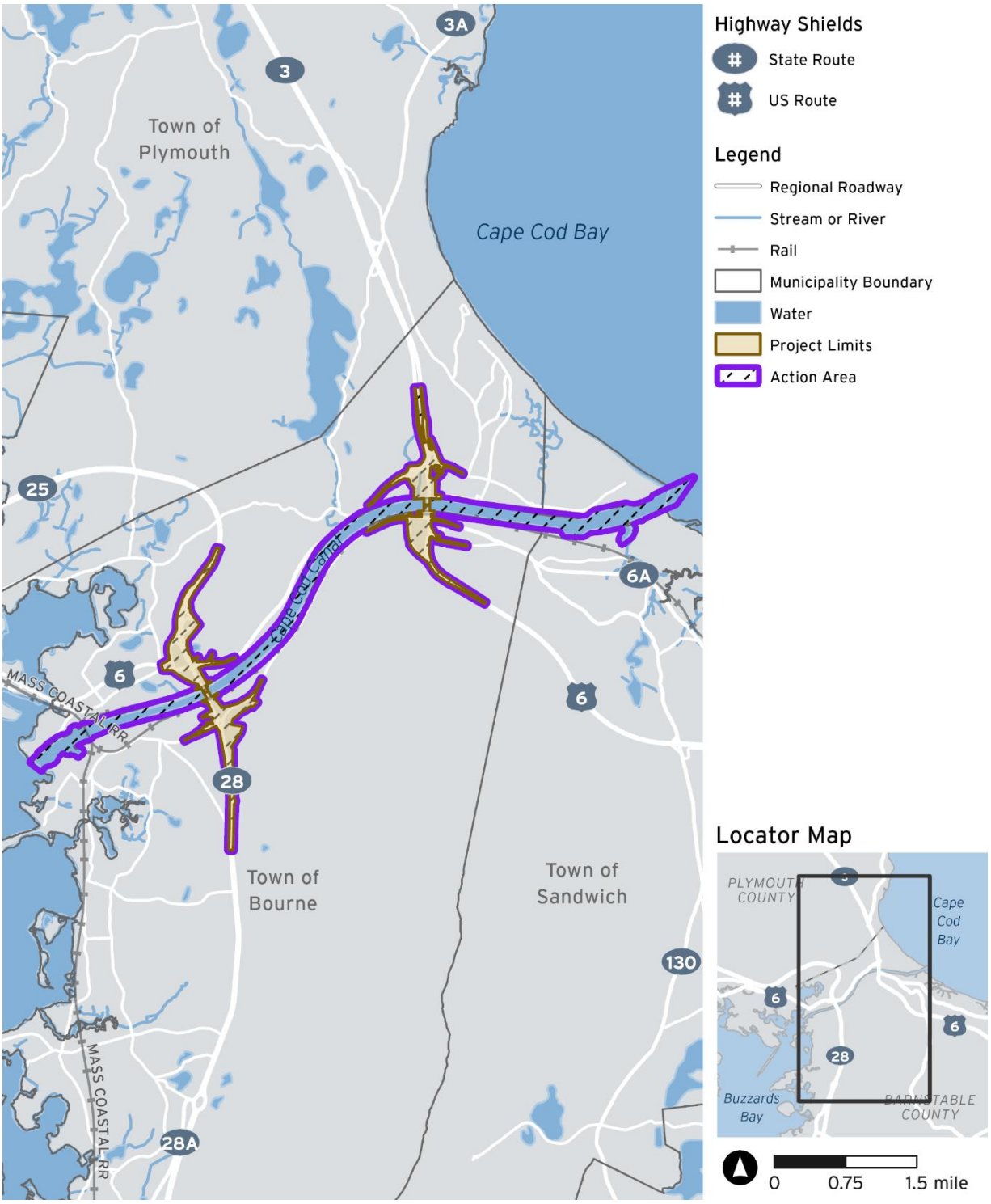
MassDOT provided Biological Assessments (BA) to the USFWS and NOAA Fisheries that detailed potential Program effects on these species and provided effects determinations for the terrestrial and

marine species protected under the ESA. MassDOT provided an EFH Assessment and Fish and Wildlife Coordination Act (FWCA) Consultation Worksheet to NOAA Fisheries describing potential effects on EFH and Trust Resources considered under the FWCA. The BA for Terrestrial Species, the BA for Marine Species, and the EFH Assessment and FWCA Consultation Worksheet are provided in **Appendix 4.11, Threatened, Endangered, and Protected Species and Habitats Material, Attachments 1, 2, and 3,** respectively.

MassDOT developed a Terrestrial Species Study Area and Aquatic Species Study Area for the analysis of Program effects on protected species and habitats, presented as **Figure 4.11-1**. Combined, these study areas comprise the Program Action Area, defined by the ESA as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action."[4] The Action Area encompasses the Project Limits, which comprise the construction footprints of the existing and proposed Sagamore and Bourne Bridges, the interchange approach networks for the highway bridges and shared-use paths, and their surrounding areas of disturbance. In addition, the Action Area extends to include Cape Cod Canal where it connects with Buzzards Bay in the southwest and Cape Cod Bay in the northeast, as well as potential routes of Program vessels to and from ports (not indicated on **Figure 4.11-1**).

[4] 50 Code of Federal Regulation (CFR) 402.2.

Figure 4.11-1. Terrestrial and Aquatic Species Study Areas



Source: Massachusetts Department of Transportation, 2024

Note: The aquatic portions of the Study Areas also include potential routes Program vessels may take to and from ports, not indicated on this figure.

4.11.2 Affected Environment

4.11.2.1 Terrestrial Resources

ESA-Protected Species

Table 4.11-2 lists the terrestrial species protected under the ESA that may occur in the Terrestrial Species Study Area, as determined by the USFWS.[5] The Program is within the range of five species listed, proposed, or identified as a candidate for listing by USFWS under the ESA. The BA for Terrestrial Species, provided as **Appendix 4.11, Threatened, Endangered, and Protected Species and Habitats Material, Attachment 1**, contains details on the potential presence of these species in the Terrestrial Species Study Area.

Table 4.11-2. Federally Protected Species Potentially Present in the Terrestrial Species Study Area

Species	Status	Federally Designated Critical Habitat in Study Area?	Description of Habitat
Mammals			
Northern Long-eared Bat (*Myotis septentrionalis*)	Endangered	No	Wide variety of forested habitats for roosting, foraging, and traveling; adjacent and interspersed non-forested habitat such as emergent wetlands and field edges. Occasionally roost in structures such as barns or sheds (particularly when suitable roost trees are unavailable). Hibernate in caves and mines.
Tricolored Bat (*Perimyotis subflavus*)	Proposed Endangered	No	Primarily roost among live and dead leaf clusters of live or recently dead deciduous hardwood trees. Often forage in patches adjacent to roosting habitat including forest, fields, and over water. Hibernate in caves and mines.
Reptiles			
Northern red-bellied cooter (*Pseudemys rubriventris*)/Plymouth red-bellied turtle (*Pseudemys rubriventris bangsi*)[a]	Endangered	No	Coastal plain ponds, river systems, cranberry bogs, and other wetlands in the seaboard lowland section of New England; require unforested, upland habitats with well-drained soils in proximity to aquatic habitat for nesting; female turtles require adequate upland connectivity between aquatic habitat and suitable nest sites.

[5] U.S. Fish and Wildlife Service. 2024. Information for Planning and Consultation. https://ipac.ecosphere.fws.gov/

Species	Status	Federally Designated Critical Habitat in Study Area?	Description of Habitat
Plants			
Sandplain Gerardia (*Agalinis acuta*)	Endangered	No	Open dry grasslands, including roadsides, pine/oak scrub forest openings, and managed cemeteries with native plants species; poor soil conditions and a disturbance regime that provides open and low competition conditions; a hemiparasite often associated with considerable lichen growth and areas of scattered, bare soil where little bluestem (*Schizachyrium scoparium*) is present.
Insects			
Monarch Butterfly (*Danaus plexippus*)	Proposed Threatened	No	Healthy and abundant milkweed for migration, breeding, and early life stage development; nectar providing flowers for breeding and migration; clean water sources.

Sources: U.S. Fish and Wildlife Service (USFWS). 2021.
Species Status Assessment (SSA) Report for the Massachusetts Population of the Northern Red-bellied Cooter (*Pseudemys rubriventris*). Version 1.0. U.S. Fish and Wildlife Service Northeast Region. Hadley, MA https://iris.fws.gov/APPS/ServCat/DownloadFile/209859;
USFWS. 2024. Plymouth red-bellied turtle species account. https://www.fws.gov/species/plymouth-red-bellied-turtle-pseudemys-rubriventris-bangsi; Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines. https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines; Sandplain gerardia species account. https://www.fws.gov/species/sandplain-gerardia-agalinis-acuta.
USFWS. n.d. Northern Long-eared Bat. https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis; Tricolored Bat. https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus; Monarch Butterfly. https://www.fws.gov/species/monarch-danaus-plexippus.

[a] This species was formerly known as Plymouth redbelly turtle (*Pseudemys rubriventris bangsi*).

MESA-Protected Species and Habitats

Table 4.11-3 lists Priority Habitats for species protected under MESA that occur in the Terrestrial Species Study Area (project limits), as determined by NHESP. The ESA-protected northern long-eared bat, tricolored bat, and northern red-bellied cooter are listed as endangered under MESA. However, these species do not have Priority Habitats as mapped by NHESP in the Terrestrial Species Study Area.

Table 4.11-3. State-Protected Species with Priority Habitat in the Terrestrial Species Study Area[a]

Species	Status	Description of Habitat
Reptiles		
Eastern box turtle (*Terrapene carolina*)	Special Concern	Dry and moist woodlands, brushy fields, thickets, marsh edges, bogs, swales, fens, stream banks, and well-drained bottomland. Overwinter in upland forests with leaf litter and woody debris.
Insects		
Barrens dagger moth (*Acronicta albarufa*)	Threatened	Xeric, open pitch pine-scrub oak barrens and scrub oak thickets on sandy soil. Host plants: Scrub oak (*Quercus ilicifolia*) and occasionally other oak species.
Herodias underwing moth (*Catocala herodias)*	Special Concern	Xeric, open pitch pine-scrub oak barrens and scrub oak thickets on sandy soil or rocky summits and ridges. Host plant: scrub oak.
Melsheimer's sack bearer (*Cicinnus melsheimeri*)	Threatened	Sandplain pitch pine-scrub oak barrens, especially scrub oak thickets. It may also be found in shrubby grasslands and heathlands with a component of scrub oak. Host plant: scrub oak.
Buck Moth (*Hemileuca maia*)	Special Concern	Xeric, open habitats with extensive scrub oak thickets, particularly sandplain pitch pine-scrub oak barrens. Host plants: scrub oak and occasionally other shrubby oak species.
Heath metarranthis (*Metarranthis pilosaria*)	Special Concern	Sandplain pitch pine-scrub oak barrens and heathlands, as well as acidic swamps and bogs. Host plants: Blueberries and cranberries (*Vaccinium* spp.) and likely leatherleaf (*Chamaedaphne calyculata*).
Pine barrens speranza (*Speranza exonerate*)	Special Concern	Pitch pine-scrub oak barrens on sandplains and rocky summits and ridges. Host plant: scrub oak.
Scrub euchlaena (*Euchlaena madusaria*)	Special Concern	Sandplain pitch pine-scrub oak barrens, heathlands, and shrubby grasslands. Host plant: Lowbush blueberries (*Vaccinium angustifolium* and *V. pallidum).*
Slender clearwing sphinx moth (*Hemaris gracilis*)	Special Concern	Pitch pine-scrub oak barrens and heathlands on sandplains or rocky summits and ridges, as well as acidic bogs and swamps. Host plants: Lowbush blueberry (*Vaccinium pallidum*) and likely other blueberry species.
Chain dot geometer (*Cingilia catenaria*)	Special Concern	Coastal plain shrublands, including sandplain grasslands and heathlands, dunes, bluffs, and maritime shrublands; occasionally also open pitch pine/scrub oak barrens. Host plants: Huckleberry (*Gaylussacia baccata*), blueberry (*Vaccinium* spp.), bayberry (*Morella caroliniensis*), and sweet gale (*Myrica gale*).

Sources: Nazdrowicz, N., J. Bowman, and R. Roth. 2008. Population Ecology of the Eastern Box Turtle in a Fragmented Landscape. Journal of Wildlife Management 72(3): 745-753; Erb, L. 2012. Eastern Box Turtle Conservation Plan for Massachusetts. Massachusetts Division of Fisheries and Wildlife. Natural Heritage and Endangered Species Program. Westborough, Massachusetts; Ernest, C., and J. Lovich. 2009. Turtles of the United States and Canada. Second Edition. The John Hopkins University Press. Baltimore, Maryland;
Natural Heritage and Endangered Species Program (NHESP). 2015. Chain dot geometer (*Cingilia catenaria*) Fact Sheet. https://www.mass.gov/doc/chain-dotted-geometer/download. NHESP. 2019. Little Brown Bat (Myotis lucifugus) Fact Sheet. https://www.mass.gov/doc/little-brown-bat/download; Barrens Dagger Moth (*Acronicta albarufa*) Fact Sheet. https://www.mass.gov/doc/barrens-dagger-

moth/download; Herodias underwing moth (*Catocala Herodias*) Fact Sheet. https://www.mass.gov/doc/herodias-underwing-moth/download; Melsheimer's sack bearer (*Cicinnus melsheimeri*) Fact Sheet. https://www.mass.gov/doc/melsheimers-sack-bearer/download; Buck Moth (*Hemileuca maia*) Fact Sheet. https://www.mass.gov/doc/buck-moth/download; Heath metarranthis (*Metarranthis pilosaria*) Fact Sheet. https://www.mass.gov/doc/heath-metarranthis/download; Pine barrens speranza (*Speranza exonerata*) Fact Sheet. https://www.mass.gov/doc/pine-barrens-speranza/download; Scrub euchlaena (*Euchlaena madusaria*) Fact Sheet. https://www.mass.gov/doc/scrub-euchlaena/download; Slender clearwing sphinx moth (*Hemaris gracilis*) Fact Sheet. https://www.mass.gov/doc/slender-clearwing-sphinx-moth/download.

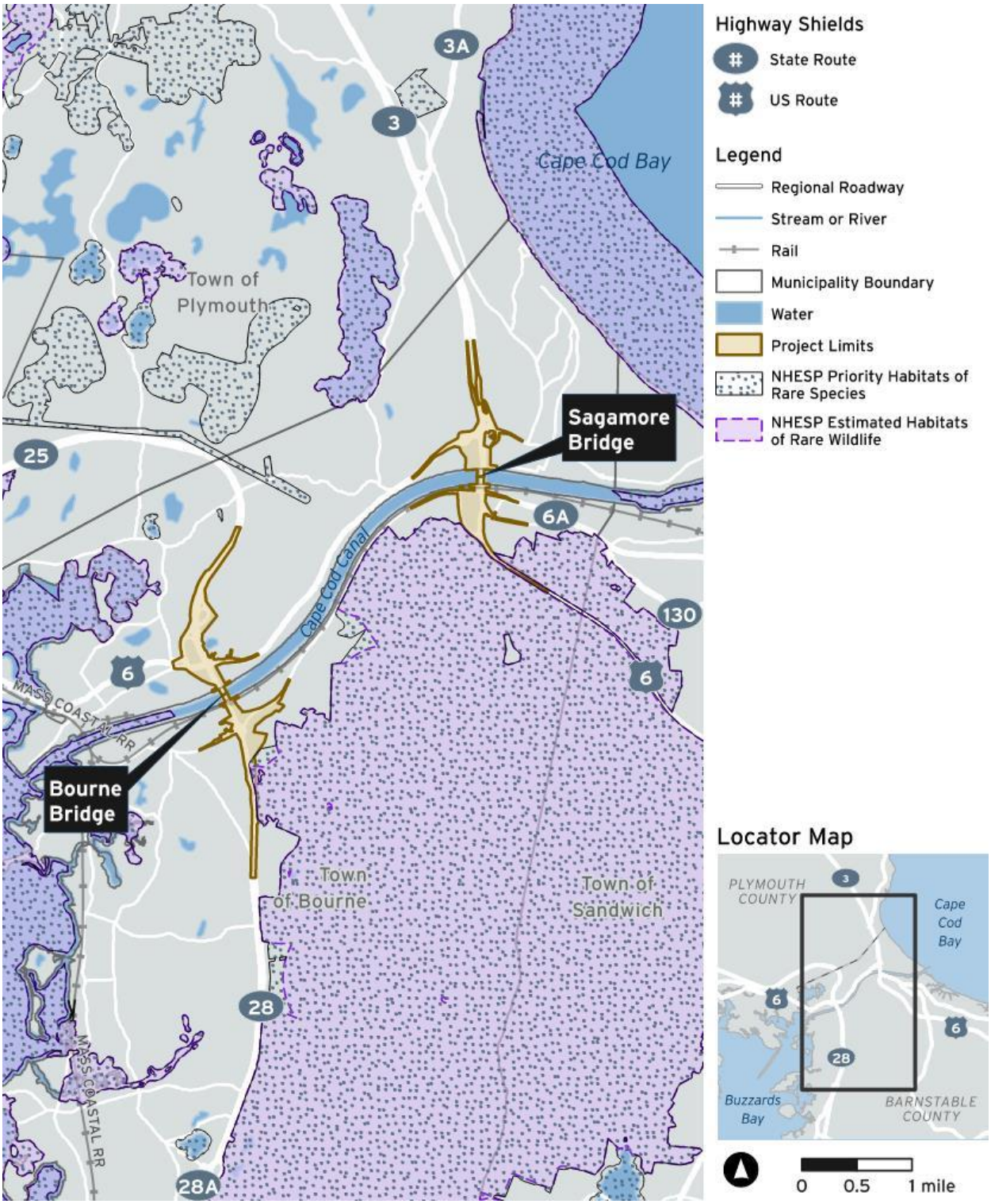
[a] The ESA-protected northern long-eared bat, tricolored bat, and northern red-bellied cooter are listed as endangered under MESA but do not have Priority Habitat as mapped by NHESP in the Terrestrial Species Study Area.

Figure 4.11-2 identifies locations where the Terrestrial and Aquatic Species Study Areas overlap Priority and Estimated Habitats for MESA-listed species. Estimated Habitats of Rare Wildlife are a mapped subset of Priority Habitats that pertain to rare wetland wildlife observed within the last 25 years and documented in the NHESP database.

The undeveloped area within and adjacent to the Terrestrial Species Study Area in the Sagamore South quadrant is primarily composed of maintained road shoulder, edge habitat associated with the pitch pine-oak forest matrix community type, and dry xeric shrubland community maintained within the existing utility right-of-way along U.S. Route 6. Two eastern box turtle road mortalities were previously documented along the southbound shoulder of U.S. Route 6 and reported to the NHESP. No additional visual observations of state-listed wildlife or plants have been documented in the Sagamore South quadrant of the Terrestrial Species Study Area.

The undeveloped areas within and adjacent to the Terrestrial Species Study Area in the Bourne South quadrant predominately include maintained road shoulder, edge and outer portions of a large forest block of the pitch pine-oak forest matrix community type contiguous with Joint Base Cape Cod, and smaller inclusions of pitch pine-oak community types typical of the coastal sandplain. No visual observations of state-listed plant or wildlife species have been documented in the Bourne South quadrant of the Terrestrial Species Study Area.

Figure 4.11-2. Natural Heritage and Endangered Species Program Priority and Estimated Habitats in and near the Project Limits



Source: Massachusetts Department of Transportation, 2025

Other Protected Species

As noted in **Table 4.11-1**, migratory birds, including Bald and Golden Eagles, are protected under the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. **Table 4.11-4** lists the migratory birds that may occur in the Terrestrial Species Study Area that are on the USFWS Birds of Conservation Concern list[6] or are protected by the Bald and Golden Eagle Protection Act. There are no known Bald Eagle nests in or within 660 feet of the Terrestrial Species Study Area, which is the closest an activity should be conducted relative to a Bald Eagle nest, based on the USFWS National Bald Eagle Management Guidelines.[7] Golden Eagles are not known to breed in the United States east of the Mississippi River,[8] and migrating Golden Eagles are rare in Massachusetts.[9]

Table 4.11-4. Birds of Conservation Concern Potentially Present in Terrestrial and Aquatic Species Study Areas

Species	Level of Concern	Breeding Season
American oystercatcher (*Haematopus palliatus)*	Birds of Conservation Concern	April 15 – August 31
Bald Eagle (*Haliaeetus leucocephalus*)	Non-Birds of Conservation Concern vulnerable	October 15 – August 31
Black Skimmer (*Rynchops niger*)	Birds of Conservation Concern	May 20 – September 15
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	Birds of Conservation Concern	May 15 – October 10
Blue-winged Warbler (*Vermivora cyanoptera*)	Birds of Conservation Concern	May 1 – June 30
Bobolink (*Dolichonyx oryzivorus*)	Birds of Conservation Concern	May 20 – July 31
Canada Warbler (*Cardellina canadensis*)	Birds of Conservation Concern	May 20 – August 10
Chimney Swift (*Chaetura pelagica*)	Birds of Conservation Concern	March 15 – August 25
Eastern Whip-poor-will (*Antrostomus vociferus*)	Birds of Conservation Concern	May 1 – August 20
Kentucky Warbler (*Oporornis Formosus*)	Birds of Conservation Concern	April 20 – August 20
Least Tern (*Sternula antillarum antillarum*)	Birds of Conservation Concern	April 25 – September 5
Lesser Yellowlegs (*Tringa flavipes*)	Birds of Conservation Concern	Breeds elsewhere
Pectoral Sandpiper (*Calidris melanotos*)	Birds of Conservation Concern	Breeds elsewhere
Prairie Warbler (*Setophaga discolor*)	Birds of Conservation Concern	May 31 – July 31
Prothonotary Warbler (*Protonotaria citrea*)	Birds of Conservation Concern	April 1 – July 31
Purple Sandpiper (*Calidris maritima*)	Birds of Conservation Concern	Breeds elsewhere
Ruddy Turnstone (*Arenaria interpres morinella*)	Birds of Conservation Concern	Breeds elsewhere
Rusty Blackbird (*Euphagus carolinus*)	Birds of Conservation Concern	Breeds elsewhere
Saltmarsh Sparrow (*Ammospiza caudacuta*)	Birds of Conservation Concern	May 15 – September 5
Scarlet Tanager (*Piranga olivacea*)	Birds of Conservation Concern	May 10 – August 10
Semipalmated Sandpiper (*Calidris pusilla*)	Birds of Conservation Concern	Breeds elsewhere
Short-billed Dowitcher (*Limnodromus griseus*)	Birds of Conservation Concern	Breeds elsewhere
Whimbrel (*Numenius phaeopus hudsonicus*)	Birds of Conservation Concern	Breeds elsewhere

[6] https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf

[7] https://www.fws.gov/sites/default/files/documents/national-bald-eagle-management-guidelines_0.pdf.

[8] Katzner, Todd, B.W. Smith, T.A., Miller, et. al. 2012. Status, Biology, and Conservation Priorities for North America's Eastern Golden Eagle (*Aguila chrysaetos*) population. The Auk. 129(1): 168-176.

[9] Mass Audubon. 2024. Birds of Prey. https://www.massaudubon.org/nature-wildlife/birds/birds-of-prey

Species	Level of Concern	Breeding Season
Willet (*Tringa semipalmata*)	Birds of Conservation Concern	April 20 – August 5
Wood Thrush (*Hylocichla mustelina*)	Birds of Conservation Concern	May 10 – August 31

Source: U.S. Fish and Wildlife Service. 2021b. Birds of Conservation Concern 2021. https://www.fws.gov/sites/default/files/documents/birds-of-conservation-concern-2021.pdf

4.11.2.2 Aquatic Resources

ESA-Protected Species

Aquatic resources include marine habitats in the Aquatic Species Study Area. **Table 4.11-5** lists the species protected under the ESA that may occur in the Aquatic Species Study Area as determined by NOAA Fisheries and the NOAA Fisheries ESA Section 7 Mapper.[10] The Program is within the range of eight species listed by NOAA Fisheries under the ESA, and within Critical Habitat designated for one species. The BA for Marine Species, provided as **Appendix 4.11, Threatened, Endangered, and Protected Species and Habitats Material, Attachment 2**, contains details on the potential presence of these species in the Aquatic Species Study Area.

Table 4.11-5. Federally Protected Species Potentially Present in the Aquatic Species Study Area

Species	Status	Federally Designated Critical Habitat in Study Area?	Description of Habitat
Marine Mammals			
Fin whale (*Balaenoptera physalus*)	Endangered	No	Deep waters offshore migrating from low latitude breeding grounds in winter to high latitude feeding areas in summer; evidence exists of adult and juvenile wintering areas in Stellwagen Bank and the eastern perimeter of Georges Bank, but individuals may occur at this latitude year-round.
North Atlantic right whale (*Eubalaena glacialis*)	Endangered	Yes	Occur off Newfoundland, Canada to the Gulf of Mexico; adults and juveniles forage from Maine to Cape Cod, Massachusetts, with most sightings in Massachusetts in spring and summer before their northerly migration, although there is increasing evidence of overwintering in Cape Cod Bay.
Sea Turtles			
Green Turtle (*Chelonia mydas*)	Threatened	No	Juveniles and adults migrate north to mid-Atlantic waters at the beginning of June and migrate south at the end of November as water temperatures cool; primarily feed on algae and seagrass.

[10] National Oceanic and Atmospheric Administration Fisheries. 2023. The Greater Atlantic Region ESA Section 7 Mapper. https://www.fisheries.noaa.gov/resource/map/greater-atlantic-region-esa-section-7-mapper

Species	Status	Federally Designated Critical Habitat in Study Area?	Description of Habitat
Kemp's Ridley Turtle (*Lepidochelys kempii*)	Endangered	No	Primarily found in Gulf of Mexico; however, juveniles and adults migrate north to Nova Scotia and the eastern Atlantic in the spring and migrate south as water temperatures cool. Feed in nearshore waters; omnivores but primarily feed on swimming crabs and crustaceans.
Leatherback Turtle (*Dermochelys coriacea*)	Endangered	No	Most extensive range of any reptile; migrate north to mid-Atlantic waters in spring as water temperatures increase and migrate south in the fall as water temperatures cool; feed primarily in pelagic waters on jellyfish, siphonophores, pyrosomes, and salps.
Loggerhead Turtle (*Caretta caretta*)	Threatened	No	Occur in US Atlantic and Gulf of Mexico coastal waters as juveniles and adults. Migrate and forage from south of Cape Cod, Massachusetts to Virginia from the beginning of May to the end of November. Feed primarily on shellfish including whelks and conchs.
Fish			
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)	Threatened, Endangered[a]	No	Anadromous, demersal fish. Spawn in freshwater rivers but spend most of life in marine and estuarine waters. May migrate long distances along U.S. coast while in marine waters. Frequently inhabit gravel and sand substrates near bays, inlets, and river mouths to forage. Winter in deeper offshore marine waters.
Shortnose Sturgeon (*Acipenser brevirostrum*)	Endangered	No	Anadromous, demersal fish. Spawn in freshwater rivers but may also inhabit estuarine and marine waters during portions of life history. May migrate in marine waters between river systems, typically in late spring or late fall months.

Sources: Atlantic Sturgeon Status Review Team. 2007. 2007 Status Review of Atlantic sturgeon (Acipenser oxyrinchus oxyrinchus). Report to National Marine Fisheries Service, Northeast Regional Office. February 23, 2007. 174 pp.
National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries). 1992. Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic, and Gulf of Mexico. https://www.fisheries.noaa.gov/resource/document/recovery-plan-leatherback-turtles-us-caribbean-atlantic-and-gulf-mexico
NOAA Fisheries. 2008. Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (Caretta caretta). https://www.fisheries.noaa.gov/resource/document/recovery-plan-northwest-atlantic-population-loggerhead-sea-turtle-caretta-caretta.
NOAA Fisheries. 2015. Kemp's Ridley Sea Turtle (Lepidochelys Kempii) 5-Year Review: Summary and Evaluation. noaa_17048_DS1.pdf
NOAA Fisheries. 2024. Stock Assessment Report. June 2024. Fin Whale (Balaenoptera physalus): Western North Atlantic Stock.
NOAA Fisheries. 2024. Stock Assessment Report. November 2024. North Atlantic Right Whale, Western Atlantic.
Seminoff, Jeffrey Aleksandr, Camryn D. Allen, George H. Balazs, Peter Howard Dutton, Tomoharu Eguchi, Heather Haas, Stacy A. Hargrove et al. 2015. Status review of the green turtle (Chelonia mydas) under the Endangered

Species Act. https://www.fisheries.noaa.gov/resource/document/status-review-green-turtle-chelonia-mydas-under-endangered-species-act

Shortnose Sturgeon Status Review Team. 2010. A Biological Assessment of shortnose sturgeon (Acipenser brevirostrum). Report to National Marine Fisheries Service, Northeast Regional Office. November 1, 2010. 417 pp. https://www.fisheries.noaa.gov/resource/document/biological-assessment-shortnose-sturgeon-acipenser-brevirostrum

[a] On February 6, 2012, NOAA Fisheries listed five Distinct Population Segments of Atlantic sturgeon under the Endangered Species Act: the Chesapeake Bay, New York Bight, Carolina, and South Atlantic Distinct Population Segments were listed as endangered; the Gulf of Maine DPS was listed as threatened (77 Federal Register 5880). 77 FR 5880 - Endangered and Threatened Wildlife and Plants; Threatened and Endangered Status for Distinct Population Segments of Atlantic Sturgeon in the Northeast Region - Content Details - 2012-1946

MESA-Protected Species

The marine species that may occur in the Aquatic Species Study Area, as listed in **Table 4.11-5**, are also protected under MESA. However, there is no Priority Habitat mapped by NHESP for these species or any other species in the Aquatic Species Study Area.

Essential Fish Habitat and NOAA Fisheries Trust Resources

A total of 28 finfish and invertebrate species are designated EFH within the Aquatic Species Study Area. Within this total, there are two types of HAPCs: Inshore Juvenile Atlantic Cod (*Gadus morhua*) and Summer Flounder (*Paralichthys dentatus*). Additionally, there are 16 NOAA Trust Resources, protected by NOAA Fisheries under the authority of the FWCA, with the potential to be present in the Aquatic Species Study Area.[11] **Table 4.11-6** lists the species with designated EFH throughout the Aquatic Species Study Area (A), in the Sagamore Bridge portion of the Aquatic Species Study Area (S), and in the Bourne Bridge portion of the Aquatic Species Study Area (B).

Table 4.11-6. Species with Designated Essential Fish Habitat in the Aquatic Species Study Area

Species	Life Stage			
	Eggs	Larvae	Juvenile	Adults/ Spawning Adults
American Plaice (*Hippoglossoides platessoides*)	S	S	S	S
Albacore Tuna (*Thunnus alalunga*)[†]	—	—	A	—
Atlantic Butterfish (*Peprilus triacanthos*)	A	B	—	A
Atlantic Cod (*Gadus morhua*)	A	A	A[*]	A
Atlantic Herring (*Clupea harengus*)	—	S	A	A
Atlantic Mackerel (*Scomber scombrus*)[†]	A	S	A	A
Atlantic Sea Scallop (*Placopecten magellanicus*)	S	S	S	S
Atlantic Surfclam (*Spisula solidissima*)	—	—	A	A
Atlantic Wolffish (*Anarhichas lupus*)[†]	A	A	A	A

[11] In the context of the FWCA, NOAA Trust Resources refer to anadromous fish, shellfish, crustaceans, or their habitats that are not managed under a federal fisheries management plan.

Species	Life Stage			
	Eggs	Larvae	Juvenile	Adults/ Spawning Adults
Black Sea Bass (*Centropristis striata*)	B	B	A	A
Bluefin Tuna (*Thunnus thynnus*)[†]	—	—	—	A
Bluefish (*Pomatomus saltatrix*)	—	—	A	A
Little Skate (*Leucoraja erinacea*)	—	—	A	A
Longfin Inshore Squid (*Doryteuthis* [*Amerigo*] *pealeii*)	B	—	A	A
Northern Shortfin Squid (*Illex illecebrosus*)	—	—	—	A
Ocean Pout (*Macrozoarces americanus*)	A	—	S	S
Pollock (*Pollachius virens*)		S	S	S
Red Hake (*Urophycis chuss*)	A	A	A	A
Scup (*Stenotomus chrysops*)	B	B	A	A
Silver Hake (*Merluccius bilinearis*)	S	S	—	S
Smoothhound Shark Complex (Atlantic Stock)	A	A	A	A
Spiny Dogfish (*Squalus acanthias*)	—	—	—	A[**]
Summer Flounder (Paralichthys dentatus)	—	B	B	A[*]
Thorny Skate (*Amblyraja radiata*)	—	—	S	—
White Hake (*Urophycis tenuis*)	S	S	S	S
Windowpane Flounder (*Scophthalmus aquosus*)	A	A	A	A
Winter Flounder (*Pseudopleuronectes americanus*)	A	A	A	A
Winter Skate (*Leucoraja erinacea*)	—	—	A	A
Yellowtail Flounder (*Limanda ferruginea*)	S	S	A	A

Sources: Evans, N.T., K.H. Ford, B.C. Chase, J.J. Sheppard. 2015. Recommended Time of Year Restrictions (TOYs) for Coastal Alteration Projects to Protect Marine Fisheries Resources in Massachusetts. Massachusetts Division of Marine Fisheries. April 2011. Revised January 2015. https://www.mass.gov/doc/time-of-year-recommendations-tr-47/download.

New England Fishery Management Council (NEFMC). 2017. Omnibus essential fish habitat amendment 2. Volume 2: EFH and Habitat Areas of Particular Concern (HAPC) designation alternatives and environmental impacts. New England Fishery Management Council, Newburyport, and National Marine Fisheries Service, Gloucester, Massachusetts, USA. October 25.

National Oceanic and Atmospheric Administration (NOAA). 1999. Essential Fish Habitat Source Document: Atlantic Mackerel, *Scomber scombrus*, Life History and Habitat Characteristics.

NOAA Fisheries. 2017. Final Amendment 10 to the 2006 consolidated Atlantic highly migratory species fishery management plan: Essential Fish Habitat and environmental assessment. Highly Migratory Species Management Division, Silver Spring, Maryland. 1 September.

Key – A: Present throughout the Aquatic Species Study Area; B: Present in Bourne Bridge Aquatic Species Study Area; S: Present in Sagamore Bridge Aquatic Species Study Area; —: not present.

[†] Species with habitat preferences outside of Cape Cod Canal
[*] Species life stage has a Habitat Area of Particular Concern in the area.
[**] Sagamore Bridge has designated adult female and male, sub-adult female, whereas Bourne Bridge only has adult female designated.

NOAA Trust Resources include 2,445 square feet (sf) of eelgrass (*Zostera marina*) (submerged aquatic vegetation [SAV]), located at the Bourne Bridge site. The U.S. Environmental Protection Agency identifies eelgrass as a "special aquatic site," pursuant to 40 Code of Federal Regulations (CFR) 230 Section 404(b)(1) of the Clean Water Act. The Mid-Atlantic Fishery Management Council has designated eelgrass as an HAPC when overlapped with summer flounder EFH.[12] Refer to **Section 4.9, Wetlands and Floodplains**, for further descriptions of eelgrass, including figures showing its locations at the Bourne Bridge site.

Each of the four Program quadrants contains a portion of shellfish habitat between the existing pier and the riprap slope, mainly blue mussels and sporadic American oysters attached to cobble and gravel substrate. Shellfish beds were present during site surveys. **Appendix 4.11, Threatened, Endangered, and Protected Species and Habitats Material, Attachment 3**, provides details of habitat types.

Per the Massachusetts Division of Marine Fisheries, the entire Cape Cod Canal is classified as "Prohibited," which indicates the waters are closed to shellfish harvesting under all conditions, except for seed gathering for municipal propagation programs under a Massachusetts Division of Marine Fisheries permit.[13]

MMPA-Protected Species

As noted in **Table 4.11-1**, the Marine Mammal Protection Act (MMPA) protects marine mammals in the United States. There are 35 species with potential to occur in the Aquatic Species Study Area. Of those 35 species, the following 11 species were determined to have a regular, common, or uncommon presence likelihood:

- Fin whale
- Humpback whale (*Megaptera novaeangliae*)
- North Atlantic right whale
- Sei whale (*Balaenoptera borealis*)
- Minke whale (*Balaenoptera acutorostrata*)
- Long-finned pilot whale (*Globicephala melas*)
- Atlantic white-sided dolphin (*Lagenorhynchus acutus*)
- White-beaked dolphin (*Lagenorhynchus albirostris*)
- Harbor porpoise (*Phocoena phocoena*)
- Gray seal (*Halichoerus grypus*)
- Harbor seal (*Phoca vitulina*)

[12] Louis A. Chiarella, Assistant Regional Administrator for Habitat Ecosystem Services. Correspondence to David Paulson, Wildlife and Endangered Species Unit Supervisor, MassDOT. February 12, 2025.

[13] Massachusetts Division of Marine Fisheries, Shellfish Sanitation and Management map for Cape Cod Canal. https://www.massmarinefisheries.net/shellfish/dsga/BB45.pdf

The remaining 24 species were determined to have a rare presence likelihood.

4.11.3 No Build Alternative

In the No Build Alternative, baseline conditions would persist for the foreseeable future and there would be no effects on threatened, endangered, and protected species. The USACE would continue to carry out activities to ensure protection of bats if conducting work on the bridge abutments in coordination with USFWS and would continue to conduct dredging of Cape Cod Canal's navigation channel and other canal maintenance in coordination with NOAA Fisheries.

4.11.4 Build Alternative

In the Build Alternative, effects could occur to federal and state threatened and endangered species, migratory birds, EFH, and marine mammals, as described in the following sections. Further details are provided in the BA for Terrestrial Species, BA for Aquatic Species, and EFH Assessment and FWCA Consultation Worksheet, included as Attachments 1, 2, and 3, respectively, to **Appendix 4.11, Threatened, Endangered, and Protected Species and Habitats Material**, and in **Appendix 3.2, Construction Approach Technical Report**.

4.11.4.1 Effects to Terrestrial Resources

Due to the construction and operation of the Program, potential effects to protected species and their habitat primarily consist of habitat alteration. The following sections summarize potential effects to ESA-protected species; MESA-protected species; other protected species, including migratory birds; and FWCA-jurisdictional wildlife resources. Refer to **Appendix 4.11, Attachment 1**, for details of land-based construction activities and anticipated effects.

ESA-Protected Species

The Build Alternative would clear approximately 132.14 acres of suitable summer habitat for northern long-eared bats and tricolored bats within the Terrestrial Study Area. However, for both species, no known roost trees are present within or adjacent to the Terrestrial Species Study Area; no maternity colonies have been documented in the Terrestrial Species Study Area; and no winter hibernacula are expected to be affected by the Build Alternative. Further, all proposed tree clearing would be within 1,000 feet of suitable summer roosting habitat that would remain intact. Forested habitat near the Terrestrial Study Area includes the large areas of Camp Edwards and Red Brook Wildlife Management Areas, and smaller parks and forested areas within and adjacent to the Terrestrial Study Area. Refer to **Section 4.6.4.2, Land Alteration Effects**, for further descriptions of the proposed tree clearing and **Appendix 3.2, Construction Approach Technical Report, Attachment 3**, for plans that identify the limits of tree clearing for the proposed work.[14]

[14] The land clearing acreage presented in this section and in **Chapter 4, Section 4.6.4.2**, reflects the most current design and supersedes the acreage presented in the BA for Terrestrial Species, which was submitted to USFWS in April 2025. The anticipated additional tree clearing, however, would not alter the findings and mitigation measures for northern long-eared bats and tricolored bats presented in this section.

To implement the Build Alternative, MassDOT would acquire properties and demolish existing structures. In addition to the existing bridge abutments, up to 21 structures would be demolished within the Project Limits.

In coordination with the USFWS, MassDOT and FHWA determined that no forest clearing activities would occur during the species' summer occupancy period from March 15 to November 30 on the Cape Cod side of Cape Cod Canal and from April 15 to October 31 on the mainland side of Cape Cod Canal. Further, MassDOT would follow Massachusetts Division of Fisheries and Wildlife guidance[15] for implementing exclusionary measures to ensure bats are not present in, or are removed from, structures and bridge abutments, including conducting inspections prior to structure demolition. Therefore, MassDOT and FHWA have determined that the Build Alternative would be **not likely to adversely affect** northern long-eared bats and tricolored bats. The USFWS concurred with this determination on May 2, 2025 (**Appendix 4.11, Attachment 1**).

The Terrestrial Species Study Area is outside of the range of known occurrences of the northern red-bellied cooter, and appropriate habitat for the species is not present in the Terrestrial Species Study Area. Therefore, MassDOT and FHWA have determined the Build Alternative would have **no effect** on the northern red-bellied cooter.

No observations of sandplain gerardia were recorded during Build Alternative habitat surveys in 2020.[16] Agency correspondence with the USFWS and NHESP did not identify concerns for this species in the Terrestrial Species Study Area. Therefore, MassDOT and FHWA have determined that the Build Alternative would have **no effect** on sandplain gerardia.

Suitable habitat for monarch butterflies may occur along the roadsides and other undeveloped, unforested portions of the Terrestrial Species Study Area. Construction of the Build Alternative could cause incidental take of monarch butterflies through vegetation clearing and removal or disturbance of breeding or migration habitat, or through direct mortality of individual butterflies. Following construction completion, cleared areas would be revegetated to the maximum extent possible, using native plant and tree species. Additionally, MassDOT has enrolled in the Nationwide Candidate Conservation Agreement with Assurances for the Monarch Butterfly (CCAA), a voluntary agreement between the USFWS, and, among others, state departments of transportation (including MassDOT).[17] Through enrollment in the CCAA, MassDOT will implement conservation measures designed to support monarch butterfly breeding and/or foraging on a portion of MassDOT lands, which would result in a net gain of habitat and/or species population numbers. In return for MassDOT's voluntary conservation measures, the USFWS would issue an Enhancement of Survival (EOS) Permit under Section 10(a)(1)(A)

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[15] Massachusetts Division of Fisheries and Wildlife (MassWildlife). 2020. Massachusetts Homeowner's Guide to Bats. Produced by Massachusetts Division of Fisheries and Wildlife. 7th Edition. Available at Homeowners Guide to Bats_2020.pdf.

[16] Stantec Consulting Services, Inc. 2020. Bourne and Sagamore Bridge Improvement Projects – Rare, Threatened, and Endangered Species Habitat Assessment. Conducted for Massachusetts Department of Transportation. December 16. MassDOT Project No. 14-33419.

[17] Cardno, Inc. 2020. Nationwide CCAA/CCA (Candidate Conservation Agreement with Assurances/Candidate Conservation Agreement) for Monarch Butterfly on Energy and Transportation Lands. Prepared for The Monarch CCAA/CCAA Development Advisory Team and the Energy Resources Center at the University of Illinois at Chicago. March 2020.

of the ESA. The EOS Permit would go into effect as of the listing date of the monarch butterfly, should a listing occur. Under the EOS Permit, incidental take of monarch butterflies would be authorized for the conservation measures and construction activities associated with the Build Alternative.[18] Therefore, MassDOT and FHWA have determined that Build Alternative would be **not likely to jeopardize the continued existence** of the monarch butterfly. The USFWS concurred with this determination on May 2, 2025 (**Appendix 4.11, Attachment 1**).

MESA-Protected Species

The Project Limits intersect with NHESP-mapped Priority and Estimated Habitats of Rare Species south of the Sagamore and Bourne Bridges, as indicated in **Figure 4.11-3** and **Figure 4.11-4**. North of the bridges, the Project Limits do not intersect with NHESP-mapped habitats. **Table 4.11-7** presents the approximate amount of Priority and Estimated Habitats within the Project Limits, estimated by Program quadrant and Program-wide.

Table 4.11-7. Mapped Rare Species Habitats within the Project Limits

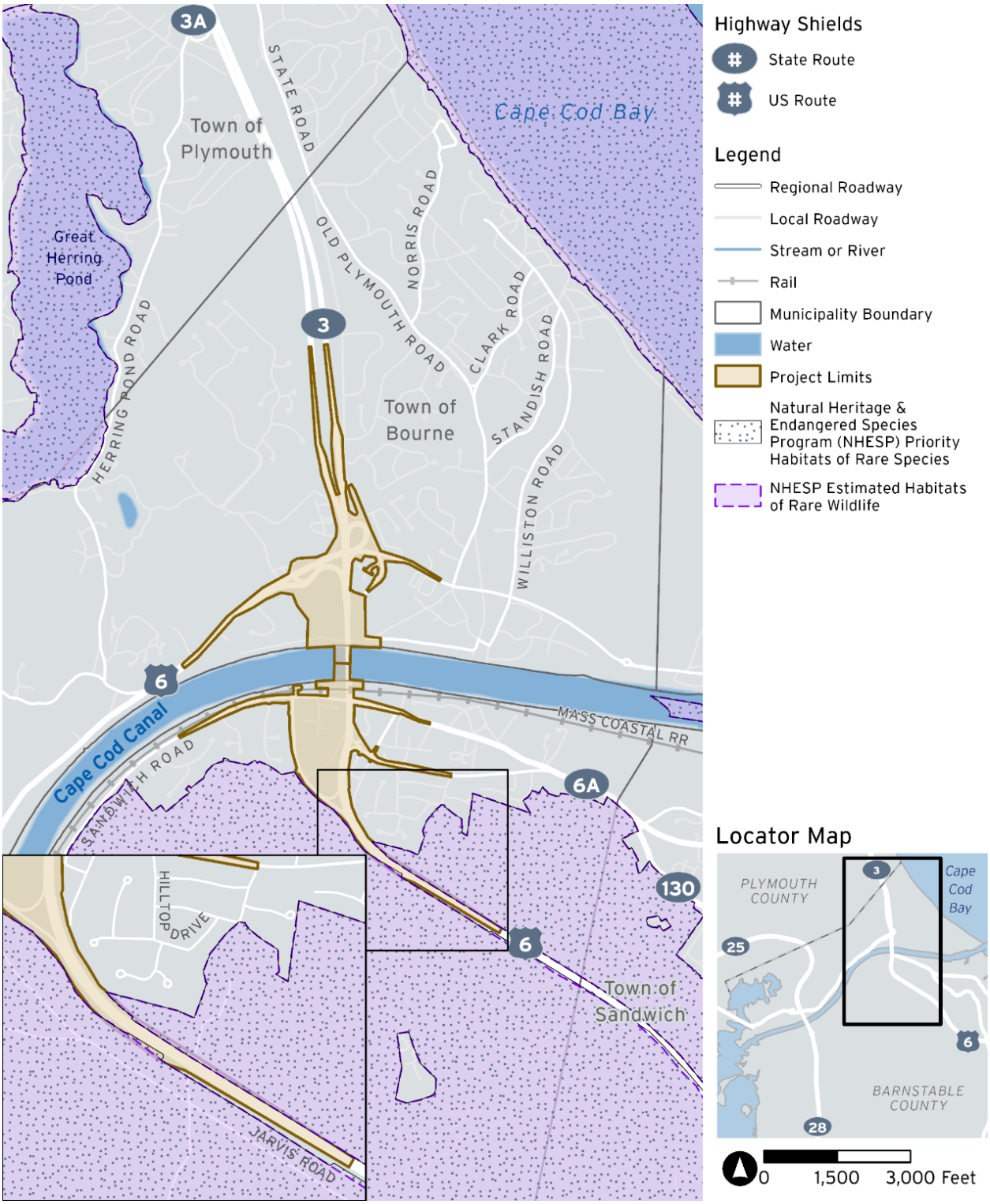
Program Quadrant	Priority Habitat (Acres)	Estimated Habitat (Acres)
Sagamore North	0	0
Sagamore South	2.48	2.08
Bourne North	0	0
Bourne South	8.17	4.96
Estimated Program-wide Total	**10.65**	**7.04**

Potentially suitable habitat for state-listed wildlife species is present in both Sagamore South and Bourne South quadrants, and there is a potential for take resulting from unavoidable project impacts. Further consultation with the NHESP would be required to support the advancement of the Build Alternative.

MassDOT will continue pre-filing consultations with the NHESP to support ongoing project planning and design; and will file for MESA review with the NHESP to determine whether the Build Alternative would result in a take, no take, or conditional no take of state-listed species (321 CMR 10.00). Further refinement of the limit of work and the outcome of future MESA consultation will be required to calculate potential MESA-impacts to the Terrestrial Species Study Area. If a MESA take is expected, further consultation with the NHESP would be required to identify the necessary compliance with the performance standards for the issuance of a Conservation Management Permit (CMP; 321 CMR 10.23).

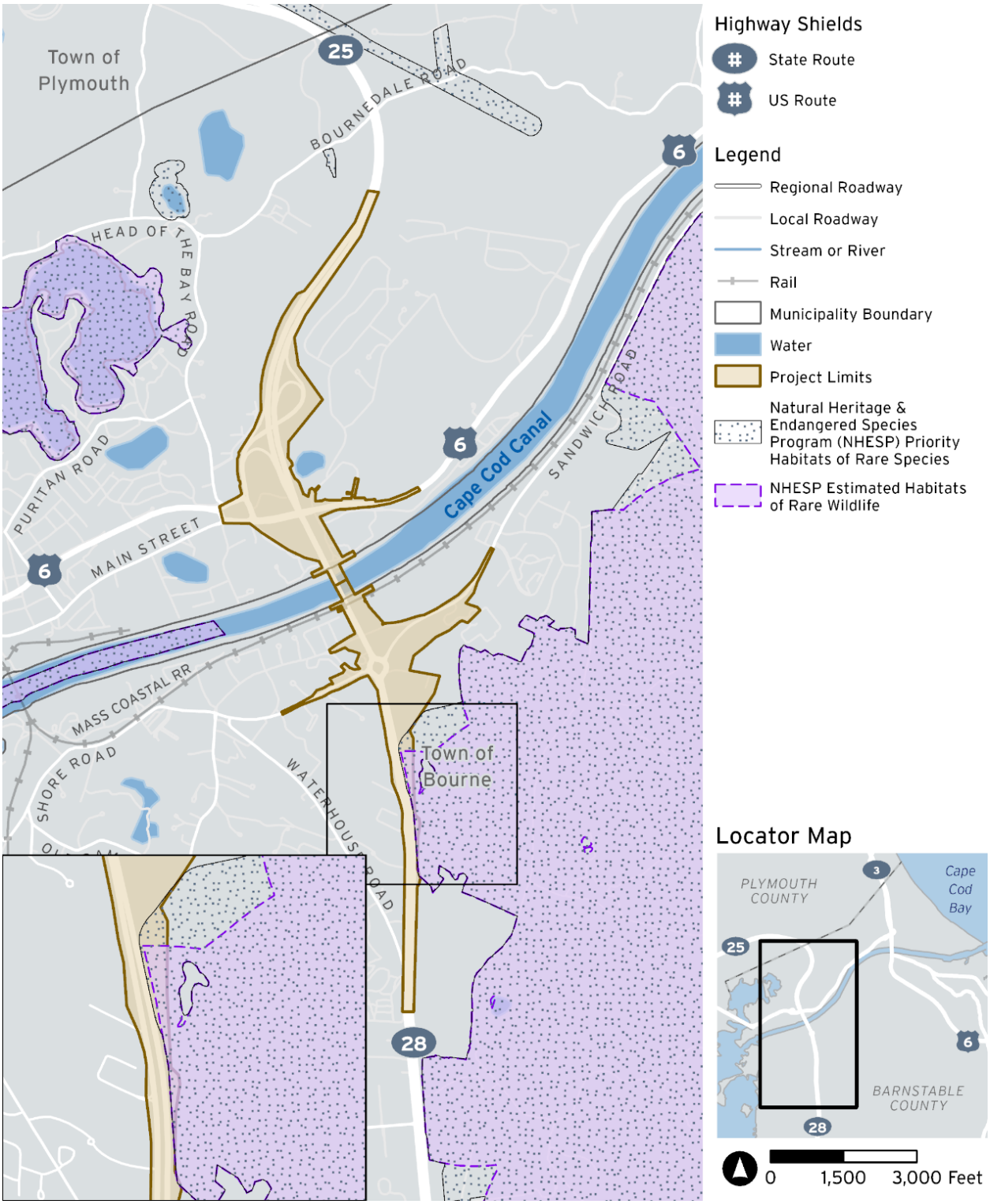
[18] The premise of the Candidate Conservation Agreement with Assurances for the Monarch Butterfly (CCAA) is that benefits from implementation of the conservation measures would outweigh the potential adverse effects on monarch butterflies, including injury or death of individuals, resulting from project construction activities.

Figure 4.11-3. Natural Heritage and Endangered Species Program Priority and Estimated Habitats in and near the Project Limits (Sagamore South Quadrant)



Source: Massachusetts Department of Transportation, 2024

Figure 4.11-4. Natural Heritage and Endangered Species Program Priority and Estimated Habitats in and near the Project Limits (Bourne South Quadrant)



Source: Massachusetts Department of Transportation, 2024

Other Protected Species

As part of the measures implemented to protect ESA-listed bats, trees would not be cleared between March 15 and November 30 on the Cape Cod side of Cape Cod Canal and from April 15 to October 31 on the mainland side of the canal. These windows encompass the nesting season for migratory birds generally and most of the Birds of Conservation Concern listed in **Table 4.11-4**. The nesting seasons of Prothonotary Warblers and Bald Eagles may extend outside of this window; however, the USFWS Information for Planning and Consultation guidance indicates a low probability of prothonotary warbler presence in the Terrestrial Species Study Area during April, when tree clearing could occur.[19]

If a Bald Eagle nest is documented in or near the Terrestrial Species Study Area, the FHWA would follow guidance provided in the National Bald Eagle Management Guidelines to minimize impacts on Bald Eagles.[20] Given this approach and the unlikelihood of Golden Eagles occurring in the Terrestrial Species Study Area, the Build Alternative would cause no adverse effect on Bald or Golden Eagles. Based on the tree clearing restrictions and implementation of guidance to protect eagles, MassDOT and FHWA have determined that the Build Alternative would cause **no adverse effect** on migratory birds.

The Build Alternative would include additional conservation and mitigation measures that would protect migratory birds. Following construction completion, MassDOT would revegetate cleared areas to the maximum extent possible, using native plant species to provide suitable habitat. MassDOT would follow conservation mowing practices in its right-of-way, like following recommended times of year for mowing (October 1 through May 1), to avoid the nesting season for most Birds of Conservation Concern potentially present in the Terrestrial and Aquatic Species Study Areas.

FWCA-Jurisdictional Wildlife Resources

MassDOT requested consultation with the USFWS for compliance with the FWCA through its submittal of the BA for Terrestrial Species. In addition to the previously cited determinations provided on May 2, 2025, the USFWS noted that the Build Alternative would not have any substantial impacts on wildlife resources under its jurisdiction relative to the FWCA (**Appendix 4.11, Attachment 1**).

4.11.4.2 Effects to Aquatic Resources

Due to the Program's in-water construction activities, potential effects to protected species, their habitat, and their prey species could include a combination of direct or indirect and temporary or permanent stressors to the surrounding environment. Stressors may include underwater noise, entrapment, changes in water quality/turbidity, benthic disturbance, reduction in fish passage, habitat alteration and/or conversion, and vessel interaction. The following sections summarize potential effects to ESA-protected species, MESA-protected species, EFH and NOAA Fisheries Trust Resources, and MMPA-protected resources. Refer to **Appendix 4.11, Attachments 2 and 3**, for details of in-water construction activities and anticipated effects.

[19] U.S. Fish and Wildlife Service (USFWS). 2024. Information for Planning and Consultation. https://ipac.ecosphere.fws.gov/
[20] U.S. Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. May 2007.

ESA-Protected Species

NOAA Fisheries stated that fin whale and North Atlantic right whale presence in Cape Cod Canal would be rare and anomalous.[21] Direct effects from Build Alternative construction would not extend beyond Cape Cod Canal. The risk of Build Alternative effects on whales would likely be limited to vessel strikes. The Build Alternative would avoid such effects by employing the conservation and mitigation measures listed in **Section 4.11.5**. Additionally, MassDOT would follow a NOAA Fisheries-approved Marine Mammal and Sea Turtle Monitoring and Mitigation Plan throughout construction.

Build Alternative vessels would transit through areas designated as North Atlantic right whale critical habitat. However, vessel effects on the physical and biological features of the critical habitat would be too small to be meaningfully measured or detected, and therefore insignificant, or would have no effect. Therefore, MassDOT and FHWA have determined the Build Alternative **may affect but is not likely to adversely affect** fin whales or North Atlantic right whales and North Atlantic right whale critical habitat. NOAA Fisheries concurred with this determination on April 7, 2025 (**Appendix 4.11, Attachment 2**).

Sea turtles are unlikely to be present in Cape Cod Canal. Literature indicates that most sea turtle sightings in the vicinity of the Aquatic Species Study Area occur in Cape Cod Bay and a lesser amount in Buzzards Bay.[22] As with marine mammals, effects on sea turtles would likely be limited to vessel strikes related to Build Alternative vessels. The measures implemented by the Build Alternative to protect marine mammals would reduce the risk for Build Alternative effects on sea turtles. Therefore, MassDOT and FHWA have determined that the Build Alternative **may affect but is not likely to adversely affect** the four sea turtle species listed in **Table 4.11-5**. NOAA Fisheries concurred with this determination on April 7, 2025.

There is a lack of documentation for Atlantic sturgeon or shortnose sturgeon presence in Cape Cod Canal; further, the NHESP does not list either species as occurring within the canal.[23] Sturgeon may be present in Cape Cod Canal during migratory movements; however, their presence is likely to be uncommon and transient. The Build Alternative would implement multiple mitigation measures to avoid or minimize effects on sturgeon, as listed in **Section 4.11.5**. Additionally, Build Alternative vessel traffic would not be expected to have direct effects on sturgeon. Sturgeon primarily occupy the bottom of the water column and would likely be below the draft of Build Alternative vessels. Therefore, MassDOT and FHWA have determined that the Build Alternative **may affect but is not likely to adversely affect** the Atlantic or shortnose sturgeon. NOAA Fisheries concurred with this determination on April 7, 2025.

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[21] Coordination with NOAA Fisheries and additional details are provided in the BA for Marine Species, provided as Appendix 4.11, Attachment 2.

[22] Halpin, P.N., A.J. Read, E. Fujioka, B.D. Best, B. Donnelly, L.J. Hazen, C. Kot, K. Urian, E. LaBrecque, A. Dimatteo, J. Cleary, C. Good, L.B. Crowder, and K.D. Hyrenbach. 2009. OBIS-SEAMAP: The world data center for marine mammal, sea bird, and sea turtle distributions. Oceanography 22(2):104-115. https://seamap.env.duke.edu/species/948946

[23] Massachusetts Division of Fisheries and Wildlife. 2015. Natural Heritage & Endangered Species Program. Atlantic Sturgeon *Acipenser oxyrinchus* Fact Sheet (https://www.mass.gov/doc/atlantic-sturgeon/download) and Shortnose Sturgeon *Acipenser brevirostrum* Fact Sheet (https://www.mass.gov/doc/shortnose-sturgeon/download)

MESA-Protected Species

The Aquatic Species Study Area does not contain Priority Habitat for any MESA-protected species. Therefore, take of marine mammals, sea turtles, or fishes would not be anticipated in the Build Alternative. Accordingly, the Build Alternative would not cause adverse effects on aquatic MESA-protected species.

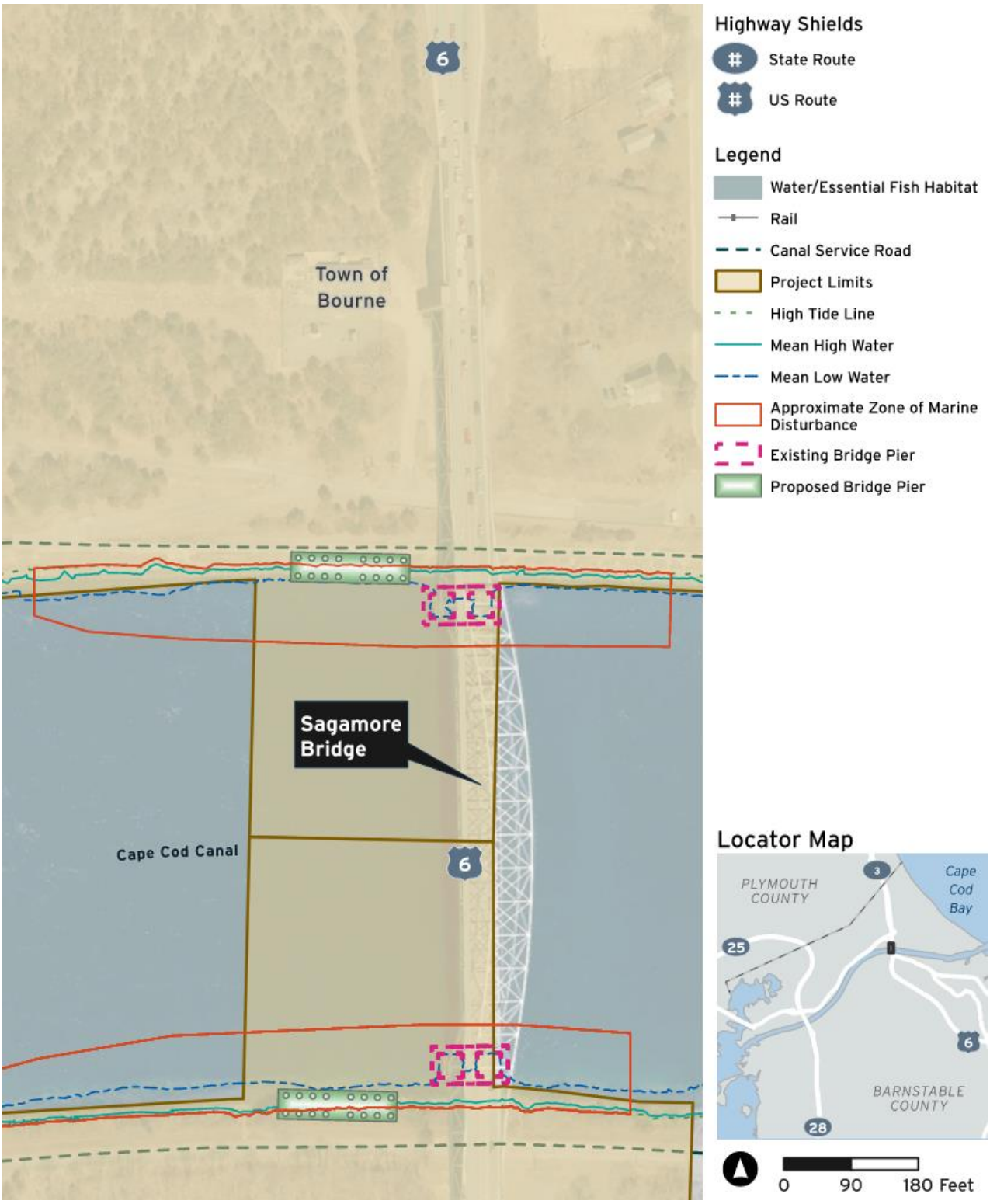
Essential Fish Habitat and NOAA Fisheries Trust Resources

Table 4.11-8 presents estimated direct effects to EFH within the approximate zone of marine disturbance at each bridge site, identified on **Figure 4.11-5 through Figure 4.11-8**. **Appendix 4.11, Attachment 3**, provides tables identifying estimated effects due to construction components and a breakdown of estimated effects by habitat type.

Table 4.11-8. Estimated Direct Effects to Essential Fish Habitat Within Zones of Marine Disturbance

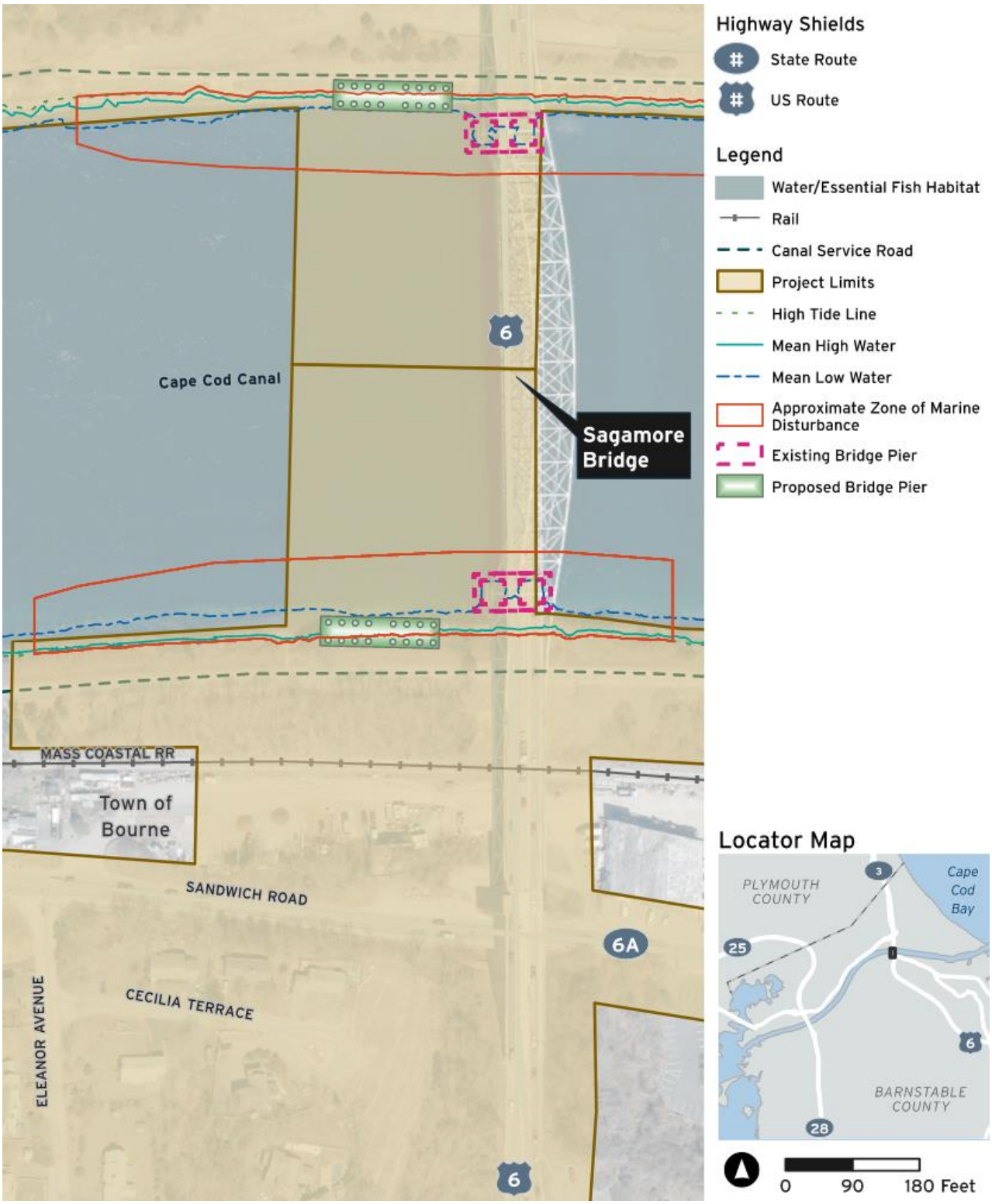
Program Quadrant	Estimated Direct Effects, acres (rounded)
Sagamore North	1.96
Sagamore South	2.05
Bourne North	1.84
Bourne South	2.03
Total	**7.88**

Figure 4.11-5. Approximate Zone of Marine Disturbance (Sagamore North Quadrant)



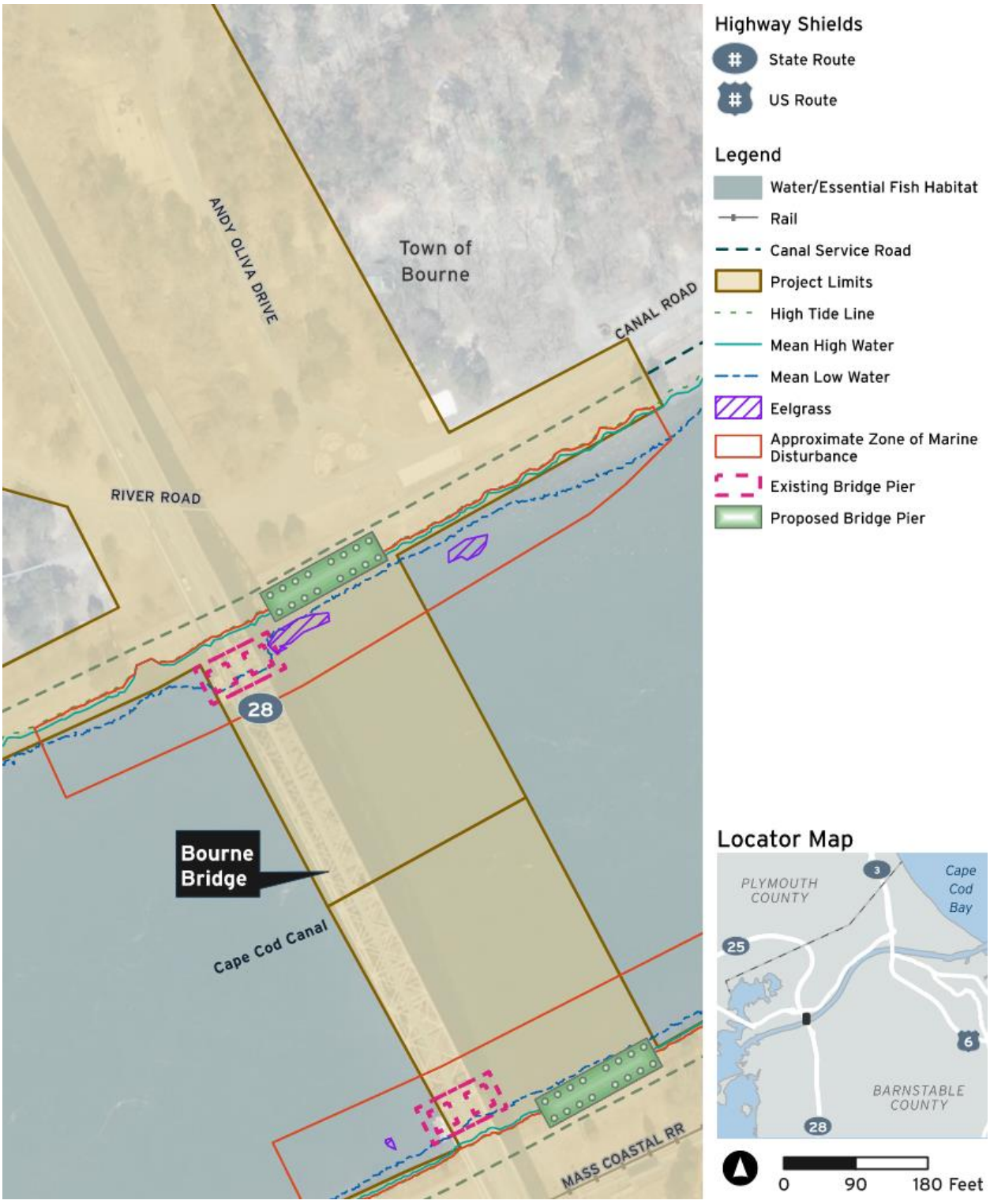
Source: Massachusetts Department of Transportation, 2025

Figure 4.11-6. Approximate Zone of Marine Disturbance (Sagamore South Quadrant)



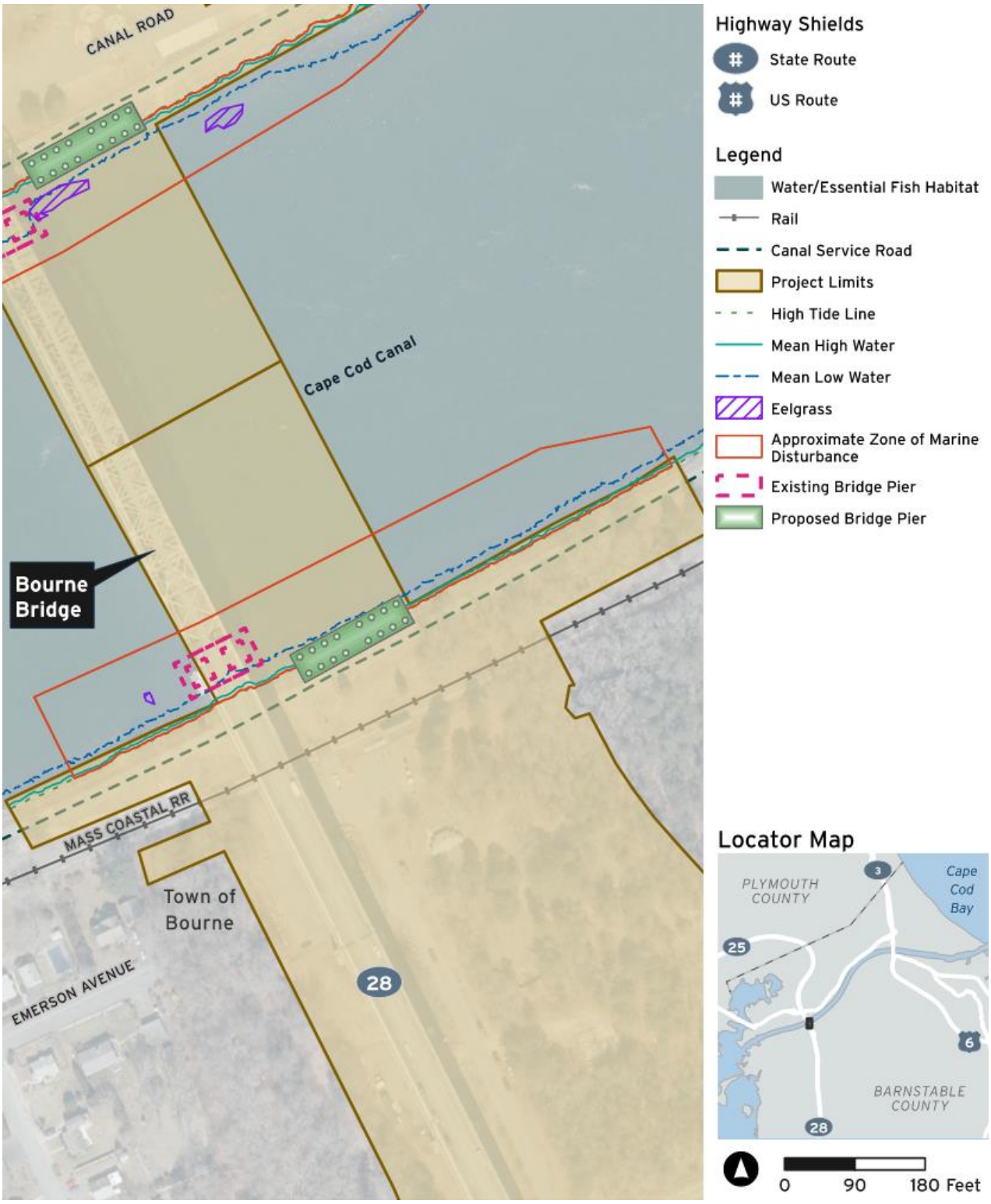
Source: Massachusetts Department of Transportation, 2025

Figure 4.11-7. Approximate Zone of Marine Disturbance (Bourne North Quadrant)



Source: Massachusetts Department of Transportation, 2025

Figure 4.11-8. Approximate Zone of Marine Disturbance (Bourne South Quadrant)



Source: Massachusetts Department of Transportation, 2025

To avoid the early life stage development and spawning seasons of most EFH species and Trust Resources, the Build Alternative would follow a time-of-year restriction prohibiting in-water construction activities that could cause acoustic effects or turbidity from March 1 through August 31. The early life stages of three species whose spawning timeframes have the potential to overlap work outside of the time-of-year restriction window—Atlantic cod, pollock, and winter flounder—could experience effects if larvae or eggs were to drift into or settle within the Build Alternative footprint from adjacent spawning grounds. Mitigation for these species, listed in **Section 4.11.5.2**, would minimize effects to individuals, eggs, or larvae using the canal corridor. Additionally, the Build Alternative's in-water activity would be intermittent across a six-to-eight-year period, allowing for a greater possibility for spawning to occur outside of active construction time periods. Based upon the best management practices that would be incorporated into the design and construction plans and the proposed minimization and avoidance measures for protecting EFH and diadromous fish, NOAA Fisheries determined that the Build Alternative would not cause adverse effects to finfish and shellfish species (**Appendix 4.11, Attachment 3**).

The Build Alternative would affect approximately 2,445 sf of SAV present at the Bourne Bridge site: two eelgrass beds, totaling 2,345 sf, are located in the Bourne North quadrant, and one eelgrass bed of 100 sf is located in the Bourne South quadrant. As an EFH Conservation Recommendation, NOAA Fisheries recommended that MassDOT monitor the SAV beds with photographic surveys before and after construction, provide the survey results to NOAA Fisheries, and provide compensatory mitigation for effects to eelgrass beds.

MassDOT is developing an Eelgrass Survey and Mitigation Plan that contains the photographic survey requirements and options for mitigating the amount of eelgrass affected per the pre-construction field surveys. MassDOT is consulting with the USACE and NOAA Fisheries to pursue the most effective approach to mitigate for the loss of the SAV. Documentation of coordination between NOAA Fisheries and MassDOT is provided as **Appendix 4.11, Attachment 3**.

MMPA-Protected Species

As previously described, the Build Alternative could result in vessel strikes to marine mammals. Underwater noise from Build Alternative construction has the potential to cause harassment, in the form of behavioral or injurious effects, of marine mammals. MassDOT has developed a Marine Mammal and Sea Turtle Monitoring and Mitigation Plan that incorporates monitoring protocols, operational procedures, and best management practices to avoid and minimize potential effects on marine mammals. Based upon the proposed avoidance and conservation measures, and in response to consultation with NOAA Fisheries Office of Protected Resources, MassDOT has determined that it would not be necessary to pursue a take authorization under the Marine Mammal Protection Act. Through adherence to the Marine Mammal and Sea Turtle Monitoring and Mitigation Plan procedures for avoiding marine mammal takes, MassDOT and FHWA have determined that the potential for take of MMPA-protected species is not likely to occur for the Build Alternative. As needed, MassDOT would coordinate with the NOAA Fisheries Office of Protected Resources throughout construction.

4.11.5 Mitigation

This section identifies measures MassDOT would incorporate through the construction of the Build Alternative to protect terrestrial and aquatic resources. With the implementation of these proposed conservation and mitigation measures, and the Build Alternative construction methods described in **Appendix 3.2, Construction Approach Technical Report**, the Build Alternative would not be expected to cause adverse permanent or construction-related effects on threatened, endangered, and protected species or EFH.

As previously cited, MassDOT is coordinating with the USACE and NOAA Fisheries to identify the most effective compensatory mitigation approach for anticipated effects to eelgrass.

4.11.5.1 Measures to Protect Terrestrial Resources

MassDOT would implement the following mitigation measures to protect terrestrial resources:

- Trees would not be cleared during the summer occupancy period for bats and typical nesting season for migratory birds, defined as March 15 to November 30 on the Cape side of Cape Cod Canal and April 15 to October 31 on the mainland side of Cape Cod Canal.
- Inspections of structures and bridge abutments would be conducted prior to demolition, and pending the proposed demolition method and timing, entry points would be sealed in the late summer period and before the start of the hibernation period to prevent potential bat entry during the winter. Methods would follow the Massachusetts Division of Fisheries and Wildlife's (MassWildlife) guidance.[24]
- Conservation mowing practices would be used on a portion of MassDOT lands, including MassDOT rights-of-way, to protect monarch butterflies and butterfly habitat, as part of enrollment in the CCAA.
- Cleared areas would be revegetated following construction completion to the maximum extent possible, using native plant species to provide suitable habitat for bat species, pollinators, and other native species.

Additional mitigation measures could be required if NHESP determines that the Build Alternative would result in a take of MESA-protected species with Priority Habitat. Further, mitigation would be necessary for the Build Alternative to meet the performance standards for the issuance of a Conservation Management Permit.

[24] https://www.mass.gov/info-details/bats-in-the-home

4.11.5.2 Measures to Protect Aquatic Resources

MassDOT would implement the following mitigation measures and best management practices to protect aquatic resources:

- In-water construction activities (excluding vessel traffic) would be confined to the Cape Cod Canal, which will allow for early detection of ESA-listed species through regular communication with canal operators and users during in-water construction activities.
- In-water construction activities with the potential to cause acoustic or turbidity effects would be prohibited from March 1 through August 31.[25] Dredging outside of cofferdams would not occur from March 1 through August 31 of any year. Once cofferdams are installed, work within the cofferdams can occur at any time of year.
- Clamshell buckets would be used for dredging and dredging equipment speeds would be slow and cautious, following USACE excavation guidance.
- Vessels traveling within Cape Cod Canal and between Cape Cod Canal, Buzzards Bay, Cape Cod Bay, and supply ports would operate at speeds not to exceed 10 knots (unless higher speeds are necessary to maintain safe vessel maneuverability).[26]
- A fisheries biologist, trained observer, or protected species observer would be present on vessels and at construction sites during cofferdam construction, in accordance with the Marine Mammal and Sea Turtle Monitoring and Mitigation Plan. The protected species observer would maintain the authority to stop work if a protected species is observed in the construction area.
- Soft starts or equipment ramp-ups following NOAA Fisheries guidance would be required for in-water, sound-producing construction activities, such as impact and vibratory pile driving.
- Dolphins and bollards would be used to anchor construction vessels rather than repetitive barge spudding.
- Cushion blocks would be used and, when feasible, vibratory driving or rotary drilling would be used to drive piles to refusal instead of impact driving.
- Cofferdams, fabricated from steel sheet piling, would be used to allow in-the-dry construction of the new bridge piers and demolition of the existing bridge pier columns. Diver surveys would be conducted to confirm cofferdams are clear before dewatering.

Further details on proposed mitigation measures and best management practices are included in **Appendix 4.11, Threatened, Endangered, and Protected Species and Habitats Material, Attachments 1, 2, and 3**.

[25] The Biological Assessment for Terrestrial Species also includes this mitigation measure to protect terrestrial species.
[26] The Biological Assessment for Terrestrial Species also includes this mitigation measure to protect terrestrial species.