Chapter IV.E: Biological Resources – Fjord Trail South

A. INTRODUCTION

This chapter presents the existing conditions and assesses the Proposed Action's potential impacts on biological resources, including ecological communities, plants, wildlife, and threatened, endangered, and special concern species and significant natural communities, within the Fjord Trail South Corridor. This chapter identifies measures to avoid and minimize potential impacts to these resources and, where applicable, identifies proposed mitigation measures. Chapter III.E, "Biological Resources – Fjord Trail North," evaluates the proposed northern section, known as "Fjord Trail North."

B. METHODOLOGY

For purposes of this chapter, the Fjord Trail South Corridor represents the area within which the proposed trail and other project elements, such as trail banks or parking lots, may be located, as exact locations are subject to change as design progresses. Existing conditions for ecological communities, plants, wildlife, and threatened, endangered, and special concern species within or in the vicinity of the Fjord Trail South Corridor were characterized based on the following sources:

- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) database of federally threatened, endangered, proposed, and candidate species.
- National Oceanic and Atmospheric Administration, NOAA Fisheries, Essential Fish Habitat (EFH) Mapper. https://www.habitat.noaa.gov/apps/efhmapper
- New York State Department of Environmental Conservation (NYSDEC) 2000–2005 New York State Breeding Bird Atlas and ongoing 2020–2024 Breeding Bird Atlas (BBA) and 1990–1999 Herp Atlas Project.
- New York Natural Heritage Program (NYNHP) Database: New York Natural Heritage Program. 2024. Element Occurrence Dataset. New York Natural Heritage Program, State University of New York College of Environmental Science and Forestry, Albany NY. (NYNHP 2024).
- NYNHP map of ecological communities in Hudson Highlands State Park Preserve (HHSPP) (NYNHP 2010)
- Plant and animal species lists in the Final Master Plan/Final Environmental Impact Statement (EIS) for Clarence Fahnestock Memorial State Park and HHSPP (the HHSPP Final Master Plan/Final EIS) (NYS Office of Parks, Recreation, and Historic Preservation and New York Natural Heritage Program [OPRHP] 2010a).
- Biodiversity inventory reports and other sources of information pertaining to natural resources of the area, as cited herein.
- Information on rare, threatened, or endangered species and rare ecological communities in the HHSPP provided directly by OPRHP and NYNHP staff (OPRHP 2024, NYNHP 2024),

including the results of surveys by the NYNHP of rocky summit grassland natural communities within HHSPP (Ring 2018).

- Daytime visual encounter survey of birds, mammals, reptiles and amphibians conducted within and immediately surrounding the Fjord Trail South Corridor on October 19, 2016; between May 15 and 18, 2017; between October 28 and November 1, 2019; and on September 15, 2021.[1]
- Observations of plants and ecological communities within and immediately surrounding the Fjord Trail South Corridor during site reconnaissance conducted on October 19, 2016; between May 15 and 18, 2017; between October 28 and November 1, 2019; on November 9, 2021; and in September 2023.
- Incidental observations of ecological communities, plants, and wildlife during site visits on various occasions for other purposes.
- Additional species with the potential to occur within the Fjord Trail South Corridor based on their geographic range within New York State, common occurrence, habitat requirements, and sensitivity to human disturbance, as described in literature cited herein (e.g., DeGraaf and Yamasaki 2001, Mitchell et al. 2006, Gibbs et al. 2007, Billerman et al. 2020).

Impacts from construction and operation of Fjord Trail South to ecological communities, plants, wildlife, and threatened, endangered, and special concern species within the Corridor were assessed by considering short-term temporary impacts due to construction such as land-clearing activities, construction noise and vehicle movement and long-term permanent impacts such as habitat loss, forest fragmentation, barriers to wildlife movement, and human disturbance from recreational activities. The potential for construction and operation of Fjord Trail South to impact terrestrial biological resources were considered within and adjacent the Trail Corridor.

The potential for construction and operation of Fjord Trail South to impact aquatic biological resources, including threatened and endangered species, EFH, and Significant Coastal Fish and Wildlife Habitat were assessed by considering underwater noise from construction barges and pile drilling, and placement of fill within the freshwater tidal reach of Hudson River in the vicinity of the Corridor. The assessment of potential impacts to aquatic biological resources will consider the Protection of Waters permit issuance standards including that the project may not result in unreasonable damage to natural resources of the state, which include both regulated resources like endangered/ threatened species and unregulated resources such as Hudson River Submerged Aquatic Vegetation (SAV).

C. EXISTING CONDITIONS

DESIGNATIONS

Most of the Fjord Trail South Corridor is owned by New York State's Metropolitan Transportation Authority (MTA), a public authority. This corridor is part of the MTA's Hudson Line, which is operated by MTA's subsidiary Metro-North Commuter Railroad Company (MNR). Except for the potential Meander along Fair Street, the remainder of the Fjord Trail South Corridor (Little Stony Point, Dockside, Washburn Lot) is within the HHSPP. HHSPP was established in 2010 when

[1] Surveys conducted for this project were mostly conducted during the spring and late fall and are not considered a full representation of all species present within and adjacent to the Fjord Trail South Corridor. Any required surveys to be conducted in the future will be targeted to the appropriate times of year for specific plants or animals at specific locations.

Hudson Highlands State Park was designated a Park Preserve as defined by Article 20 of the Parks, Recreation and Historic Preservation Law. This designation aims to conserve and protect park lands containing unique and rare wildlife, flora, scenic, historic, and archaeological sites in New York State (OPRHP 2010). In 2010, the majority of HHSPP was also designated as a Bird Conservation Area (BCA),[2] which provides recognition of its elevated importance for bird habitat, particularly for migratory waterfowl, neo-tropical migratory songbirds, and state-listed species – and a Natural Heritage Area (NHA), defined at Article 11, Title 5, Section 0539 of the New York State Environmental Conservation Law, which allows for the dedication of state-owned lands with rare species and/or significant natural communities.

The HHSPP BCA contains relatively large tracts of interior forest habitat that provides important stopover and breeding sites for forest-breeding species such as American redstart, yellow-throated vireo, and Acadian flycatcher. The forests adjacent to the Hudson River are important for two species of conservation concern: the cerulean warbler, which breeds in mature forests adjacent to the river, and the bald eagle, which uses forests along the river in the winter and in the breeding season. Cliff communities provide breeding sites for peregrine falcon, and rocky summit communities such as along Breakneck Ridge provide early successional habitats important for breeding by species such as the prairie warbler. Management considerations include controlling invasive species, reducing deer overbrowsing, adjusting operations such as reducing human activities during the winter and the breeding season in areas regularly used by bald eagles, monitoring sensitive habitat areas to ensure that human activities are not negatively impacting these areas, educating visitors about the uniqueness of the plant and animal communities at these sites, and providing trail access that allows passive recreational opportunities while protecting plants and wildlife using these areas (OPRHP 2010). The NHA designation provides additional recognition of the significant natural resources within an area but does not preclude the area from future development. Interpretation, education and outreach are key components of these designations. The BCA and NHA designations did not include Little Stony Point, Dockside, or Bannerman's Island, which are located within or adjacent to the Fjord Trail Corridor.

The HHSPP Final Master Plan/Final EIS (OPRHP 2010) notes that "these designations recognize that these areas are invaluable and irreplaceable parts of the state's natural heritage and will provide additional natural resource protection as well as call for increased interpretation of those resources." It further identifies the vision for HHSPP: to connect people to the river and the unique history of the Hudson Valley while providing critical habitat for native plants and animals and supporting passive recreation while expanding and protecting open space and critical habitat in the Highlands region. HHSPP will also establish greater collaboration for environmental education and outreach to improve connectivity of people with wildlife.

The Hudson River forms the western boundary of HHSPP in this area. It flows from the federal lock and dam in Troy to the ocean and has been noted by NYSDEC as the Hudson River Estuary Area of Biological Concern in the Hudson River Estuary Program's *Hudson River Estuary Wildlife and Habitat Conservation Framework – An Approach for Conserving Biodiversity in the Hudson River Estuary Corridor*. This designation is due to the region's unique geologic setting of the Hudson River Valley which contributes to the great biological diversity found along the river valley. At the same time, the Hudson River Estuary Area of Biological Concern is one of the most densely populated areas of the United States and one of New York's primary industrial centers.

[2] https://dec.ny.gov/nature/animals-fish-plants/birds/conservation-area-program-and-sites

For that reason, open space areas and the plants and animals they support are declining and the large unbroken areas of forest and wetland are becoming fragmented (NYSDEC 2006).

ECOLOGICAL COMMUNITIES

The Fjord Trail South Corridor (approximately 47.9 acres total) consists of several different ecological communities. Ecological communities are variable assemblages of interacting plant and animal populations that share a common environment (NYNHP 2024). The ecological communities within the Fjord Trail South Corridor, as characterized by Edinger et al. (2014), include successional southern hardwoods forest, estuarine riprap/artificial shore, tidal river, floodplain forest,[3] successional shrubland, tidal river, railroad,[4] unpaved road/path,[5] mowed lawn,[6] paved road/path,[7] Appalachian oak-hickory forest,[8] pitch pine-oak-heath rocky summit,[9] oak-tulip tree forest[10], and mowed lawn with trees[11] communities (see **Figures IV.E-1a through IV.E-1c**).

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[3] Edinger et al. (2014) describes this ecological community as "typically hardwood forest that occurs on mineral soils on low terraces of river floodplains and river deltas. These sites are characterized by their flood regime; low areas are annually flooded in spring and high areas are flooded irregularly. Some sites may be quite dry by late summer whereas other sites may be flooded again in late summer or early autumn (these floods are caused by heavy precipitation associated with tropical storms). This is a broadly defined community; floodplain forests are quite variable and may be very diverse."

[4] Edinger et al. (2014) describes this ecological community as "a permanent road having a line of steel rails fixed to wood ties and laid on a gravel roadbed that provides a track for cars or equipment drawn by locomotives or propelled by self-contained motors."

[5] Edinger et al. (2014) describes this ecological community as "a sparsely vegetated road or pathway of gravel, bare soil, or bedrock outcrop. These roads or pathways are maintained by regular trampling or scraping of the land surface."

[6] Edinger et al. (2014) describes this ecological community as "residential, recreational, or commercial land, or unpaved airport runways in which the groundcover is dominated by clipped grasses and there is less than 30 percent cover of trees. Ornamental and/or native shrubs may be present, usually with less than 50 percent cover. The groundcover is maintained by mowing and broadleaf herbicide application."

[7] Edinger et al. (2014) describes this ecological community as "a road or pathway that is paved with asphalt, concrete, brick, stone, etc. There may be sparse vegetation rooted in cracks in the paved surface."

[8] Edinger et al. (2014) describes this ecological community as "a hardwood forest that occurs on well-drained sites, usually on ridgetops, upper slopes, or south- and west-facing slopes. The soils are usually loams or sand loams. This is a broadly defined forest community with several regional and edaphic variants."

[9] Edinger et al. (2014) describes this ecological community as "a community that occurs on warm, dry, rocky ridgetops and summits where the bedrock is non-calcareous (such as quartzite, sandstone, or schist), and the soils are more or less acidic. The vegetation may be sparse or patchy, with numerous rock outcrops. This community is broadly defined and includes examples that may lack pines and are dominated by scrub oak and/or heath shrubs apparently related to fire regime. Oak-heath summits without pitch pine are more common in the Hudson Highlands. This community is often surrounded by chestnut oak forest."

[10] Edinger et al. (2014) describes this ecological community as "a mesophytic hardwood forest that occurs on moist, well-drained sites in southeastern New York."

[11] Edinger et al. (2014) describes this ecological community as "residential, recreational, or commercial land in which the groundcover is dominated by clipped grasses and forbs, and it is shaded by at least 30 percent cover of trees. Ornamental and/or native shrubs may be present, usually with less than 50 percent cover. The groundcover is maintained by mowing and broadleaf herbicide application."

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HUDSON HIGHLANDS FJORD TRAIL

Ecological Communities

Figure IV.E-1a

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Ecological Communities

HUDSON HIGHLANDS FJORD TRAIL

Figure IV.E-1b

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Trail Corridor - Fjord Trail South
Tidal River
Riprap/Artificial Shore
Mowed Lawn
Mowed Lawn with Trees
Oak-Tulip Tree Forest
Successional Shrubland
Successional Southern Hardwoods
Appalachian Oak-hickory Forest
Pitch Pine-oak-heath Rocky Summit
Paved Road/Path
Unpaved Road/Path
Railroad

HUDSON HIGHLANDS FJORD TRAIL

Ecological Communities

Figure IV.E-1c

Approximately 23 percent of the Fjord Trail South Corridor is categorized as terrestrial cultural communities,[12] as characterized by Edinger et al. (2014), which include the railroad, unpaved road/path, paved road/path, mowed lawn, and mowed lawn with trees communities listed in **Table IV.E-1**. These ecological communities are common throughout the Hudson Highlands region and are generally disturbed and sparsely vegetated. The MNR tracks follow the entire length of the Fjord Trail South Corridor, with small sections of unpaved road/path and mowed lawn with trees within Little Stony Point and Dockside Park (see **Figures IV.E-1a through IV.E-1c**).

Table IV.E-1
Approximate Areas of Ecological Communities within Fjord Trail South Corridor

Ecological Community	Area in Acres
Estuarine Riprap/Artificial Shore	1.9
Successional Shrubland	4.8
Successional Southern Hardwoods	8.7
Tidal River	18.4
Unpaved Road/Path	2.5
Railroad	5.3
Floodplain Forest	0.8
Oak-Tulip Tree Forest	0.6
Mowed Lawn	0.3
Paved Road/Path	0.5
Appalachian Oak-Hickory Forest	0.4
Pitch Pine-Oak-Heath Rocky Summit	0.5
Mowed Lawn with Trees	2.3

Sources: NYNHP ecological community map (2010) of HHSPP and survey reports from the project team in 2021 and 2023. Surveys of plants and ecological communities within and immediately surrounding the Fjord Trail South Corridor by the project team on October 19, 2016; between May 15 and 18, 2017; between October 28 and November 1, 2019; on November 9, 2021; and in September 2023. Incidental observations of ecological communities, plants, and wildlife during site visits on various occasions for other purposes.

Edinger et al. (2014) describes estuarine riprap/artificial shore as the wetland community of a constructed estuarine shore in which the substrate is composed of broken rocks, wooden bulkheads, or concrete placed to reduce erosion. This ecological community is common along the Hudson River shoreline of the Hudson Highlands region and is characterized by low vegetative cover and species diversity. This community occupies approximately 1.9 acres within the Fjord Trail South Corridor along the Hudson River shoreline (see **Figures IV.E-1a through IV.E-1c**).

Edinger et al. (2014) describes tidal river as the aquatic community of continuously flooded substrates that support no emergent vegetation. This community comprises the portion of the Corridor within the Hudson River. The tidal river ecological community within the Fjord Trail South Corridor is designated as a significant natural community by New York State. There are two zones: the deepwater zone (substrates are usually over six feet deep at low tide) and the shallow zone (submerged areas less than six feet deep at low tide that lack rooted aquatic vegetation). Most of the Fjord Trail South Corridor within this community falls within the shallow

[12] Edinger et al. (2014) describes the terrestrial cultural subsystem of ecological communities as those that are "either created and maintained by human activities; are modified by human influence to such a degree that the physical conformation of the substrate; or the biological composition of the resident community is substantially different from the character of the substrate or community as it existed prior to human influence."

zone (see **Figures IV.E-1a through IV.E-1c**). Salinities in a tidal river may fluctuate with tidal flow, with brackish water coming in with the tide increasing. Characteristic fishes include year-round residents as well as seasonal migrants or anadromous species that enter the river as adults to spawn and return to the ocean afterwards. The aquatic biota of the Hudson River are described in more detail below under "Animals."

Edinger et al. (2014) describes floodplain forest as a hardwood forest that occurs on mineral soils on low terraces of river floodplains and river deltas characterized by their flood regime; low areas are annually flooded in spring and high areas are flooded irregularly. This community occupies approximately 0.8 acres within the northernmost portion of the Fjord Trail South Corridor (see **Figure IV.E-1a**) comprising a mature community of sugar maple, northern pin oak (*Quercus palustris*), red maple, and green ash in the tree stratum; spice bush and southern arrowwood (*Viburnum dentatum*) in the shrub stratum; garlic mustard and eastern poison ivy in the herbaceous stratum; and eastern poison ivy in the vine stratum. This ecological community is common within the Hudson Highlands region.

Edinger et al. (2014) describes successional shrubland as a shrubland that occurs on sites that have been cleared (for farming, logging, development, etc.) or otherwise disturbed. This community occupies approximately 4.8 acres within the Fjord Trail South Corridor. Characteristic shrubs include gray dogwood (*Cornus racemosa*), eastern red cedar (*Juniperus virginiana*), raspberries (*Rubus* spp.), serviceberries (*Amelanchier* spp.), chokecherry (*Prunus virginiana*), wild plum (*Prunus americana*), sumac (*Rhus glabra*, *R. typhina*), nanny-berry (*Viburnum lentago*), and southern arrowwood. Non-native invasive shrubs include hawthorns (*Crataegus* spp.), multiflora rose, Russian and autumn olive (*Elaeagnus angustifolia*, *E. umbellata*), buckthorns (*Rhamnus cathartica*, *Frangula alnus*), and shrub honeysuckles. This ecological community is common within the Hudson Highlands region. Within the Fjord Trail South Corridor, the successional shrubland is characterized by disturbance and colonization by invasive plant species (e.g., multiflora rose and Japanese barberry). This community was observed to be present along much of the shoreline wherever there was no riprap/artificial shore (see **Figures IV.E-1a through IV.E-1c**).

Edinger et al. (2014) describes successional southern hardwoods forest as a hardwood or mixed forest that occurs on sites that have been previously cleared or otherwise disturbed, followed by regrowth of vegetation. This community occupies approximately 8.7 acres within the Fjord Trail South Corridor and includes box elder (*Acer negundo*), Norway maple (*Acer platanoides*), tree of heaven (*Ailanthus altissima*), red maple, black cherry (*Prunus serotina*), white oak (*Quercus alba*), northern red oak, and sassafras in the tree stratum. The understory is commonly vegetated with invasive and/or ruderal species: Japanese barberry, honeysuckle (*Lonicera japonica*, L. *morrowii*, and *L. tatarica*), and multiflora rose (*Rosa multiflora*) in the shrub stratum; garlic mustard, mugwort (*Artemesia vulgaris*), Queen Anne's lace (*Daucus carota*), Japanese knotweed (*Reynoutria japonica*), Japanese stiltgrass (*Microstegium vimineum*), late goldenrod (*Solidago gigantea*), wrinkle-leaf goldenrod (*Solidago rugosa*), and common dandelion (*Taraxacum officinale*) in the herbaceous stratum; and Asiatic bittersweet, Virginia creeper, eastern poison ivy, and grape (*Vitis* sp.) in the vine stratum. This ecological community is common throughout the Hudson Highlands region. Within the Fjord Trail South Corridor, the successional southern hardwoods forest is characterized by disturbance due to its location along existing trails, old roadbeds, and road rights-of-way, on the far edges of the more significant and intact areas of habitat, and colonization by invasive plant species (e.g., Norway maple, multiflora rose, and Japanese barberry). This community is recorded on Little Stony Point and in Dockside Park (see **Figures IV.E-1a through IV.E-1c**).

Edinger et al. (2014) describes the Appalachian oak-hickory forest community as a hardwood forest that occurs on well-drained sites, usually on ridgetops, upper slopes, or south- and west-facing slopes. This ecological community is common throughout the Hudson Highlands region and occupies approximately 0.4 acres within the Fjord Trail South Corridor primarily on Little Stony Point (see **Figure IV.E-1b**) where common overstory trees comprise red oak, Norway maple, and black locust. Understory species within this community at Little Stony Point include privet, Japanese barberry, multiflora rose, wineberry and winged euonymus (Graham and Kiviat 2021).

Edinger et al. (2014) describes the pitch pine-oak-heath rocky summit as a community that occurs on warm, dry, rocky ridgetops and summits where the bedrock is non-calcareous, and the soils are more or less acidic. The vegetation may be sparse or patchy with numerous rock outcrops. This community occupies approximately 0.5 acres within the Fjord Trail South Corridor. While this ecological community is designated as a significant natural community by New York State on Breakneck Ridge, within the Fjord Trail South Corridor this community is located on Little Stony Point (see **Figure IV.E-1b**) and is not designated as a significant natural community. Within Little Stony Point this community comprises sparse trees with abundant herbaceous cover and exposed bedrock. Tree species include pitch pine, black cherry, chestnut oak, pin cherry, eastern red cedar, gray birch, pignut hickory, and quaking aspen. Herbaceous species include grasses such as little bluestem and common hairgrass (Graham and Kiviat 2021).

Edinger et al. (2014) describes the oak-tulip tree forest community as a mesophytic hardwood forest that occurs on moist, well-drained sites in southeastern New York. This ecological community is designated as a significant natural community by New York State and occupies approximately 0.6 acres within the Fjord Trail South Corridor within the Washburn Parking Lot (see **Figures IV.E-1b through IV.E-1c and Figure IV.E-2**). The tree canopy in this community is dominated by tulip tree (*Liriodendron tulipifera*), sugar maple (*Acer saccharum*), Norway maple, and tree of heaven. The sapling and shrub layer is dominated by multiflora rose, tree of heaven, black locust (*Robinia pseudoacacia*), burning bush (*Euonymus alatus*), and wineberry (*Rubus phoenicolasius*). The woody vine stratum is dominated by summer grape (*Vitis aestivalis),* Asiatic bittersweet (*Celastrus orbiculatus*), poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), and Chinese wisteria (*Wisteria sinensis*). The herbaceous stratum is dominated by garlic mustard (*Alliara petiolata*), Japanese honeysuckle, common mugwort, wineberry, poison ivy, and Virginia jumpseed (*Persicaria virginiana*).

PLANTS

As documented under "Ecological Communities," the area along and surrounding the Fjord Trail South Corridor supports a wide variety of ecological communities that includes a diverse assemblage of trees, shrubs, and herbaceous species. The following section provides information on those plant species observed and assumed likely to be present within the Fjord Trail South Corridor.

Observations of plant species within the Fjord Trail South Corridor were recorded during site reconnaissance conducted in October 2016 and September 2023. **Appendix III/IV.E-1**, Table IV.E-1, lists the plant species identified within the Fjord Trail South Corridor during these reconnaissance investigations and provides the dates of the site visits. Documentation of threatened, endangered, and rare plant species and invasive species are included below.

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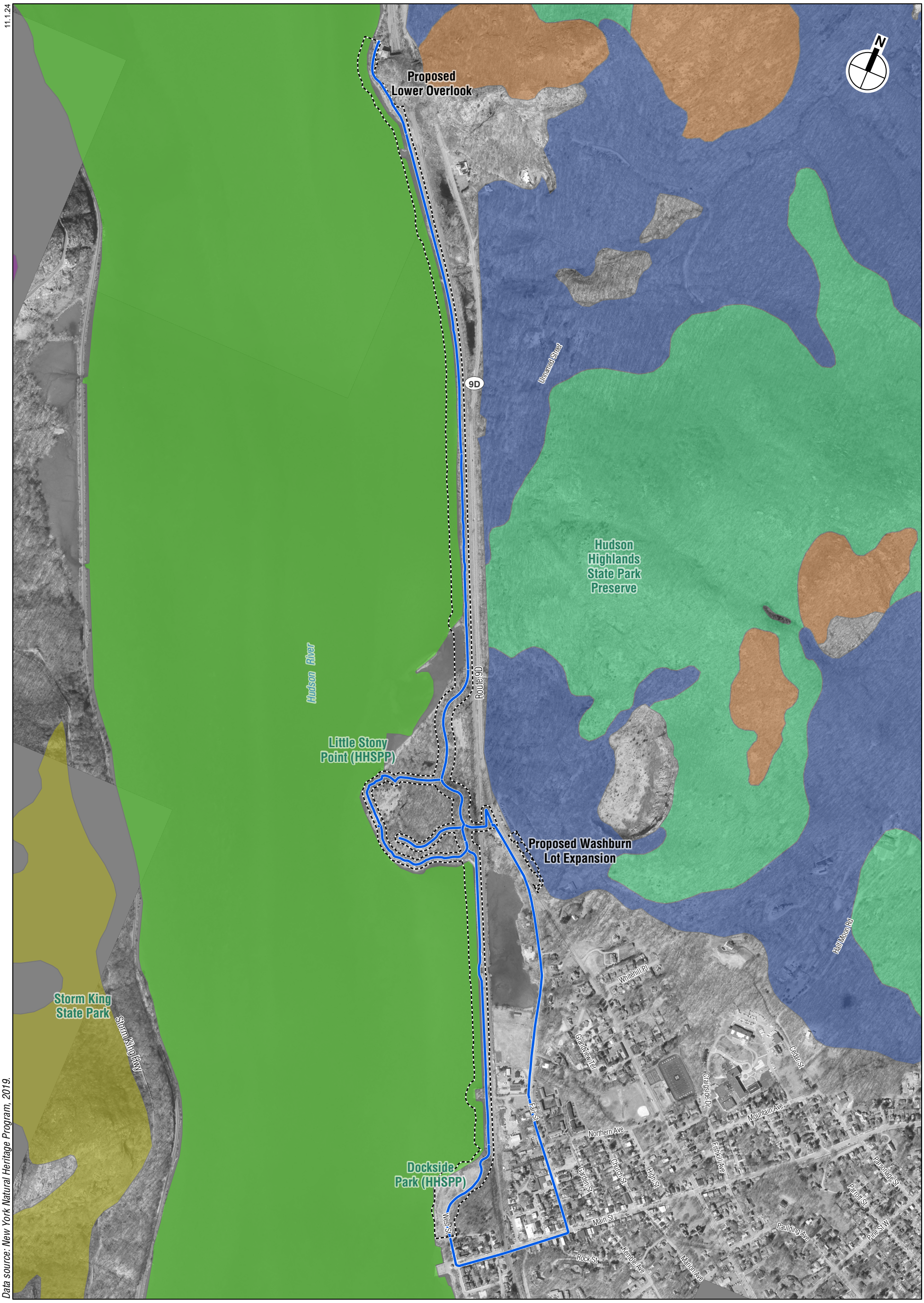

Data source: New York Natural Heritage Program, 2019.

Trail Corridor
Fjord Trail South
Acidic talus slope woodland
Appalachian oak-hickory forest
Chestnut oak forest
Oak-tulip tree forest
Pitch pine-oak-heath rocky summit
Tidal river

0 2,000 FEET

NYS Significant Natural Communities

HUDSON HIGHLANDS FJORD TRAIL

Figure IV.E-2

SUBMERGED AQUATIC VEGETATION (SAV)

The Hudson River in the vicinity of the Fjord Trail South Corridor supports communities of SAV, which are rooted aquatic plants that grow completely under water. SAV beds are found in lower intertidal and shallow water habitats in water no more than six feet deep (Miller 2013). SAV improves water quality by increasing oxygen in the water and provides nursery habitat for young fish that may be more susceptible to predation in open waters. SAV beds also provide essential feeding and refuge habitat for many species and life stages of birds, turtles, and invertebrates. The most common native species of SAV in the Hudson River watershed is water celery (*Vallisneria americana*), which generally grows in water shallower than three meters (9.8 feet) due to light requirements. Other species include clasping leaved pondweed (*Potamogeton perfoliatus*) and the non-native plants curly pondweed (*Potamogeton crispus*) and Eurasian water milfoil (*Myriophyllum spicatum*, NYSDEC 2021a). There are documented discrete occurrences of SAV along the Hudson River shoreline of the Fjord Trail South Corridor (see **Figure IV.E-3**) (see SAV Survey Report in **Appendix III/IV.E-3**).

RARE, THREATENED, AND ENDANGERED PLANT SPECIES

Federally Listed Plant Species

The IPaC (USFWS 2024) does not identify any federally listed plant species known to occur in the vicinity of the Fjord Trail South Corridor.

State-Listed Plant Species

State-listed plant species that were identified during site reconnaissance for the Fjord Trail project or by the NYNHP as having the potential to occur along the Fjord Trail South Corridor include Davis' sedge (*Carex davisii),* Estuary beggar-ticks (*Bidens bidentoides*), Smooth bur-marigold (*Bidens laevis* (L.) B.S.P.), Long's bittercress (*Cardamine longii*), Clustered sedge (*Carex cumulata*), Spongy-leaved arrowhead (*Sagittaria montevidensis* ssp. *spongiosa*), Saltmarsh aster (*Symphyotrichum subulatum* var. *subulatum*), Stiff flat-topped goldenrod (*Solidago rigida* var. *rigida*), Great plains flat sedge (*Cyperus lupulinus* ssp. *Lupulinus*), and Western beakgrain (*Diarrhena obovate*). These plant species are described further in the following sections.

Davis' Sedge

Davis' sedge (*Carex davisii)* is a New York State threatened species. It is a perennial species and grows densely clumped together. Davis' sedge grows near rivers and is often found adjacent to the Hudson River. It grows in soils that vary from mesic to wet, and its habitats include mesic limestone, rich bottomland, wet meadows, gravel bars of large rivers, and floodplain forests. Davis' sedge is occasionally associated with disturbed areas, such as roads and paths. New York is the northeastern extent of its range (NYNHP 2021f). Davis' sedge was observed within the Fjord Trail South Corridor during a site reconnaissance in September 2021.

Estuary Beggar-ticks

Estuary beggar-ticks (*Bidens bidentoides*), a state rare species, is an annual herb found in freshwater tidal mudflats and marshes, often at the border between mudflat and marsh, or along sandy or muddy openings within a marsh (NYNHP 2021b). Communities identified as freshwater tidal marsh or freshwater tidal mudflats may provide suitable habitat for the estuary beggar-ticks. Estuary beggar-ticks were observed within the Fjord Trail South Corridor during several site reconnaissance visits.

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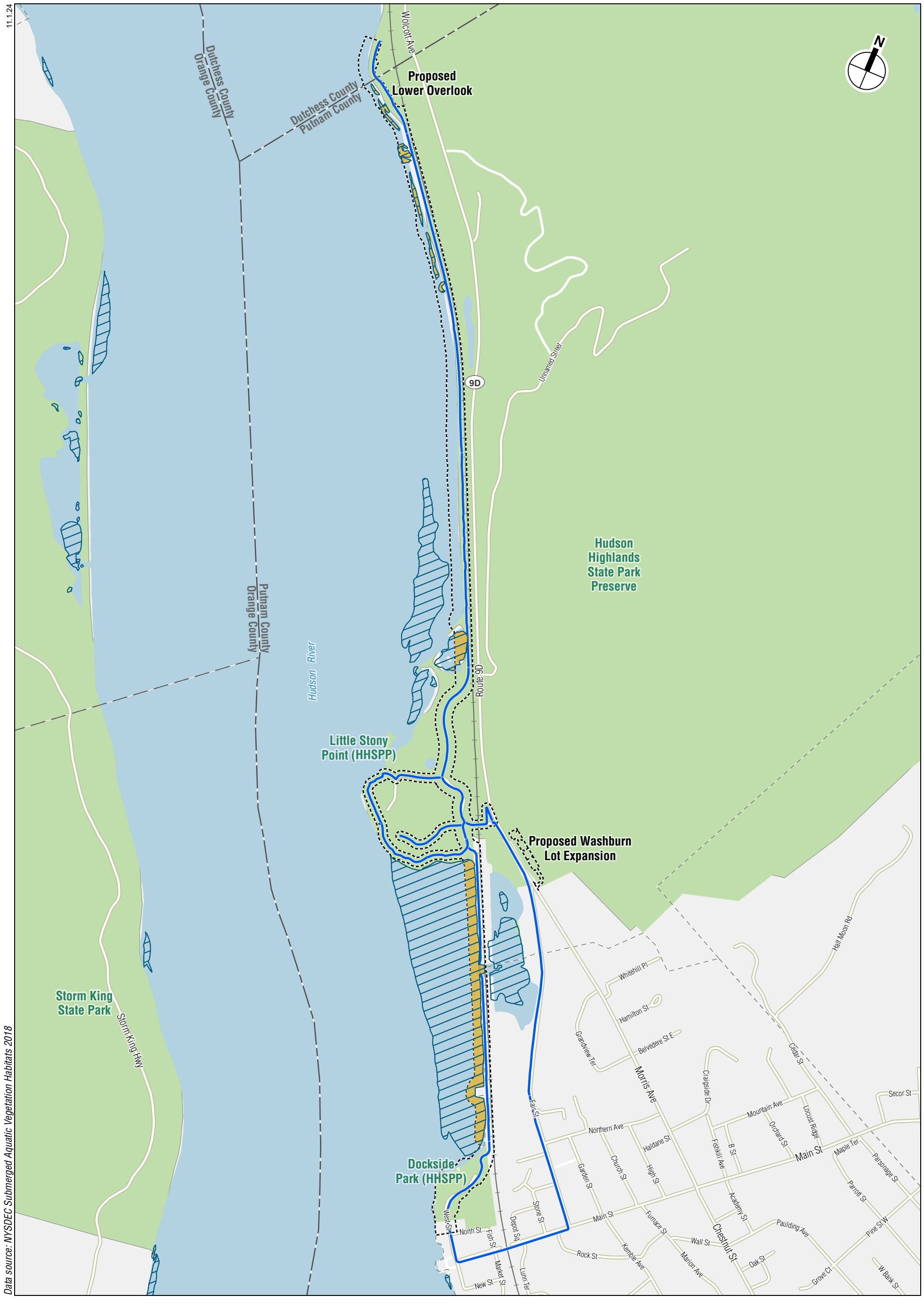

Data source: NYSDEC Submerged Aquatic Vegetation Habitats 2018

NYSDEC-mapped Areas of Submerged Aquatic Vegetation (SAV) in Hudson River

Smooth Bur-marigold

Smooth bur-marigold (*Bidens laevis* (L.) B.S.P.), also known as smooth beggar ticks, is an annual herbaceous plant that is listed as threatened in New York. It is found primarily in freshwater and brackish tidal mud flats and tidal marshes and has strong associations with chair-maker's bulrush (*Schoenoplectus americana*), wild rice (*Zizania aquatica*), Estuary beggar-ticks, smooth beggar ticks (*Bidens cernua*), pickerelweed (*Pontederia cordata*), and green arrow-arum (*Peltandra virginica*), alongside which the smooth-bur marigold often grows (NYNHP 2021c). This species was observed within the Fjord Trail South Corridor during a September 2021 site reconnaissance.

Long's Bittercress

Long's bittercress (*Cardamine longii*) is a New York State threatened mustard relative that inhabits intertidal areas within tidal estuaries and backwater areas. It was once thought to be restricted only to Long Island but has recently been found along the Hudson River (NYNHP 2021d). Long's bittercress was not observed within the Fjord Trail South Corridor during site reconnaissance.

Clustered Sedge

Clustered sedge (*Carex cumulata*) is a New York State threatened perennial species that inhabits dry, open oak-dominated woods and thin soil in full sun on west-facing slopes (NYNHP 2021e). Communities classified as oak-tulip tree forest or successional southern hardwoods may provide suitable habitat for this species. Clustered sedge was not observed within the Fjord Trail South Corridor during site reconnaissance.

Spongy-leaved Arrowhead

Spongy-leaved arrowhead (*Sagittaria montevidensis* ssp. *spongiosa*) is listed as a threatened species of annual herb in New York State. This species grows in tidally flooded areas, including freshwater to brackish intertidal mud flats and the adjacent marshes (NYNHP 2021g). It is often found with *Sagittaria subulate.* This species was observed within the Fjord Trail South Corridor during a September 2021 site reconnaissance.

Saltmarsh Aster

Saltmarsh aster (*Symphyotrichum subulatum* var. *subulatum*) is listed as threatened in New York State. Along the Hudson River, it is found in brackish marshes and brackish tidal drainages, as well as in some disturbed habitats adjacent to the marshes (NYNHP 2021i). It is the only annual aster native to New York. Much of the habitat has been damaged or destroyed. Threats to saltmarsh aster populations include the invasive common reed, purple loosestrife, alteration of hydrology, deer browsing, and habitat destruction. This species was observed within the Fjord Trail South Corridor during a September 2021 site reconnaissance.

Stiff Flat-topped Goldenrod

Stiff flat-topped goldenrod (*Solidago rigida* var. *rigida*) is listed as threatened in New York State. It grows well in successional old fields and other grassland habitats. Its largest threats are development, highway construction, and invasive species (NYNHP 2021g). Stiff flat-topped goldenrod was observed within the Fjord Trail South Corridor during a September 2021 site reconnaissance.

Great Plains Flat Sedge

Great Plains flat sedge (*Cyperus lupulinus* ssp. *lupulinus*) is listed as threatened in New York State, where it has mostly been found in Long Island, with a few known occurrences in the Hudson Valley region. It grows in open sandy environments often used for recreation or development,

such as at beaches, railroads, roadsides, and pastures. Great Plains flat sedge was observed at Little Stony Point during a September 2021 site reconnaissance.

Western Beakgrain

Western beakgrain (*Diarrhena obovate*) is listed as threatened in New York State. It is a grass found in floodplain forests and stream banks within the Wallkill Valley. NYNHP notes that there are no threats to the species at this time, and numbers seem to be stable. Western beakgrain was observed in Cold Spring near Dockside Park during a September 2021 site reconnaissance.

INVASIVE PLANT SPECIES

Invasive species are non-native species to a particular ecosystem that can cause harm to the environment, the economy or human health. Depending on the species and context, some ecological benefits can be provided by invasive plants, including stormwater management, habitat for certain species, and soil stability because they are often adapted to grow in difficult conditions. However, overall these species cause harm to the environment and are one of the greatest threats to New York's biodiversity and threaten to disrupt the resilience of the state's ecosystems. Impacts from invasive species include habitat degradation and loss; loss of native fish, wildlife and tree species; loss of recreational opportunities and income; and risks to public safety (NYSDEC 2018). Invasive species generally reproduce quickly and in large numbers and, once introduced, are difficult to remove from an area.

Several invasive species are present within HHSPP, most notably black swallow-wort (*Cyanchum louiseae*), common reed, multiflora rose, Japanese barberry, and mile-a-minute weed (OPRHP 2010a). Other invasive plant species observed within the Fjord Trail South Corridor include the shrub honeysuckles, Japanese honeysuckle, garlic mustard, Japanese knotweed, Asiatic bittersweet, Norway maple, Russian and autumn olive, and buckthorns.

The European water chestnut (*Trapa natans*) is an invasive aquatic plant that can be found along the shoreline of the Fjord Trail South Corridor. The leaves sit on top of the water and spread out in a circular pattern (ISC 2024). It can clog waterways, lakes, and ponds, adversely affecting aquatic ecosystem functions by forming dense mats of floating vegetation (NYIS 2019). These dense mats can reduce oxygen levels beneath them and prevent native SAV from growing (NYSDEC 2021a).

ANIMALS

TERRESTRIAL WILDLIFE

The Hudson Highlands region represents one of New York State's least fragmented and most biodiverse forested landscapes (Penhollow et al. 2006, OPRHP 2010a). However, much of the Fjord Trail South Corridor is in developed areas along the existing MNR tracks, the NYS Route 9D right-of-way, and existing recreational trails. Conditions in these existing developed areas are degraded and persistently affected by human activity, thus supporting mainly disturbance-tolerant species of wildlife. Little Stony Point is the portion of the Fjord Trail South Corridor with the least existing development, and thus more likely to support fewer disturbance-tolerant species. Many of the rare and otherwise noteworthy animal species for which the eastern Hudson Highlands is significant for supporting are more likely to be found in lesser-disturbed portions of HHSPP and other large natural areas, distant from most elements of the Fjord Trail South Corridor.

Birds

The Hudson Highlands supports one of the highest levels of bird species richness in New York State (McGowan and Zuckerberg 2008). More than 200 species of birds are present in the region during the breeding season, winter, migration, or year-round (DeOrsey and Butler 2006). This is largely attributable to the region's large tracts of interior forest, varied topography, abundance of lakes and other freshwater systems, and the Hudson River itself. HHSPP and nearby Clarence Fahnestock Memorial State Park, which have been designated as Important Bird Areas by the National Audubon Society and as BCAs by OPRHP and NYSDEC, represent more than 15,000 acres of forested habitat for birds in the eastern Highlands (Wells 1998).

The 2000–2005 Breeding Bird Atlas documented 79 species as confirmed, probable, or possible breeders in the atlas block that spans the Fjord Trail South Corridor (Blocks 5858A) while the 2020–2024 Breeding Bird Atlas documented 23 additional species in the atlas blocks that span the Fjord Trail South Corridor (West Point CW and West Point SW; see **Appendix III/IV.E-1**, Table IV.E-2). The atlas blocks are nine square miles and cover habitats that are not found in or representative of the Fjord Trail South Corridor or its immediate surroundings. For example, deep interior forest, and ridgetop heath and grassland habitats associated with interior and high-elevation areas of HHSPP are not habitat types found in the direct vicinity of the Fjord Trail South Corridor. Several of the species documented in the atlas blocks are therefore not considered to have the potential to occur within or adjacent to the Corridor or be affected by Fjord Trail South. The subset of species that are considered to have the potential to breed along the Fjord Trail South Corridor, based on their habitat associations, area requirements, and sensitivity to human disturbance (Billerman et al. 2020) are listed in Table IV.E-2 in **Appendix III/IV.E-1**.

The more developed areas of the Fjord Trail South Corridor that contain greater human or train activity are likely to contain habitat for only urban-adapted generalists and common "backyard" birds, such as American robin, blue jay, mourning dove, northern mockingbird, house sparrow, European starling, Canada goose, and northern cardinal.

Birds with the potential to breed along the disturbed woodland edges that are characteristic of the Fjord Trail South Corridor adjacent to the MNR tracks and NYS Route 9D include American robin, blue jay, house wren, song sparrow, brown-headed cowbird, northern mockingbird, northern cardinal, red-bellied woodpecker, house sparrow, and European starling. More sensitive species would be limited to the more interior portions of HHSPP to the east, distant from the disturbance and edge effects caused by the existing MNR tracks and NYS Route 9D.

The breeding bird community of the interior portions of Little Stony Point is expected to be dominated by disturbance-tolerant woodland species with small area requirements, such as American robin, black-capped chickadee, blue jay, tufted titmouse, northern cardinal, song sparrow, and red-bellied woodpecker. However, additional birds, such as wood thrush, ovenbird, red-eyed vireo, eastern towhee, rose-breasted grosbeak, gray catbird, and Baltimore oriole, also have potential to nest on Little Stony Point. Birds observed within Little Stony Point during a site reconnaissance in October 19, 2016, which coincided with the end of fall migration/beginning of the wintering period for most birds of the region, and on September 15, 2021, which coincided with the peak of fall migration, included: American robin, black-capped chickadee, yellow-bellied sapsucker, downy woodpecker, eastern phoebe, great-crested flycatcher, white-breasted nuthatch, American crow, northern flicker, American goldfinch, red-bellied woodpecker, blackpoll warbler, wild turkey, great blue heron, double-crested cormorant, turkey vulture (flyover), and bald eagle (flyover).

Examples of some riparian birds that have the potential to nest in the narrow fragment of riverside habitat found along the northern portion of the Fjord Trail South Corridor include common yellowthroat, eastern kingbird, willow flycatcher, yellow warbler, and American redstart.

Reptiles and Amphibians

The NYSDEC Herp Atlas Project was a 10-year survey (1990–1999) of the geographic distribution of reptiles and amphibians in New York State. Forty-two species were documented in the atlas block that covers the Fjord Trail South Corridor (*West Point* USGS quadrangle) (**Appendix III/IV.E-1**, Table IV.E-3). Most of these species have been documented within HHSPP specifically (OPRHP 2010a; **Appendix III/IV.E-1**, Table IV.E-3). However, the atlas block and HHSPP contain types of habitats such as forests, lakes, permanent coldwater streams, and vernal pools, that are not found in the vicinity of the Fjord Trail South Corridor. Therefore, several of these species do not have the potential to occur near the Trail Corridor (see **Appendix III/IV.E-1**, Table IV.E-3).

Habitat for reptiles and amphibians along much of the Fjord Trail South Corridor is limited due to high human activity and railroad and roadway infrastructure. Species with the potential to occur within the Corridor include garter snake, brown snake, red-backed salamander, and snapping turtle.

Woodland reptiles and amphibians with the potential to occur in the interior portions of Little Stony Point include garter snake, red-backed salamander, and American toad. Five-lined skinks are known to occur on Little Stony Point, most likely in the open habitats, such as the sandy meadows. Northern copperhead has also been documented on Little Stony Point. No vernal pools that would be suitable for supporting vernal pool-obligate amphibians are present on Little Stony Point, and its small supratidal pool is expected to be used by generalists such as bullfrog, green frog, and American toad. Areas of dry, open forest and sandy meadow represent potential habitat for eastern box turtles. The dry, sandy, or gravely areas, as well as the rocky ledges and barrens on Little Stony Point, may be suitable habitat for eastern fence lizards, which are known to occur elsewhere in HHSPP (OPRHP 2010a).

Habitat for eastern fence lizards and timber rattlesnakes near the Fjord Trail South Corridor is found on Breakneck Ridge at the northern end of the Corridor, and Bull Hill to the east of the Fjord Trail South Corridor, where there are rocky outcrops and ledges within the documented hardwood forest/rocky summit ecological communities in the area (Jaycox 2021). See below under "State Listed Animal Species" for discussion of potential occurrence of eastern fence lizard and timber rattlesnake in this area.

Transient diamondback terrapins and snapping turtles, in the open water or perhaps briefly basking on rip-rap, are the only reptile species expected to occur along the northern end of the Fjord Trail South Corridor where the shoreline is narrow and rocky. Snapping turtles may also lay eggs in nests dug adjacent to the MNR tracks and anywhere there is bare ground along the shoreline.

No reptiles or amphibians were observed in the vicinity of the Fjord Trail South Corridor during the October 19, 2016 or September 15, 2021 wildlife surveys.

Mammals

Mammal species richness is high in the Hudson Valley due to the overlap of northern and southern species' ranges and a wide diversity of habitat types. In addition, the Hudson Highlands region has some of the largest, intact tracts of forest remaining in New York State, which can support mammals with large area requirements, such as fisher, bobcat, and black bear. The Fjord Trail South Corridor, however, is largely within developed and disturbed areas that can support a limited

number of mammal species. Mammals that have been documented within HHSPP (OPRHP 2010a) and the subset of those considered to have the potential to occur in the vicinity of the Fjord Trail South Corridor on the basis of their habitat associations (Whitaker and Hamilton 1998, DeGraaf and Yamasaki 2001, and others cited below) are listed in **Appendix III/IV.E-1**, Table IV.E-4.

The limited habitats available within the Corridor, where there is higher human activity and persistent train and motor vehicle disturbance, are expected to support urban-adapted species such as gray squirrel, Norway rat, white-footed mouse, big brown bat, eastern red bat, woodchuck, eastern cottontail, raccoon, and striped skunk. The northern part of the Fjord Trail South Corridor between the MNR tracks and Hudson River is unlikely to support mammals, except potentially bats such as big brown bats and eastern red bats foraging over the shoreline and open water, and aquatic mammals such as mink and muskrat briefly moving along the rip-rap.

Bats, such as big brown bat, little brown bat, eastern red bat, and hoary bat may also roost in the woodland on Little Stony Point and forage along its edges and shoreline. An old mine shaft on Little Stony Point, which is accessible to and popularly visited by recreationists, is too shallow, short in ceiling height, and disturbed by human activity to function as a hibernaculum for a community of bats.

Mammals observed in the vicinity of the Fjord Trail South Corridor during the October 19, 2016 and September 15, 2021 wildlife surveys included gray squirrel (downtown Cold Spring), eastern chipmunk (Little Stony Point), white-tailed deer (Little Stony Point), and eastern coyote (only scat; Little Stony Point).

AQUATIC BIOTA

The Fjord Trail South Corridor runs along the eastern shore of the Hudson River with the MNR tracks and NYS Route 9D just to the east of the Corridor. The Hudson River in the vicinity of the Corridor receives freshwater input from various tributaries that flow in a generally west or southwesterly direction through the project area. One freshwater stream, Breakneck Brook, is located within the Fjord Trail South Corridor and drains to the Hudson River.

Hudson River

As described in Chapter IV.D, "Water – Fjord Trail South," the Hudson River is tidally influenced from the Battery in Manhattan to the Federal Dam at Troy, New York. The Fjord Trail South Corridor follows the Mid-Hudson River Estuary near Hudson River Mile 55, a location that provides significant spawning, migratory, and nursery habitat for anadromous, estuarine, and freshwater fish (Penhollow et al. 2006). This section of the Hudson River is relatively narrow and deep (up to 200 feet deep) with strong currents and a rocky bottom substrate. Striped bass spawn in the Hudson River in the vicinity of the Fjord Trail South Corridor in May and June. The adults leave this area shortly after spawning, and, after the eggs have hatched, larval fish begin moving downstream to nursery areas in the more brackish portion of the Hudson River (NYSDOS 2020). Because the salt front moves up through this area, a variety of marine species, such as bluefish, anchovy, silversides, and blue crab may also be found. The NYNHP identifies this portion of the Hudson River as an Anadromous Fish Concentration Area. Anadromous fishes are those that spawn in fresh water, migrate to the ocean to forage and mature, and return to fresh water to spawn and begin the cycle again. As discussed later in this chapter under "Rare, Threatened, or Endangered Species," Atlantic sturgeon (*Acipenser oxyrhynchus*, federally endangered and state high priority species of greatest conservation need) and shortnose sturgeon (*Acipenser brevirostrum*, federally and state endangered) travel through the deeper waters of the river during

migration. **Appendix III/IV.E-1**, Table IV.E-5 lists the finfish species that have the potential to occur near the Fjord Trail South Corridor.

Essential Fish Habitat

EFH is defined by the National Marine Fisheries Service (NMFS) as waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. NMFS designates EFH within marine waters. **Appendix III/IV.E-1**, Table IV.E-6 lists the 11 species and life stages of fish that NMFS has identified as having EFH in this portion of the Hudson River.

Significant Coastal Fish and Wildlife Habitat

Portions of the Fjord Trail South Corridor are within or adjacent to the Hudson Highlands Significant Coastal Fish and Wildlife Habitat (SCFWH). The Hudson Highlands SCFWH comprises the stretch of the Hudson River from just west of Denning's Point in Beacon south to Stony Point in Rockland County and Verplanck in Westchester County (Hudson River Miles 44-56) and is relatively narrow and deep with strong currents and a rocky bottom substrate. Its SCFWH designation is due largely to a significant concentration of wintering bald eagles, presence of spawning area for striped bass, presence of nursery and summering areas for federally endangered Atlantic sturgeon, and the presence of migration routes for both Atlantic and the federally and New York State endangered shortnose sturgeon (NYSDOS 2023). An additional SCFWH area, the Constitution Marsh SCFWH, is located just south of the Fjord Trail South Corridor.

Breakneck Brook

As described in Chapter IV.D, "Water – Fjord Trail South," Breakneck Brook is a Class B fresh surface water that runs through the Fjord Trail South Corridor. It is a warmwater (meaning it does not have conditions suitable for trout or trout spawning) tributary to the Hudson River that provides important habitat for diadromous fish species such as Atlantic and shortnose sturgeon, Atlantic needlefish (*Strongylura marina*), blueback herring (*Alosa aestivalis*), alewife (*Alosa pseudoharengus*), and American eel. Herring use freshwater habitats like Breakneck Brook for spawning (Anderson et al. 2003). The Fjord Trail South Corridor crosses over Breakneck Brook at its confluence with the Hudson River.

RARE, THREATENED, AND ENDANGERED WILDLIFE SPECIES

The USFWS IPaC system list of federally threatened, endangered, candidate, or proposed species with the potential to occur in the general area of the Fjord Trail South Corridor includes Indiana bat (federally and NYS endangered), northern long-eared bat (federally threatened, NYS endangered), tri-colored bat (federally proposed endangered), and monarch butterfly (federal candidate) (see **Appendix III/IV.E-2**). Federally and/or state-listed species of which NYNHP has non-historical records in the general area of the Fjord Trail South Corridor include northern long-eared bat, bald eagle, Atlantic and shortnose sturgeon, eastern fence lizard, eastern wormsnake, timber rattlesnake, and peregrine falcon (OPRHP 2021, NYNHP 2010, 2024).

State-listed bird species documented by the 2000–2005 Breeding Bird Atlas in census block 5858A and the 2020–2024 Breeding Bird Atlas in census blocks West Point CW and West Point SW that are considered to have the potential to breed in the vicinity of the Fjord Trail South Corridor on the basis of their habitat requirements and sensitivity to human disturbance (DeGraaf and Yamasaki 2001, Billerman et al. 2020) include red-shouldered hawk (NYS special concern), bald eagle (NYS threatened), osprey (NYS special concern), peregrine falcon (NYS endangered), and cerulean warbler (NYS special concern).

Federally or state-listed reptiles or amphibians documented by the Herp Atlas Project in the West Point USGS quadrangle and considered to have the potential to occur in the vicinity of the Fjord Trail South Corridor on the basis of their habitat requirements (Klemens 1993, DeGraaf and Yamasaki 2001, Mitchell et al. 2006, Gibbs et al. 2007) include: timber rattlesnake (NYS threatened), eastern hognose snake (NYS special concern), eastern wormsnake (NYS special concern), eastern fence lizard (NYS threatened), and eastern box turtle (NYS special concern).

No federally or state-listed species of wildlife were observed in the vicinity of the Fjord Trail South Corridor during the reconnaissance investigations.

Federally Listed Wildlife Species

Indiana Bat

Habitats used by Indiana bats outside of their winter hibernation period are varied and include riparian, bottomland/floodplain, and upland forests (Humphrey et al. 1977, Britzke et al. 2006, Watrous et al. 2006), often within agricultural landscapes (Murray and Kurta 2004, Watrous et al. 2006, USFWS 2007a). They typically roost near forest gaps or edges, where trees receive direct sunlight for much of the day (Callahan et al. 1997, Menzel et al. 2002), and forage along forest edges or over fields and other large open habitats. The Indiana bat is listed by the USFWS IPaC System as potentially present near the Fjord Trail South Corridor. NYNHP has no records of the species in the vicinity of the Fjord Trail South Corridor and Indiana bats are not known to occur anywhere within HHSPP (OPRHP 2010a, 2021a), but Indiana bats have not specifically been surveyed for in this area. The closest known occurrences of Indiana bats are within approximately 4 to 7 miles of the Fjord Trail South Corridor. Indiana bats are considered to have the potential to occur in the vicinity of the Fjord Trail South Corridor where it passes Little Stony Point and along its approach to the NYS Route 9D tunnel beneath Breakneck Ridge. Woodland edges that could be used for foraging or roosting by Indiana bats occur in these areas.

Northern Long-eared Bat

Habitat of the northern long-eared bat generally includes mature, closed-canopy, deciduous or mixed forest within heavily forested landscapes (Owen et al. 2003, Carter and Feldhammer 2005, Ford et al. 2005). The northern long-eared bat is considered a forest-dependent species that is sensitive to fragmentation and requires interior forest for both foraging and breeding (Foster and Kurta 1999, Broders et al. 2006, Henderson et al. 2008). Roost trees are usually in intact forest, close to the core and away from large clearings, roads, or other sharp edges (Menzel et al. 2002, Owen et al. 2003, Carter and Feldhammer 2005). Foraging activity is greatest in interior areas with a tall and closed canopy (Owen et al. 2003, Patriquin and Barclay 2003, Adams 2013), often on forested hillsides and ridges (Harvey et al. 2011). Northern long-eared bats are expected to occur in HHSPP (OPRHP 2010a), which contains a vast tract of preferred forest interior habitat and is within 5 miles of a hibernaculum on the west side of the river (OPRHP 2021, NYNHP 2010, 2024). In contrast, woodland habitat along the Fjord Trail South Corridor is limited to small fragments with sharp edges along roads, rail tracks, and other forms of development. As such, northern long-eared bats are not likely to occur in the vicinity of Fjord Trail South, although their presence is possible.

Tri-colored Bat

The tri-colored bat is a federally proposed endangered species found throughout eastern North America. In the winter, this species hibernates in humid areas, deep within caves and abandoned mines (NYNHP 2024). During the active season, tri-colored bats are found in forested habitats where they roost in trees, primarily in the foliage of live or recently dead trees, but have also been documented roosting in rock crevices, caves, and anthropogenic structures such as barns

(NYSDEC 2017, NYNHP 2024, USFWS 2024). Tri-colored bat is known to typically forage at the tree-top level, preferring open woods near water (NYSDEC 2017, NYNHP 2024).

Tri-colored bats forage at or above canopy height, over open water, and along forest edges (Barbour and Davis 1969, Mumford and Whitaker 1982, Hein et al. 2009). Foraging areas are usually within 3 miles of roost sites for females and 7 miles for males (Veilleux et al. 2003, Thames 2020). Wetlands and surface waters are important foraging habitats and sources of drinking water (USFWS 2022).

The tri-colored bat has experienced local population declines of 90–100 percent across 59 percent of its geographic range due to white nose syndrome (Cheng et al. 2021). The range-wide population is predicted to decline by 89 percent over the next few years, resulting in a 65 percent reduction in spatial distribution (USFWS 2021, 2022). Mortality caused by wind-energy facilities is the second greatest contributor to tri-colored bat population declines (USFWS 2022), with another 19-21 percent decrease expected to result under current wind-energy development scenarios (Wiens et al. 2022, Whitby et al. 2022). In contrast to these stressors, USFWS (2021, 2022) considers the impact of habitat loss on tri-colored bat population sizes to currently be low.

Suitable forested habitat availability is not currently believed to limit tri-colored bat abundance and is not expected to be a limiting factor in the near future (USFWS 2022). However, while tri-colored bat populations are perilously low, they are vulnerable to local extirpations caused by the cumulative effects of habitat loss and other stressors that compound the broader impacts of white nose syndrome and wind-energy mortality (USFWS 2022).

Tri-colored bats are expected to occur in HHSPP based on habitat availability. The Fjord Trail South Corridor is located approximately 4 to 7 miles away from the closest known hibernaculum (NYNHP, 2024). Tri-colored bats are considered to have the potential to occur in the vicinity of the Fjord Trail South Corridor where it passes Little Stony Point and along its approach to the NYS Route 9D tunnel beneath Breakneck Ridge. Woodland edges that could be used for foraging or roosting by tri-colored bats occur in these areas.

Monarch Butterfly

The monarch butterfly is a migratory insect that has experienced recent population declines and is currently being reviewed by the USFWS as a candidate for listing under the U.S. Endangered Species Act (ESA). Despite these declines, the monarch butterfly is widespread and ubiquitous across North America, and can be found in nearly any open habitat, including within heavily modified urban and agricultural landscapes (Mawdsley and Rubinoff 2020). They migrate from eastern and central North America to winter in montane forests in Mexico and then return north in spring to breed. After breeding throughout the summer, multiple generations iteratively move southwards again to Mexico (Brock and Kaufman 2003). Monarchs are dependent on milkweeds as their larval host plant; milkweeds grow in a variety of conditions, including disturbed and degraded habitats such as old fields, roadside margins, residential properties, and city parks. Given the ubiquity of monarch butterflies to open habitats, they have the potential to occur any time from spring through fall in open areas of the Fjord Trail South Corridor.

Shortnose Sturgeon

The shortnose sturgeon is a federally and state-listed endangered species that can occur in riverine, estuarine, and marine environments along the Atlantic coast of North America. The only known New York population of shortnose sturgeon occurs in the Hudson River. In rivers on the northern end of their range (including the Hudson River), shortnose sturgeon are amphidromous—i.e., they spawn in fresh water but regularly enter saltwater habitats during their life. In general, adult

shortnose sturgeon primarily occur in either saline estuarine waters or, more rarely, coastal waters, between spawning cycles, while juveniles tend to remain in the estuary. The Hudson River shortnose sturgeon population currently appears to be stable and has recovered from a significant decline that was due to overfishing and habitat degradation.[13]

Shortnose sturgeon are also known to occur at a wide range of depths. A minimum depth of 0.6 meters (approximately two feet) is necessary for the unimpeded swimming by adults. Shortnose sturgeon are known to occur at depths of up to 30 meters (98.4 feet) but are generally found in waters less than 20 meters (65.5 feet) (Dadswell et al. 1984; Dadswell 1979). Shortnose sturgeon typically occur in the deepest parts of rivers or estuaries where suitable oxygen and salinity values are present (Gilbert 1989); however, shortnose sturgeon forage on vegetated mudflats and over shellfish beds in shallower waters when suitable forage is present (NMFS 2018).

Atlantic Sturgeon

The New York Bight Distinct Population Segment of the Atlantic sturgeon, which includes sturgeon from the Hudson River, is federally listed as endangered and is on the state's list of high priority species of greatest conservation need. Juvenile Atlantic sturgeon could potentially occur in the vicinity of the Fjord Trail South Corridor at any time throughout the year; however, sub-adult and adult Atlantic sturgeon and early life stages occur in the Hudson River seasonally during the late spring to fall months and potentially occur near the Fjord Trail South Corridor during those months. Atlantic sturgeon spend most of their lives in marine waters along the Atlantic coast. Adults migrate from the ocean upriver to spawn in fresh water above the salt front in the Hudson River from late April to early July. The primary spawning area for Atlantic sturgeon is near Hyde Park (Dutchess County) (River Mile 83), upriver from the Fjord Trail South Corridor (River Mile 55 to 62).[14] The NMFS has designated critical habitat for Atlantic sturgeon along the length of the tidal Hudson River. NYSDEC annual monitoring of juvenile Atlantic sturgeon shows a significant increase in relative abundance in the Hudson River since 2004, but they are still at risk of mortality from fisheries bycatch, vessel strikes, and habitat loss and degradation (Pendleton and Adams 2021).

State Listed Animal Species

Bald Eagle

The bald eagle is listed as threatened in New York State and federally protected under the Bald and Golden Eagle Protection Act. The bald eagle was removed from the U.S. Endangered Species List in 2007 because of a significant recovery from population declines that had occurred throughout the prior century. NYSDEC has also proposed down-listing the state status of the bald eagle from threatened to special concern (NYSDEC 2019). The recovery of bald eagles throughout their range is largely attributable to decades of generational, increasing habituation to human activity and land-use change (Johnson 2010, Guinn 2013) along with successful reintroduction and management efforts, and the ban of Dichlorodiphenyltrichloroethane (DDT) (Buehler 2020).

The closest known bald eagle nest to the Fjord Trail South Corridor is less than a mile on the opposite (western) side of the Hudson River with another nest located within HHSPP near Dutchess Junction, approximately 2 miles north of the Fjord Trail South Corridor. Eagles from

[13] Transactions of the American Fisheries Society, Volume 136, "Year-Class Strength and Recovery of Endangered Shortnose Sturgeon in the Hudson River, New York," by R.J. Woodland and D.H. Secor, 2007, pages 2-81.

[14] Ibid.

nests elsewhere up- or down-river and wintering eagles have the potential to occasionally perch along the shore within the Fjord Trail South Corridor and occur over the open water of the Hudson River when foraging for fish. Wintering eagles commonly occur on the west side of the river, across from Dockside Park. A bald eagle was observed from Little Stony Point, over the open water of the river, during the October 19, 2016 wildlife survey.

Peregrine Falcon

The high ridges of the lower Hudson River corridor historically supported numerous peregrine falcon eyries before the species' widespread decline in the mid-1900s primarily due to reproductive failure caused by the prevalent use of DDT. By the 1960s, peregrine falcons had all but disappeared from this area (Herbert and Herbert 1969). Due to successful re-introduction programs, the ban of DDT, and the species' gradual adaptation to urban environments and usage of tall artificial structures as surrogates for natural nest sites, the Lower Hudson Valley has once again become a stronghold for peregrine falcons and an epicenter of population recovery in New York State and the Northeast (Loucks 2008). Because of this significant recovery, NYSDEC has proposed down-listing peregrine falcon from endangered to a species of special concern (NYSDEC 2019). Peregrine falcons nest in HHSPP, on exposed ledges overlooking the river (Wells 1998; OPRHP 2010a, 2021). The northern portion of the Fjord Trail South Corridor is located within proximity to a known peregrine falcon nesting area. Peregrine falcons are aerial predators that hunt on the wing, also high in the air (White et al. 2020). Except for the nearby nesting area, peregrine falcons would not be expected to occur on or along any portion of the Fjord Trail South Corridor, but for infrequent potential occurrences of birds perched along the shoreline for brief periods between hunting bouts.

Osprey

Osprey (*Pandion haliaetus*) is listed as a special concern species by New York State. Once listed as endangered in 1976 due to impacts from DDT on reproductive output, its status was downgraded to threatened in 1983 and further downgraded to special concern in 1999 (NYSDEC 2024). Osprey populations in the U.S., including New York State, have recovered significantly in recent decades after steep, range-wide declines that occurred throughout the mid-1900s (Nye 2008, Poole et al. 2020). Due to this strong recovery in New York State, NYSDEC has proposed to fully de-list the osprey from its current status as a species of special concern (NYSDEC 2019). Ospreys nest in dead trees and on a variety of artificial structures such as utility poles, buoy towers, and platforms erected specifically for use by ospreys. Ospreys breed along coastal and inland shorelines where fish prey can be easily accessed in shallow water. Ospreys most commonly nest on inland ponds and lakes rather than rivers, and their occurrence along the Hudson River is primarily limited to spring and fall migration (DeOrsey and Butler 2006). Osprey populations in New York State have increased significantly since the 1970s, with observations of the species in almost every county across the state in the 2000–2005 Breeding Bird Atlas. In addition, osprey were documented in the 2020–2024 Breeding Bird Atlas within the census blocks where the Fjord Trail South Corridor is located (West Point CW and West Point SW). The shallow waters of the Hudson River along the shoreline of the Fjord Trail South Corridor provide potential foraging habitat for osprey.

Cerulean Warbler

The cerulean warbler is a neotropical migratory songbird that breeds in mature forests of the eastern U.S. and overwinters in South America. Cerulean warblers historically bred in western New York State and then in the mid-20th century, expanded their range eastward, including to the Hudson Highlands (Rosenberg 2008). The species is listed as a species of special concern (NYSDEC 2024). Cerulean warblers are most associated with forested wetlands and riparian

corridors dominated by sycamore, cottonwood, silver and red maple, and green ash, and north- and east-facing dry ridgetops and hillsides with mature oak/hickory-dominated forest (Rosenberg et al. 2000, Buehler et al. 2020). Cerulean warblers are considered highly sensitive to forest fragmentation, although their area requirements appear to vary geographically and be lowest in the eastern extent of their range (Buehler et al. 2020). Loss and fragmentation of mature forest breeding habitat is considered the greatest threat to the conservation of cerulean warbler populations (Robbins et al. 1992). The species' sensitivity to direct human disturbance is undescribed (Buehler et al. 2020).

Breeding and probable breeding cerulean warblers have been documented within the Fjord Trail South Corridor at Little Stony Point, around the Washburn parking lot, and in the vicinity of Bull Hill. The species is a "confirmed" breeder in the 2020–2024 Breeding Bird Atlas block that spans the Fjord Trail South Corridor.

Red-shouldered Hawk

The red-shouldered hawk is regionally uncommon in many areas and listed as a species of special concern in New York. This species favors large tracts of mature (especially old growth) deciduous and mixed forest in riparian areas or flooded swamps (Dykstra et al. 2020). Breeding Bird Atlas data show a steady increase in red-shouldered hawk populations in New York since the 1980s, particularly in the Hudson River Valley, as reversion of farmland back to forest has likely increased habitat availability for the species (Dykstra et al. 2020). Red-shouldered hawks now also occasionally nest in suburban areas where forest cover is less contiguous than the species was previously thought to need (Dykstra et al. 2000, 2020). Migration and wintering habitats are similar to breeding habitat preferences, although non-breeding birds occur in fragmented landscapes and open areas more frequently than they do when nesting (Dykstra et al. 2020).

Red-shouldered hawks are likely to occur in HHSPP based on habitat availability but are unlikely to be present along most of the Fjord Trail South Corridor because of the existing development and human disturbance, although their presence is possible, particularly at Little Stony Point.

Timber Rattlesnake

The timber rattlesnake is a New York State threatened species that once ranged throughout most forested, hilly portions of New York State, but is now limited to remnant, isolated populations in the Hudson Valley, Catskills, Southern Tier, and eastern edge of the Adirondacks. Slow maturation rates and low reproductive output hinder population recovery, and illegal collection for the pet trade and indiscriminate killing are a continual problem (Klemens 1993, Gibbs et al. 2007). Timber rattlesnakes are typically found in deciduous forests containing thick understory vegetation, large woody debris, and rock outcrops or talus slopes, often near surface waters. They may also occur in edge habitats (Gibbs et al. 2007, Ulev 2008). Hibernation dens are typically on southern-facing, rocky slopes with closed-canopy forest that has nearby gaps or other openings that receive abundant sunlight (Ulev 2008).

Timber rattlesnakes occur within HHSPP (OPRHP 2010a), and NYNHP has records of the species in the vicinity of the northern portion of the Fjord Trail South Corridor (OPRHP 2021, NYNHP 2010, 2024). None of the areas within the Fjord Trail South Corridor provide the species' preferred habitat features for birthing rookeries or hibernation dens (forest with western- to southern-facing rocky slopes and rock outcrops), except for Little Stony Point. At the northern end of the Fjord Trail South Corridor, OPRHP has documented potential foraging and basking habitat within the hardwood forest/rocky summit habitats on Breakneck Ridge but does not expect that area to be suitable for gestating, birthing, or denning (Jaycox 2021). The woodlands on the east side of NYS Route 9D in this area and surrounding the Washburn parking lot are also potential foraging habitat

for the species (Jaycox 2021, 2024). Timber rattlesnakes are known to travel up to 2.5 miles or more in forested habitats for foraging and other activities during the active season (NYNHP, 2024). Therefore, the entire Fjord Trail South Corridor is potentially suitable for foraging, and especially areas east of NYS Route 9D including the proposed Washburn parking lot expansion. There is a higher likelihood for human-snake interactions on the east side of NYS Route 9D near the Washburn parking lot due to its proximity and unimpeded vegetated landscape from known occurrences.

Most of the Fjord Trail South Corridor (e.g., along the railroad tracks) does not provide the optimal habitat (e.g., hibernation dens, foraging areas) for timber rattlesnakes. Timber rattlesnakes from populations in more interior (eastern) areas of HHSPP would not be likely to occur in this narrow, shoreline area at the base of Breakneck Ridge or on the west side of NYS Route 9D, but their presence remains possible.

Eastern Fence Lizard

The eastern fence lizard is listed as threatened in New York State, which represents the northernmost extent of its geographic range (Gibbs et al. 2007). Eastern fence lizards prefer xeric hardwood and conifer forests with rocky outcrops or talus slopes and can also be found in grasslands and old fields (Mitchell et al. 2006, Gibbs et al. 2007). They have been documented within HHSPP (OPRHP 2010a), and the NYNHP has records of the species in the general area of the Fjord Trail South Corridor. Appropriate habitat for eastern fence lizards in close proximity to the Fjord Trail South Corridor is on Little Stony Point, on the east side of NYS Route 9D near the Washburn parking lot, and on Breakneck Ridge (at the north end of the Trail Corridor), where there is dry, open woodland and rocky outcrops and ledges (Jaycox 2021, 2024).

Eastern Wormsnake

The eastern wormsnake's range within New York is limited to the Albany area, a few counties in the southeastern part of the state, and on Long Island (Gibbs et al. 2007). It is uncommon in New York State relative to other northeastern states (DeGraaf and Yamasaki 2001, Gibbs et al. 2007) and is listed as a species of special concern. Eastern wormsnakes are most closely associated with damp forests with mesic, loose soils into which they can burrow, but they are also found in dry forests and a variety of other woodland habitat types (DeGraaf and Yamasaki 2001, Mitchell et al. 2006, Gibbs et al. 2007), where macrohabitat selection can be highly variable and generalistic (Orr 2006, Diefenbacher and Pauley 2014). They are not considered highly sensitive to fragmentation, as they can occur in small habitat islands, including in urban areas (Klemens 1993, Russell and Hanlin 1999, Herrera and Cove 2020). Eastern wormsnakes have been documented within HHSPP (OPRHP 2010a) and in the general area of the Fjord Trail South Corridor (OPRHP 2021, NYNHP 2010, 2024). Based on their habitat associations, Breakneck Ridge, Little Stony Point, and the Washburn parking lot are areas along the Fjord Trail South Corridor in which eastern wormsnakes have potential to occur.

Eastern Hognose Snake

The eastern hognose snake, a species of special concern in New York State, inhabits a wide variety of habitat types, including open forests, old fields, marshes, forested wetlands, coastal shrublands, and beaches (DeGraaf and Yamasaki 2001, Mitchell et al. 2006, Gibbs et al. 2007). They are most often found in open habitats like fields and open forests, and seldom occur in dense woods (Klemens 1993). In all habitat types that they use, eastern hognose snakes require loose, sandy, well-drained soils through which they can travel belowground (Klemens 1993, DeGraaf and Yamasaki 2001, Gibbs et al. 2007) although they can sometimes be found aboveground on rocky slopes and other firm ground. In New Hampshire, eastern hognose snakes have been associated

with active or abandoned sand and gravel operations because of the preferred sandy deposits and mix of sandy openings and patches of shrubs surrounded by forest (NHDFG 2015)—habitat similar to that which occurs on Little Stony Point. Eastern hognose snakes are known to occur in HHSSP (OPRHP 2010a). The open woodlands and sandy meadows on Little Stony Point and areas surrounding the Washburn parking lot are the most likely suitable habitats in the vicinity of the Fjord Trail South Corridor where eastern hognose snakes have the potential to occur.

Eastern Box Turtle

The eastern box turtle is relatively common in New York, but populations are in decline and the species is listed as special concern (Gibbs et al. 2007). Eastern box turtles prefer open forests, forest edges, and successional shrublands, often near water. They can also be found in thickets, stream riparian zones, and low-lying coastal habitats (DeGraaf and Yamasaki 2001, Gibbs et al. 2007). Eastern box turtles have been observed near the Forest Trail South Corridor, suggesting possible persistence of a local population despite collection pressures.

INVASIVE ANIMAL SPECIES

Invasive species are non-native species that can cause harm to an environment when they are introduced (NYSDEC 2021b). Several invasive pests are of concern throughout this region of New York State, including emerald ash borer (*Agrilus planipennis*), hemlock woolly adelgid (*Adelges tsugae*), and spotted lanternfly (*Lycorma delicatula*). Emerald ash borer is native to Asia and is responsible for the destruction of North American ash trees (*Fraxinus* sp.). Hemlock woolly adelgid is an aphid-like insect that can cause extensive damage to North American hemlock trees. Both emerald ash borer and hemlock woolly adelgid are listed as prohibited invasive species by 6 NYCRR Part 575, which states that "no person shall sell, import, purchase, transport, introduce or propagate, or have the intent to take any of these actions on the regulated species, unless issued a permit by NYSDEC for research, education, or other approved activity." Spotted lanternfly was only discovered in the United States in 2014 but has since spread rapidly, feeding on a wide variety of plants, and causing concerns over forest health and agricultural and tourism industries. Spotted lanternfly has been confirmed present in Dutchess and Putnam counties and the counties surrounding the Fjord Trail South Corridor (Cornell CALS 2024).

The zebra mussel (*Dreissena polymorpha*) is a small bivalve introduced to North America in the mid-1980s and has since become a problematic species within the Hudson River. Zebra mussels are suspension feeders that eat phytoplankton, small zooplankton, large bacteria, and organic detritus by filtering the water (CIES 2021). Because they can filter large quantities of water, populations of plankton, which form the base of the aquatic food web that many animals depend on, have declined by 70 to 80 percent in the Hudson River (CIES 2021). They also colonize at extensive rates and can easily outcompete native mussels. Zebra mussels have been documented in the Hudson River in the vicinity of the Fjord Trail South Corridor (NYIS 2019).

D. FUTURE WITHOUT THE PROPOSED ACTION

ECOLOGICAL COMMUNITIES

In the future without the proposed Fjord Trail South, ecological communities and habitats in the area would be expected to remain largely the same as the current condition with the exception of any changes due to climate change and sea level rise.

PLANTS

In the future without the proposed Fjord Trail South, no vegetation clearing would be expected. Vegetation and species composition in the vicinity of the Fjord Trail South Corridor would be expected to remain largely the same as the current condition with the exception of any changes due to climate change and sea level rise.

ANIMALS

In the future without the proposed Fjord Trail South, habitat in the vicinity of the Fjord Trail South Corridor would be expected to remain largely the same as the current condition with the exception of any changes due to climate change. Increases in temperature, changes in precipitation patterns, sea level rise and extreme storms associated with climate change all have the potential to adversely affect wildlife gradually over time.[15] As such, wildlife communities and aquatic biota along the Fjord Trail South Corridor would be expected to largely remain unchanged and composed of the same species as under existing conditions in at least the near term.

E. FUTURE WITH THE PROPOSED ACTION

DESIGN PHILOSOPHY TO AVOID AND MINIMIZE EFFECTS

Early in the planning and design processes considerations were made to avoid and minimize effects on biological resources to the greatest extent possible. The HHSPP Final Master Plan/Final EIS did not contemplate the proposed Hudson Highlands Fjord Trail, nevertheless during the early design of the Fjord Trail – due to its alignment through and adjacent to HHSPP - local biological resources were taken into consideration. Biological resources identified in the HHSPP Final Master Plan/Final EIS were reviewed as a resource. Multiple biological field surveys were conducted. The Ecological Working Group was developed, as described in Chapter I, "Introduction and Background," providing input on planting and landscape restoration strategies along the Trail Corridor and lending their expertise related to ecological communities, flora, and fauna that may be in and around the proposed Fjord Trail. Additionally, efforts were made to incorporate the vision and management goals identified in the HHSPP Final Master Plan/Final EIS for providing opportunities for passive recreation and connection with the river while protecting native plants and animals. These goals include but are not limited to: protecting and maintaining areas important as habitat for rare, threatened, endangered or protected species; improving the ecological connectivity between disjoint parcels and with other nearby protected lands; designing and locating recreational and interpretive facilities to assure that they do not exceed the parkland's capacity to withstand use or infringe on important natural habitats and are compatible with the protection of park resources; applying the principles of ecosystem-based management to operational and resource protection activities within the park, and providing and maintaining vistas to the Hudson River using topography or existing clearings whenever possible. For example, the Main Trail alignment through Little Stony Point was shifted out of a sensitive area to protect state and locally rare plants.

The HHSPP Final Master Plan/Final EIS identifies measures associated with recreational trails to protect sensitive resources. This included limiting trail disturbance primarily to the required width of the Trail Corridor and following trail standards and guidelines identified in the HHSPP Final

[15] https://dec.ny.gov/environmental-protection/climate-change/effects-impacts#:~:text=Other%20Impacts%20of%20Climate%20Change%20Around%20New%20York%20State&text=Warmer%20temperatures%20are%20altering%20the,that%20are%20destroying%20native%20ecosystems.

Master Plan/Final EIS, as applicable. Where possible, the trail alignment was sited above mean high water and top of bank along the Hudson River. Proposed removals of mature trees and clearing and grubbing of vegetation would be minimized.

Ecological enhancements would be incorporated wherever feasible, such as improving shoreline stability and resilience to climate change, planting native vegetation suited for the conditions within the Fjord Trail South Corridor, structural habitat enhancements at pile locations, and restoration of SAV beds.

Trail and facility design would keep limits of disturbance as narrow as possible while meeting Accessibility needs and other design requirements. The trail surface near or in water resources, to the degree possible, will be elevated to minimize impacts to aquatic communities including the use of helical piles. To reduce the impact to this community and interior forest, the parking area expansion would be designed to be close to NYS Route 9D keeping to the edge of the forested habitat, as feasible.

In addition, to facilitate animal movement through their habitats, wildlife crossings will be included at points along Meanders and the Main Trail to allow safe passage for animals. These may include elevated trail sections and wildlife culverts under the trail. In ecologically sensitive areas, the design may include vegetative buffers to keep users on the Main Trail and out of the landscape. Designs will ensure any buffers are porous and contain breaks, so as not to impede wildlife passage.

ECOLOGICAL COMMUNITIES

CONSTRUCTION

Construction of Fjord Trail South would result in the clearing of vegetation from multiple terrestrial ecological communities. Existing trails, such as trails at Little Stony Point and Dockside, would be incorporated into the design, as feasible, to reduce the amount of vegetation removal. Tree clearing, in general, would be minimized to the extent possible. Large trees would be avoided to the extent practicable upon final trail and facility (e.g., parking lot expansion, restrooms) design and layout. Impacts to vegetation on steep slopes would also be minimized. The majority of trees to be removed are within the proposed at-grade portion of Fjord Trail South and are not occupying the immediate sloped shoreline. In addition, by rebuilding riprap in areas that are currently oversteepened or where failures/erosion have already occurred and by planting vegetation across the embankment face, the Project would improve the stability of the shoreline edge. Trail and facility design will keep limits of disturbance as narrow as possible while meeting Accessibility needs and other design requirements. The trail surface near or in water resources, to the degree possible, will be elevated to minimize impacts to aquatic communities, including the use of helical piles for the on-land portion of the trail. Best management practices (BMPs), such as visual inspection and cleaning of equipment/vehicles prior to entering or exiting a work site to prevent transport of invasive species, would be implemented during construction and as part of the Invasive Species Management Plan. Tree protection measures would include radial trenching (3-foot offset from trunk), and the use of tree protection fencing with signage and mulch. Aeration of roots via soil injection or fertilizer would be performed prior to and after construction by a certified arborist, if approved by OPRHP.

OPERATION

As described above, the full Trail Corridor represents the area within which Fjord Trail South elements may be located and actual disturbances would be less than the areas presented in Table

IV.E-1. Based on current assumptions of trail widths and locations of other elements, Fjord Trail South would result in the permanent loss of approximately 8.4 acres of the existing terrestrial ecological communities within the Corridor that were identified in **Table IV.E-1** falling into the following community types: 2.4 acres of successional shrubland, 1.4 acres of successional southern hardwoods, < 0.1 acres of pitch pine-oak-heath rocky summit, 1.7 acres of terrestrial cultural communities comprising railroad, mowed lawn, mowed lawn with trees, unpaved road/path, and paved road/path, 1.5 acres of riprap/artificial shore, 0.4 acres of tidal river, 0.6 acres of oak-tulip tree forest, <0.1 acres of Appalachian oak-hickory forest, and 0.3 acres are floodplain forest. Because the Fjord Trail South would maintain a 25-foot minimum setback from the centerline of the closest MNR tracks and a minimum of 6 feet of clearance from rail utility infrastructure, there would be minimal impact to the railroad ecological community. As discussed under Section C, "Existing Conditions," the area of floodplain forest ecological community within the Fjord Trail South Corridor has not been identified by the NYNHP as a significant natural community. NYNHP has not identified any terrestrial significant natural communities on the west side of NYS Route 9D within the Fjord Trail South Corridor. On the east side of NYS Route 9D, NYNHP identified the following significant natural communities: chestnut oak forest, pitch pine-oak-heath rocky summit, and oak-tulip tree forest. The oak-tulip tree forest occurs in and adjacent to the Washburn parking lot expansion. There will be a small permanent loss of oak-tulip tree forest due to the expansion of the Washburn parking lot. This parking area is adjacent to NYS Route 9D. To reduce the impact to this community and interior forest, the parking area expansion would be designed to be close to NYS Route 9D keeping to the edge of the forested habitat, as much as possible. To help reduce the impact and mitigate the loss of this area and of other terrestrial natural communities, large trees would be protected to the extent feasible and native plantings will be incorporated into the design of the trail and facilities. The tidal river ecological community that represents the Hudson River is also identified as a significant natural community. Impacts to the tidal river ecological community (the Hudson River) are discussed below under "Aquatic Biota."

Operation of the proposed Fjord Trail South may indirectly impact ecological communities and the wildlife that use these communities as habitat adjacent to the Fjord Trail South for a certain distance on either side of the trail, called the zone of influence, by increasing and introducing new recreational activity, human disturbance, and possibly invasive species into existing ecological communities. The additional trails would result in habitat fragmentation and could increase the type of edge habitats where invasive plant species often outcompete native plants. However, the zone of influence for the proposed Fjord Trail South would be limited by existing development (e.g., MNR tracks, NYS Route 9D, residential properties in Cold Spring). Existing trails (e.g., along Dockside Park and Little Stony Point) currently affect surrounding ecological communities with their zone of influence, and thus the portion of the trail that uses these existing trails would not contribute a new zone of influence to the potential effects of the proposed Fjord Trail South. The largest area of mature trees exists within Little Stony Point, which is already exposed to recreational usage. Management of areas replanted after trail construction and invasive species management protocols would mitigate some of the impacts on vegetated ecological communities. Plans for restoration of native vegetation in selected areas along the trail would consider the resilience, vigor, site specificity, habitat value, and aesthetic value of the species that would be planted.

BMPs, such as visual inspection and cleaning of equipment/vehicles prior to entering or exiting the Trail Corridor to prevent transport of invasive species, would be implemented during operation/maintenance activities and as part of the Invasive Species Management Plan.

Educational signage would be installed to alert trail users about invasive species and the sensitive resources surrounding the Trail with encouragement to remain on trails. Bike-cleaning stations and boot scrubbers may be installed at key locations to encourage trail users to remove any invasive species from their bikes or shoes. In addition, design elements (e.g., boulders, logs, small fencing) would be incorporated to prevent people from leaving the trails and entering sensitive natural areas. In upland areas, native tree, shrub, and herbaceous species that are resilient to climate change would be planted. In the floodplain, native tree, shrub, and herbaceous species that can withstand ice scour would be planted. Plant species for the intertidal zone would include swamp rose mallow (*Hibiscus moscheutos*), blueflag Iris (*Iris versicolor*), swamp rose (*Rosa palustris*), arrowhead (*Sagittaria* sp.), three-square sedge (*Schoenoplectus pungens*), pickerel weed (*Pontederia cordata*), bulrush (*Scirpus* sp.), marsh marigold (*Caltha palustris*), willow (*Salix*), and dogwood (*Cornus*) species. Vegetation management plans would be developed for the native plantings to assure survival and stabilization. As discussed below, the Applicant would consult with OPRHP with respect to invasive plant species management and on proposed native species plant lists that follow OPRHP's Native Plant Policy.

PLANTS

This section describes potential construction and operation impacts from the Proposed Action on plants in general and avoidance, minimization, and mitigation measures, as appropriate, to address these potential impacts. Rare, threatened, and endangered plant species are discussed in detail further below.

CONSTRUCTION

As discussed above, existing trails would be incorporated into the design to the extent possible. Tree clearing and other vegetation removal would be minimized to the extent needed for installation of the Trail, with additional clearing as needed for invasive species management. Impacts to vegetation on steep slopes would also be minimized, as feasible. Trail and facility design will keep limits of disturbance as narrow as possible while meeting Accessibility needs and other design requirements such as maintaining the required setbacks from the MNR tracks and utility infrastructure. BMPs, such as visual inspection and cleaning of equipment/vehicles prior to entering or exiting a work site to prevent transport of invasive species, would be implemented during construction and as part of the Invasive Species Management Plan. Tree protection measures would be implemented during construction to avoid disturbance to selected mature trees within the Fjord Trail South Corridor. Additionally, tree replanting, control and/or removal of invasive plant species, educational signage, and development of a vegetation management plan, would be implemented as strategies to avoid, minimize, and mitigate project-related impacts.

OPERATION

As described above, Fjord Trail South would result in the permanent loss of individual plants and assemblages of plant species, which are cleared for trail construction and facility development, within the Corridor. Potential indirect impacts would include changes in the ecological communities' structure and function, increased competition from native and non-native disturbance adapted species surrounding the proposed trails and facilities, and the indirect effects of human disturbance caused by the recreational usage of the trails. However, the zone of influence for the proposed Fjord Trail South would be limited by existing development (e.g., MNR tracks, NYS Route 9D, residential properties in Cold Spring). Existing trails (e.g., along Dockside Park and Little Stony Point) currently affect surrounding plants with their zone of influence, and thus would not contribute a new zone of influence to the potential effects of the proposed Fjord Trail

South. Therefore, indirect impacts on plants from the proposed Fjord Trail South would not be significantly different from existing conditions. In addition, design elements (e.g., boulders, logs, small fencing) would be incorporated to prevent people from leaving the trails and entering sensitive natural areas, thereby further avoiding and minimizing indirect impacts on plants.

BMPs, such as visual inspection and cleaning of equipment/vehicles prior to entering or exiting the Trail Corridor to prevent transport of invasive species, would be implemented during operation/maintenance activities and as part of the Invasive Species Management Plan. Educational signage would be installed to alert trail users about invasive species and the sensitive resources surrounding the Trail with encouragement to remain on trails. Bike-cleaning stations and boot scrubbers may be installed at key locations to encourage trail users to remove any invasive species from their bikes or shoes. In upland areas, native tree, shrub, and herbaceous species that are resilient to climate change would be planted. In the floodplain, native tree, shrub, and herbaceous species that can withstand ice scour would be planted. Vegetation management plans would be developed for the native plantings to assure survival and stabilization. The Applicant would consult with NYSDEC and OPRHP with respect to invasive plant species management and with OPRHP on native species plant lists.

SUBMERGED AQUATIC VEGETATION (SAV)

Construction

Portions of Fjord Trail South would be elevated trail sections over the edge of the Hudson River in locations of existing SAV (see **Figure IV.E-3**). In-water and shoreline construction work between Little Stony Point and Breakneck Ridge would mostly be done using barge-based crews and materials. For this section, construction of in-water and shoreline components would have the potential to result in temporary impacts to SAV resulting from movement of construction barges and vessels along the shoreline, which could temporarily block sunlight from reaching SAV beds and potentially result in sediment resuspension. Installation of in-water piles to support the elevated trail would result in some sediment resuspension. Increases in turbidity due to sediment resuspension can lead to degraded water quality, lower dissolved oxygen levels, and release of contaminants in the sediment. Temporary shading and increases in suspended sediment resulting from the use of barges would be minor, temporary, localized, and sediment resuspended would dissipate upon cessation of sediment disturbing activities and would not have the potential to adversely affect SAV beds in the long-term. Erosion and sediment control measures would be implemented on land during construction to prevent the discharge of materials into adjacent SAV habitat.

Construction of Fjord Trail South between Dockside and Little Stony Point would be done with a top-down approach which would not require construction barges but would still require in-water pile installation and some sediment resuspension that would be expected to be minor, temporary, localized and expected to dissipate upon cessation of pile installation activities and would not have the potential to adversely affect SAV beds in the long term.

Operation

The in-water components of Fjord Trail South could result in permanent impacts to SAV within the limits of disturbance (see **Figure IV.E-3**). As design of Fjord Trail South progresses, permanent versus temporary impacts to SAV would be refined; however, the piles installed below MHW would permanently displace potential SAV habitat within the footprint of the piles. Elevated trail sections between Dockside Park and Little Stony Point would also incorporate grated deck surfaces to allow sunlight to reach the water and minimize the potential effects of

shading. Reduction in light due to overwater coverage from the Trail could still have an adverse effect on the ability of SAV to grow and thrive. As the design for the Fjord Trail South advances, SAV survey results will be finalized for the Hudson River within the Fjord Trail South Corridor in coordination with OPRHP and the NYSDEC to avoid and minimize impacts to these beds to the extent possible through construction means and methods and elevated trail design. In consultation with the NYSDEC, OPRHP, and NMFS, SAV restoration opportunities would be explored, focusing on native species such as water celery (*Vallisneria americana*) in areas along the shoreline identified as having the appropriate conditions. SAV restoration and creation and selective control of invasive water chestnut in these areas would be conducted in consultation with OPRHP and NYSDEC.

RARE, THREATENED, AND ENDANGERED PLANT SPECIES

As described under Section C, "Existing Conditions," no federally listed plant species are known to occur in the area of the Fjord Trail South.

Multiple state protected plant species are known to occur or have the potential to occur in the Fjord Trail South Corridor. Efforts to avoid or minimize impacts to rare, threatened, and endangered terrestrial and aquatic plant species would be incorporated into the final design and layout of the proposed trail. Additional terrestrial and aquatic plant surveys would be conducted at appropriate times of year to determine locations and potential impacts. The preparation and implementation of protection plans would be developed, as needed, in coordination with OPRHP and NYNHP.

INVASIVE PLANT SPECIES

As discussed above, there are multiple invasive plant species documented in the Fjord Trail South Corridor. The locations of existing invasive plant species would be considered upon final design. The Applicant would consult with OPRHP and NYSDEC, as appropriate, and would prepare an Invasive Species Management Plan to control and/or remove invasive plant species to prevent them from growing or spreading during and after construction. BMPs such as visual inspection and cleaning of equipment/vehicles prior to entering or exiting a work site to prevent transport of invasive species, would be implemented during construction and operation/maintenance and as part of the Invasive Species Management Plan. As feasible, topsoil and other material planned to be delivered to the project site would be inspected for invasive species prior to delivery. Educational signage would be installed, and development of a vegetation management plan would be implemented as additional strategies to avoid, minimize, and mitigate project-related impacts. However, the zone of influence for the proposed Fjord Trail South would be limited by existing development (e.g., MNR tracks, NYS Route 9D, residential properties in Cold Spring). Existing trails (e.g., along Dockside Park and Little Stony Point) currently affect the establishment and spread of invasive species with their zone of influence, and thus would not contribute a new zone of influence to the potential effects of the proposed Fjord Trail South.

Restoration of SAV beds would be conducted within the subtidal zone in areas that have been determined suitable for restoration. Because water chestnut, an invasive species, is also present in within the Hudson River in the vicinity of the Fjord Trail South project, measures to control its growth and distribution in the long term would be implemented to ensure the success of restored or crated SAV beds. The Applicant would consult with NYSDEC and OPRHP and would prepare an Invasive Species Management Plan for aquatic plant species, as required.

ANIMALS

TERRESTRIAL WILDLIFE

This section describes potential construction and operation impacts from the Proposed Action on terrestrial wildlife in general and avoidance, minimization, and mitigation measures, as appropriate, to address these potential impacts. Rare, threatened, and endangered wildlife species are discussed in detail further below.

Construction

In the heavily developed areas along the Fjord Trail South Corridor (e.g., along the railroad Corridor and Dockside Park), habitat for wildlife is limited to manicured lawn and shade trees, a small woodlot in Dockside Park, rip-rapped shoreline, and bands of ruderal vegetation. The wildlife community in these areas is therefore composed of urban-adapted generalists that would not be affected by project construction other than potential temporary, short-term displacement from the immediate areas of construction activity. Habitat for such species is ubiquitous and abundant in the surrounding area, such that any wildlife temporarily displaced by construction activity would be expected to easily relocate. From Dockside Park to Little Stony Point and from Little Stony Point to the Breakneck Ridge Connector, the Fjord Trail South would be immediately adjacent to the MNR tracks, where habitat is limited to rip-rapped shoreline and a narrow band of ruderal vegetation that would be influenced by existing disturbance. Tree clearing would be restricted to November 1 to March 31 to minimize potential impacts to bats and to migratory birds.

Construction activity within the Hudson River or along its shoreline could prevent waterbirds from occurring on the shoreline or the nearshore waters, and as such, there may be temporary displacement of waterbirds from this area. In-water construction activities would not occur from March through June to minimize impacts to migrating anadromous fish species. Because the portion of the Fjord Trail South between Breakneck Ridge and Little Stony Point will be constructed from the water and can only be constructed during the portion of the tidal cycle when water depths are sufficient to keep the construction barges off the river bottom, work activities can only occur during one quarter of every workday, which will limit disturbance to waterfowl and other wildlife. Snapping turtles and painted turtles may use this area for nesting and basking, which would be interrupted during construction activities. However, there is ample comparable Hudson River Shoreline outside of construction areas to accommodate nesting and basking activities. There would be no long-term significant reduction in nesting and basking habitat as the trail along the shoreline would be elevated.

Direct impacts from construction along the portions of Fjord Trail South between the Hudson River shoreline and the MNR tracks would be limited to temporary displacement and a minor amount of habitat loss. Analysis of noise levels at a peregrine falcon nest closest to the Breakneck Connector and Bridge Project (OPRHP 2023) resulting from construction activities for that project which included simultaneous pile drilling with clearing and tree removal or rock excavation occurring simultaneously determined that noise levels resulting from construction of the Breakneck Connector project would be comparable to noise levels created by nearby commuter rail and vehicular traffic. Given the similar close proximity of the Fjord Trail South to the MNR tracks and to NYS Route 9D and the existing high levels of noise and other disturbance from passing MNR trains and motor vehicles on NYS Route 9D, construction in this area would not be expected to result in significant adverse impacts to wildlife upslope on Breakneck Ridge due to elevated noise levels.

The portion of Fjord Trail South through Little Stony Point would result in the clearing of approximately 1.5 acres of trees during construction. Although tree clearing and other land disturbance would be required for the proposed widening of, and improvements to, the existing trails in Little Stony Point, clearing would mostly be limited to the forest's eastern edge, which is degraded by its proximity to the rail tracks and NYS Route 9D and recreational usage of the existing trail. Wildlife in this area is therefore mainly limited to generalist species that are tolerant of disturbed, roadside forest edges, although some additional species such as five-lined skinks and northern copperhead are also known to occur in the area. Construction noise would be expected to carry west, into more interior habitat on Little Stony Point, and thus potentially displace, stress, or otherwise temporarily affect the wildlife there, during construction. Completing tree clearing during winter, outside of sensitive breeding periods and when fewer species are present (e.g., migratory birds), would reduce potential impacts to wildlife from the construction activity.

The expansion of the Washburn parking lot farther south would result in the clearing of approximately 0.6 acres of trees during construction. To reduce the impact to habitat and interior forest in this area, the parking area expansion would be designed to be close to NYS Route 9D keeping to the edge of the forested habitat, as feasible. Due to the proximity to NYS Route 9D and the existing parking lot, wildlife in this area may be mainly limited to generalist species that are tolerant of disturbed, roadside forest edges, although some additional species such as five-lined skinks and northern copperhead are also known to occur in the area. Construction noise would be expected to carry east, into more interior habitat, and thus potentially displace, stress, or otherwise temporarily affect the wildlife there, during construction. All tree clearing would be completed during winter, outside of sensitive breeding and nesting periods and when fewer species (e.g., migratory birds) are present, reducing potential impacts to wildlife from construction activity.

Measures that would be implemented to reduce potential impacts to sensitive wildlife during construction include tree clearing outside of the active seasons (between November 1 and March 31), using an on-site NYSDEC-licensed monitor during construction activities if during the active season, and developing and implementing an Education and Encounter Plan in coordination with NYSDEC, as required.

Operation

Fjord Trail South would result in the permanent loss of approximately 2.4 acres of wooded ecological communities comprising floodplain forest, successional southern hardwoods, oak-tulip tree forest, Appalachian oak-hickory forest, and pitch pine-oak-heath rocky summit and would reduce the amount of habitat currently buffered from edge effects. Within Little Stony Point and the expansion of Washburn parking lot, Fjord Trail South would not result in the permanent loss of quality habitat for sensitive species or specialists. However, it could increase nest predation and parasitism, and introduce other negative effects associated with edges into the more interior portions of forest. The altered conditions combined with the existing disturbance from ongoing recreational usage of the existing trails would benefit disturbance-tolerant, generalist wildlife like blue jay, brown-headed cowbird, and gray squirrel, while disfavoring more sensitive species that currently have the potential to occur on Little Stony Point, such as wood thrush and red-eyed vireo.

As a measure to help reduce impacts to wildlife using the Fjord Trail South Corridor and adjacent habitats, the Applicant will coordinate with MNR and NYSDOT with respect to existing culverts beneath the railroad tracks and NYS Route 9D and observations regarding stormwater and animal movement. In the future, when replacement or upgrades of culverts are proposed, the Applicant would work with these entities to maintain and/or enhance wildlife connectivity through the culverts while meeting stormwater management requirements.

The zone of influence for the proposed Fjord Trail South would be limited by existing development (e.g., MNR tracks, NYS Route 9D, residential properties in Cold Spring). Existing trails along Dockside Park and Little Stony Point currently affect wildlife with their zone of influence, and thus would not contribute a new zone of influence to the potential effects of the proposed Fjord Trail South. Therefore, operation of the proposed Fjord Trail South is not expected to significantly affect wildlife.

AQUATIC BIOTA

Hudson River

Construction

Fjord Trail South would be elevated over the Hudson River shoreline, except for the portion that would pass through Little Stony Point. Construction of Fjord Trail South would require up to three spud barges, secured by two piles each, for material delivery and storage for the northern portion of the Trail between Breakneck Ridge and Little Stony Point. Piles would be drilled into the mudline and filled with concrete to support the elevated section of Fjord Trail South. All piles would be drilled rather than installed with a vibratory or impact hammer, as drilling produces significantly less underwater noise. Analysis by NOAA in Washington State concluded that rotating steel casements for drilled shafts are not likely to produce underwater sound at a level that is likely to cause injury or noise that would induce adverse changes to fish behavior (NMFS 2018). Increases in underwater noise and shading from the construction barges could lead to temporary habitat avoidance by fish and some macroinvertebrates. All vessels would be shallow draft and would maintain low speeds when moving within the area.

Operation

Fjord Trail South would result in approximately 0.5 acres of overwater coverage along the Hudson River shoreline from the elevated sections of the Trail. For these sections, the piles supporting the elevated sections of the Trail would have an in-water footprint of approximately 365 square feet below Mean Higher High Water (MHHW). Fjord Trail South over the Hudson River has been designed to avoid or minimize impacts below the top of bank and below Mean High Water (MHW), limiting the placement of elements below MHW to specific areas where the Trail must avoid upland utilities or other infrastructure. The loss of 365 square feet of bottom habitat for infaunal[16] macroinvertebrates, or those that live within the sediment, resulting in a loss of forage for fish, would be minimal compared with the habitat available along the shoreline of, and throughout, the Hudson River.

In addition to the loss of bottom habitat within the river occupied by the piles, the shoreline beneath the elevated trail would be stabilized using riprap armor stone interspersed with milled stone tide pools, comprising about 0.07 acres below SHW, of which 0.06 acres would be below MHW.

As the design for the Fjord Trail South advances, SAV survey results for the Hudson River within the Fjord Trail South Corridor will be finalized in coordination with OPRHP and the NYSDEC to avoid and minimize impacts to SAV beds to the extent possible through construction means and methods and elevated trail design. In consultation with the NYSDEC, OPRHP, and NMFS, SAV restoration opportunities would be explored, in areas along the shoreline identified as having the appropriate conditions. SAV restoration and creation and selective control of invasive water chestnut in these areas would be conducted in consultation with OPRHP and NYSDEC. With

[16] Aquatic animals that live within the substrate (SERC 2024).

these restoration efforts, adverse impacts to SAV and the aquatic biota that use SAV, would be minimized. Therefore, construction and operation of Fjord Trail South is not expected to result in significant adverse impacts to aquatic biota within the Hudson River.

Essential Fish Habitat

Consultation with NMFS under the Magnuson-Stevens Act with respect to the protection of EFH would be initiated during the permitting process. At a minimum, in-water construction activities within the Hudson River would adhere to restricted windows for the protection of anadromous species migration (March 1 to June 30). As discussed above, fish would likely avoid the area during construction. Once construction of Fjord Trail South within the Hudson River is complete, motile aquatic biota would be expected to return to the area. The loss of 365 square feet of bottom habitat for infaunal macroinvertebrates would result in minimal loss of foraging area for fish compared with the foraging habitat available along the shoreline and throughout the rest of the Hudson River. SAV restoration and control of invasive water chestnut would be conducted in subtidal regions viable for SAV restoration. Therefore, the Fjord Trail South section would not result in significant adverse impacts to EFH.

Significant Coastal Fish and Wildlife Habitat

Fjord Trail South would be located partially within and adjacent to the Hudson Highlands SCFWH. The Hudson Highlands SCFWH designation is partly due to the presence of spawning area for striped bass, presence of nursery and summering areas for Atlantic sturgeon, and the presence of migration routes for both Atlantic and shortnose sturgeon. As discussed above, in-water construction activities would have the potential to result in temporary increases in suspended sediment that would be localized and expected to dissipate quickly. During construction, erosion and sediment control measures would be implemented to prevent discharge of materials into the Hudson River. The Applicant would consult with NYSDEC and OPRHP with respect to invasive species management to limit the spread of invasive water chestnut. SAV restoration would be conducted in subtidal regions viable for SAV restoration to support fish and other species. The SCFWH designation is also due largely to a significant concentration of wintering bald eagles, with designated wintering habitat located from Denning's Point south to the Notch area, with no designated wintering habitat located within the Fjord Trail South Corridor.

Breakneck Brook

Fjord Trail South would not directly impact Breakneck Brook. The Trail in this area would pass over the existing culvert through which Breakneck Brook flows toward the Hudson River. Sediment and erosion control measures would be implemented during construction to prevent sediments and construction debris from entering Breakneck Brook. Therefore, construction and operation of Fjord Trail South would not result in significant adverse impacts to the aquatic biota of Breakneck Brook.

RARE, THREATENED, OR ENDANGERED WILDLIFE SPECIES

Indiana Bat (U.S. Endangered, NYS Endangered)

While NYNHP has no records of Indiana bats in close proximity to the Fjord Trail South Corridor and Indiana bats are not known to occur anywhere within HHSPP (OPRHP 2010a, 2021a), they have not specifically been surveyed for in this area. Based on habitat preference, Indiana bats may have the potential to forage or roost in the woodland edges where Fjord Trail South would cross Little Stony Point, at Washburn parking lot, and along the approach to the NYS Route 9D tunnel beneath Breakneck Ridge. Therefore, as a precautionary measure, all tree clearing (3-inch

diameter at breast height [dbh] or larger) to construct Fjord Trail South would be limited to the winter hibernation period (November 1 to March 31) to avoid any potential for direct impacts to Indiana bats during the active season. All trees slated to be cut during winter would also be inspected by a trained observer for nesting birds prior to cutting, to avoid impacts to birds protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Approximately 2.1 acres of wooded ecological communities comprising floodplain forest, successional southern hardwoods, oak-tulip tree forest and pitch pine-oak-heath rocky summit would be directly disturbed as a result of the proposed Fjord Trail South, which would not constitute a significant loss of habitat or adversely impact Indiana bats, considering white-nose syndrome is the primary cause of population decline for Indiana bats. The Applicant would consult with OPRHP, NYSDEC, and USFWS, as appropriate, to discuss any additional measures required to minimize potential impacts to the Indiana bat.

Northern Long-eared Bat (U.S. Endangered, NYS Threatened)

Northern long-eared bats are expected to occur in HHSPP (OPRHP 2010a), which contains a vast tract of forest interior habitat and is within five miles of a hibernaculum on the west side of the river (OPRHP 2021, NYNHP 2010, 2021). Although northern long-eared bats are not likely to be found within the Fjord Trail South Corridor due to their preference for interior forest habitat, as a precautionary measure, all tree clearing (3-inch dbh or larger) would be limited to the winter hibernation period (November 1 to March 31). This would avoid any potential for direct impacts to northern long-eared bats during the active and pup-rearing seasons. All trees slated to be cut during the winter would also be inspected by a trained observer for nesting birds prior to cutting, to avoid impacts to these federally protected species during their breeding and nesting seasons. The approximately 2.1 acres of wooded ecological communities comprising floodplain forest, successional southern hardwoods, oak-tulip tree forest and pitch pine-oak-heath rocky summit that would be directly disturbed because of the proposed Fjord Trail South is not considered suitable habitat for northern long-eared bats. Therefore, construction of the proposed Fjord Trail South would not result in a loss of northern long-eared bat habitat. The Applicant would consult with OPRHP, NYSDEC, and USFWS, as appropriate, to discuss any additional measures required to minimize potential impacts to the northern long-eared bat.

Tri-colored Bat (U.S. Proposed Endangered)

As discussed under Section C, "Existing Conditions," tri-colored bats are expected to occur in HHSPP based on habitat availability. The Fjord Trail South Corridor is located approximately 4 to 7 miles away from the closest known hibernaculum (NYNHP 2024). Tri-colored bats are considered to have the potential to occur in the vicinity of the Fjord Trail South Corridor where it passes Little Stony Point and along its approach to the NYS Route 9D tunnel beneath Breakneck Ridge. Woodland edges that could be used for foraging or roosting by tri-colored bats occur in these areas. All tree clearing (3-inch dbh or larger) would be limited to the winter hibernation period (November 1 to March 31). This would avoid any potential for direct impacts to tri-colored bats during the active and pup-rearing seasons. The approximately 2.1 acres of wooded ecological communities comprising floodplain forest, successional southern hardwoods, oak-tulip tree forest and pitch pine-oak-heath rocky summit that would be directly disturbed as a result of the proposed Fjord Trail South would not constitute a significant loss of habitat or adversely impact tri-colored bats, considering white-nose syndrome is the primary cause of population decline for tri-colored bats.

Monarch Butterfly (U.S. Candidate Species)

As discussed under Section C, "Existing Conditions," monarch butterflies are widespread and ubiquitous, and outside of winter, have the potential to occur in any open habitats along the Fjord Trail South Corridor. Following construction, roughly the same amount of marginal habitat would be present for monarch butterflies in these areas, just in potentially different configurations. The Applicant would consider a post-construction planting plan that would feature milkweeds for larval development and native wildflowers for foraging, potentially improving habitat conditions for monarch butterflies from the present and creating a pollinator pathway connecting pollinator plant communities to the extent possible. Monarch butterflies are tolerant of high levels of human activity, and as such, would not be impacted by operation of the Fjord Trail South Corridor through areas in which monarch butterflies could occur. Overall, construction and operation of Fjord Trail South would be unlikely to adversely affect monarch butterfly populations.

Shortnose Sturgeon (U.S. and NYS Endangered)

Although shortnose sturgeon typically occur in the deepest parts of rivers or estuaries, they forage in shallower waters when suitable habitat is present (NMFS 2018). Shortnose sturgeon would be expected to avoid the area during construction in favor of the miles of shallow water habitat available elsewhere along the Hudson River. As discussed above, piles would be drilled into the mudline and filled with concrete to support the elevated section of Fjord Trail South. Drilling produces significantly less underwater noise and would not produce underwater sound at a level that is likely to cause injury or noise that would induce adverse changes to fish behavior (NMFS 2018). The loss of approximately 365 square feet of bottom habitat in the footprint of the piles and placement of 1,920 cubic yards of fill below MHHW in the footprint of riprap to stabilize the shoreline represents a *de minimis* loss of potential foraging habitat for shortnose sturgeon when compared to the amount of similar habitat in the Hudson River. Additionally, restoration of SAV beds that would be implemented as part of the project would eventually provide replacement foraging habitat for sturgeon to mitigate some of that loss. During the permitting process, the Applicant would initiate consultation with NMFS under Section 7 of the Endangered Species Act (ESA) with respect to the potential impacts to shortnose sturgeon from construction and operation of the Fjord Trail South within the Hudson River.

Atlantic Sturgeon (U.S. Endangered, NYS High Priority Species of Greatest Conservation Need)

Juvenile Atlantic sturgeon also have the potential to occur along the Fjord Trail South Corridor while they forage. Similar to shortnose sturgeon, pile drilling could result in impacts to Atlantic sturgeon due to elevated noise levels; however, it is not expected for noise to rise to levels that would result in physiological or behavioral effects to Atlantic sturgeon (NMFS 2019). During construction, Atlantic sturgeon would likely avoid the area in favor of the miles of shallow water habitat available elsewhere along the shoreline and throughout the Hudson River. The loss of approximately 365 square feet of bottom habitat in the footprint of the piles and minor modification of the existing riprap below MHW along the shoreline represents a de minimis loss of potential foraging habitat for Atlantic sturgeon when compared to the amount of similar habitat in the Hudson River. Additionally, restoration of SAV beds that would be implemented as part of the project would enhance foraging habitat for sturgeon to mitigate some of that loss. During the permitting process, the Applicant would initiate consultation with NMFS under Section 7 of the ESA and with the NYSDEC under Article 11 of the New York Environmental Conservation Law with respect to the potential impacts to Atlantic sturgeon from construction and operation of Fjord Trail South within the Hudson River.

Bald Eagle (U.S. Protected, NYS Threatened)

Concerns for this species are related to potential noise impacts associated mainly with the construction of the proposed Fjord Trail South. The closest known bald eagle nest is located less than one mile from the Corridor and is located on the west side of the Hudson River. NYSDEC may require a noise assessment for construction activities. Bald eagles that forage in portions of the Hudson River in the vicinity of the Fjord Trail South Corridor are tolerant of the high levels of human disturbance currently generated by activity in downtown Cold Spring, trains on the MNR tracks, and/or recreational use of the trails on Little Stony Point and Breakneck Ridge. Construction and subsequent use of Fjord Trail South would not cause significant or long-term displacement of bald eagles from foraging habitat on the Hudson River. For precautionary measures, the tops of cranes and any other tall construction equipment would be marked with flagging to prevent bald eagles and other raptors from landing on them.

Peregrine Falcon (NYS Endangered)

Peregrine falcons nest on the exposed ledges of HHSPP that overlook the Hudson River. NYNHP has a record of peregrine falcons nesting in the vicinity of the northern terminus of the Fjord Trail South Corridor. No part of the Fjord Trail South alignment would be constructed in high-elevation areas that are known or potential nesting sites for peregrine falcons. Additionally, peregrine falcons have become highly adapted to human-dominated landscapes in recent decades (Cade et al. 1996, White et al. 2020) and are tolerant of almost any level of human activity taking place below their nest, provided that the nest is inaccessible (Ratcliffe 1972). For construction, due to the proximity of nesting peregrine falcons, a noise impact assessment may be required by NYSDEC. Any work needing to be performed during the restricted period (February 1 to July 31) would be undertaken only after consultation with NYSDEC and in compliance with any NYSDEC required mitigation measures. The tops of cranes and any other tall construction equipment would be marked with flagging to prevent peregrine falcons and other raptors from landing on them. Due to the proximity of the commuter rail activity and vehicular use of NYS Route 9D to the nesting area, the operation and use of the Trail is not expected to significantly impact the nesting falcons.

Osprey (NYS Special Concern)

Osprey occurrence on the Hudson River is most common during spring and fall migration (DeOrsey and Butler 2006). Migrating ospreys or ospreys from nesting sites outside of the project area have the potential to occur in the vicinity of the Fjord Trail South Corridor when foraging for fish over the open waters of the Hudson River. Construction of the Trail would have the potential to displace ospreys from nearshore areas immediately along the Corridor, but any such effect would be temporary and limited in spatial scale. An abundance of comparable open-water foraging habitat would remain available and unaffected elsewhere in the area during construction, such that no to minimal adverse impacts to osprey foraging success or energetic condition would be expected to occur. Similarly, recreational use of Fjord Trail South would not be expected to elevate levels of human disturbance above existing conditions to the extent that ospreys would experience a significant reduction in the amount of undisturbed open-water foraging habitat available to them in the area. Ospreys are known for a high tolerance of human disturbance, and even during nesting, habituate easily to human activity (Poole 1989, Bierregaard et al. 2020). For these reasons, construction and operation of Fjord Trail South is expected to have minimal adverse impact on the osprey.

Cerulean Warbler (NYS Special Concern)

As discussed under Section C, "Existing Conditions," breeding cerulean warblers have been documented within the Fjord Trail South Corridor at Little Stony Point, around the Washburn parking lot, and in the vicinity of Bull Hill. Existing trails on Little Stony Point would be incorporated into the design as feasible to reduce the amount of required vegetation removal, thereby reducing the amount of habitat loss, loss of canopy, creation of new forest edges, and potential fragmentation. The Washburn parking lot expansion would be designed to be as close to NYS Route 9D, as feasible, keeping to the edge of the forested habitat to reduce the impacts to more interior forest. Large trees would be avoided to the extent practicable upon final trail and facility (e.g., parking lot expansion, restrooms) design and layout to maintain forest canopy. All tree clearing (3-inch dbh or larger) would be limited to November 1 to March 31 to avoid potential impacts to breeding cerulean warblers.

The zone of influence for the proposed Fjord Trail South would be limited by existing development (e.g., MNR tracks, NYS Route 9D, residential properties in Cold Spring). Use of existing trails (e.g., along Dockside Park and Little Stony Point) currently affect cerulean warbler with their zone of influence, and thus would not contribute a new zone of influence to the potential effects of the proposed Fjord Trail South. Cerulean warblers breeding in the vicinity of the existing trails must be tolerant of the existing level of human activity. Therefore, operation of the proposed Fjord Trail South would not significantly affect cerulean warblers.

Red-shouldered Hawk (NYS Special Concern)

As discussed under Section C, "Existing Conditions," the red-shouldered hawk is likely to occur in HHSPP based on habitat availability but are unlikely to be present along most of the Fjord Trail South Corridor because of the existing development and human disturbance, although their presence is possible, particularly at Little Stony Point. Existing trails on Little Stony Point would be incorporated into the design, as feasible, to reduce the amount of required vegetation removal, thereby reducing the amount of potential habitat loss, creation of new forest edges, and potential fragmentation. Trees would be removed outside of the red-shouldered hawk breeding season. The tops of cranes and any other tall construction equipment would be marked with flagging to prevent red-shouldered hawks and other raptors from landing on them. Therefore, construction and operation of the Fjord Trail South is not expected to significantly impact red-shouldered hawks.

Timber Rattlesnake (NYS Threatened)

Timber rattlesnakes occur within HHSPP (OPRHP 2010a), and NYNHP has records of the species in the vicinity of the northern portion of the Fjord Trail South Corridor (OPRHP 2021, NYNHP 2010, 2024). As discussed under Section C, "Existing Conditions," the Fjord Trail South Corridor lacks habitats that contain the species' preferred features for birthing rookeries and hibernation dens, except for Little Stony Point, and is isolated from core, eastern areas of HHSPP, where there is suitable habitat for timber rattlesnakes, by a two-lane road (NYS Route 9D) that likely represents a significant barrier to timber rattlesnake movement (Steen et al. 2007, Clarke et al. 2010). Although timber rattlesnakes would not be expected to occur in the narrow sections between the shoreline and the MNR tracks, the entire Fjord Trail South Corridor is potentially suitable for foraging, and especially areas east of NYS Route 9D including the proposed Washburn parking lot expansion. There is a higher likelihood for human-snake interactions on the east side of NYS Route 9D near the Washburn parking lot due to its proximity and unimpeded vegetated landscape from known occurrences.

Concerns for this species pertain to habitat removal and direct impact to individuals. Construction of the Fjord Trail South would generate disturbance that would potentially displace any timber rattlesnakes in the area from the immediate vicinity of the construction activity, although the impact would be temporary and not all sections of the Fjord Trail South would be under construction simultaneously. This would be expected to allow timber rattlesnakes to avoid areas with active construction without significant adverse impacts to their fitness or survivorship. Protection measures that would be implemented to reduce potential impacts to timber rattlesnakes during construction include tree clearing outside of the active seasons (November 1 to March 31), using an on-site NYSDEC-licensed monitor during construction activities if during the active season (April 1 to October 31), and developing and implementing an Education and Encounter Plan in coordination with NYSDEC, as required. Future consultation with NYSDEC is required to determine appropriate mitigation measures for the different sections of Fjord Trail South.

To facilitate animal movement through their habitats, wildlife crossings will be included at points along Meanders and the Main Trail to allow safe passage for animals. These may include elevated trail sections and wildlife culverts under the Trail. In ecologically sensitive areas, the design may include vegetative buffers to keep users on the Main Trail and out of the landscape. Designs will ensure any buffers are porous and contain breaks, to not impede wildlife passage. The Trail design will consider placement of rocks and boulders along the trail edge to not create crevices that would attract snakes and where snakes would likely hide, such as embedding boulders and filling in voids with permanent material.

Existing trails at Little Stony Point would be incorporated into the design, as feasible, to reduce the amount of required vegetation removal. The Washburn parking lot expansion would be designed to be close to NYS Route 9D, as feasible, keeping to the edge of the forested habitat to reduce the impacts to more interior forest. The construction footprint would represent a negligible reduction in wooded foraging habitat available to timber rattlesnakes in the area, and fragmentation caused by the addition of new trails and associated facilities (i.e., parking lot expansion) in areas where there currently are none would not be expected to significantly diminish habitat quality for timber rattlesnakes given their tolerance of fragmentation (Wittenberg 2012, Wittenberg and Beaupre 2014).

Because timber rattlesnakes persist in other areas of HHSPP where there is extensive recreational activity on existing trails, operational usage of Fjord Trail South would be unlikely to displace timber rattlesnakes from potentially foraging in the Trail's vicinity. Use of the Trail and its associated facilities would increase the potential for negative human-snake interactions and indiscriminate killings of timber rattlesnakes, in the event any are present in the area, but this would be mitigated with educational signage and similar outreach measures about protection efforts for protected species. Overall, construction and recreational use of Fjord Trail South would not be expected to result in a significant adverse impact to the local population of timber rattlesnakes in HHSPP.

Eastern Fence Lizard (NYS Threatened)

Eastern fence lizards have been documented within HHSPP (OPRHP 2010a), and the NYNHP has records of the species in the general area of the Fjord Trail South (OPRHP 2021, NYNHP 2010, 2021). As discussed under Section C, "Existing Conditions," the only appropriate habitat for eastern fence lizards near the Fjord Trail South Corridor is on Little Stony Point, on the east side of NYS Route 9D near the Washburn parking lot, and Breakneck Ridge, where there is dry, open woodland, and rocky outcrops and ledges. Although recent surveys conducted by OPRHP and the project team did not find eastern fence lizards on Little Stony Point (OPRHP 2021,

NYNHP 2010, 2021, Graham and Kiviat 2021), fence lizards can be difficult to detect and additional survey efforts under the right weather conditions, time of year, and in appropriate habitat may be necessary to detect presence. With known appropriate habitat in the area, measures that would be implemented to reduce potential impacts to eastern fence lizard during construction include tree clearing outside of the active seasons (November 1 to March 31), using an on-site NYSDEC-licensed monitor during construction activities if during the active season, and developing and implementing an Education and Encounter Plan in coordination with NYSDEC, as required. Consultation with NYSDEC would determine any additional mitigation measures.

Existing trails at Little Stony Point would be incorporated into the design, as feasible, to reduce the amount of required vegetation removal. Some potential habitat for eastern fence lizards on Little Stony Point could be lost, but this would be expected to represent a minimal reduction in total habitat availability for eastern fence lizards in the area such that the size or viability of any population potentially present would not be likely to be significantly impacted.

Eastern Wormsnake (NYS Special Concern)

Eastern wormsnakes occur in HHSPP (OPRHP 2010) and have been documented in the general area of the Fjord Trail South Corridor (OPRHP 2021, NYNHP 2010, 2021). They are generalistic in their habitat associations, occurring in a variety of woodland habitat types (Klemens 1993, Russell and Hanlin 1999, Orr 2006, Diefenbacher and Pauley 2014). As discussed under Section C, "Existing Conditions," eastern wormsnakes have the greatest potential to occur in the vicinity of the Fjord Trail South Corridor at Breakneck Ridge and Little Stony Point. Construction activities such as grading and other ground disturbance would have the potential to result in the direct mortality of eastern wormsnakes within the limits of disturbance. Where appropriate, similar protection measures to those proposed for timber rattlesnakes and eastern fence lizards could be implemented to protect eastern wormsnake, including tree clearing outside of the active season (November 1 to March 31), using an on-site NYSDEC-licensed monitor during construction activities if during the active season, and developing and implementing an Education and Encounter Plan.

To facilitate animal movement through their habitats, wildlife crossings will be included at points along Meanders and the Main Trail to allow safe passage for animals. These may include elevated trail sections and wildlife culverts under the Trail. In ecologically sensitive areas, the design may include vegetative buffers to keep users on the Main Trail and out of the landscape. Designs will ensure any buffers are porous and contain breaks, so as not to impede wildlife passage.

The permanent clearing of trees and other vegetation along the Fjord Trail South Corridor at Little Stony Point would reduce the amount of wooded habitat available for eastern wormsnakes. Existing trails at Little Stony Point would be incorporated into the design, as feasible, to reduce the amount of required vegetation removal. The parking lot expansion would be designed to be close to NYS Route 9D, as feasible, keeping to the edge of the forested habitat to reduce the impacts to more interior forest. There would be a small reduction in forested area compared to the forested extent of the local landscape. Given the species' tolerance of small and urban habitat fragments (Klemens 1993, Russell and Hanlin 1999, Herrera and Cove 2020), it is likely that the large amount of woodland that would remain around Little Stony Point would continue to support eastern wormsnakes following project construction. Eastern wormsnakes have small area requirements and strong home range fidelity (Barbour et al. 1969, Orr 2006), making it likely they would remain in the unaffected areas of the forest (assuming they are present now).

Eastern Hognose Snake (NYS Special Concern)

As discussed under Section C, "Existing Conditions," the open woodlands and sandy meadows on Little Stony Point and areas surrounding the Washburn parking lot are the most likely suitable habitats for eastern hognose snakes in the vicinity of the Fjord Trail South Corridor. Eastern hognose snakes have large area requirements (Plummer and Mills 2000, LaGory et al. 2009, NHDFG 2015) and are reluctant to cross roads (Robson 2011). This may reduce the likelihood of their crossing NYS Route 9D. There remains a lack of data for eastern hognose snake west of NYS Route 9D along the Trail Corridor.

There is the potential for direct impacts and some habitat loss caused by construction of the trails on Little Stony Point and the expansion of the Washburn parking lot. Existing trails on Little Stony Point would be incorporated into the design, as feasible, to reduce the amount of required vegetation removal. The parking lot expansion would be designed to be as close to NYS Route 9D, as feasible, keeping to the edge of the forested habitat to reduce the impacts to more interior forest. During construction, where appropriate, similar protection measures to those proposed for timber rattlesnakes and eastern fence lizards could be implemented to protect eastern hognose snake, including tree clearing outside of the active season (November 1 to March 31), using an on-site NYSDEC-licensed monitor during construction activities if during the active season, and developing and implementing an Education and Encounter Plan.

To facilitate animal movement through their habitats, wildlife crossings will be included at points along Meanders and the Main Trail to allow safe passage for animals. These may include elevated trail sections and wildlife culverts under the Trail. In ecologically sensitive areas, the design may include vegetative buffers to keep users on the Main Trail and out of the landscape. Designs will ensure any buffers are porous and contain breaks, to not impede wildlife passage.

The levels of anticipated recreational activity would also increase the likelihood of negative human-snake interactions and indiscriminate killings of snakes, in the event any are present near the Trail or parking area. Signage and educational information would be installed to inform the public about measures to take when snakes are encountered to reduce the potential for negative human-snake interactions.

Eastern Box Turtle (NYS Special Concern)

Eastern box turtles prefer open forests, forest edges, and successional shrublands, often near water, and can also be found in thickets, stream riparian zones, and low-lying coastal habitats (DeGraaf and Yamasaki 2001, Gibbs et al. 2007). Suitable habitat for eastern box turtles is present in the vicinity of the Fjord Trail South Corridor. To reduce potential impacts during construction, protective fencing may be installed around construction areas to prevent turtles from passing through and getting injured. Similar to timber rattlesnakes and eastern fence lizards, protection measures would include using an on-site NYSDEC-licensed monitor during construction activities if during the active season and developing and implementing an Education and Encounter Plan.

To facilitate animal movement through their habitats, wildlife crossings will be included at points along Meanders and the Main Trail to allow safe passage for animals. These may include elevated trail sections and wildlife culverts under the Trail. In ecologically sensitive areas, the design may include vegetative buffers to keep users on the Main Trail and out of the landscape. Designs will ensure any buffers are porous and contain breaks, to not impede wildlife passage.

Fjord Trail South could eliminate some potential habitat for eastern box turtles, but this would likely represent a negligible reduction in total habitat availability in the area. There would

potentially be an increase in collection pressure due to the increased number of visitors. Interpretive signage and educational information would be installed regarding protected species in general to dissuade collection.

INVASIVE ANIMAL SPECIES

The Applicant would prepare a comprehensive Invasive Species Management Plan that may include the following measures: properly disposing of trees and other vegetation cleared during construction to prevent the spread of infested materials, implementing invasive species management measures to control the spread of emerald ash borer, hemlock woolly adelgid, and spotted lantern fly within the Fjord Trail South Corridor, cleaning and inspection of construction equipment before entering and leaving the Corridor would be taken to ensure invasives species do not spread both on land and in water. Fjord Trail South may also incorporate educational materials throughout the Trail to alert visitors to the threat of both terrestrial and aquatic invasive animal species and ways for individuals to help contain their spread. OPRHP has standard educational signage about aquatic invasive species that can be installed at kayak launches along the Fjord Trail South.

F. MITIGATION

ECOLOGICAL COMMUNITIES AND PLANTS

Avoidance, minimization, and mitigation strategies for ecological communities and plants would be proposed and coordinated with OPRHP and NYNHP, and may include tree protection measures during construction, native tree, shrub and herbaceous replanting, control or removal of invasive species, development of a vegetation management plan, educational and interpretive signage, restoration of SAV, or a combination of these methods as appropriate. Tree protection measures would include radial trenching (three-foot offset from trunk), and the use of tree protection fencing with signage and mulch. Aeration of roots via soil injection or fertilizer would be performed prior to and after construction by a certified arborist, if approved by OPRHP. Any proposed management of vegetation to be conducted as mitigation on OPRHP owned or leased property would be assessed in accordance with OPRHP's Policy on Management of Trees and Other Vegetation and OPRHP's Policy on Native Plants in State Parks and Historic Sites. An Invasive Species Management Plan would also be prepared.

BMPs such as visual inspection and cleaning of equipment/vehicles prior to entering or exiting a work site to prevent transport of invasive species, would be implemented during construction and as part of the Invasive Species Management Plan. Educational signage would be installed to alert trail users about invasive species and the sensitive resources surrounding the Trail with encouragement to remain on trails. Bike-cleaning stations and boot scrubbers may be installed at key locations to encourage trail users to remove any invasive species from their bikes or shoes. In addition, design elements (e.g., boulders, logs, small fencing) would be incorporated to prevent people from leaving the trails and entering sensitive natural areas.

Protection and mitigation strategies would be developed in coordination with OPRHP and NYNHP for populations of the state-listed plant species that would have the potential to be affected by construction of Fjord Trail South. As the design advances, efforts would be made to avoid impacts to mature trees, state-listed species, and other sensitive resources.

Trail and facility design would keep limits of disturbance as narrow as possible while meeting Accessibility needs and other design requirements. The trail surface near or in water resources, to the degree possible, will be elevated to minimize impacts to aquatic communities including the

use of helical piles or micropiles to support boardwalk structures to maintain existing drainage patterns, such as at Little Stony Point. There will be a small permanent loss of oak-tulip tree forest due to the expansion of the Washburn parking lot. To reduce the impact to this community and interior forest, the parking area expansion would be designed to be close to NYS Route 9D, keeping to the edge of the forested habitat, as feasible. To help reduce the impact and mitigate the loss of this area and of other terrestrial natural communities, large trees would be protected to the extent feasible and native plantings will be incorporated into the design of the Trail and facilities. Plans for restoration of native vegetation would consider the resilience, vigor, site specificity, habitat value, and aesthetic value of the species that would be planted. During the final design process, OPRHP may also require additional plant surveys, and OPRHP and NYNHP would have final review and approval of planting lists to assure native plant species are used.

ANIMALS

The Applicant would consult with NMFS, USFWS, and NYSDEC, as appropriate, with respect to aquatic and terrestrial species protected in designated EFH, under the ESA, and under Article 11 of the Environmental Conservation Law. Avoidance, minimization and mitigation strategies that may be implemented to protect aquatic biota, including threatened and endangered species, include requiring vessels to be shallow draft and maintain low speeds, using a vacuum extraction process during sediment withdrawal when drilling the piles, following restricted construction windows for the protection of anadromous species migration (March 1 to June 30), implementing sediment and erosion control measures to prevent discharges of sediment from upland construction from entering the Hudson River or Breakneck Brook, and restoring SAV habitat in areas determined to be suitable for restoration.

To protect Indiana bats, northern long-eared bats, and tri-colored bats, all tree clearing for Fjord Trail South would be limited to the winter hibernation period (November 1 to March 31). This would also offer protection to the cerulean warbler, timber rattlesnake, eastern fence lizard, eastern wormsnake, and eastern hognose snake, breeding birds, and other wildlife by focusing this type of land disturbance on the non-active or non-breeding and nesting seasons for these species. All trees slated to be cut during winter to avoid impacts to bats would also be inspected by a trained observer for nesting birds prior to cutting, to avoid impacts to these federally protected species during their breeding and nesting seasons. In addition, future design would consider modifications to reduce spatial footprints and/or avoid sensitive habitats. Ongoing coordination with OPRHP, NYSDEC, USFWS, and NMFS, as appropriate, will continue as the project advances to ensure that all protected species that have the potential to use the Fjord Trail South Corridor and surrounding habitats are provided adequate protection.

The tops of cranes and any other tall construction equipment would be marked with flagging to prevent bald eagles, peregrine falcons, osprey, and red-shouldered hawks from landing on them. For construction, due to the proximity of nesting peregrine falcons and bald eagles and the potential for other birds of prey to be present, a noise impact assessment may be required by NYSDEC.

The Washburn parking lot expansion would be designed to be as close to NYS Route 9D as feasible, keeping to the edge of the forested habitat to reduce the impacts to more interior forest. Large trees would be avoided to the extent practicable upon final trail and facility (e.g., parking lot expansion, restrooms) design and layout to maintain forest canopy. In addition, to facilitate animal movement through their habitats, wildlife crossings will be included at points along Meanders and the Main Trail to allow safe passage for animals. These may include elevated trail sections and wildlife culverts under the Trail. In ecologically sensitive areas, the design may

include vegetative buffers to keep users on the Main Trail and out of the landscape. Designs will ensure any buffers are porous and contain breaks, to not impede wildlife passage. These design elements (i.e., siting of parking lot expansion, inclusion of wildlife crossings, and vegetative buffers) would help to avoid and minimize potential effects to reptiles (e.g., timber rattlesnake, eastern fence lizard, eastern wormsnake, eastern hognose snake, and eastern box turtle) and other species sensitive to fragmentation (e.g., cerulean warbler). During construction, protective fencing may be installed around construction areas to prevent snakes and turtles from passing through and getting injured.

Signage and educational information would be installed to inform the public about measures to take when snakes are encountered to reduce the potential for negative human-snake interactions. In addition, developing and implementing an Education and Encounter Plan in coordination with NYSDEC would occur as required to avoid and minimize potential effects on sensitive species.

An Invasive Species Management Plan would also be developed in consultation OPRHP and NYSDEC.

If impacts to threatened and endangered species cannot be fully addressed, then mitigation and net conservation benefit to the species will be required through the Incidental Take Permit process. Mitigation measures may include, among others: aligning the Trail away from sensitive habitat areas; design considerations; adjusting the timing and phasing of construction to minimize impacts on wildlife, especially during critical periods of higher biological activity, such as breeding seasons; seasonal Trail section closures; and considerations in siting locations of staging areas. On-going monitoring of sensitive species may be required as well.

Article 20, "New York State Park Preserve System," Section 20.02, indicates the OPRHP Commissioner shall maintain the integrity of the parkland and resources within designated park preserves, shall provide personnel trained in natural sciences to staff park preserves, shall establish environmental education classes for the public to be conducted by naturalists, and shall develop a written stewardship plan for each park preserve.

In addition, as noted above, the lands and waters through which the proposed Fjord Trail Corridor is located have multiple designations related to biological resources. These include: HHSPP Bird Conservation Area, HHSPP Natural Heritage Area, Hudson River Estuary Area of Biological Concern, Significant Coastal Fish and Wildlife Habitats, Essential Fish Habitat, and Winter Waterfowl Concentration Area.

In consideration of these together, the Applicant acknowledges the creation of the Trail would increase human presence in some otherwise relatively undisturbed areas. The Applicant will work closely with OPRHP to make additional resources available toward mitigation in the form of providing personnel trained in natural sciences, establishing environmental education classes for the public, and developing a written stewardship plan for HHSPP.

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