Bird Surveys at the proposed Dover Knolls Development Site Town of Dover, Dutchess County, New York

Existing Conditions

Report prepared for
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Introduction

Bird surveys were conducted in the spring of 2004 at the proposed Dover Knolls development site in the Town of Dover, New York, by Nicholas A. Miller on behalf of Michael W. Klemens LLC. These surveys were completed in order to determine the current composition and distribution of the avian fauna at the site. The bird surveys are part of a larger biodiversity assessment at the site, led by Michael W. Klemens, LLC.

This report contains a description of existing avifauna and related habitat conditions at the Dover Knolls site. Plans for the proposed development were not available at the time this report was prepared; therefore, potential impacts of the project to the site's avifauna are not considered here, but may be provided in a subsequent report.

Methods

The following bulleted list presents protocols for breeding bird surveys that are established in the scientific literature (e.g., see Ralph et al. 1995, among others). These protocols were followed during bird surveys at the Dover Knolls site in order to maximize bird detectability and the reliability of results. Details specific to this site are provided following the bulleted list.

- *Bird surveys should occur during the spring breeding season (mid-May through early July).* Results of surveys conducted during this season indicate which species utilize a site specifically for reproduction; therefore, those results can be used to determine the viability of specific habitats for maintenance of bird populations. Although supplemental data collected outside of the breeding bird season can be valuable, all site assessments should, at a minimum, include surveys conducted during the breeding season.

- *Surveys should occur during the early morning hours.* Peak bird activity (e.g., singing, territorial defense) occurs during this time period; thus, detectability is maximized during these hours.

- *Surveys should occur under fair weather conditions.* Inclement weather (e.g., rain, high winds) impacts bird activity levels and reduces observability.

- *Surveys should follow standardized point-count or transect techniques.* These techniques, applied in scientific research, ensure that results are repeatable and increase the reliability of the data collected.

- *Surveys should be conducted within all habitats on site (e.g., grasslands, forested uplands, forested wetlands), regardless of where proposed construction activities would take place.* Some species are area-sensitive; they are therefore affected by changes to habitat in the vicinity—not just within their breeding territories. In addition, many species depend upon a complex of habitats within the course of their life cycles; it is important to consider not only breeding habitats, but also foraging, roosting, and wintering habitats.

- *Multiple field visits to the same site—spaced throughout the breeding season—increases detectability.* Peak activity levels occur at different periods in the breeding season, depending on the species in question. To maximize detectability of all species, multiple site visits should occur.

Survey methods at the Dover Knolls site

Eight surveys (i.e., visits) were interspersed throughout the breeding bird season of 2004 on the following dates: May 17, May 23, May 29, June 13, June 20, June 21, June 26, and June 28. All birds seen and heard during these surveys were recorded (see Table 1). Visit 7 (June 26) was a nocturnal survey for owls, which commenced at 8:55pm. All other visits were breeding bird surveys that followed the protocols provided in the bulleted list, above. Each breeding bird survey commenced at approximately 5:00 am and continued until bird activity levels declined (generally in the late morning, occasionally into the early afternoon). Weather conditions on these visits ranged from mostly cloudy to clear, with no precipitation; no surveys were conducted during winds in excess of 12 mph.

I conducted transect surveys at this site in order to maximize the number and extent of habitats covered during the surveys. The entire site was surveyed over the

course of the eight visits; most of the habitats were surveyed on two or more visits. All on-site habitats were surveyed, including deciduous and mixed forests, coniferous forests, forested wetlands and shrub swamps, open water (rivers and ponds), vernal pools, marshes, wet meadows and fens, upland meadows and agricultural fields, post-agricultural habitats, developed areas, golf course areas, and gravel mines.

On the first visit, observations were made of some probable migrating species (i.e., birds that are migrating through the area, rather than establishing territories and breeding on site). Some species of conservation concern were also observed. To determine if birds in these two categories were actively holding territories on the site, song playback methods were used on Visits 3 through 8. Song playback (i.e., broadcasting recorded bird songs to elicit territorial behavior and counter-singing) can confirm the continued presence and likely breeding status of these birds. During the nocturnal owl surveys, on Visit 7, playback techniques were employed for all owls that could occur in this area. Equipment used included a digital .mp3 player with portable speakers amplified via battery power.

Results & Discussion

A total of 101 bird species were observed at the Dover Knolls site (see Table 1), including three species designated as Special Concern by New York State (Cooper's hawk, red-shouldered hawk, and cerulean warbler); two species that have been assigned a Heritage rank of S3, meaning that their populations are vulnerable (double-crested cormorant and northern parula); five species that have been categorized on Audubon's WatchList as "declining" (American black duck, worm-eating warbler, blue-winged warbler, prairie warbler, and wood thrush); and one species categorized as "declining rapidly" on the WatchList (cerulean warbler). The site also contains guilds of species (e.g., area-sensitive Neotropical migrants) that are known to decline in response to impacts associated with development and urbanization. In addition, North American Breeding Bird Surveys conducted by the U.S. Geological Survey (Sauer et al. 2004) have revealed significant declines in New York State populations of numerous species that occur at the Dover Knolls site.

The data are presented within the context of broad habitat categories. The habitat categories defined in the Dover Knolls report prepared by Hudsonia Ltd. have been aggregated into broader categories suitable for analysis of bird data. Where relevant—particularly for rare, declining, and listed species—finer detail is provided.

The purpose of this section is to describe existing conditions of the avifauna at the Dover Knolls site. The intent is not to provide location-specific data in relation to potential impacts from the proposed development; such information and analyses may be provided in a subsequent report, after plans for the proposed development have been obtained.

Upland forest (deciduous, mixed, and coniferous)

Hudsonia habitat types: upland deciduous forest, upland conifer forest, upland mixed forest, oak heath barren, red cedar woodland

Forests provide highly variable and often complex vegetation structure. The tree canopies, subcanopies, shrub layers, and herb layers found in healthy forests provide an abundance of habitat niches for forest birds. A certain subset of these birds—often referred to as area-sensitive or forest-interior species—depend upon large expanses of forest that are relatively unaltered and unfragmented (Robbins et al. 1989). Fragmentation of forests by roads and associated developments can eliminate these species from a site by dissecting habitats into units of insufficient size (Saunders et al. 1991). Fragmentation can also degrade remaining, smaller forest patches by increasing the amount of habitat "edge" relative to the amount of habitat "interior," which alters the amount of light, wind, moisture, invasive species, predators, and nest parasites penetrating into the forest habitat. As individual forest patches become increasingly isolated due to continued fragmentation, it becomes more and more difficult for animals to disperse among these patches. For all of these reasons, certain species become extinct in small, isolated fragments.

Upland forest east of Route 22

The eastern portion of the Dover Knolls site contains a large expanse of unfragmented forest, in excess of 400 acres. This forest encompasses numerous types

(e.g., conifer, deciduous, mixed) and spans a ridgeline, adjacent slopes, rocky outcrops, and surrounding areas. Many portions of this forest are of high quality, and the surveys revealed a diverse bird community. See Sullivan et al. (2004) for further discussion of forests at this site.

The community of Neotropical migrants in this area is particularly noteworthy. Hooded warblers occur in abundance here—particularly in the mature forest along the ridgeline, the slopes north and west of the ridgeline, and more sparsely scattered in other forested areas east of Route 22. This robust population of hooded warblers is significant because the Town of Dover lies at the northern edge of the species' breeding range. Also using these forests are a number of neotropical migrants that have been experiencing significant declines statewide or regionally (Sauer et al. 2004) including black-billed cuckoo (observed in the oak heath barren and surrounding deciduous forest in the southeast portion of the site), eastern wood-pewee (observed throughout mixed and deciduous forests east of Route 22), veery (associated with moister woodlands containing dense shrublayers), wood thrush (also "declining" on the Audubon WatchList; observed throughout mixed and deciduous forests east of Route 22), black-and-white warbler (sparsely scattered in deciduous forest), worm-eating warbler (also "declining" on the Audubon WatchList; concentrations occurred in the ravine below the reservoir, in the stream corridor of the extreme southeast portion of the property, and along the steep forested slopes in the east-central portion of the property), American redstart (sparsely scattered throughout), Louisiana waterthrush (associated with forested stream corridors in the southeast portion of the site), scarlet tanager (throughout forested portions of the site), and rose-breasted grosbeak. Other Neotropical migrants found throughout these forests include ovenbird, great crested flycatcher, red-eyed vireo, and yellow-throated vireo. The ravine below and to the west of the reservoir contains an exemplary suite of Neotropical migrant species.

The upland forest east of Route 22 also provides important habitats for other species—in addition to Neotropical migrants—that are present year round, that are passing through on their migration to breeding grounds further north, or that are short-distant migrants (i.e., those species that may not migrate all the way down to the tropics). Among these species, arguably foremost in conservation concern is the ruffed grouse, which has experienced an estimated decline of more than 20% annually in New York State since 1980 (Sauer et al. 2004). One grouse was heard drumming immediately north

of the reservoir, and Klemens' herpetological crew observed six grouse near the greenhouses in the northern portion of the site, just east of Route 22.

The red-shouldered hawk—listed by New York State as "Special Concern"—has established a nest in the vicinity of the vernal pools and forested wetland south of the reservoir. An adult responded to playback and was observed sitting on the nest and also flying low over the reservoir. No young were observed, but the young may already have fledged at the time of detection (June 28). In addition, numerous raptor vocalizations were reported during herpetological surveys of the nearby vernal pool, earlier in the hawk's breeding season.

The eastern towhee is also of great conservation concern. Towhee populations have experienced estimated declines of 5.7% annually in New York State since 1966 (see Figure 1; Sauer et al. 2004). Towhees require forests with dense, tangled undergrowth and will also utilize shrubby areas adjacent to forests. Towhees were observed in low numbers throughout the site, with concentrations in and near the shrubby old-field/post-agricultural habitats near forest borders.

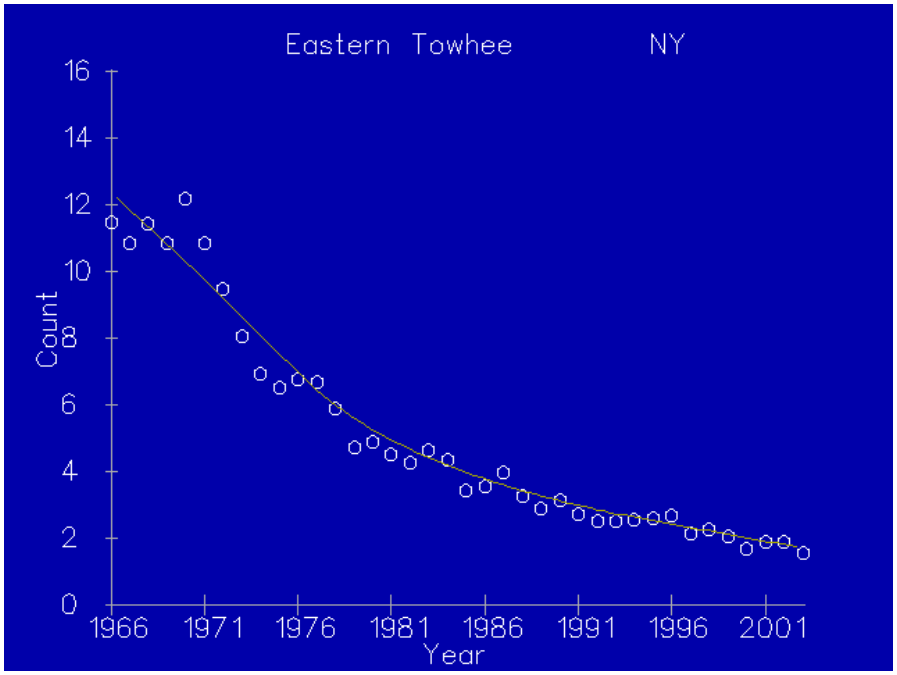

Figure 1. North American Breeding Bird Survey Trend Results for the Eastern Towhee in New York State (-5.7% annually, p<0.00). The left axis indicates number of birds per survey route. *From Sauer et al. (2004).*

A barred owl was observed in the forested stream corridor in the disjunct, extreme eastern portion of the site. Although no downward trends have yet been detected in New York's barred owl populations, this species is considered sensitive to development and has even been assigned an "endangered" status in some areas of the northeast (e.g., State of New Jersey). Numerous observations were made of yellow-bellied sapsuckers south and east of the reservoir. A golden-crowned kinglet—at the southern limit of its breeding range in Dover—was observed in the coniferous forest northwest of the ridge. Other short-distant migrants observed in this portion of the Dover Knolls site included Baltimore oriole, blue-gray gnatcatcher, and blue-headed vireo, among others. The pileated woodpecker, an area-sensitive species, occurs primarily in the southern and eastern forested portions of the site. A red-tailed hawk nest containing nestlings was observed on the steep slopes in the central, mixed forest east of Route 22. The forest also provides habitat for numerous common resident species, including brown creeper, hairy woodpecker, northern cardinal, blue jay, white-breasted nuthatch, and others.

Although survey dates were scheduled to maximize detection of breeding species (i.e., after most migrants have passed through), a number of migrating birds were observed. I include them here because their presence indicates the importance of this forest as stopover habitat, needed by birds to rest and re-fuel. A cerulean warbler (state-listed as "Special Concern," designated as "declining rapidly" on the Audubon WatchList, and found to be the most area-sensitive bird studied by Robbins et al. [1989]) was observed on Visit 1 just west of the cemetery. It is conceivable that cerulean warblers would use this site for breeding, but subsequent visits and playback of cerulean songs at this location and in appropriate habitats throughout the site yielded no results. Therefore, I conclude that this bird was migrating through and did not breed on-site. A Swainson's thrush also was observed during Visit 1 in the ravine just below the dam; again, playback surveys during subsequent visits revealed that this species did not remain for the breeding season. Other birds that were likely migrating through included the blackpoll warbler and the black-throated blue warbler.

There are a number of species that, based on range and habitat availability, could have utilized forests east of Route 22. For example, quality habitat was available for broad-winged hawks, northern harrier, sharp-shinned hawks, northern goshawks, Cooper's hawks, northern saw-whet owls, short-eared owls, long-eared owls, and a number of other forest species of conservation concern. Although these species were

specifically targeted (using playback techniques for most of them), they were not detected.

Upland forest west of Route 22

Upland forests west of route 22 are smaller, more fragmented, less mature, less structurally diverse, and in general contain more invasive plant species than their counterparts to the east of Route 22. Accordingly, they generally have lower avian biodiversity values. Rare and declining bird species do occur here. For example, black-and-white warblers, American redstarts, and wood thrushes were observed in the deciduous forest in the extreme southwest of the site and in the forest north and west of the sewage disposal plant. Eastern towhees were observed in the fragmented woodlands north of the golf course. However, they were not observed in the quantity or diversity found in the more expansive forests at this site. Of note, however, was the presence of a Cooper's hawk (New York State "Special Concern") flying near a small copse of conifers in the predominantly agricultural area in the northwestern portion of the site (see section on "marble knolls"). Although Cooper's hawks are classified as forest birds, they will utilize more fragmented areas and hunt near forest/field edges. Warbling vireos, which were not observed east of Route 22, were found in forest habitats near the Swamp River floodplain. A purple finch was observed in a copse of trees within the upland meadow in the southwest portion of the site.

Marble knoll

Hudsonia habitat type: marble knoll

Marble knolls, which are primarily concentrated north of the golf course, contain a diversity of habitat types. Therefore, analysis of bird data has, for the most part, been presented according to the constituent habitat types of marble knolls. Species of note that occurred in association with the marble knolls north of the golf course include prairie warblers, eastern towhees, and a Cooper's hawk (observed on marble knoll #9).

Marsh and open water (river, pond, and reservoir)
Hudsonia habitat types: constructed pond, river, emergent marsh

Marsh and open water habitats were combined for purposes of this discussion. Open water habitats included small man-made ponds, the river, and the reservoir. Marsh habitats at the Dover Knolls site ranged in quality from the *Phragmites*-dominated marshes along the Swamp River to the high-quality marsh northeast of the reservoir. See the Hudsonia report for more details concerning marsh and open water habitats.

The American black duck ("declining" on the Audubon WatchList) was observed with fledged young in the marsh northeast of the reservoir. This species is likely declining due to interbreeding with its close relative, the mallard, which was also observed on-site. Wood ducks were observed in the middle portion of the Swamp River; their numbers have undoubtedly been enhanced by the installation of artificial nest boxes in the floodplain swamp adjacent to the river. An abandoned nest cavity in a snag was also observed; this is likely to be a natural wood duck nest site.

Habitat also occurs on-site for the American bittern (New York State "Special Concern"), the king rail, and the least bittern (New York State "Threatened"). There are breeding records for both bitterns in Dutchess County, but none of these species were detected. A double-crested cormorant (Heritage Status S3, "vulnerable") was observed flying over the site on one occasion, but there were no indications that this species is using the Dover Knolls site. Marsh wrens, Virginia rails, and sora also breed in marshes of Dutchess County, but they were not observed on the site. A green heron was observed in the northern portion of the site along the Swamp River, near a marsh.

A variety of swallows were observed foraging over open water, including northern rough-winged swallow, barn swallow, tree swallow, and bank swallow. Bank swallows have been declining at an estimated rate of 6% annually since 1966 (Sauer et al. 2004); the barn swallow, often considered a common species, has also been declining at an estimated rate of 2% annually since 1980. The best swallow habitats on-site include the reservoir and Swamp River; the man-made pond in the southeastern portion of the golf course was also used by swallows. Belted kingfishers, which also require open water habitat, were observed at several points along the Swamp River.

Other species associated with marsh and open water habitat were observed, including Canada goose, red-winged blackbird (considered the United State's most abundant bird, but declining in New York State at an estimated annual rate of 2.6% since 1966), great blue heron, and willow flycatcher, among others.

Vernal pool

Hudsonia habitat type: intermittent woodland pool

Vernal pools are small habitats embedded within a larger forested landscape. Therefore, bird species associated with vernal pools tend to be those associated with the matrix forest habitat. Neotropical migrant birds—most of which are considered upland species—tend to be more abundant where landscapes contain a greater proportion of wetland habitats (Flather and Sauer 1996), which includes vernal pools. See the "forests" and "wooded swamps" section for the types of species found in and near vernal pool habitats.

The northern waterthrush, a Neotropical migrant that requires forested wetland habitat for breeding, also often uses vernal pools. Despite song playback methods, however, no northern waterthrushes were detected in vernal pools at this site. The red-shouldered hawk (New York State "Special Concern"), observed at its nest near the vernal pools south of the reservoir, requires a mosaic of habitat types including upland and wetland; it is highly likely that the hawk was using this vernal pool landscape.

Wet meadow and fen

Hudsonia habitat types: wet meadow, calcareous wet meadow, fen

Fens and wet meadows have the potential to provide quality bird habitat, but surveys did not reveal a particularly diverse avifauna in these areas. Sedge wrens (New York State "threatened") require fen and fen-like habitats, and northern harriers often hunt in fens, but neither of these species was detected on site. Possible reasons for the low avian diversity within these habitats include the presence of invasive species, succession of these open habitats into shrubby areas, and the small and distributed nature of these habitats. Barn and tree swallows were found in fairly high numbers feeding over these wetlands. Willow flycatchers and chestnut-sided warblers were also observed

where succession to shrubbier conditions has occurred. Red-winged blackbirds also use these habitats.

If these wetlands were maintained as open (through removal of woody vegetation, cutting or burning) it might be possible to attract a range of other species including the bobolink, which prefers tall grasslands and also breeds in wet meadows. This would also increase the amount of open, unwooded habitat in the western and northwestern portions of the site, increasing the likelihood that American kestrels and eastern meadowlarks will continue to use the site.

Wooded swamp (forested wetland & shrub swamp)
Hudsonia habitat type: hardwood and shrub swamp

As discussed in the Hudsonia report (2004), the site contains extensive tracts of high quality forested wetland and associated shrub swamp. In terms of bird diversity, the best example of this habitat type occurs in the floodplain along the Swamp River. The forested wetland east of the reservoir also contains high quality habitat for birds. Although forested swamps (and scrub-shrub swamps) contain unique species that are generally not found in drier upland wooded areas, they also contain many species associated with uplands. For example, Neotropical migrant birds—most of which are considered upland species—tend to be more abundant where landscapes contain a greater proportion of wetland habitats (Flather and Sauer 1996). The hydrology of swamps generates greater food resources and increased structural complexity, particularly in the shrub layer, which increases niche availability for birds (Golet et al. 1993). Examples of "upland" species that occur in wooded swamps include black-and-white warbler, wood thrush, American redstart, common yellowthroat, great crested flycatcher, veery, and many others.

The northern waterthrush is an area-sensitive, swamp-dependent Neotropical migrant that is of conservation concern in this region. This species was found actively defending breeding territories in the floodplain forest along the entire length of the Swamp River at this site. Northern waterthrushes were also detected in forested wetland northeast of the reservoir, but playback techniques indicated that these individuals did not maintain territories there into the breeding season. The Canada warbler is also a swamp-dependent species in portions of its range. Despite the use of song playbacks in all

forested wetlands on the site, no Canada warblers were detected. The prothonotary warbler, another swamp songbird ("declining" on the Audubon WatchList), was also not detected on site. A northern parula (designated as "vulnerable," S3, by the Heritage Program) and a least flycatcher were observed in the forests of the Swamp River floodplain, north of the train station. A family of yellow-bellied sapsuckers was detected using the forested wetland southeast of the reservoir, in combination with the surrounding forest and the forested swamp due east of the reservoir.

Several bird species associated with dense shrub swamps were detected. These include the swamp sparrow (in wetlands of the Swamp River floodplain, in the south of the site), chestnut-sided warbler (observed in shrubby habitats throughout the site), and yellow-billed cuckoo (around the reservoir and in the shrub swamp in the southwestern portion of the site). The eastern towhee and the veery (declining in New York State at an estimated annual rate of 1.8%; Sauer et al. 2004) were also detected in swamps. These species prefer dense, tangled shrub layers that are often prevalent within forested swamps. The best examples of these shrubby habitats are found in the Swamp River floodplain and also in the swamp east of the reservoir.

Great blue herons were observed flying over the site during every bird survey visit, sometimes on numerous occasions. Because herons often form rookeries in wooded swamps, I searched extensively for a rookery throughout the floodplain. None were found; however, heron colonies need to relocate their rookeries on occasion. Because high quality habitats exist for a heron rookery, and because there is an abundance of great blue herons in the vicinity, any plans to develop this site should consider maintaining the forested wetland habitat in an undisturbed state to accommodate future relocations of heron rookeries.

Upland meadow, agricultural field, and post-agricultural field
Hudsonia habitat types: upland meadow, shrubby oldfield

Grassland habitats and their surrogates—working farmlands—have been declining in the northeastern United States since the early 1900s due to the abandonment of farms and the suppression of wildfires. As these open habitats have succeeded into shrublands and forests, the avifauna associated with them has declined. Today, many grassland species are declining or have disappeared completely (e.g., many of the

grassland sparrows, bobolinks, meadowlarks, and upland sandpipers). An assortment of open habitats (meadows, shrublands, and agricultural fields) is still found in the western portion of the Dover Knolls site; the eastern portion of the site contains shrubby post-agricultural habitats scattered throughout in a range of sizes.

In the more open (i.e., relatively less shrubby) habitats, birds that were detected include chipping sparrow, field sparrow, song sparrow, American kestrel (hunting over agricultural fields in the northwest portion of the site), barn swallow, indigo bunting (along field and grassland edges), prairie warbler, eastern kingbird, eastern meadowlark (in the hayfield in the extreme northwest portion of the site), eastern bluebird, and of course the American robin (which was also found throughout the site in a variety of habitats), among others. Of these, several have experienced significant declines in New York in recent decades (Sauer et al. 2004), including eastern kingbird, barn swallow, field sparrow, American kestrel, eastern meadowlark (5% estimated annual decline since 1966), and even the song sparrow. Perhaps more revealing, however, was the absence of several species that could have occurred in the more open habitats, including northern harrier, bobolink, Vesper sparrow, grasshopper sparrow. Despite the use of song playback techniques to increase the detectability of these species, none of them were observed.

Birds observed in the shrubbier post-agricultural habitats include the white-eyed vireo (observed in the large shrubby oldfield west of the main ridgeline), gray catbird, American goldfinch, field sparrow, chestnut-sided warbler, prairie warbler, blue-winged warbler ("declining" on the Audubon WatchList), song sparrow, eastern towhee, indigo bunting, and chipping sparrow. Neither golden-winged warblers (New York State "Special Concern" and designated as "declining rapidly" on Audubon's WatchList) nor yellow-breasted chats (New York State "Special Concern") were detected in this habitat type, despite the use of song playbacks.

The presence of agricultural and post-agricultural lands presents an opportunity for restoration that could contribute significantly to the avifauna at this site, as well as the greater landscape and region.

Developed areas, golf course, and gravel mine

Hudsonia habitat types: cultural, developed, waste ground

The areas that have received the greatest degree of human land use include the golf course, the gravel mines north of the golf course, the train station and associated structures, the sewage treatment plant, the hospital and surrounding infrastructure and residences, and all paved areas. Developments of these types tend to increase the abundance of a small suite of bird species, while decreasing or eliminating many other species. Species that benefit (and that were observed in these areas) include the house finch, house sparrow, northern mockingbird, house wren, rock dove, blue jay, American crow, common grackle, European starling, and American robin. In terms of bird habitat, the golf course functions as an expansive lawn, favoring robins, grackles, and some swallows (which reach their greatest abundance at the pond in the southeastern portion of the golf course). The presence of buildings, houses, and associated infrastructure (whether abandoned or not) favor house finches, rock doves, starlings, and robins. An eastern screech-owl was detected in the abandoned residential area. Because lawns associated with the buildings and residential areas have, in many cases, not been maintained, relatively less common species associated with natural grasslands also occur here, including eastern bluebird and chipping sparrow.

Focusing development and re-development into the areas discussed in this section would result in the least impact to avifauna at the Dover Knolls site. Many of the species that occur in these areas would persist after residential development.

Summary and Conclusions

All conclusions provided here are based solely on existing avifaunal conditions at the Dover Knolls site and are not provided in response to site plans, which have not been provided at this point. Therefore, the conclusions drawn are broad and general in nature.

The habitat that possesses the greatest conservation value for birds is the forest and associated wetland habitat in the eastern portion of the site. This forest provides high

quality habitat for numerous forest-interior, area-sensitive species that are declining throughout the northeastern United States due to development, urbanization, and associated habitat fragmentation and degradation. The quality of this intact forest is enhanced by the presence of vernal pools, open waterbodies, streams, ravines, wooded swamps, and shrubby openings, which combine to create a diversity of habitat niches. This portion of the site contains numerous species with conservation status (i.e., state-listed, Heritage status, WatchList status, and/or species that are known to be experiencing sharp declines in the state). Development plans that fragment or otherwise disturb this forest would result in negative impacts to birds within this site and town-wide.

The wooded swamp along the floodplain of Swamp River also provides very important bird habitat. Impacts to birds in this swamp could be reduced by setting back development in adjacent upland areas. The swamp is of sufficient conservation value to merit setbacks that meet or exceed state or town minima.

The western area of the site (surrounding the western portion of the golf course and continuing to the western site boundary) contains significant species that are rare and/or declining within New York State. Although this area has received relatively intensive land use pressures, there is tremendous potential for restoration of early-successional habitats—both wetlands and uplands. Restoration of upland meadows, wet meadows, fens, and shrublands could greatly enhance the avian diversity at this site, which would also have a positive impact at broader scales (town- and region-wide).

The areas that have already received the greatest development pressures (i.e., the hospital compound, the correctional facility, the abandoned residential area, and the golf course) do not provide quality habitats for birds; surveys in these areas revealed a suite of development-associated species. If the Dover Knolls site is to be developed, these areas can most sustainably accommodate that development with the least impact to the site's avifauna.

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Table 1. Bird species observed at the Dover Knolls site

Common Name	Latin Name	New York State Status	Heritage Status*	Audubon WatchList Status
Double-crested cormorant	*Phalacrocorax auritus*		S3	
Mallard	*Anas platyrhynchos*			
American black duck	*Anas rubripes*			Declining
Wood duck	*Aix sponsa*			
Canada goose	*Branta canadensis*			
Great blue heron	*Ardea herodias*			
Green heron	*Butorides virescens*			
Killdeer	*Charadrius vociferus*			
Ruffed grouse	*Bonasa umbellus*			
Wild turkey	*Meleagris gallopavo*			
Rock dove	*Columba livia*			
Mourning dove	*Zenaida macroura*			
Turkey vulture	*Cathartes aura*			
Cooper's hawk	*Accipiter cooperii*	Special Concern		
Red-tailed hawk	*Buteo jamaicensis*			
Red-shouldered hawk	*Buteo lineatus*	Special Concern		
American kestrel	*Falco sparverius*			
Barred owl	*Strix varia*			
Eastern screech-owl	*Megascops asio*			
Yellow-billed cuckoo	*Coccyzus americanus*			
Black-billed cuckoo	*Coccyzus erythropthalmus*			
Belted kingfisher	*Ceryle alcyon*			
Hairy woodpecker	*Picoides villosus*			
Downy woodpecker	*Picoides pubescens*			
Yellow-bellied sapsucker	*Sphyrapicus varius*			
Pileated woodpecker	*Dryocopus pileatus*			
Red-bellied woodpecker	*Melanerpes carolinus*			
Northern flicker	*Colaptes auratus*			
Chimney swift	*Chaetura pelagica*			
Ruby-throated hummingbird	*Archilochus colubris*			
Eastern kingbird	*Tyrannus tyrannus*			
Great crested flycatcher	*Myiarchus crinitus*			
Eastern phoebe	*Sayornis phoebe*			
Eastern wood-pewee	*Contopus virens*			
Willow flycatcher	*Empidonax traillii*			
Blue jay	*Cyanocitta cristata*			
Common raven	*Corvus corax*			
American crow	*Corvus brachyrhynchos*			
Fish crow	*Corvus ossifragus*			
European starling	*Sturnus vulgaris*			
Brown-headed cowbird	*Molothrus ater*			
Red-winged blackbird	*Agelaius phoeniceus*			
Eastern meadowlark	*Sturnella magna*			
Baltimore oriole	*Icterus galbula*			
Common grackle	*Quiscalus quiscula*			

** Status provided only for species designated S3 (Vulnerable) or lower.*

Table 1. Bird species observed at the Dover Knolls site (Continued)

Common Name	Latin Name	New York State Status	Heritage Status*	Audubon WatchList Status
Purple finch	*Carpodacus purpureus*			
House finch	*Carpodacus mexicanus*			
American goldfinch	*Carduelis tristis*			
Chipping sparrow	*Spizella passerina*			
Field sparrow	*Spizella pusilla*			
Song sparrow	*Melospiza melodia*			
Swamp sparrow	*Melospiza georgiana*			
Eastern towhee	*Pipilo erythrophthalmus*			
Northern cardinal	*Cardinalis cardinalis*			
Rose-breasted grosbeak	*Pheucticus ludovicianus*			
Indigo bunting	*Passerina cyanea*			
Scarlet tanager	*Piranga olivacea*			
Barn swallow	*Hirundo rustica*			
Tree swallow	*Tachycineta bicolor*			
Bank swallow	*Riparia riparia*			
Northern rough-winged swallow	*Stelgidopteryx serripennis*			
Cedar waxwing	*Bombycilla cedrorum*			
Red-eyed vireo	*Vireo olivaceus*			
Warbling vireo	*Vireo gilvus*			
Yellow-throated vireo	*Vireo flavifrons*			
Blue-headed vireo	*Vireo solitarius*			
White-eyed vireo	*Vireo griseus*			
Black-and-white warbler	*Mniotilta varia*			
Worm-eating warbler	*Helmitheros vermivorum*			Declining
Blue-winged warbler	*Vermivora pinus*			Declining
Northern parula	*Parula americana*		S3	
Yellow warbler	*Dendroica petechia*			
Black-throated blue warbler	*Dendroica caerulescens*			
Yellow-rumped warbler	*Dendroica coronata*			
Cerulean warbler	*Dendroica cerulea*	Special Concern		Declining Rapidly
Chestnut-sided warbler	*Dendroica pensylvanica*			
Blackpoll warbler	*Dendroica striata*			
Prairie warbler	*Dendroica discolor*			Declining
Ovenbird	*Seiurus aurocapilla*			
Northern waterthrush	*Seiurus noveboracensis*			
Louisiana waterthrush	*Seiurus motacilla*			
Common yellowthroat	*Geothlypis trichas*			
Hooded warbler	*Wilsonia citrina*			
American redstart	*Setophaga ruticilla*			
House sparrow	*Passer domesticus*			
Northern mockingbird	*Mimus polyglottos*			
Gray catbird	*Dumetella carolinensis*			
Carolina wren	*Thryothorus ludovicianus*			
House wren	*Troglodytes aedon*			
Brown creeper	*Certhia americana*			

Table 1. Bird species observed at the Dover Knolls site (Concluded)

Common Name	Latin Name	New York State Status	Heritage Status*	Audubon WatchList Status
White-breasted nuthatch	*Sitta carolinensis*			
Tufted titmouse	*Baeolophus bicolor*			
Black-capped chickadee	*Poecile atricapillus*			
Golden-crowned kinglet	*Regulus satrapa*			
Blue-gray gnatcatcher	*Polioptila caerulea*			
Wood thrush	*Hylocichla mustelina*			Declining
Veery	*Catharus fuscescens*			
Swainson's thrush	*Catharus ustulatus*			
American robin	*Turdus migratorius*			
Eastern bluebird	*Sialia sialis*			