HUDSONIA
a nonprofit institute

PO Box 5000, Annandale, NY 12504
Phone: (845) 758-7053
Fax: (845) 758-7033
kiviat@bard.edu
www.hudsonia.org

Potential Impacts on Wildlife of Noise from the Proposed Factory at 850 Route 28, Town of Kingston, Ulster County, New York

by Erik Kiviat PhD PWS

Hudsonia

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In this report, at the request of the Woodstock Land Conservancy and Catskill Mountainkeeper, I address the potential impacts on wildlife of noise from the proposed industrial development at 850 Route 28 in the Town of Kingston, Ulster County, New York. My review was restricted to the SEQRA documents and the scientific literature about noise effects on animals. The applicant has not provided a full Environmental Impact Statement (EIS), and the potential impacts of the proposed project on wildlife have not been adequately addressed. It now falls to the Town Planning Board to address those deficiencies.

The Bluestone Wild Forest (BWF) lands support diverse wildlife and plants. The project site itself and the surrounding areas contain lakes, quarry pit ponds, temporary pools, at least one stream, wetlands, forest, a recently clearcut area, and a variety of rocky, post-quarrying, wooded and non-wooded habitats. Onteora Lake and Pickerel Pond are important recreational lakes adjoining and near the site, and the extensive wetlands on both sides of Route 28, into which the lakes drain, are important habitats for wildlife and plants. My analysis indicates that noise from project construction during the stated 2-3 year period will have adverse impacts on a number of sensitive wildlife species known or likely to occur on or near the site, including certain species listed by New York as Species of Greatest Conservation Need.

I reconnoitered representative portions of the BWF adjoining the development site on 16 May 2019 (Kiviat 2019) and studied a different area of BWF in 2011 (Kiviat 2012). I have also conducted field work in a variety of other locations in the Catskills region, including abandoned quarrying terrains and the habitats of many of the species discussed here. Hudsonia does not advocate for or against land use projects. Rather, we review scientific literature and environmental documents, make observations, and analyze potential impacts on biodiversity.

Noise and Wildlife

Recent research, including both field studies and laboratory studies, has demonstrated a variety of impacts on wildlife from anthropogenic sound. Adverse impacts have been found for invertebrates (Morley et al. 2014), fish (Anderson et al. 2011), amphibians (Troïanowski et al. 2017, Simmons and Narins 2018), reptiles (Bowles et al. 1999), birds (Botallico 2016, Mulholland et al. 2018), and mammals (Kight and Swaddle 2011), to cite a few examples. Impacts include interference with acoustic communication, adaptation of acoustical signals to be effective in noisy environments, increases in stress hormone levels, immune suppression, hearing loss, behavioral changes, avoidance of or attraction to noisy areas, and diminished fitness. In some situations, impacts begin at modest sound levels. For example, the review by Shannon et al. (2016) stated, “This literature survey shows that terrestrial wildlife responses begin at noise levels of approximately 40 dBA, and 20% of papers documented impacts below 50 dBA.” A few of the studied noise impacts on wildlife are shown in Table 1, with examples selected from different taxonomic groups.

In the present analysis, I have had to assume equivalence between raw sound pressure data (dB) and variously frequency-weighted data (e.g., dBA). While this may distort my comparisons to some extent, the differentials are great enough between the reported levels causing negative impacts to wildlife and the modelled or predicted levels generated by the proposed development for me to believe that there will indeed be adverse impacts.

Table 1. Examples of relevant scientific literature about noise impacts on wildlife. Many more studies demonstrating noise impacts to wildlife may be found in the open scientific literature.

Wildlife species or group (lab or field study)	**Finding**	**Reference**
Wood frog (field and lab)	Traffic noise produced physiological stress & inhibited female migration to breeding pool	Tennessen et al. 2014
European treefrog (lab)	Traffic noise increased stress hormone levels & suppressed immune response	Troïanowski et al. 2017
Box turtle (field)	Slight noise disrupted nest-digging behavior	Congello 1978
Desert tortoise (outdoor enclosure)	Simulated jet noise overhead caused some tortoises to freeze; after the first exposure they continued to exhibit milder behavior change as did the non-freezing tortoises	Bowles et al. 1999
Birds	Noise caused interference with communication sounds including alarm calls	Grade and Sieving 2016, Dooling & Leek 2018, Zhou et al. 2019
Various	Evolutionary adaptations to noise	Swaddle et al. 2015
Cavity-nesting songbirds (field)	Gas compressor noise affected nesting habitat selection, numbers of nests declined from 55 to 80 dB for 2 of 4 species studied (the other 2 were unaffected)	Kleist et al. 2017
Pallid bat (lab)	Playback of traffic and gas compressor noise at 58-76 dB, and amplifier noise at 35 dB, reduced foraging efficiency. References cited within indicate European *Myotis* spp. bats avoided traffic noise or experienced reduced foraging efficiency.	Bunkley & Barber 2015

The noise impact studies cited here mostly pertain to wildlife species in other regions; however, the nature of the impacts and responses is such that I expect similar impacts on species of the site and the BWF. Based on habitat assessments and biological surveys Hudsonia has conducted in the Bluestone Wild Forest and other nearby areas (in 2011, 2019, etc.), there are likely to be variably sensitive wildlife species some of which are shown in Table 2 below. I emphasize that the ecology and behavior of many common and rare wildlife species of this region are poorly studied, thus effects of human activities are often not well understood or highly predictable.

Table 2. Selected species that are likely to occur on and near the site (see Kiviat and Stevens 2001) and that are potentially sensitive to noise associated with the proposed industrial facility. * New York Species of Greatest Conservation Need (SGCN).

Local Species	**Habitat Affinities**	**Seasonal Occurrence**
Northern Gray Treefrog, *Hyla versicolor*	Diverse ponds and pools for breeding; various wooded & nonwooded habitats the rest of year	Resident; dormant in winter
Wood Frog, *Lithobates sylvaticus*	Intermittent ponds for breeding; woods the rest of year	Resident; dormant in winter
Eastern Box Turtle, *Terrapene carolina**	Woods, woods edges, open areas; uses standing water in ponds and wetlands in hot weather	Resident; dormant in winter
Great Blue Heron, *Ardea herodias*	Nests in dead trees; forages in diverse surface waters & fields	Spring-summer-fall; a few birds remain all winter at open water
Cooper's Hawk, *Accipiter cooperi**	Nests in woods or conifer plantation	Spring-summer-fall; a few birds remain during winter
Red-Tailed Hawk, *Buteo jamaicensis*	Nests in woods or woods edges; forages in non-wooded areas	Resident all year; migrants also pass through
American Woodcock, *Scolopax minor**	Nests & forages in young woods, shrub thickets, swamps; courtship displays in open areas	Mostly spring-summer-fall (local breeders and migrants)
Wood Thrush, *Hylocichla mustelina**	Woods & woods edges, especially extensive mature forest	Spring-summer-fall
Blue-winged Warbler, *Vermivora cyanoptera**	Shrub-sapling stands, wet or dry	Spring-summer-fall
Yellow Warbler, *Setophaga petechia*	Wet or dry shrubland, common reed stands, etc.	Spring-summer-fall
Ovenbird, *Seiurus aurocapillus*	Woods	Spring-summer-fall
Scarlet Tanager, *Piranga olivacea**	Woods & woods edges	Spring-summer-fall
Several bat species * (the region supports 9 species of which 8 are classified as SGCN)	Diverse wooded & non-wooded areas; roost in trees, rock crevices, & structures; forage along woods edges & watercourses	Spring-summer-fall
Bobcat, *Lynx rufus*	Most upland & wetland habitats; commonly dens in rocky areas	Resident all year

How Much Noise Will Site Preparation and Construction Make?

Potential noise impacts on people and wildlife have been posited in discussions of the environmental impacts and permitting of the proposed pre-cast concrete factory at 850 Route 28 adjoining the Bluestone Wild Forest (BWF). The two proposed factory buildings would be within 100 meters of the northern and eastern property lines where the industrial site adjoins the BWF (Medenbach & Eggers 2018). The application states (Medenbach & Eggers 2020):

> *Initial site preparation, comprised of rough grading the building pad, associated roadways and stormwater features for both buildings, will produce noise from drilling, blasting, stone processing, hauling and excavating activities. Drilling and blasting will be needed to remove the highwalls left over from the former mining operation and the stone generated from these blasts will be processed for use or hauled away. Once the highwall has been levelled and rough grades have been achieved, drilling and blasting activities will cease. These site preparation activities are expected to occur during the first two to three years of the project. Construction activity will be quieter, with noise generated by haul trucks and excavators completing the final grading of the building pad, associated roadways and stormwater features. Once the site is built out and operational, noise will be limited to tractor-trailers delivering materials and picking up finished products and haul trucks and forklifts moving materials and products to and from the yard and into the building.*

Medenbach & Eggers (2020, p. 11) asserted that site preparation noise would be limited to daylight hours therefore would not disturb foraging bats. This assumes that roosting bats would not be affected by the noise. Weekend noise (also without blasting) was estimated by the applicant as 55.4 dBA at the property line (Medenbach & Eggers 2020). Noise impacts from rock removal and blasting are projected to occur for 2-3 years. Noise at Pickerel Pond (just outside the northwestern property line) "with proposed mitigations" was estimated at 67.7 dBA. Site preparation noise levels were estimated at 40-66.7 dBA, mostly above 50 dBA, at property lines, assuming an intervening earthen berm (H2H 2019). Reviews of the applicant's noise studies by Barton & Logiudice (2020) and CHANGE Environmental (2020) suggest that noise levels could be much higher than those stated by Medenbach & Eggers. The projected levels mostly exceed levels known to cause disturbance to wildlife (Shannon et al. 2016).

Many of the published studies of noise impacts on wildlife measured animal responses to traffic noise at various levels. Industrial site preparation and construction noise will be more temporally variable than highway traffic noise, and will include sudden much louder sounds (blasting, of course, but also other sounds) which could make it harder for animals to habituate. (It should also be noted that noise can cause physiological stress despite behavioral habituation.) Given the widespread documentation of traffic noise impacts on wildlife, it's likely that trucks entering and leaving the site, and possibly idling onsite, will affect wildlife behavior and physiology on and near the site, in addition to the impacts of construction noise as discussed here.

Will this Project Disturb Wildlife on Neighboring Lands?

I must emphasize that, although impacts on wildlife at levels of approximately 50-65 dB at the property lines may be subtle, these impacts almost certainly will include avoidance of the area by some species (e.g., certain forest-breeding songbirds), interference with animal communication and other behaviors, and physiological stress that will reduce fitness of individuals. Moreover, impacts of noise from the industrial facility will for some species be additive to the effects of visual disturbance from movements of equipment and people, vegetation removal, dust generation, siltation of the quarry pits and other wetlands,

changes in stormwater runoff, other alterations of habitat within the development site, night lighting, and larger-scale processes that include climate change and other existing and near-future land use nearby. If blasting occurs during site preparation or construction, there will be additional wildlife impacts such as collapse of rock structures.

Here are a few examples of bird species known to respond negatively to noise in studies at other regions. Numbers of four bird species that very likely breed near the 850 site boundaries, American robin, cedar waxwing, yellow warbler, and chipping sparrow, were affected by experimental road noise at < 55 dB (McClure et al. 2013). Eight hundred meter noise buffer zones to protect nesting bald eagles and red-tailed hawks were recommended by Call (1979); red-tailed hawk likely nests within this distance of the site, and bald eagle nesting is quite possible given the two large lakes and the expanding Hudson Valley eagle population. Bosakowski et al. (1993) recommended a permanent 600 m buffer zone between a Cooper's hawk nest and any habitat alterations including development; Cooper's hawk is listed as Special Concern in New York. One concern expressed by Bosakowski et al. was that noise near the nest could result in the attending adult flushing and exposing itself and the eggs to predation.

In conclusion, I believe that site preparation and construction at 850 Route 28 for 2-3 years will have an ecologically significant adverse effect on some of the local fauna. Lack of detail and ambiguity in the development proposal, and lack of knowledge of the wildlife on and near the site, make it hard to interpret the controversy about noise and apply the results to understanding disturbance to BWF and its wild fauna.

In my earlier report (Kiviat 2019) about potential impacts on bats, I stated:

> *Environmental documents for the industrial project assert that, since agency guidelines will be followed (e.g., tree removal during winter only), there will be no harmful effects to the federally-listed Indiana bat and northern long-eared bat. Even if the wooded areas of the site are preserved, the construction and operations noise (and night lighting) may make the site and nearby areas uninhabitable by those bat species. Published research indicates that chronic loud noise from industrial activities can make habitat unusable by certain bat species (e.g., Bunkley et al. 2015). Noise can also deter other wildlife from using otherwise suitable habitats (Francis and Barber 2013). Many bird species are sensitive to chronic noise. Because comprehensive biological surveys have not been conducted at and near the industrial site, it is impossible for me to judge the extent to which species of conservation concern might be affected by the proposed project.*

My current analysis leads me even more strongly to this conclusion about the impacts of construction noise.

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