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**Review of Incidental Take Permit Application for Construction of
an Access Road to the Red Wing Mine, White Schoolhouse Road,
Town of Rhinebeck, Dutchess County, New York**

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Hudsonia

Report to the Rhinebeck Town Board

Rhinebeck, New York

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Preamble

Hudsonia was asked to review the application of Red Wing Properties to the New York State Department of Environmental Conservation (DEC) for an Incidental Take Permit (for the state threatened Blanding's turtle) required prior to construction of a new access road to the Red Wing mine site on White Schoolhouse Road (Anonymous 2020). Separately, Red Wing has also applied to the DEC for expansion of the existing, inactive mine in the northern end of the site (Griggs-Lang 2008). Hudsonia is a nonprofit institute conducting ecological research and providing information to environmental professionals for decision making in land use and conservation. We do not advocate for or against land use projects; rather we collect data, make observations, synthesize scientific information from the literature, analyze environmental documents, and in some cases prepare recommendations concerning biological diversity (biodiversity) and its conservation.

The Site

The Red Wing site covers 241 acres on the west side of White Schoolhouse Road approximately 1 km (0.62 mile) straightline distance south of Route 308. The site is about 1 km long from south to north. A previous owner mined the northernmost 37 acres of the site; the mine has been inactive for several years. The southern, majority portion of the site is farmed and was planted to field corn in 2020. The upland portions of the site are underlain principally by Hoosic gravelly loam, a soil formed in gravelly glacial outwash. The site borders or is close to the western edge of the Gallatin Thrust Slice (Fisher and Warthin 1976), a long tongue of bedrock that extends southward from Columbia County as far as Pleasant Plains. The Thrust Slice is composed of bedrock of the Elizaville Formation, namely interbedded argillite and quartzite. The Thrust Slice, moving horizontally, dragged with it blocks of limestone along the western edge of the Slice. The Red Wing site lies between Sepasco Lake (north 2.5 km) and Zipfeldberg Bog (south about 3 km), both of which also have areas of limestone bedrock or uprooted limestone. As explained below, the gravelly glacial outwash allowed the formation of a Blanding's turtle habitat complex at and near the Red Wing site, and the limestone is present as ledge-and-talus in small knolls and ridges overlapping the southern edge of the site.

Northwestern Dutchess County has been used and altered historically by logging, farming, mining, roadbuilding, wetland fill and drainage, planting, and many other human activities with unintentional and intentional ecological effects on the landscape. Many altered areas provide biodiversity support services, and should be examined for their present and potential future roles in the conservation of uncommon and rare biota. This is an imperative of nature management, and not a rationale for additional alteration of the landscape. Abandoned soil mines can have many habitat functions (e.g., Svedarsky and Crawford 1982, cited only as examples, not for specific application to the Red Wing site). Because some soil mines support large populations of uncommon or rare species, such as bank swallow, and soil mines also have impacts to surface waters and groundwaters, vegetation, and soils of those habitats, both onsite and offsite, the involved parties, including mining companies, regulatory agencies, and citizens, have a responsibility to work together to optimize understanding, conservation, and management of habitats and species at current and former mining sites.

The Blanding's Turtle

In the western two-thirds of Dutchess County, sand and gravel mines typically are established in deep glacial outwash deposits that also hold rich groundwater aquifers and often support the habitat complexes of the Blanding's turtle, a New York Threatened species (Kiviat 1997, Kiviat and Stevens 2001). This has resulted in conflicts of natural resource management. At the Red Wing site, the Blanding's turtle is the emergent issue in regulation; however, analysis and balancing of concerns should not stop with this one species. Biodiversity is more than Endangered and Threatened species, despite that the rest of nature is often dismissed during environmental reviews. The Blanding's turtle requires a habitat complex that includes core wetland habitat(s) in which the turtles spend much of their time; associated wetlands that may serve for foraging, thermoregulation, and rehydration during nesting migrations; nesting habitat(s) with sunny, sparsely vegetated, friable, coarse-textured mineral soil at least 20 cm (8 inches) deep; springfed ponds or deep wetland pools used for refuge during dry summers and droughts; and "corridors" that allow safe movement among all those habitats. The habitat complex may cover one to several square kilometers of the landscape, and the adult turtles are highly mobile often moving 1000 m or more, in days or weeks, between core wetland and nesting area, or between wetlands (Kiviat 1997).

The Red Wing site is part of a habitat complex of excellent quality for Blanding's turtle. Among its components are a large (ca. 4 hectares = 10 acres) kettle shrub pool – intermittent woodland pool - this portion of New York State Freshwater Wetland RC-30 is essentially deep flooding swamp dominated by tall shrubs (mostly buttonbush, *Cephalanthus occidentalis*), with red maple and highbush blueberry on woody hummocks (raised root crowns), and compares favorably to many of the core wetland habitats I have studied in the county. There are also two smaller kettle shrub pools of ca. 0.8 (south) and 0.5 (north) hectares just east of the mined area and narrowly connected to the main part of wetland RC-25. A variety of associated wetlands and ponds is also present onsite and offsite, including small and large mine pit excavations with permanent or intermittent water, tree swamp, and a large beaver flowage. There is extensive potential nesting habitat such as around the margins of the crop fields and in the abandoned mine area and its margins. It should be noted that the Red Wing site was included in a much larger area recognized as a "Priority Conservation Area" (Reinmann and Stevens 2007) and identified as a potential Critical Environmental Area by the Town Conservation Advisory Board (Stevens and Kiviat 2014). These designations included the extensive potential Blanding's turtle habitat complexes as well as several types of habitats for other species of conservation concern.

Problems with the Incidental Take Permit Application

I have performed many trapping surveys for Blanding's turtle in Dutchess County 1985-present, and my colleagues and I radio-tracked Blanding's turtles for a dozen years at Arlington High School – James Baird State Park in Dutchess County. This experience led to standardization of techniques to make surveys as comparable to each other as possible. The Blanding's turtle work performed at the Red Wing site is not comparable, and is deficient in several ways.

The authors of the report (Anonymous 2011) are not named nor is their experience stated. As in most field biology work, more experienced field workers find more rare organisms including more Blanding's turtles.

Blanding's turtle trapping was apparently not accompanied by scanning the wetlands with binoculars. In some wetlands, the turtles can be seen even when they do not enter traps.

The reason for two separated trapping periods in 2011 is not stated. In each period, traps were set for four 24-hour periods rather than the five 24-hour periods we have used as standard (ten 24-hour periods total). An analysis of a dozen years of trapping for about three weeks beginning 1 May each year at Arlington High School indicated that a single trapping period of ten 24-hour periods (10 days, not 8 days) detected at least one Blanding's turtle every year in the occupied habitat complex. Often, the turtles were caught in different places in different years and months.

In 2011, traps at the Red Wing site were set at the beginning and in the middle of the nesting season. Many females would have been outside the wetlands then and not trappable.

Twenty traps is not enough for an area as large as the Red Wing site. I would have recommended 25-30 traps. Not enough traps were set in Wetland A (RC-30), the most important potential core wetland habitat comprising about 4 hectares. More traps should have been set in Wetlands B and D, two kettle shrub pools (only 2 traps were set there, one in each wetland). No traps were set in the two isolated pools in the mine area west of RC-25. No trap was set in the isolated pool southwest of RC-25. In other words, traps were not distributed throughout the most important potential wetland habitats. Trapping in the main portions of RC-25 may have been in relatively cool microhabitats; water surface temperatures were not reported.

There was no trapping in offsite wetlands. Blanding's turtles are very mobile and demonstrate extensive use of space with much seasonal and interannual variation in habitat use. It is possible that more individual turtles were in offsite areas, or onsite areas, that were not trapped.

The weather conditions (precipitation, air and water surface temperatures) during trapping weeks were not reported. Temperatures are critical to trapping success, and turtles may not enter traps during a few cool days or a week. The spring-summer precipitation regime in 2011 also could have affected turtle movements, which are sensitive to rising or falling water levels.

The report does not state trap dimensions. Commercial hoop nets come in multiple diameters and multiple mesh sizes; these affect the microhabitats where traps can be set, and whether small juvenile turtles can be captured.

The report (Anonymous 2011) mentions sardines in oil used for bait. Was this soy oil or sardine oil (the former is believed to be more effective)? How much bait was used? Bait replenishment was not described – was the same bait just left in the traps for the entirety of each trapping period?

What microhabitats were traps set in? This affects catch. For example, the "moat" around the edges of some kettle shrub pools remains cool due to groundwater discharge and is not a good

microhabitat for trapping. Traps set next to potential basking perches are often successful. What water depths were traps set in?

Blanding's turtle BL-1 was tracked until 30 August 2011 after which the signal was lost (Anonymous 2011). The report does not state how, and how far, the field worker looked for the turtle, or from how far the signal could be detected prior to its loss. Blanding's turtles sometimes move away from a habitat complex and then return later. Could this turtle have been elsewhere on or near the site after the signal was lost?

Without the above procedures and documentation it is impossible to judge the efficacy and appropriateness of the trapping surveys. It cannot legitimately be asserted, based on the survey work done, that the population is small. Moreover, no field work was conducted that would have underpinned the claim that the population is not viable – this is a long-term demographic question, not one that can be answered from trapping and tracking a few turtles in one or two seasons.

Other Concerns

Among the hazards that Blanding's turtles (and other turtles, snakes, frogs, and salamanders) will face during entrance road construction and mine operation are morbidity and mortality from vehicles and heavy equipment; crushing of nests; dust, runoff, and infiltration polluting wetland habitats; and pesticides used on agricultural crops. Turtles can not, in practicality, be kept out of harm's way in an active mine.

The access road design intends to keep turtles off the road by means of underpasses and one-way barrier fences (Anonymous 2020). Hudsonia designed and implemented the first one-way turtle fence in the U.S. (Kiviat et al. 2000, 2004). The design of the "gates" (one-way passages) in the fence is critical to assure turtles will pass one way and not the other, and to minimize maintenance. Few details are presented in Anonymous (2020). The fence Hudsonia designed is about 1.3 km (0.8 mile) long, yet some individual Blanding's turtles regularly walk around the ends of the fence. If turtles circumambulate the fences at Red Wing, will the turtles end up at risk in the mining area or on White Schoolhouse Road? The Red Wing fence is proposed to be constructed of "hardware fabric." In the absence of details, I assume this means galvanized hardware cloth, which can leach toxic zinc and possibly cadmium from the plating.

Anonymous (2020) states that grain or hay crops may be grown in the southern portion of the site. Farming operations (e.g., mowing hay) would be a serious hazard to Blanding's turtles because they are likely to move among wetlands (e.g., between RC-25 and RC-30) at almost any time. As a more general concern, the stated dates of the Blanding's turtle activity season, and the dates of the hatchling emergence season, are conservative. At Arlington High School, the earliest hatchling emergence was 12 August (Bock 2007), whereas the "hatchling period" is pegged at 1-30 September in Anonymous (2020). The activity season is pegged at 15 April – 15 October in Anonymous (2020); however, in the Town of La Grange (Dutchess County) I have found adults active in the last week of March and in one winter even in February during a warm spell. Turtles will be at risk of injury or death if inaccurate season dates are used. Even the DEIS (Griggs-Lang

2008, p. 97) considers the active season to begin in March, although no source is cited for this statement.

There is little or no evidence of reclamation at the extant mined area in the northern portion of the site, although reclamation concurrent with mining is normally a condition of a DEC mining permit. There are several soil piles, and extensive exposed gravelly or sandy soil, indicating that the mine was abandoned without significant reclamation. There is also a tire dump, some demolition debris, and other refuse and equipment abandoned on the mining site – no matter the future of the mine, the landowner should remove and recycle all the refuse, equipment, materials, erosion control fabrics, demolition debris, and other things that do not belong there. What kind of reclamation or restoration would be appropriate were this area to not be mined again? Logically, wetland habitat and nesting habitat could be created and managed for Blanding's turtles and other turtles (see Kiviat et al. 2000, 2004, Dowling et al. 2010). It should be noted that such habitat creation is expensive and demanding of considerable accurate local information, and that habitats must be managed indefinitely in order to remain of good quality. In addition, shrubland and sapling wood habitat could be expanded for the New England cottontail, a species that state and federal agencies have been highly concerned about managing.

The Red Wing wetland map (Griggs-Laing 2007) is difficult to read because of the tiny print. Apparently this map only depicts state-regulated wetlands. There appear to be unmapped, town-jurisdictional wetlands at several locations: a small intermittent pond in a depression between RC-25 and RC-30 and potentially the fallow field between that pool and RC-30; two small depression ponds between the mined area and the farm fields, one of which appears to be bordered by *Phragmites* reeds (shown as seasonal water on the map); a large area of potential wet meadow west of RC-25 with low herbaceous vegetation, and willows and cottonwoods of seedling and sapling size, in the southern portion of the mined area; and three small wet areas including an apparent vernal pool 10 m or more in diameter in the northern end of the site. Additionally, there is wooded swamp straddling the property line at the western edge of the northern end of the site. Blanding's turtles use all kinds of wetlands, ponds, and pools when standing water is 25 cm deep or deeper, and are very likely to use the small ponds and pools onsite. The small ponds and shrubby pools bordering the mined area could be important for females to rehydrate between bouts of seeking nest sites.

Spotted turtles are even more eurytopic (use varied habitats) than Blanding's turtles, and use wet meadows as well as standing water habitats. Both species travel overland and may estivate in upland habitats of various kinds. The DEIS states (Griggs-Lang 2008 p. 99) that nine spotted turtles were captured during biological surveys of the site. Because spotted turtles are cryptic and often do not enter standard hoop nets, this number suggests a substantial population. The spotted turtle is a New York Special Concern species and is subject to many of the same threats as the Blanding's turtle.

There are other, operating soil mines near the Red Wing site. Given the congruence of glacial outwash, groundwater aquifers, Blanding's turtle, and other biota of conservation concern, Red Wing should perform a cumulative impact assessment and also assess offsite impacts of the proposed mining operation. Finally, because Red Wing has had a Draft Environmental Impact Statement before the DEC for several years for mine expansion, the Incidental Take Permit

application for the access road, and the application for mine expansion, need to be considered together so the full impact upon the Blanding’s turtle, its habitats, and other organisms can be assessed.

Most of the Red Wing documents cite no information sources, therefore it is impossible to judge the accuracy of some of the information used in the analyses and planning. The DEIS cites references sparingly, apparently only one of which is about the Blanding’s turtle.

The western edge of the mined area supports some invasive woody plants, including tree-of-heaven, autumn-olive, and multiflora rose, all species that readily colonize disturbed mineral soil. A plan for non-chemical management of these plants should accompany plans for use of the site, unless it can be shown that spread of these species would be desirable for biodiversity.

Additional Species of Concern

Habitat assessment of the site and its margins indicate potential habitat for additional species of conservation concern (Table 1), most of which wildlife species are classified in New York as Threatened, Special Concern, or other Species of Greatest Conservation Need (SGCN). The applicant should assess potential habitat extent and quality for these species, and survey for the ones that are most likely to be affected by the proposed access road and expanded mine. Knowledge of these species may require modification of the mitigation (“net conservation benefit”) proposal.

Table 1. Species of conservation concern that potentially occur on the Red Wing site, based on a habitat assessment. SGCN = NY Species of Greatest Conservation Need.

Taxon	Habitat affinities	Notes
Bats (All species but one are E, T, or at least SGCN)	Active season roost & nursery in shagbark hickory, black locust, other trees in woods edges or interiors	Production of species-specific prey insects also important
New England cottontail (SC; high-priority SGCN) *	Scrub & sapling wood, dry or wet	DEIS notes 10 acres of shrubland that could support this animal
American black duck (High-priority SGCN)	Kettle shrub pool, other flooded wetlands & ponds, rock niches for nesting	Also wood duck, mallard (with different nesting microhabitats)
American woodcock (SGCN)	Display ground in inactive mine	Possible use of shrubland, wet meadows on mine floor, etc.
Bald eagle (SGCN)	Open water for foraging, large trees for perching, roosting, nesting	RC-25 is large enough for foraging, despite statement to contrary
Common nighthawk (High-priority SGCN)	Extensive open dry area for nesting	

Henslow's sparrow, grasshopper sparrow (both High-priority SGCN)	Known to nest in surface mines	
Pied-billed grebe (Threatened)	Potential habitat in wetland RC-25	
Ruffed grouse (SGCN)	Where sapling stands border mature forest	
Black racer (SGCN)	Diverse habitats including open areas for basking & nesting	
Eastern (woodland) box turtle (High-priority SGCN)	Woods edges, wetlands, open areas for nesting	
Eastern ribbon snake (SGCN)	Calcareous wetland edges, etc.	
Eastern hog-nosed snake (High-priority SGCN)	Sandy or gravelly soil with toad breeding pools	Small kettleholes at two locations, & other small pools, may support toad populations
Spotted turtle (High-priority SGCN)	Wide variety of wetlands, ponds, uplands	Nine caught during TES surveys
Wood turtle (High-priority SGCN)	Probably in Landsman Kill close to site; often nests in soil mines	
Eastern musk turtle (High-priority SGCN)	Possibly in RC-25, Landsman Kill, other permanent waters; nesting in mined area or field edge	
Four-toed salamander (High-priority SGCN)	Mossy hummocks in KSP-IWP & nearby uplands	
Fowler's toad (SGCN)	Mined area & ponds or marsh pools	
Marbled salamander (SGCN)	Intermittent woodland pools, kettle shrub pools, uplands	Adults may forage distant from breeding pools
Butterflies, several species	Little bluestem host plant for several common & uncommon butterflies	Plant is locally abundant at mined area
Lilypad forktail (S3) (a damselfly)	RC-25 with water-lilies	
Mattox's clam shrimp (Data-deficient SGCN)	Temporary pools in open areas	
Field dodder (<i>Cuscuta pentagona</i>) (S3-Rare)	Mugwort & other weedy composites in mined area (e.g., on soil piles) are potential hosts	A small parasitic vine
Uncommon & rare plants (e.g., <i>Corydalis flavula</i> [S3-Rare])	Mossy limestone ledge-&-talus at S edge of site	Potential dust impacts on plants

* The DEIS (Griggs-Lang 2008) mentions about 4 hectares (10 acres) of shrubland, but asserts that habitat for New England cottontail does not occur on the site – these statements are contradictory.

Conclusion

The very limited amount of Blanding's turtle trapping and tracking performed by TES is insufficient to establish movement patterns or habitat use, not to mention population size or viability. Moreover, the trapping technique was inadequate for a site with extensive, potential, core wetland habitat.

It is difficult to understand how the proposed actions will constitute a "net conservation benefit" given that Red Wing proposes a more extensive mining operation where no mining has occurred for several years. My impression in assessing this site is that a significant factor in its value to Blanding's turtle, spotted turtle, and certain other SGCN is that there has been no industrial activity onsite for several years. Red Wing proposes mitigation including: 1. turtle underpasses and one-way turtle barrier fencing associated with the proposed entrance road; 2. limitation of agricultural activity to grain and hay crops; 3. restricting certain activities to periods outside the Blanding's turtle active season, nesting season, or hatchling emergence season; and 4. placing a conservation easement on part of the site. Blanding's turtles may use the underpasses, but some turtles encountering the fences will almost certainly walk along the fencing until they reach either White Schoolhouse Road or the active mine, and in either case they would be at risk of injury or death. The cultivation of any crop on the site will be a hazard to turtles because of the operation of farming equipment and the use of pesticides, both of which are known to be hazardous to turtles and other wildlife. Seasonal restrictions are a good idea but the inaccurate turtle phenology reduces their benefit. And a conservation easement should protect the entire site, not just part of it; residential development or other post-mining use should be foregone by Red Wing. Moreover, the responsibilities of land owner and easement holder would need clarification because maintenance of fencing and underpasses, cleanup of refuse, and restoration of mined areas to habitats that benefit Blanding's turtles and other rare biota will be labor-intensive and costly. In view of these concerns, I can not consider the Red Wing proposal to have a "net conservation benefit" compared to the extant situation either with or without agriculture.

Blanding's turtle is not the only organism that needs consideration at the Red Wing site. Everyone needs to cooperate in order that other species, such as those listed as wildlife SGCN, or S3-Rare plants, do not become Threatened or Endangered. That is the purpose of the SGCN lists and the New York Natural Heritage Program rare species rankings.

The information and analysis I have provided will help inform permit decisions by the DEC and the Town.

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