Timber Rattlesnake Habitat Assessment
Nevele Resort, Casino and Spa Redevelopment Project
Town of Wawarsing, Ulster County, NY

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For

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June 11, 2014

Timber Rattlesnake Habitat Assessment – Nevele

INTRODUCTION

A timber rattlesnake habitat assessment was conducted at the site of the former Nevele Hotel in the Town of Wawarsing, Ulster County, New York on 24 April 2014 by KT Wildlife, LLC. The survey was conducted to determine which areas have potential denning and other critical habitats, and whether they may be impacted by the proposed redevelopment project. The New York State Natural Heritage Program (NYSNHP) records indicate that there are known timber rattlesnake dens within 1.5 miles of the site. The habitat assessment provides information to make a determination whether any additional surveys are needed to evaluate timber rattlesnake use of the proposed project property.

Timber rattlesnakes require specific habitats for the various stages of their life history cycle. Essential for their survival is a communal den site, usually found in a rock ledge or buried talus structure. In addition an adjacent open rocky area with sufficient rock cover to protect gravid females and their young from predation is considered critical habitat. In order for a rattlesnake population to be viable, these habitats must exist at a site and have remained essentially undisturbed over time.

HABITAT AND DISCUSSION

The proposed Nevele Resort, Casino and Spa Redevelopment Project is a redevelopment of the former Nevele Grande Hotel, a resort which had been in operation since 1903, closing in 2009[1]. The maintenance of the Nevele properties has continued since the 2009 closing, and the existing golf course and grounds are mowed on a regular basis. The existing golf course occupies approximately 120 acres. The larger Nevele properties encompass 524 acres of diverse ecological communities.

Only a portion of the property (the "focus area" at 40 acres) is being impacted by redevelopment activities for the Nevele Resort, Casino and Spa Redevelopment. The existing golf course and ancillary lands and facilities will continue to be maintained in their current configuration as well. That portion of the property is located between US Route 209 and State Route 52 running north to south, both heavily traveled roads. The attached map, Figure 1, shows the limits of disturbance (LOD) and the area of potential effect (APE) of the proposed project. A series of photographs at the end of the report (Figures 2 through 11) illustrate the conditions both within the Limit of Disturbance and in areas within the greater Nevele property.

The traffic on US Route 209 and State Route 52 would make it very unlikely, at a minimum, for any rattlesnakes to successfully cross into the property and return to a den off site, with the exception of a Route 52 bridge spanning several hundred feet of valley to the east. This will be addressed later in the report.

There was no suitable timber rattlesnake denning habitat within the Limit of Disturbance area shown on Figure 1. These areas included the previously built structures and cleared ski slope

[1] The Chazen Companies. 2014. DGEIS for the Nevele Resort, Casino & Spa Redevelopment Project dated April 15, 2014. Page 8.

(Figures 2, 3 and 4). The equestrian center had several buildings along the edge of mixed deciduous woods, a small wetland area, and several large brush and debris piles in this vicinity (Figure 5). Although this part of the project had no potential denning habitat, the mixed deciduous woods and the debris piles area could be considered timber rattlesnake summer foraging habitat for a den within 1.5 miles.

Near the entrance to the resort, a small wooded triangle of land between Route 209 and Arrowhead Road, which is included in the LOD, contained habitat suitable for summer foraging activities, should rattlesnakes be present on the proposed project property (Figure 6). As noted previously, US Route 209 may serve as a barrier to potential rattlesnake migration. The riparian corridors of Sandburg Creek and the other smaller streams, which are not within areas of disturbance, were also identified as suitable foraging habitat.

To the east and southeast of the existing facilities, specifically south of the existing ski slope, and outside of the proposed limits of disturbance, there is chestnut oak forest, that extends to Route 52. This area was surveyed for potential habitat. There were some steep rock ledge formations with a few potential west facing basking areas on this part of the property (Figure 7). The forest was typical of timber rattlesnake summer foraging habitat (Figure 8). It is unlikely that this area provides denning habitat, since if a rattlesnake den existed in such close proximity to the former resort, there would have been reports of sightings near the buildings or on the golf course on a regular basis. This area is not within the proposed project workspace and the majority of the forest is outside the area of potential effect.

The portion of the property to the west of Route 209 was surveyed briefly. The survey and review of aerial mapping of the area showed it to be a uniformly forested area with mixed deciduous and coniferous woodland (Figure 9). To the north and east of this part of the property, within distances of less than 1.5 miles, there are rock formations which could be potential denning habitat. This property is not within any LOD or APE.

The portion of the property east of Route 52 has a moderately high possibility of supporting a rattlesnake den. The property does not have easy access due to the steepness of the slope from Route 52 and the terrain of the surrounding landscape. It was surveyed by driving the small roads surrounding it and reviewing aerial maps. There is considerable rock ledge habitat as well as open basking type outcrops (Figure 10). The property has a steep western slope adjacent to Route 52 however it dips down again to the east before rising up higher on the mountain, providing excellent southeast exposure typical for rattlesnake dens. There are no plans for development on this portion of the property.

RECOMMENDATIONS

By letter dated June 6, 2014, the NYSDEC commented on Volume 1, Section 3.6, Terrestrial and Aquatic Ecology of the Nevele Resort, Casino & Spa Redevelopment Project Draft Generic Environmental Impact Statement (DGEIS). A copy of that comment letter is provided at the end of this report. The Department recommended that, “at a minimum,” the project sponsor develop the following:

- Direct take avoidance measures that will be in place during construction, particularly in areas of new development or ground disturbance work.

- An education and removal plan for the chance encounter of timber rattlesnakes moving forward with construction and during facility operations.

The letter further states that timber rattlesnakes have also been seen at the Waste Water Treatment Plant in Ellenville, and recommends that this be evaluated to determine if any additional mitigation measures are needed should any new construction or site work associated with the Nevele development occur at this facility.

Prior to receipt of the NYSDEC's comment letter, Kathy Michell of KT Wildlife LLC had been retained to conduct a timber rattlesnake habitat assessment to determine whether critical habitat was present and to determine the potential for rattlesnake use on the focus property.

No potential habitat for timber rattlesnake denning was located on the proposed redevelopment site within the LOD or APE, which is primarily composed of existing structures, mowed lawn, parking areas and a maintained golf course. It is unlikely that timber rattlesnakes use the proposed project property due to its location being bordered by the presence of two well-traveled roadways to the east and west with no more than one mile between them. However, immediately north of the portion of property along Route 52, there is a bridge spanning a valley several hundred feet wide (Figure 11). If a timber rattlesnake den were present in the rugged terrain east of Route 52, this valley could be a potential travel corridor for rattlesnakes to arrive on the proposed project property west of Route 52. This could also be a potential route for timber rattlesnakes from dens described by the NYSNHP as being within 1.5 miles of the property. To address the recommendations and concerns of the June 6, 2014 NYSDEC letter, the following measures are proposed.

Direct Take Avoidance Measures: For the proposed Nevele Resort, Casino & Spa Redevelopment project, impacting approximately 40 acres within the "focus area" as shown on Figure 1, where there is the potential for timber rattlesnake foraging habitat use on the property, the following recommendations will minimize any impacts to them:

- Any cleanup, clearing and grading of the forested areas surrounding the ski slope and former equestrian center should be avoided during the active foraging and mating season months, June through August, when rattlesnakes may be found considerable distances from their dens (up to 2 miles).
- Clearing of the wooded section of the property along the entrance between Route 209 and Arrowhead Road which is in the LOD should also be avoided from June through August.

Educational and Removal Plan: KT Wildlife, LLC and The Chazen Companies will develop an educational plan for contractors working at the project site. This plan will include the following:

- An approximately 30 minute educational program on the timber rattlesnake. This will include snake identification, site specific rattlesnake information, and actions to be taken if a rattlesnake is encountered. This educational program will be given by KT Wildlife and Chazen biologists at the pre-construction meeting. All supervisory personnel will be given contact information for KT Wildlife and Chazen biologists at the pre-construction meeting.

- On-Site contractors meeting for all new personnel will include timber rattlesnake awareness training to be conducted with safety and environmental orientation. Sign-in sheets will document all those who have received the awareness level training. Handouts with photos of rattlesnakes will be provided to all workers attending these sessions summarizing the orientation information. The handouts will be designed and distributed by KT Wildlife and Chazen Companies.
- In the event that work needs to be conducted in wooded or brushy areas within the June to August 2014 window, sweeps will be conducted by KT Wildlife prior to any clearing of these areas where there is an increased possibility of finding a timber rattlesnake.
- Due to the low probability of encountering any rattlesnakes during the construction on the previously developed property, a full time monitor is not recommended by KT Wildlife, LLC. Key supervisory personnel will be trained by KT Wildlife in safe handing in the event that an encounter should occur. They will be instructed to contact KT Wildlife and/or Chazen for appropriate removal from the work area.

Ellenville Waste Water Treatment Plant: The project does not propose any new construction or site work at the Ellenville Waste Water Treatment Plant site.

CONCLUSIONS

It is unlikely that timber rattlesnakes use the 40 acres within the "focus area" of the Nevele Resort, Casino and Spa Redevelopment Project, as shown on Figure 1, for any of their seasonal activities. This site has been disturbed and used for over 100 years. The proposed redevelopment project is essentially limited to the footprint of the former site with the exception of the improved entrance road which is immediately adjacent to Route 209. The Nevele Resort, Casino and Spa Redevelopment Project as proposed should have no impact to timber rattlesnakes. Since there are known timber rattlesnake dens within 1.5 miles northeast of the property, there is a possibility of an occasional timber rattlesnake arriving on the property at some point during their seasonal movements. The above recommendations are proposed in order to avoid an "incidental take" of the species, as suggested by the NYSDEC.

Figure 1. Map showing limit of disturbance, area of potential effect, property boundaries, potential foraging areas west of RT 209, potential denning and habitat areas east of RT 52 and RT 52 bridge span.

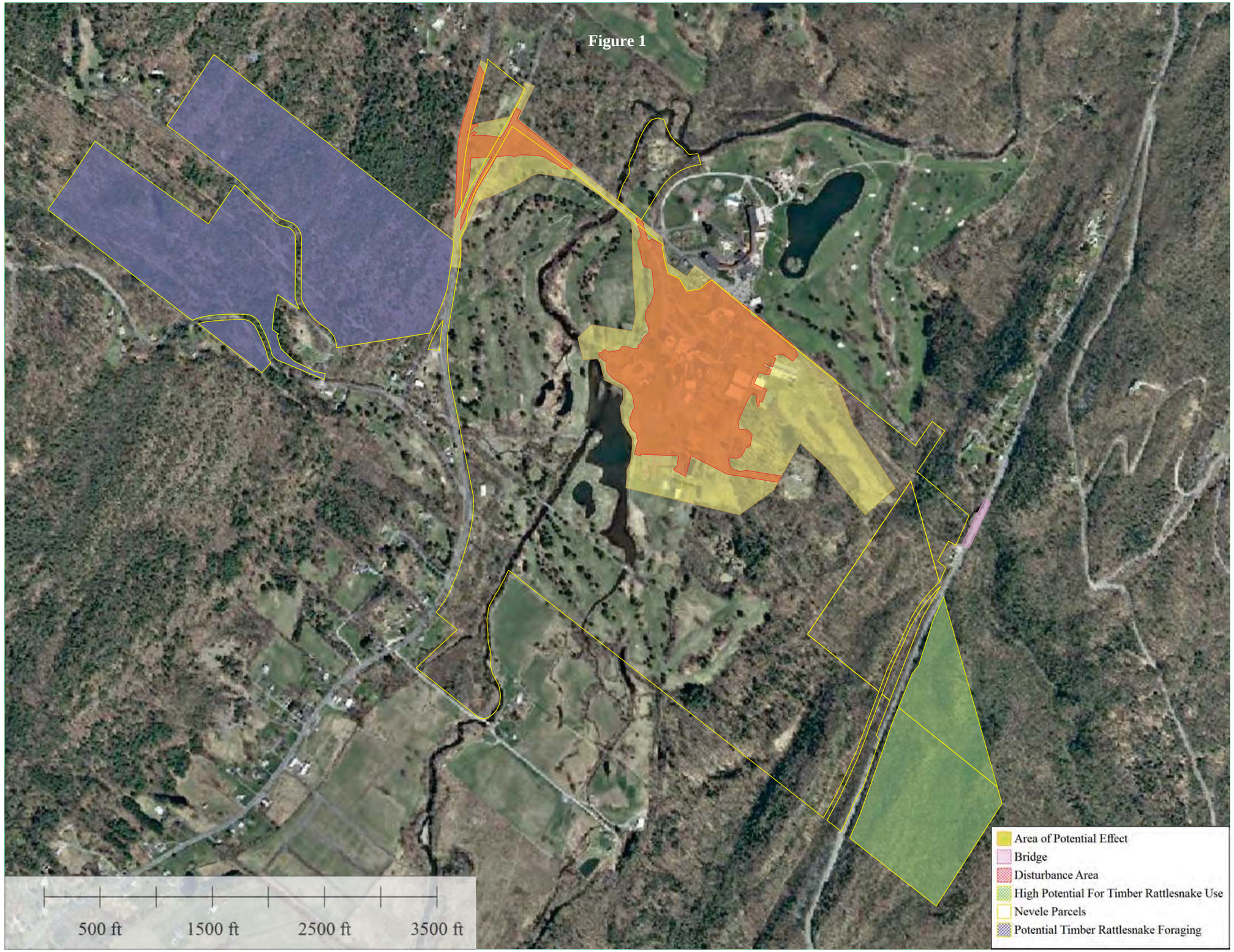
Figure 1
Area of Potential Effect
Bridge
Disturbance Area
High Potential For Timber Rattlesnake Use
Nevele Parcels
Potential Timber Rattlesnake Foraging
500 ft
1500 ft
2500 ft
3500 ft

Figure 2. Existing Nevele structures.

Figure 3. Existing Nevele buildings.

Figure 4. Ski Slope lift area.

Figure 5. Former equestrian center with brush piles.

Figure 6. Triangle of land between Route 209 and Arrowhead Road.

Figure 7. Ledges and potential basking west of Route 52.

Figure 8. Potential foraging habitat west of Route 52.

Figure 9. Potential foraging habitat west of route 209.

Figure 10. Ledges and open rock (in background) east of Route 52

Figure 11. Valley beneath expanse of Route 52 bridge.

New York State Department of Environmental Conservation
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Joe Martens
Commissioner

June 6, 2014

Leonard M. Distel, Supervisor
Town of Wawarsing, Town Board
108 Canal Street
Ellenville, NY 12428

RE: DGEIS Comments - The Nevele Resort, Casino & Spa Redevelopment Project
Town of Wawarsing, Ulster County

Dear Supervisor Distel:

The Department has received a copy of the Draft Generic Environmental Impact Statement (DGEIS) for the above proposed project, which was deemed complete on May 1, 2014 by the Town of Wawarsing Town Board as the SEQR lead agency for this action. After review of the GDEIS documents we offer the following comments:

1. DGEIS Vol. 1 Section 3.5 (Stormwater):

   The Stormwater Pollution Prevention Plan (SWPPP) for the referenced project states that the project is redevelopment and has been designed to meet the standards for redevelopment in accordance with the Department's Stormwater Design Manual (SWDM) Chapter 9. As the project consists of a combination of both new development and redevelopment, the SWPPP must be designed to meet the new development criteria (SWDM Chap.4) for the newly developed areas, and the redevelopment standards (SWDM Chap.9) for the areas that are to be redeveloped.

2. DGEIS Vol. 1 Section 3.5 (Wastewater):

   The DGEIS identifies the preferred alternative to treat wastewater is for connection with the Village of Ellenville WWTP and decommissioning of the existing on-site permitted Nevele WWTP (DEC permit #3-5156-00056/00015; SPDES NY0100048). While it is anticipated the Nevele WWTP will not be utilized, a detailed operational assessment of its wastewater process system will be completed during design phase. The DGEIS states the purpose of the assessment will document the current condition of the on-site WWTP and include a detailed plan of design modification and improvement to ensure the plant can adequately treat wastewater in accordance with the SPDES permit discharge limitations.

   The Department agrees that such an assessment is necessary should the Nevele WWTP be utilized. It should be noted that simple "replacement in kind" work to the facility can be done as a repair or maintenance, but any work that changes the method of treatment, or capacity, will need to be reviewed and approved by the Department. As stated elsewhere in the DGEIS, any improvements to the Village of Ellenville wastewater treatment plant or conveyances to handle flows from the Nevele should be submitted to the Department for review and an approval of sewer works and or determination if a modification of the Village SPDES permit is required. Department staff would be available to discuss any proposed work to determine if approval is required or to answer any technical questions that you or project sponsor may have.

3. DGEIS Vol. 1 Section 3.6 Terrestrial and Aquatic Ecology
The DGEIS identifies a documented timber rattlesnake (NYS threatened species) hibernaculum within the vicinity of the project site and that the site is within the travel distance (1.5 miles or more) these species are known to travel. The conclusion provided in Section 3.6.C of the DGEIS is that no significant impacts to the timber rattlesnake are anticipated. While the Department agrees that there will not be an adverse modification of habitat on site for timber rattlesnake, there is no documentation provided to conclude at this time that there will be no potential for impacts. As snakes could move through the site on a given day, an inadvertent "take" of the species, pursuant to 6 NYCRR Part 182 Threatened and Endangered Species regulations, could occur during construction related activities or facility operations. In order to determine that a "take" will not occur or is mitigated so there is no adverse impact, the Department recommends the project sponsor at a minimum develop the following:
   - direct take avoidance measures that will be in place during construction, particularly in areas of new development or ground disturbance work;
   - an education and removal plan for the chance encounter of timber rattlesnake moving forward with construction and during facility operation.

   Timber rattlesnakes have also been seen at the Waste Water Treatment plant in Ellenville. This should be evaluated and additional mitigation measures may be needed if any new construction or site work associated with the Nevele development will occur at this facility.

   Please refer to the enclosed document titled *"Guidelines for Reviewing Projects for Potential Impacts to Timber Rattlesnake"*, particularly the section on *Mitigation Recommendations* which lists potential mitigation methods including education. If assistance in identifying appropriate avoidance measures and development of an education and removal plan for this project is required, please contact Lisa Masi, DEC Region 3 Endangered Species, at (845) 256-2257.

Thank you for the opportunity to provide comments. Should you or the project sponsor have any questions regarding these comments or Department jurisdiction for this project, please do not hesitate to contact me at (845) 256-3059.

Sincerely,

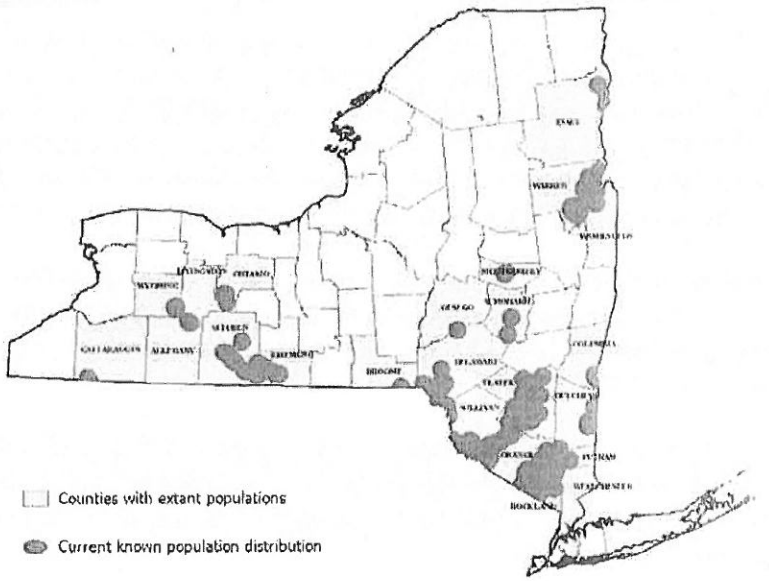
James J Eldred
Deputy Regional Permit Administrator
DEC Region 3

Enclosure

Cc: Abby Osgood, Nevele Investors, LLC, PO Box 388, Ellenville, NY 12428
Greg Merriam II, AICP, The Chazen Companies
Terresa Bakner, Whiteman Osterman & Hanna LLP
Lisa Masi, Wildlife, DEC Region 3
Shohreh Karimipour, DOW, DEC Region 3
Pat Ferracane, DOW, DEC Region 3

Guidelines for Reviewing Projects for Potential Impacts to the Timber Rattlesnake

The timber rattlesnake (*Crotalus horridus*) is listed as a *threatened* species in New York and is protected by Environmental Conservation Law (ECL) section 11-0535 and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a "take", which includes, but is not limited to, adverse modification, degradation or destruction of occupied habitat of any species listed as endangered or threatened pursuant to the above laws and regulations. In New York, timber rattlesnakes are typically associated with steep-slopes and rocky terrain of deciduous or mixed deciduous/coniferous forest. They are, however, known to use and/or move through a wide variety of land types (e.g. wetlands and early successional habitats) during a typical seasonal activity cycle. In areas where movement is not impeded by artificial barriers (e.g. major roads and urban areas) timber rattlesnakes may migrate three miles or more from their den each summer in search of essential summer habitats (e.g. basking and gestating areas), food, and mating partners. Human-rattlesnake interactions are most likely to occur during the summer and early autumn when movement rates peak and snakes are typically at their maximum distance from the den; in some locations, migration routes may require snakes to pass through residential developments or other areas of intensive land use. Where multiple den sites are clustered in relatively close proximity, areas of potential range overlap between snakes from different dens may be particularly important locations for continued gene flow. Thus, avoiding fragmentation of these areas of genetic exchange is critical for the long-term viability of a local population.



Timber rattlesnake distribution in New York State

Impact Assessment Requirements

For projects that have been determined to be in close proximity to a known timber rattlesnake den, the project design will need to avoid alteration of suitable habitats and incorporate mitigation measures to prevent impacts to the snakes that would constitute a take under ECL Section 11-0535. Where the landscape will be significantly altered, mitigation is difficult and avoiding impacts may require detailed information about timber rattlesnakes on and around the project site. Therefore, if it has been determined that a potential taking could result from the project, the following information may be required to assess the potential project-related impacts on timber rattlesnakes: 1) habitat assessment [identify all suitable hibernacula, transient habitat, and summer range, 2) site usage, and 3) movement between summer and winter habitats.

Habitat Assessment

Due to the species' large home range and multiple habitat requirements a habitat assessment (PFBC-NDS, 2004) should be conducted to determine the presence of suitable basking, foraging, gestating and denning habitat or potential travel corridors within the project boundaries. Information collected for each area identified as potentially suitable habitat should include, at minimum, a habitat description and geographic location (i.e. GPS coordinates). Results of the habitat assessment will determine what additional information and/or mitigation may be required. Locations identified as potential habitat will also be used as the primary focus areas of presence-absence surveys, if necessary. Habitat assessments must be conducted by individuals that have knowledge of timber rattlesnake ecology.

Population Surveys

If the project site contains suitable habitat(s), it may be assumed rattlesnakes utilize the site during some stage of their annual cycle and the potential impacts to the species and their habitats should be assessed and mitigation measures (see Mitigation Recommendations) should be incorporated into the project design. If any of the above habitat elements occur on or in close proximity to the project site ***AND*** usage of the site by timber rattlesnakes will not be assumed, then surveys to detect the presence (e.g. den emergence, basking and gestating habitat searches) and site usage/snake movement (e.g. radio telemetry) should be conducted.

Population surveys (Casper *et al.* 2001) must be conducted during the time when timber rattlesnakes are not hibernating and can be expected to be active. To ensure accurate results, surveys should only be conducted between April 15th and October 31st on days when the air temperatures is 66° F or greater ***AND*** there is no appreciable precipitation.

To adequately assess the site for the presence (or probable absence) of timber rattlesnakes, each location identified as suitable basking, gestating, or denning habitat or as a potential travel corridor should be visited at least four (4) times within the survey period, and visits to each suitable habitat location should be separated by seven (7) or more days.

Survey to detect the presence of timber rattlesnakes at potential den habitats are confined to the beginning and end of the active season when snakes are most likely to be detected at or near den sites. Thus, two (2) visits per potential den should occur post den emergence between April 15th and May 15th, and an additional two (2) visits per potential den should occur between September 15th and October 25th when the snakes are congregating around dens prior to den ingress for winter hibernation.

The collection of site usage and snake movement data may require telemetric monitoring (via external and/or internal radio transmitters) to record the location and behavior of a representative sample of snakes throughout their annual cycle. In order to assess movement patterns, or to be reasonably certain that rattlesnakes do not use specific areas of a proposed project site, up to three field seasons of data collection may be required (a minimum of two full activity cycles of data are recommended). Contingent upon the data collection requirements of the project, a detailed scope of work should be developed by the project sponsor (in consultation with Department staff) and approved by the Department prior to the initiation of any field work.

All timber rattlesnake population surveys should be conducted by individuals that have knowledge of the species' ecology, and surveys that may involve handling snakes (e.g. marking, radio telemetry) must be conducted by individuals that have experience with such techniques and are licensed by New York State to handle timber rattlesnakes.

Threats

- Loss and/or degradation of habitat - residential and commercial development and mining operations eliminate available habitat and may degrade that which is not destroyed (e.g. stormwater runoff, use of residential chemicals).

- Persecution and illegal collection - increased human activity in timber rattlesnake habitats increases the potential for snake mortality from intentional killing of snakes by humans. A higher rate of illegal collection (effective mortality) for the pet trade is also often a result of increased human presence near timber rattlesnake populations.

- Fragmentation and road mortality - the species' large home range and a high degree of site fidelity result in timber rattlesnakes typically following the same route each year during long-distance migrations between habitats. Thus, any newly-constructed road that intersects a snake's traditional travel route will become either an impassable barrier to migration or an annual road-mortality hazard.

Mitigation Recommendations

The following is a list of potential mitigation methods that may be used to avoid or minimize certain project-related impacts; however, not all methods are appropriate for all projects.

- <u>Seasonal restrictions</u>

  All allowable disturbance activities, including movement of construction vehicles, excavation, and alteration of vegetation, should be conducted during the period when the snakes would be expected to be hibernating and are less likely to be directly impacted by above-ground disturbances. The acceptable work period is November 1st through March 31st.

  Habitat management (including timber harvesting) and trail maintenance activities should also be timed to minimize the potential for injury/death of snakes. Habitats that are actively managed (e.g. mowing and prescribed burning) and trailsides that are cleared using a brush hog may increase mortality as snakes are killed by machinery or incinerated by fire (Means and Campbell, 1982b)

  In addition to the seasonal restrictions applied to vegetation management practices, disturbance to non-transient habitats should be avoided at ***ALL*** times. Roads, skid trails and landings should be kept at least 330 feet from all known or potentially suitable basking and gestating habitats, and to minimize the potential for collapse or disturbance of dens, heavy equipment and site preparation work (e.g. disk-harrowing, shearing, root-raking) should be prohibited within 660 feet of any known hibernacula.

- <u>Timber rattlesnake monitor</u>

  If any project-related work is to occur (in whole or in part) during April 1st through October 31st, the project sponsor should retain the services of a snake monitor. The snake monitor must be a qualified biologist that has knowledge of timber rattlesnake ecology and relocation procedures. The monitor must also have experience handling rattlesnakes and be licensed by New York State to do so.

  The snake monitor should be on site during all construction activities and would be responsible for: 1) conducting reconnaissance surveys for timber rattlesnakes within the work area prior to the initiation of any disturbance activities, and 2) relocating snakes as required.

- Temporary barrier

When disturbance is likely to occur from actions occurring outside of the acceptable work periods, a temporary restrictive (Stechert, 2001) barrier may help to avoid impacts if installed around the perimeter of the disturbance footprint of small projects (< 1 acre). The barrier should be: 1) installed before the end of the acceptable work period and maintained until the end of the construction phase of the project or until the beginning of the next acceptable work period, whichever occurs first, 2) inspected daily and, if necessary, repaired immediately to a fully functional condition*, and 3) constructed in accordance with the following design specifications:

- made of ¼ inch square hardware cloth or wire mesh
- a minimum of 48" high
- anchored into the ground with reinforcement bars placed on the "disturbance side" of the barrier and spaced between 6 – 8 feet apart.
- secured at the base (barrier/ground interface) with at least 6" of fence material covered with soil backfill

* The effectiveness of the barrier will be diminished and snakes may be able to gain access to the disturbance area if debris (e.g. tree limbs, soil) is allowed to overtop or pile up along side of the barrier.

- Education

Persecution by humans is a significant source of timber rattlesnake mortality and is thought to be a major contributing factor to the population declines experienced by the species over the past 100 years. Misconceptions about the actual versus perceived threat posed by timber rattlesnakes often leads to the snakes being injured or killed by humans who, when encountering a timber rattlesnake, are fearful of being attacked. Prospective residents in subdivisions located near known den sites should be provided with educational materials that help identify timber rattlesnakes and accurately describe the snakes' non-aggressive behavior. Educational materials should also include information about the Department's nuisance rattlesnake relocation program. The subdivision's prospectus could also be required to disclose the potential for the presence of timber rattlesnakes on the property. Homeowners and local law enforcement agencies should be provided with phone numbers of nuisance rattlesnake responders in the area.

- Habitat creation/enhancement

In some locations, natural succession may cause shading-over of hibernacula or essential summer habitats. Such habitat suitability changes, particularly that of gestating and birthing areas, can decrease the long-term viability of the location's timber rattlesnake population. Vegetation thinning to reclaim the site or the establishment of open stone piles to create escape cover and basking areas may mitigate some of habitat lost to successional changes. In such cases, the development of a site management plan, along with a long-term commitment by the landowner, may more than offset the loss of non-essential habitat resulting from project-related actions.

- Herp tunnel

Where roads and highways separate summer and winter habitats, it may be possible to maintain migration corridors via herp tunnels.

References

Brown, W. S. 1993. Biology, status, and management of the timber rattlesnake (*Crotalus horridus*): a guide for conservation. SSAR Herp. Circ. No. 22. vi + 78 pp.

Casper et al. 2001. *Recommended Standard Survey Protocol For the Eastern Massasauga, Sistrurus catenatus catenatus*. Unpublished.

Means, D. Bruce and Howard W. Campbell. 1982b. Effects of prescribed burning on amphibians and reptiles. Pages 89-97 *in* G. W. Wood, editor. Prescribed fire and wildlife in Southern forests. Proceedings of a symposium. Belle W. Baruch Forest Science Institute, Clemson University, Clemson, South Carolina, USA.

PFBC-NDS. 2004. Pennsylvania Fish and Boat Commission Natural Diversity Section Timber Rattlesnake Presence-Absence Survey Guidelines (Form-06, revised 3/9/04).

Stechert, R. 2001. Effectiveness of an experimental timber rattlesnake (*Crotalus horridus*) exclusion fence at Schunemunk Mountain, Town of Woodbury, Orange County, New York. Report to the Eastern Chapter of the New York Natural Conservancy and the New York State Department of Environmental Conservation. 23p.

Related Resources and Links

New York Natural Heritage Program

New York Natural Heritage Program. 2008. Online Conservation Guide for *Crotalus horridus*. Available from: http://www.acris.nynhp.org/guide.php?id=7536

NatureServe Explorer

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer

NYSDEC

New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources. 2006. Timber Rattlesnake Fact Sheet. http://www.dec.ny.gov/animals/7147.html