



Best Management Practices for Minimizing Impacts to Timber Rattlesnakes (*Crotalus horridus*) During Earth Moving Projects

Projects occurring within the known range for timber rattlesnakes, hereafter rattlesnakes, have the potential to encounter rattlesnakes and rattlesnake habitat. The following mitigation strategies can be implemented to reduce direct and indirect impacts to both rattlesnakes and rattlesnake habitat occurring within the project boundary and surrounding areas:

- 1) **A “no kill” snake policy should be enacted and enforced within the project boundary and surrounding areas to minimize risk to workers and staff.** All workers and staff working within the project boundary should be advised that rattlesnakes may be encountered. Rattlesnakes are venomous, making them a possible risk to personal safety. The majority of rattlesnake, and other snake species’ bites occur when people are handling or trying to kill or harass snakes. Workers and staff should be provided with basic training on how to address a rattlesnake encounter and how to safely operate within the project boundary to reduce encounters. Killing or take of rattlesnakes, or any other snake species native to West Virginia, is unlawful and in violation of State Rule, Title 58 Code of State Rules, Series 73.
- 2) **All workers and staff should adhere to posted speed limits along project access roads.** Speed limits along access roads within the project boundary should not exceed 25 mph to reduce road mortality of rattlesnakes and other wildlife species.
- 3) **When possible, a trained rattlesnake biologist/biological monitor should be on-site during active work periods to locate and move rattlesnakes from within the active work zone and access roads.** Rattlesnakes encountered in active work areas or along access roads should be safely captured and moved into suitable habitat no more than 100-m from the capture location, but preferably less if the potential release site is safe from construction activity and other threats. Rattlesnakes captured for relocation must be released within 15 minutes of capture.
 - a. If an encountered rattlesnake cannot be captured safely or a trained rattlesnake biologist/biological monitor is not present, and the rattlesnake is within the active work zone or access road, harassment of the rattlesnake can be used to encourage the animal to move to a safe location. Harassment methods can include use of a hose or other tool to release a light stream of water onto the rattlesnake, or gentle prodding of the rattlesnake using a stick or tool handle. All harassment methods should be performed from at least 2-ft away from the rattlesnake and should cease if the method is not effectively moving the animal after 5 minutes of harassment.
- 4) **It is recommended that a rattlesnake habitat assessment be performed within the project boundary and at least 300-ft outside of the project boundary.** Completing a

rattlesnake habitat assessment will assist project planners in avoiding or minimizing disturbance to rattlesnake habitat, particularly denning and gestation habitat. See habitat assessment form below. Color photographs of the assessment area must be captured, including a general panorama of the area assessed, rocky areas, and any rattlesnakes observed. Completed rattlesnake habitat assessment forms and photographs should be submitted to the West Virginia Division of Natural Resources, either digitally or by mail, for review and consultation:

Wildlife Diversity Unit
West Virginia Division of Natural Resources
PO Box 67
Elkins, WV 26241
kevin.j.oxenrider@wv.gov

- 5) **It is recommended that projects be modified to avoid disturbance of potential or known denning habitat occurring within the project boundary.** If potential or known rattlesnake denning habitat occurs within the project boundary, complete avoidance is recommended as this habitat is irreplaceable. Consultation with the West Virginia Division of Natural Resources will allow for formulated recommendations to avoid adverse impacts to rattlesnakes and denning habitat.
- 6) **It is recommended that projects be modified to avoid disturbance of potential or known gestation habitat within the project boundary.** If potential or known gestation habitat cannot be avoided, it is recommended that gestation habitat is replaced by creating rattlesnake structures following the West Virginia Division of Natural Resources recommendations for creation of artificial structures (see below). Rattlesnake structures can also be used to create or replace basking habitat.
- 7) **Tree clearing and timber operations within potential rattlesnake habitat should be conducted from November 1 to March 31 to avoid/minimize rattlesnake encounters.**
- 8) If there are additional concerns and/or questions, including high numbers of rattlesnake encounters during construction activities, high degree of habitat alteration, development of rattlesnake structures, etc., please contact the West Virginia Division of Natural Resources for consultation.

Kevin Oxenrider – Amphibian and Reptile Program Leader
304-822-3551
kevin.j.oxenrider@wv.gov



Timber Rattlesnake Habitat Assessment Field Form

West Virginia Division of Natural Resources

General Information

Property Name/Site ID _____ County _____

Modeled Habitat Suitability ID: ☐ Low Suitability ☐ Moderate Suitability ☐ High Suitability

Site Location (Centroid of Site):

Latitude (dd.dddd) _____ Longitude (dd.dddd) _____

Assessment Area (Acreage) _____

Investigator _____ Affiliation _____

Additional Parties Present _____

Survey Date and Conditions

Date of Survey _____ Start Time _____ End Time _____

Air Temperature (°F) _____ % Cloud Cover* _____

Habitat Information

General Habitat Description (briefly describe the habitat in the survey area):

Slope (degrees) _____ Aspect (orientation, i.e. direction hillside faces) _____

% Rock Ground Cover** _____ % Canopy Cover** _____

Feature Presence (mark all that apply):

- ☐ Rock Out Crops or Ledges ☐ Boulder Fields ☐ Talus/Scree
☐ Large Flat Rocks ☐ Downed Logs/Woody Debris ☐ Downed Hollow Logs

Dominant Plant Species:

Trees _____

Shrubs _____

Other Plant Species of Note _____

Landscape Surrounding Survey Site

Does timber rattlesnake habitat occur outside of the survey boundary? ☐ Yes ☐ No

If yes, is habitat contiguous with habitat within survey site? ☐ Yes ☐ No

If yes, please mark all habitat features seen outside of survey boundary:

☐ Rock Out Crops or Ledges

□ Boulder Fields

☐ Talus/Scree

□ Large Flat Rocks

☐ Downed Logs/Woody Debris

□ Downed Hollow Logs

Species Observations

Timber rattlesnake observed or heard during survey? ☐ Yes ☐ No ☐ Unsure

If yes, number of timber rattlesnakes observed _____

Additional herpetofauna species observed:

Investigator's Opinion

Habitat Suitability for Timber Rattlesnakes:

☐ Not Suitable ☐ Low Suitability ☐ Moderate Suitability ☐ High Suitability

Habitat Type(s) Available (mark all that apply within survey site):

□ Hibernaculum/ Den

☐ Gestation/ Birthing

☐ Basking

□ Foraging

Sketch (or include aerial map; include north arrow, all timber rattlesnake habitat types, survey boundary, and locations and direction of all habitat photographs and observed rattlesnakes)

Recommendations for Development of Artificial Timber Rattlesnake Structures

Rock structures (Figure 1)

- Assemble rock structures 5-10 yards out from the forest edge in a location that receives 5-7 hours of direct sun exposure each day, typically on the west or northwest side of an opening.
- Place several rocks on the ground, ideally 4 rocks, each about 4-in, to a maximum of 6-in thick, to form a base used to keep the remainder of the structure off the ground, and provide refuge for timber rattlesnakes under the structure.
- Place 2 to 3 large, flat rocks (minimum of 4-ft x 6-ft and approximately 6-in to 10-in thick) on top of the rocks used to construct the base.
 - At least one side of the structure should be ground level to reduce air flow through the structure and maintain a constant temperature.
 - If a gap occurs between the rocks used, place an additional rock over the gap to make the structure as waterproof as possible.
- Multiple structures can be assembled side-by-side if an appropriate number of suitable large, flat rocks are available.
- If collection of large, flat rocks from another area is needed to construct structures, rocks should be selected from north-facing slopes and areas that do not receive direct sunlight. When selecting rocks, select rocks that are imbedded in the ground, with no openings or cavities that would permit access under the rock, or those positioned at sharp angles as they are less likely to be serving as habitat for timber rattlesnakes.

Log structures (Figure 2)

- Log structures should be assembled 5-10 yards out from the forest edge in a location that receives 5-7 hours of direct sun exposure each day, typically on the west or northwest side of an opening.
- Logs should be stacked in a pyramid formation with a minimum of 6 total logs (i.e. a 3, 2, 1 configuration). A structure containing 10 logs is preferred.
- Logs used in the structure should be 6-ft to 9-ft in length and have a diameter of 12-in or more.
- Preferably, a minimum of 3 hollow or partially hollow logs should be used to construct the structure. Placement of hollow logs on the second row of the structure is preferred.
- Logs stacked above hollow logs should be roughly the same length as the hollow log and should not shade the opening(s) of the hollow log.
- If structure is being constructed on a slope, logs should be stacked perpendicular to the slope to prevent logs from rolling away from the site as logs naturally decay.



Figure 1. Photograph of a timber rattlesnake (*Crotalus horridus*) structure constructed using rocks.

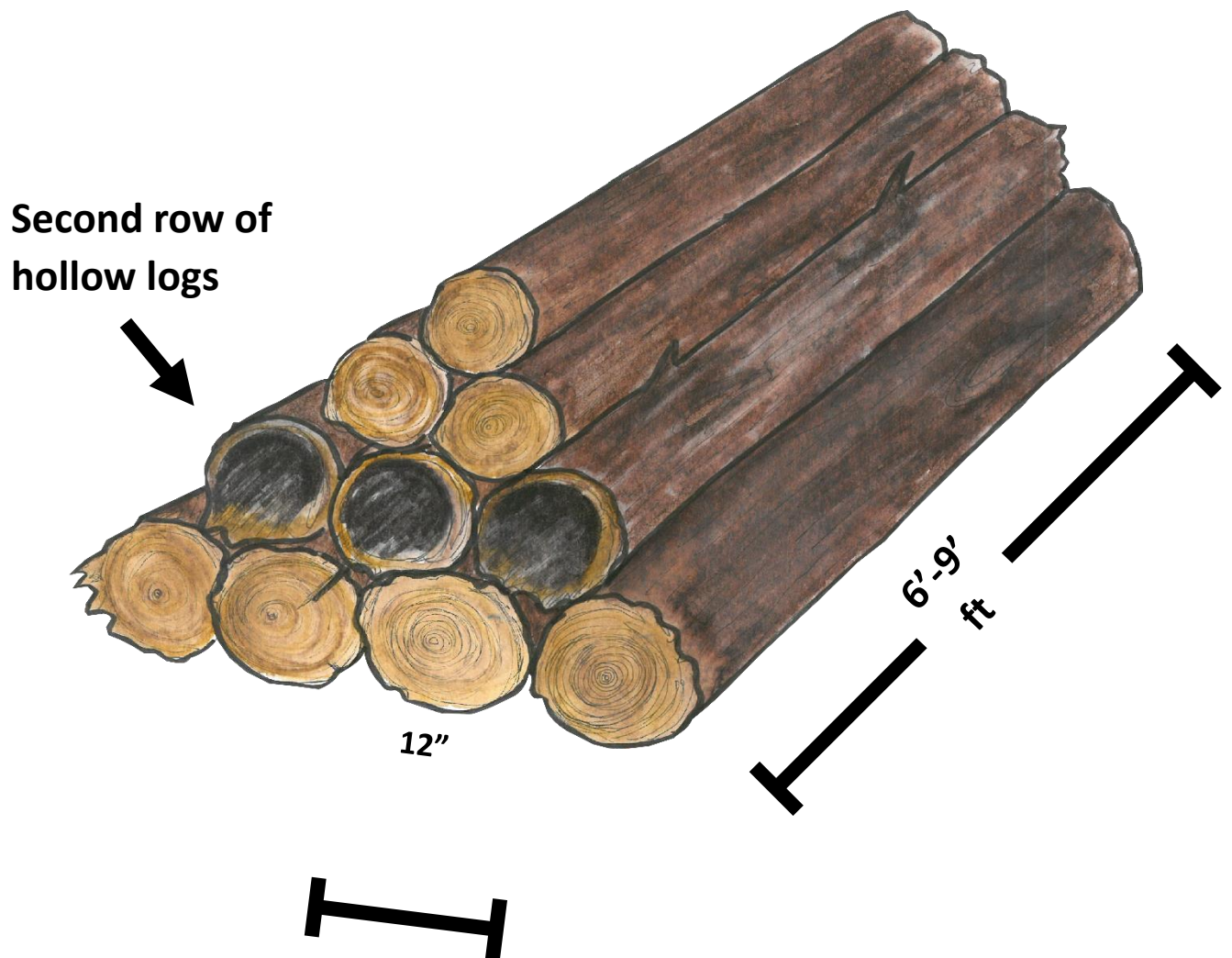


Figure 2. Illustration of a timber rattlesnake (*Crotalus horridus*) structure constructed using logs.