



# SOUTHEAST GAP ANALYSIS PROJECT



## Species Modeling Report

### Timber Rattlesnake

*Crotalus horridus*

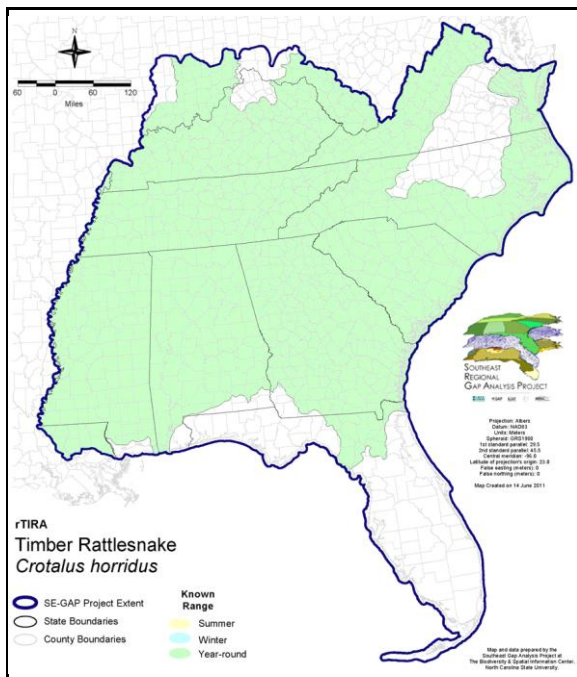
Taxa: Reptilian  
 Order: Squamata  
 Family: Viperidae

SE-GAP Spp Code: **rTIRA**

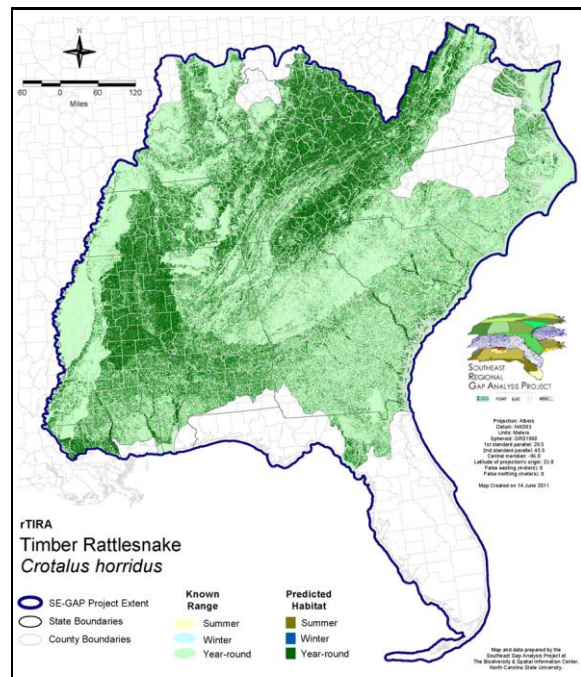
ITIS Species Code: 174306

NatureServe Element Code: ARADE02040

#### KNOWN RANGE:



#### PREDICTED HABITAT:



Range Map Link: [http://www.basic.ncsu.edu/segap/datazip/maps/SE\\_Range\\_rTIRA.pdf](http://www.basic.ncsu.edu/segap/datazip/maps/SE_Range_rTIRA.pdf)

Predicted Habitat Map Link: [http://www.basic.ncsu.edu/segap/datazip/maps/SE\\_Dist\\_rTIRA.pdf](http://www.basic.ncsu.edu/segap/datazip/maps/SE_Dist_rTIRA.pdf)

GAP Online Tool Link: <http://www.gapservice.ncsu.edu/segap/segap/index2.php?species=rTIRA>

Data Download: [http://www.basic.ncsu.edu/segap/datazip/region/vert/rTIRA\\_se00.zip](http://www.basic.ncsu.edu/segap/datazip/region/vert/rTIRA_se00.zip)

#### PROTECTION STATUS:

Reported on March 14, 2011

Federal Status: ---

State Status: CT (E), IL (LT), IN (SE), KS (C), KY (N), MA (E), ME (EXT), MN (THR), MS (Non-game species in need of management), NC (SC), NE (NC), NH (E), NY (T), OH (E), PA (PC), RI (State Historical/Protected), TX (T), VT (E), WI (SC/P), ON (EXP), QC (Non suivie)

NS Global Rank: G4

NS State Rank: AL (S5), AR (S4), CT (S1), DC (SH), FL (S3), GA (S4), IA (S3), IL (S3), IN (S2), KS (S3), KY (S4), LA (S3S4), MA (S1), MD (S3), ME (SX), MN (S2), MO (S3S4), MS (S5), NC (S3), NE (S1), NH (S1), NJ (S1), NY (S3), OH (S1), OK (S3), PA (S3S4), RI (SX), SC (SNR), TN (S4), TX (S4), VA (S4), VT (S1), WI (S2S3), WV (S3), ON (SX), QC (SNA)

**SUMMARY OF PREDICTED HABITAT BY MANAGMENT AND GAP PROTECTION STATUS:**

	US FWS		US Forest Service		Tenn. Valley Author.		US DOD/ACOE	
	ha	%	ha	%	ha	%	ha	%
Status 1	48,411.5	< 1	31,930.7	< 1	0.0	0	0.0	0
Status 2	73,836.9	< 1	320,208.4	< 1	0.0	0	1,121.3	< 1
Status 3	2,025.9	< 1	1,707,560.5	5	34,795.9	< 1	154,825.2	< 1
Status 4	37.3	< 1	0.0	0	0.0	0	127.9	< 1
Total	124,311.6	< 1	2,059,699.5	6	34,795.9	< 1	156,074.4	< 1
	US Dept. of Energy		US Nat. Park Service		NOAA		Other Federal Lands	
	ha	%	ha	%	ha	%	ha	%
Status 1	0.0	0	273,882.2	< 1	45.5	< 1	0.0	0
Status 2	0.0	0	14,545.6	< 1	5,309.1	< 1	0.0	0
Status 3	21,218.3	< 1	75,307.3	< 1	0.0	0	837.6	< 1
Status 4	0.0	0	0.0	0	0.0	0	0.0	0
Total	21,218.3	< 1	363,735.1	1	5,354.6	< 1	837.6	< 1
	Native Am. Reserv.		State Park/Hist. Park		State WMA/Gameland		State Forest	
	ha	%	ha	%	ha	%	ha	%
Status 1	0.0	0	1,202.9	< 1	68.7	< 1	0.0	0
Status 2	0.0	0	15,035.4	< 1	365,159.1	1	1,282.8	< 1
Status 3	24,547.4	< 1	103,388.5	< 1	121,003.7	< 1	24,354.9	< 1
Status 4	0.0	0	< 0.1	< 1	52,467.8	< 1	0.0	0
Total	24,547.4	< 1	119,626.8	< 1	538,699.3	2	25,637.7	< 1
	State Coastal Reserve		ST Nat.Area/Preserve		Other State Lands		Private Cons. Easemt.	
	ha	%	ha	%	ha	%	ha	%
Status 1	0.0	0	12,082.5	< 1	0.0	0	0.0	0
Status 2	3,944.8	< 1	48,811.4	< 1	1.2	< 1	926.3	< 1
Status 3	0.0	0	5,149.8	< 1	3,573.0	< 1	16,745.9	< 1
Status 4	0.0	0	2.1	< 1	1,185.1	< 1	0.0	0
Total	3,944.8	< 1	66,045.8	< 1	4,759.3	< 1	17,672.1	< 1
	Private Land - No Res.		Water		Overall Total			
	ha	%	ha	%	ha	%	ha	%
Status 1	0.0	0	0.0	0	367,623.8 1			
Status 2	0.0	0	0.0	0	850,182.2 3			
Status 3	487.7	< 1	0.0	0	2,295,821.6 12			
Status 4	28,598,557.7	84	8,891.4	< 1	28,713,699.9 85			
Total	28,599,045.4	84	8,891.4	< 1	32,227,327.5 100			

GAP Status 1: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a natural state within which disturbance events (of natural type, frequency, and intensity) are allowed to proceed without interference or are mimicked through management.

GAP Status 2: An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive use or management practices that degrade the quality of existing natural communities.

GAP Status 3: An area having permanent protection from conversion of natural land cover for the majority of the area, but subject to extractive uses of either a broad, low-intensity type or localized intense type. It also confers protection to federally listed endangered and threatened species throughout the area.

GAP Status 4: Lack of irrevocable easement or mandate to prevent conversion of natural habitat types to anthropogenic habitat types. Allows for intensive use throughout the tract. Also includes those tracts for which the existence of such restrictions or sufficient information to establish a higher status is unknown.

**PREDICTED HABITAT MODEL(S):**

**Year-round Model:**

Habitat Description: From NatureServe 2005: In the South, "preferred habitat is "hardwood forests of the type found in Loess Bluff and in many river bottoms" (Cook 1943), swampy areas and floodplains (Mount 1975), wet pine flatwoods, river bottoms and hydric hammocks (Ashton and Ashton 1981), and hardwood forests and cane fields of alluvial plain and hill country (Dundee and Rossman 1989). In the Northeast, this species inhabits mountainous or hilly deciduous or mixed deciduous-coniferous forest, often with rocky outcroppings, steep ledges, and rock slides (Petersen and Fritsch 1986, Brown 1993). At least in the northeastern part of the range (Reinert 1984, Reinert and Zappalorti 1988, Hammerson and Lemieux 2001), males and nongravid females are primarily forest dwellers and gravid females use open, sparsely forested sites. This open habitat was not used by males or nongravid females. "Transient habitat" a somewhat arbitrary category, generally is within 200 m of a den."

In mountains, prefers moderately steep, rocky ridge tops with light ground cover, rocky ledges with southern exposure. In coastal plain, prefers btoomland hardwoods, creek bottoms, coastlines, wiregrass flatwoods, low pine, overgrown fields, abandoned farms, cypress swamps, floodplains, and canebrakes.(Wilson 1995)# Wet pine flatwoods, river bottoms, and hydric hammocks (Ashton 1988). In Louisiana, where hardwood forest predominates (Dundee & Rossman 1989). # Lowland thickets, pinewoods, cane thickets, or swamp borders (Ernst & Barbour 1989). # Flatwoods, river bottoms, and hammocks (Carr and Goin 1955). # In Kansas, rocky habitat, ravines, hilltops, and walls.

Quoted from SC-GAP

Ecosystem Classifiers: Coastal Plain Only: Maritime, Mixed, Hardwood & Mesic Forests, Flatwoods, Swamps, Domes/Hammocks, Depressional & Floodplain/Riparian (No herb mods or blackwater). Outside Coastal Plain: Hardwood, Mixed, Mesic Slope & Mesic Cove Only.

Customized Model: Use landform restrictor in all ecoregions EXCEPT for the Coastal Plain. Amy Silvano 29Aug05

**Selected Map Units:**

Functional Group	Map Unit Name
Anthropogenic	Low Intensity Developed
Forest/Woodland	Allegheny-Cumberland Dry Oak Forest and Woodland
Forest/Woodland	Allegheny-Cumberland Dry Oak Forest and Woodland - Hardwood Modifier
Forest/Woodland	Appalachian Hemlock-Hardwood Forest
Forest/Woodland	Atlantic Coastal Plain Central Maritime Forest
Forest/Woodland	Atlantic Coastal Plain Dry and Dry-Mesic Oak Forest
Forest/Woodland	Atlantic Coastal Plain Fall-line Sandhills Longleaf Pine Woodland - Offsite Hardwood Modifier
Forest/Woodland	Atlantic Coastal Plain Mesic Hardwood and Mixed Forest
Forest/Woodland	Atlantic Coastal Plain Northern Maritime Forest
Forest/Woodland	Atlantic Coastal Plain Northern Mixed Oak-Heath Forest
Forest/Woodland	Atlantic Coastal Plain Southern Maritime Forest
Forest/Woodland	Central and Southern Appalachian Montane Oak Forest
Forest/Woodland	Central and Southern Appalachian Northern Hardwood Forest
Forest/Woodland	Central and Southern Appalachian Spruce-Fir Forest
Forest/Woodland	Central Appalachian Oak and Pine Forest
Forest/Woodland	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest - Hardwood Modifier
Forest/Woodland	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest - Mixed Modifier
Forest/Woodland	East Gulf Coastal Plain Interior Upland Longleaf Pine Woodland - Offsite Hardwood Modifier
Forest/Woodland	East Gulf Coastal Plain Limestone Forest
Forest/Woodland	East Gulf Coastal Plain Maritime Forest
Forest/Woodland	East Gulf Coastal Plain Northern Dry Upland Hardwood Forest
Forest/Woodland	East Gulf Coastal Plain Northern Loess Bluff Forest
Forest/Woodland	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland - Hardwood Modifier
Forest/Woodland	East Gulf Coastal Plain Northern Mesic Hardwood Forest
Forest/Woodland	East Gulf Coastal Plain Southern Loess Bluff Forest

Forest/Woodland	East Gulf Coastal Plain Southern Mesic Slope Forest
Forest/Woodland	Mississippi Delta Maritime Forest
Forest/Woodland	Northeastern Interior Dry Oak Forest - Mixed Modifier
Forest/Woodland	Northeastern Interior Dry Oak Forest-Hardwood Modifier
Forest/Woodland	Northern Atlantic Coastal Plain Dry Hardwood Forest
Forest/Woodland	South-Central Interior Mesophytic Forest
Forest/Woodland	Southeast Florida Coastal Strand and Maritime Hammock
Forest/Woodland	Southern and Central Appalachian Cove Forest
Forest/Woodland	Southern and Central Appalachian Oak Forest
Forest/Woodland	Southern and Central Appalachian Oak Forest - Xeric
Forest/Woodland	Southern Appalachian Montane Pine Forest and Woodland
Forest/Woodland	Southern Coastal Plain Dry Upland Hardwood Forest
Forest/Woodland	Southern Coastal Plain Oak Dome and Hammock
Forest/Woodland	Southern Interior Low Plateau Dry-Mesic Oak Forest
Forest/Woodland	Southern Interior Low Plateau Dry-Mesic Oak Forest - Evergreen Modifier
Forest/Woodland	Southern Piedmont Dry Oak-(Pine) Forest - Hardwood Modifier
Forest/Woodland	Southern Piedmont Dry Oak-(Pine) Forest - Mixed Modifier
Forest/Woodland	Southern Piedmont Dry Oak-Heath Forest - Hardwood Modifier
Forest/Woodland	Southern Piedmont Dry Oak-Heath Forest - Mixed Modifier
Forest/Woodland	Southern Piedmont Dry Oak-Heath Forest - Virginia/Pitch Pine Modifier
Forest/Woodland	Southern Piedmont Mesic Forest
Forest/Woodland	Southern Ridge and Valley Dry Calcareous Forest
Forest/Woodland	Southern Ridge and Valley Dry Calcareous Forest - Hardwood Modifier
Forest/Woodland	Southwest Florida Coastal Strand and Maritime Hammock
Rock Outcrop	Allegheny-Cumberland Sandstone Box Canyon and Rockhouse
Rock Outcrop	Central Interior Acidic Cliff and Talus
Rock Outcrop	Central Interior Calcareous Cliff and Talus
Rock Outcrop	East Gulf Coastal Plain Dry Chalk Bluff
Rock Outcrop	North-Central Appalachian Acidic Cliff and Talus
Rock Outcrop	North-Central Appalachian Circumneutral Cliff and Talus
Rock Outcrop	Southern Appalachian Granitic Dome
Rock Outcrop	Southern Appalachian Montane Cliff
Rock Outcrop	Southern Appalachian Rocky Summit
Rock Outcrop	Southern Appalachian Spray Cliff
Rock Outcrop	Southern Interior Acid Cliff
Rock Outcrop	Southern Interior Calcareous Cliff
Rock Outcrop	Southern Interior Sinkhole Wall
Rock Outcrop	Southern Piedmont Cliff
Rock Outcrop	Southern Piedmont Granite Flatrock
Wetlands	Atlantic Coastal Plain Brownwater Stream Floodplain Forest
Wetlands	Atlantic Coastal Plain Nonriverine Swamp and Wet Hardwood Forest - Taxodium/Nyssa Modifier
Wetlands	Atlantic Coastal Plain Nonriverine Swamp and Wet Hardwood Forest - Oak Dominated Modifier
Wetlands	Atlantic Coastal Plain Northern Basin Peat Swamp
Wetlands	Atlantic Coastal Plain Northern Wet Longleaf Pine Savanna and Flatwoods
Wetlands	Atlantic Coastal Plain Small Brownwater River Floodplain Forest
Wetlands	Atlantic Coastal Plain Southern Wet Pine Savanna and Flatwoods
Wetlands	Central Florida Pine Flatwoods
Wetlands	East Gulf Coastal Plain Interior Shrub Bog
Wetlands	East Gulf Coastal Plain Jackson Plain Dry Flatwoods - Open Understory Modifier
Wetlands	East Gulf Coastal Plain Jackson Plain Dry Flatwoods - Scrub/Shrub Understory Modifier
Wetlands	East Gulf Coastal Plain Large River Floodplain Forest - Forest Modifier
Wetlands	East Gulf Coastal Plain Near-Coast Pine Flatwoods - Offsite Hardwood Modifier
Wetlands	East Gulf Coastal Plain Near-Coast Pine Flatwoods - Open Understory Modifier
Wetlands	East Gulf Coastal Plain Near-Coast Pine Flatwoods - Scrub/Shrub Understory Modifier
Wetlands	East Gulf Coastal Plain Small Stream and River Floodplain Forest
Wetlands	East Gulf Coastal Plain Southern Loblolly-Hardwood Flatwoods

Wetlands	East Gulf Coastal Plain Treeless Savanna and Wet Prairie
Wetlands	Lower Mississippi River Bottomland and Floodplain Forest
Wetlands	Lower Mississippi River Bottomland Depressions - Forest Modifier
Wetlands	Mississippi River Low Floodplain (Bottomland) Forest
Wetlands	Mississippi River Riparian Forest
Wetlands	South Florida Bayhead Swamp
Wetlands	South Florida Cypress Dome
Wetlands	South Florida Dwarf Cypress Savanna
Wetlands	South Florida Hardwood Hammock
Wetlands	South Florida Pine Flatwoods
Wetlands	South-Central Interior/Upper Coastal Plain Wet Flatwoods
Wetlands	Southern Coastal Plain Hydric Hammock
Wetlands	Southern Coastal Plain Nonriverine Cypress Dome

**Selected Secondary Map Units within 250m of Primary Map Units:**

Functional Group	Map Unit Name
Anthropogenic	Deciduous Plantations
Anthropogenic	Successional Shrub/Scrub (Clear Cut)
Anthropogenic	Successional Shrub/Scrub (Utility Swath)
Anthropogenic	Successional Shrub/Scrub (Other)
Anthropogenic	Pasture/Hay

**CITATIONS:** Ashton, R. E., Jr., and P. S. Ashton. 1981. Handbook of Reptiles and Amphibians of Florida. Part One: The Snakes. Windward Pub. Co., Miami, Florida. 176 pp.

Ashton, R. E., Jr., and P. S. Ashton. 1988. Handbook of reptiles and amphibians of Florida. Part Three. The amphibians. Windward Publ. Co., Miami.

Barbour, R. W. 1971. Amphibians and reptiles of Kentucky. Univ. Press of Kentucky, Lexington. x + 334 pp.

Behler, J. L., and F. W. King. 1979. The Audubon Society field guide to North American reptiles and amphibians. Alfred A. Knopf, New York. 719 pp.

Brown, C. W., and C. H. Ernst. 1986. A study of variation in eastern timber rattlesnakes, *CROTALUS HORRIDUS* Linnae (Serpentes: Viperidae). *Brimleyana* 12:57-74.

Brown, W. S. 1987. Hidden life of the timber rattler. *National Geographic* 172:128-138.

Brown, W. S. 1991. Female reproductive ecology in a northern population of the timber rattlesnake, *CROTALUS HORRIDUS*. *Herpetologica* 47:101-115.

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.

Brown, W. S., D. W. Pyle, K. R. Greene, and J. B. Friedland-er. 1982. Movements and temperature relationships of timber rattlesnakes (*Crotalus horridus*) in northeastern New York. *J. Herpetol.* 16:151-161.

Campbell, J. A., and E. D. Brodie, Jr., editors. *Biology of the pit vipers*. Selva, Tyler, Texas.

Carr, A. F., Jr., and C. J. Goin. 1955. A guide to the reptiles, amphibians and fresh-water fishes of Florida. Univ. Florida Press, Gainesville. 341pp.

Collins, J. T. 1982. Amphibians and reptiles in Kansas. Second edition. Univ. Kansas Mus. Nat. Hist., Pub. Ed. Ser. 8. xiii + 356 pp.

Collins, J. T. and J. L. Knight. 1980. *CROTALUS HORRIDUS*. Catalogue of American Amphibians and Reptiles. *SSAR NO.* 47:1-2.

Conant, R. 1975. *A Field Guide to Reptiles and Amphibians of Eastern and Central North America*. Second Edition. Houghton Mifflin Company, Boston, Massachusetts. xvii + 429 pp.

Conant, R. and J. T. Collins. 1991. *A field guide to reptiles and amphibians: eastern and central North America*. Third edition. Houghton Mifflin Co., Boston, Massachusetts. 450 pp.

Cook, F. A. 1943. *Crotalus horridus* Linne; timber rattler; canebrake rattler; banded rattler; velvetail rattler. Pages 53-55 in F. A. Cook. *Snakes of Mississippi*. Mississippi State Game and Fish Comm. Surv. Bull., Jackson, Mississippi. 73 pp.

DeGraaf, R. M., and D. D. Rudis. 1983. *Amphibians and reptiles of New England. Habitats and natural history*. Univ. Massachusetts Press. vii + 83 pp.

Dundee, H. A., and D. A. Rossman. 1989. *The amphibians and reptiles of Louisiana*. Louisiana State Univ. Press, Baton Rouge.

Ernst, C. H. 1992. *Venomous reptiles of North America*. Smithsonian Inst. Press, Washington, D.C. ix + 236 pp.

- Ernst, C. H., and R. W. Barbour. 1989. Snakes of eastern North America. George Mason Univ. Press, Fairfax, Virginia. 282 pp.
- Fraser, D. F., and R. W. Fritsch, II. 1991. The status of the timber rattlesnake in east Glastonbury, Connecticut 1985-1990. Report submitted to Connecticut Department of Environmental Protection, Wildlife Bureau. 41 pp.
- Gibbons, J. W., and R. D. Semlitsch. 1991. Guide to the reptiles and amphibians of the Savannah River Site. Univ. of Georgia Press, Athens. xii + 131 pp.
- Green, N. B., and T. K. Pauley. 1987. Amphibians and reptiles in West Virginia. University of Pittsburg Press, Pittsburg, Pennsylvania. xi + 241 pp.
- Hammerson, G. A., and R. Lemieux. 2001. Population status, movements, and habitat use of timber Rattlesnakes (*Crotalus horridus*) in central Connecticut, 1998-2000: final report. Unpublished report submitted to Connecticut Department of Environmental Protection.
- Johnson, T. R. 1987. The amphibians and reptiles of Missouri. Missouri Department of Conservation, Jefferson City. 368 pp.
- Klauber, L. M. 1972. Rattlesnakes: their habits, life histories, and influence on mankind. Second edition. Two volumes. Univ. California Press, Berkeley.
- Martin, W. H. 1993. Reproduction of the timber rattlesnake (*CROTALUS HORRIDUS*) in the Appalachian Mountains. *J. Herpetol.* 27:133-143.
- Martof, B. S., W. M. Palmer, J. R. Bailey, and J. R. Harrison, III. 1980. Amphibians and reptiles of the Carolinas and Virginia. University of North Carolina Press, Chapel Hill, North Carolina. 264 pp.
- Minton, S. A., Jr. 1972. Amphibians and reptiles of Indiana. *Indiana Academy Science Monographs* 3. v + 346 pp.
- Mitchell, J. C. 1991. Amphibians and reptiles. Pages 411-76 in K. Terwilliger (coordinator). *Virginia's Endangered Species: Proceedings of a Symposium*. McDonald and Woodward Publishing Company, Blacksburg, Virginia.
- Mount, R. H. 1975. The Reptiles and Amphibians of Alabama. Auburn University Agricultural Experiment Station, Auburn, Alabama. vii + 347 pp.
- Petersen, R. C. and R. W. Fritsch II. 1986. Connecticut's Venomous Snakes: The Timber Rattlesnake and Northern Copperhead. *Bulletin* 111, State Geological and Natural History Survey of Connecticut, Department of Environmental Protection, Hartford, Connecticut.
- Peterson, A. 1990. Ecology and management of a timber rattlesnake (*CROTALUS HORRIDUS* L.) population in south-central New York. Pages 255-261 in Mitchell et al., eds. *Ecosystem management: rare species and significant habitats*. *New York State Mus. Bull.* 471
- Pisani, G. R., J. T. Collins, S. R. Edwards. 1972. A re-evaluation of the subspecies of *CROTALUS HORRIDUS*. *Trans. Kansas Acad. Sci.* 75(3):255-263.
- Reinert, H. K., and R. T. Zappalorti. 1988. Field observation of the association of adult and neonatal timber rattlesnakes, *CROTALUS HORRIDUS*, with possible evidence for conspecific trailing. *Copeia* 1988:1057-1059.
- Reinert, H. K., and R. T. Zappalorti. 1988. Timber rattlesnakes (*CROTALUS HORRIDUS*) of the Pine Barrens: their movement patterns and habitat preference. *Copeia* 1988:964-978.
- Reinert, H. K., D. Cundall, and L. M. Bushar. 1984. Foraging behavior of the timber rattlesnake, *CROTALUS HORRIDUS*. *Copeia* 1984:976-981.
- Reinert, H.K. 1984. Habitat separation between sympatric snake populations. *Ecology* 65:478-486.
- Smith, P. W. 1961. The amphibians and reptiles of Illinois. *Illinois Natural History Survey* 28:1-298.
- Tennant, A. 1984. The Snakes of Texas. Texas Monthly Press, Austin, Texas. 561 pp.
- Tyning, T. F., editor. 1992. Conservation of the timber rattlesnake in the northeast. Massachusetts Audubon Society, Lincoln, Massachusetts.
- Vogt, R. G. 1981. Natural history of amphibians and reptiles of Wisconsin. Milwaukee Public Museum. 205 pp.
- Webb, R. G. 1970. Reptiles of Oklahoma. University of Oklahoma Press, Norman. 370 pp.
- Wilson, L. A. 1995. The Land Manager's Guide to the amphibians and reptiles of the South. Chapel Hill, NC: The Nature Conservancy.