A Reptile and Amphibian Survey

of

The Skitchawaug Wildlife Management Area

in Springfield, Vermont

2006

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Introduction

This report is based on fieldwork done at the Skitchawaug Wildlife Management Area (SWMA) in 2006. Results are based on three visits to the site during the 2006 field season. The scope of the fieldwork was to perform a brief herpetological survey of SWMA within the budgetary and time limitations of the contract. The goals of the survey were to locate any rare, threatened, or endangered reptiles or amphibians (herptiles) that were using the parcel or might be using the parcel based on their location, habitat, and reports from adjacent areas. An additional goal was to determine and discuss any issues pertaining to the sustainability of any populations of rare, threatened, or endangered herptiles found or suspected to be at the site and propose management strategies specific to those species, including additional inventories if warranted. Funding and effort were limited and this should not be considered a complete survey. This report covers herptiles located or possible in the **Skitchawaug Wildlife Management Area** in 2006 (Table 1), paying particular attention to those with a Vermont State Heritage rank of S3 or lower. In addition, significant habitats and locations are noted and management suggestions given.

Methods

No one method will inventory the complete range of reptiles and amphibians occurring in an area. A combination of methods must be employed over a variety of seasons, but as a result of limited time and funding, I used one of the most comprehensive of the methods: active searches. Visits were made on May 2, July 29, and September 27. On May 2, I visited the site with a volunteer helper. During the July 29 visit, I was assisted by a team of students and counselors from Vermont Audubon. The help of all these additional eyes, ears, and hands was significant and paid for out of other sources. On September 27, my assistant and one very capable volunteer helped with the survey work. All of the community types were surveyed at least once. We targeted sites that seemed the most likely to hold unusual species. Unusual reptile and amphibian species often require multiple visits to the same site to locate them. Consequently the species list (Table 1) for this parcel may not be entirely complete.

An active search is a concentrated effort in a predetermined area to locate reptiles and amphibians by raking leaf litter, looking under rocks and logs, looking within rotten logs or under any items, natural or unnatural, that provide moist and shady retreats during the day. In addition, diurnally active species are searched for in appropriate microhabitat and identified if calling.

In addition to the above method, I used records from previous visits to the area, old bounty records, literature reports, and other contributions to the Vermont Reptile and Amphibian Database. As coordinator of the Vermont Reptile and Amphibian Atlas Project, all known records of Vermont herptiles current or historic are on a database on my computer. These records were accessed to check for all other records from the region and surrounding towns.

Results

All reptiles and amphibians located

Twelve species of herptile were located in the WMA or along the access way to it (Table 1): four species of frog; American Toad (*Bufo americanus*), Spring Peeper (*Pseudacris crucifer*), Green Frog (*Rana clamitans*), and Wood Frog (*Rana sylvatica*), five species of salamander; Spotted Salamander (*Ambystoma maculatum*), Northern Dusky Salamander (*Desmognathus fuscus*), Northern Two-lined Salamander (*Eurycea bislineata*), Eastern Newt (*Notophthalmus viridescens*), Eastern Red-backed Salamander (*Plethodon cinereus*), and three species of snake; Ring-necked Snake (*Diadophis punctatus*), Milksnake (*Lampropeltis triangulum*), and Common Gartersnake (*Thamnophis sirtalis*). The Milksnakes were located immediately north of the WMA along the access route in the slate piles but are assumed to use the WMA as well. No turtle species were located. All the species located are fairly common S4 & S5 species.

Other possible herptiles based on reports in our database from surrounding areas or historic records from this site

Based on the community types found within the WMA, reliable reports of additional species from the towns (and the region) surrounding SWMA, and historic records from this site, six other species may use this WMA (Table 1).

Five other species are **reliably and currently** reported from surrounding towns, or other sites within Springfield, but there is no additional evidence that they use this area other than the fact that it contains some habitat that may be suitable for them. Two of these are common S5 species: Gray Treefrog (*Hyla versicolor*) and Red-bellied snake (*Storeria occipitomaculata*) that are often difficult to find due to their life histories. Gray Treefrog is very difficult to find using active searches if it is not calling. Most of the field season this species is foraging up in trees or hiding in knotholes, under bark, or in other small spaces up in trees. The Red-bellied Snake is most easily located in small forest openings under bark and other organic woody debris. It is small, and often widely dispersed, hence it can be difficult to find. DeKay's Brownsnake (*Storeria dekayi*) is an S4 species that has been reported from Springfield and usually spends most of its time foraging in overgrown fields and wetlands but retreats to upland rocky woodlands to over-winter. It may be also be on site and overlooked. If present, I would imagine it over-wintering on the talus slopes along the eastern boundary of the WMA.

Two **S2 species of special concern** may be using this WMA based on Herp Database records and habitat types. One is the **Four-toed Salamander (*Hemidactylium scutatum*)**. The vernal pools and open wetlands along the northwestern boundary of the WMA are potential breeding habitat for this salamander. Although we did not find them in the time we spent at this WMA, this salamander is rare, secretive, and hard to find except during the spring breeding season. Drift-fences are the most reliable technique for locating these at a site of this type but egg-mass searches could also be effective. The **Jefferson Salamander (*Ambystoma jeffersonianum*, S2, SC)** also may breed in the vernal pools in the western half of the property. Their most typical breeding habitat is fairly deep ridge-line pools in well–buffered soils and it is a more of a stretch to imagine it breeding here. One of the vernal pools is quite deep but I doubt the pH is high enough and the surrounding soils do not seem appropriate. Egg mass searches or trapping in the spring would help determine the presence or absence of this species. Road searches in the area could also help determine if either of these species were present. I am currently inclined to believe that these two species are found here in very limited numbers if at all.

One S1 endangered species must have used this area historically and could possibly be using it now in small numbers. The **Timber Rattlesnake** (*Crotalus horridus*) is reported from Skitchawaug (also spelled Skitchewaug in some reports) Mountain in 14 records in our database. Eight more reports (including records of bounties paid from the town of Springfield) are assumed to be from this area or very close by. All but one of these records range in date from 1890 to 1950. A single record from 1994 is an outlier. All the records have been attached to this report (Appendix F). It appears that the location of the den mentioned is not on the current state property. The one mention of it states there once was a large cave at the den site that collapsed and that the area has since been mined, however this is second-hand anecdotal information. Talus slopes appropriate for denning do occur along the eastern boundary of the property and any Rattlesnake denning on this ridge on or off the WMA would easily have all of the WMA within its foraging range. I did not see any Rattlesnakes nor did I hear any reports (even historic) from current landowners adjacent to the WMA that I talked to. However, I have only talked to a couple of the adjacent landowners due to time and budget constraints. Additional landowner interviews would be useful.

I suspect that since the Timber Rattlesnake travels up to five miles (16 km) from its den site to forage, the presence of Route 5 to the east and Interstate 91 to the west limit successful foraging. In addition, alteration of the denning sites and collection for sport and bounties probably extirpated Rattlesnakes at this site. It is completely isolated from other known current denning areas in Vermont and New Hampshire and hence it would be unlikely to be recolonized unless unknown populations persist nearby. However, Rattlesnakes are a secretive and cryptic species that could easily be overlooked if not found while at the dens in the spring and fall.

It is not possible to prove the absence of small, secretive, seasonal, or rare species. It is still possible that species other than those mentioned above exist in low numbers in the area during certain seasons. However, it is unlikely that species not already discussed have significant populations within this WMA. A current list of

all known Vermont species of reptiles and amphibians along with their protective status and state ranks is contained in Appendix A.

Sites visited

Over the course of the past year we were able to make at least one visit to all known community types within SWMA on the parcels east and west of Interstate 91. This included the sites I felt were most likely to reveal the diversity of herptiles using the WMA. Additional visits to the previously sampled areas at different times of the year, during different weather conditions, or using different methods could reveal additional species but I feel the area was adequately surveyed given funding realities. Any additional efforts should focus on key times and locations for target species such as Timber Rattlesnake denning areas in May and September, and salamander breeding locations in April.

This WMA includes only a moderate diversity of community types and hence its herptile diversity is limited. What makes this area unique for herptiles are primarily its talus slopes, vernal pools, and open wetland/seepage areas. The slate piles on the access road from the north, while not within the WMA, are great habitat for snakes and provide part of the habitat mosaic that, together with the woodlands and wetlands on the WMA, meets their needs.

The parcel to the west of the WMA does not include talus or amphibian breeding habitat and hence is less significant other than as a potential travel and foraging corridor. The portion on the east of Interstate 91 is the more diverse and herpetologically significant of the two.

Discussion

Conservation of the most significant reptiles and amphibians located

Even though the Timber Rattlesnake was not located during this survey and it probably has been extirpated from this site, its presence historically is still the most significant herpetological and perhaps overall biological feature of this site. The 1994 reported sighting by Dan Magoon and the report of a dog struck by a Rattlesnake immediately across the river in NH (not in our database) within the last couple years raise the possibility that some of this species may still survive in the area. Neither of these reports can be verified with photos or specimens. Other species (most notably Milksnakes) are often confused for Rattlesnakes and New Hampshire biologist Mike Marchand searched the area of the reported dog bite in NH and did not locate potential habitat. Still we know it once existed at this site. Additional surveys targeted at talus slopes in May or September both on the WMA and on privately owned talus nearby should be the highest priority for additional survey effort. Three or four full days with two to three people would be a respectable effort. If Rattlesnakes are denning on nearby privately owned talus, they may well be foraging on the WMA.

I think it is wise to manage the site as if Rattlesnakes continue to use the site, until some more intensive surveys provide more solid evidence that they are not. Consequently, I have included Rattlesnake management suggestions. These management actions would benefit the other two snake species known to be using the area as well.

If using the site, Rattlesnakes would be using east, southeast, or south-facing cliff, cliff top, and talus for over-wintering, basking, and birthing. All known locations in Vermont where this species has been found, contain ledge, cliff face, talus, and nearby warm deciduous forests with oak and hickory. Consequently managing areas for hardwood, berries (small mammal food), and open talus, ledge, and ridge would benefit any potential Rattlesnakes in the area. Currently a very large percentage of the area is in Hemlock.

Keeping the talus slopes, cliff faces, and ledge areas largely open and with minimal soil would maintain denning, basking, and birthing locations (with the exception of north facing areas). Some of these slopes have become overgrown and shaded in recent years. Scattered live trees, and standing snags should be left in place, and some could be dropped onto the talus slopes. Along the top edges of the cliffs, I think thinning of the trees would be a good idea, particularly the large evergreens, which shade the most exposed rock area. In this way more sunny pockets would be created. The goal would be to create a mix of exposed rock, standing dead trees,

standing large live hardwoods, scattered shrub cover and leaf litter, mixed with some large dead and down logs. The largest concern would be the direct disturbance or mortality of any Rattlesnakes. Consequently it would best be done in the late fall and winter when snakes should be in their dens. Fire management might work to remove accumulating organic material that would form topsoil and fill in too quickly. Timing of any fire management should be when the snakes are least likely to be in the basking and birthing area (July).

The following are a list of general recommendations that would benefit Timber Rattlesnakes.

- Perform targeted surveys on talus and exposed ledges on the WMA and on private lands nearby during May and September.
- Release rocky areas (ledge, talus, stone walls). Open them up with small patch cuts to create basking and feeding sites. Fire management may be useful.
- Prohibit ATV use of trails and actively work to stop illegal use. They run over basking snakes. There is evidence of heavy use in this area.
- If logging takes place on the WMA, it should be during winter or late fall (November) to minimize the chances of causing snake mortality.
- Provide food and cover for small mammals in woods. Encourage oak, hickory, and berries; maximize course woody debris in hardwood areas.
- Encourage reporting and, if possible, photo documentation of all sightings on the WMA and surrounding lands.
- Inform contractors, staff, or volunteers working at the site that we are trying to protect and encourage snakes. (As a result of fear and lack of information, many people kill snakes without thinking.)
- If Rattlesnakes are verified, don't advertise the presence of the snakes in widely distributed publications. Illegal collection, relocation, and/or disturbance is a concern.

<u>Conservation of other significant reptiles and amphibians that might use the area</u>

One of the possible **S2 species of special concern** was the **Jefferson Salamander**. One possible breeding area are the vernal pools in the western lowland portion of the eastern segment (east of Rte. 91) of the WMA (see Appendix E for GPS locations). I have found Jefferson Salamanders in rocky hardwoods with permanent or semi-permanent breeding pools. There also seems to be a correlation with close to neutral pH (6-7). This site seems more acidic than ideal and the pools may not have a long enough hydroperiod for this species. Personally, I suspect that it is not using this area, however, without trapping in early spring they cannot be ruled out entirely. The management suggestions given below would also apply to the more common Spotted Salamanders and Wood Frogs that we know are breeding in these pools.

Quite a few vernal pools are scattered along the western half of the main portion (east of Rte. 91) of the WMA. These are known breeding locations for Spotted Salamanders and Wood Frogs. They are the result of a fine balance between the amount of water received and the rate at which it is lost. If they are exposed to more sunlight than they normally receive, they may evaporate too fast to provide habitat through metamorphosis in June or July. Hence it is important that these pools remain shaded (if shaded at present) and that the drainage is not altered in such a way as to prevent them from receiving and/or holding as much run-off. A minimum 30-m buffer (100 ft.) of uncut trees should be left to conserve shade. Pools are essential for maintaining herptile diversity and population viability. As Semlitsch and Bodie (1998, 1129) concluded, "small, isolated wetlands are extremely valuable for maintaining biodiversity, [and] the loss of small wetlands will cause a direct reduction in the connectance among remaining species populations".

The need to maintain such buffer strips around pools is clear but sometimes obscures the equally important concept of protecting foraging and overwintering habitat for the species that breed in those protected water bodies. Semlitsch (1998) reviewed travel distances of many amphibian species and determined that a protected distance of 164.3 m would include 95% of the salamander population using a given pond. This is clearly short, however, of the total distance traveled by Wood Frogs and Eastern Newts, and does not consider recolonization distances. Amphibians breeding in the pools may be coming from as far away as 400 meters. deMaynadier and Hunter (1995) recommend that no more than 25% of the basal area should be cut in a 100-m 2nd-tier buffer that extends beyond the no-cut zone around a pool. I recommend carefully managing a 600-ft. terrestrial-habitat zone, starting at the pool edge.

Heavy equipment should be kept out of the pools and they should not be filled with debris. Fish should not be introduced into any pools, beaver ponds, or lakes that have significant breeding populations of spring breeding amphibians. The introduction of salmonids in the western US to high elevation lakes has been shown to be the cause of precipitous declines of both salamanders and frogs (Gillespie and Hero 1999).

As a result of their moist permeable skin, amphibians absorb water, and any substance that is dissolved in it, directly through their skin. Any species that feed upon amphibians, such as herons, raccoons, and snakes, can then be affected by these chemicals as well. Although many **biocides** have been shown to be toxic to amphibians (Power et al. 1989), the short-term toxic effects of most chemicals (herbicides, pesticides, fungicides, etc.) have not been tested on amphibians. The long-term and/or sublethal effects are almost never tested prior to commercial use. Information regarding the effects of different biocides on amphibians and reptiles may be found at www.on.ec.gc.ca/herptox/.

There is a marijuana plot in the large open wetland (large seepage area) near the northwest boundary and near Interstate 91 (see Appendix E for GPS location). There is evidence of attempted propagation near the large central seepage area (along the intermittent stream) as well. The relevance of the one successful plot to amphibians is that in an apparent attempt to control deer predation, moth balls have been scattered around the plot. **Many of these mothballs are in the wetlands and I am concerned about their impact on developing amphibians**, though I have not read anything specific about the impact of mothballs on amphibians.

Jefferson Salamanders are not tolerant of habitat acidification. The number of eggs that adults deposit, and egg and larval survival rates are correlated with water acidity (Petranka 1998). Changes to the pH of these pools could potentially affect the population viability of the Jefferson Salamander and other amphibian species.

A few general recommendations for protecting the habitat in and around wetlands follow. They are the same as for protecting habitat around vernal pools.

- Potential breeding pools along the margins of wetlands should be kept buffered (100 ft. no cut zone) and surrounding terrestrial habitat should be carefully managed.

- I recommend that woodlands within 600 feet of wetlands and known and potential breeding pools be managed as amphibian terrestrial habitat. In this zone (outside the buffer), woodlands can be managed for hardwoods, maximizing coarse woody debris and dense leaf litter. However, no more than 25% of the 600-foot radius outside the buffer around the pool should be in young or early successional growth. The rest should be 70 years old in moist areas and older in dry areas. This concentrates activity and disturbance in a relatively small area and leaves the majority of habitat undisturbed. This is a slightly different recommendation than that of deMaynadier and Hunter (1995) who recommend spreading a smaller impact over a wider area (remove no more than 25% of basal area). These two approaches could be looked at as two management options for any given site.

The **Four-toed Salamander (S2, special concern)** was not found on the parcel but it is a secretive species that may use the vernal pool and wetlands along the northwest boundary. It lays eggs under moss or in tussocks near the wetlands and migrates from nearby uplands where it feeds and overwinters. It is not known how far

- coarse woody debris in adjacent forested areas,
- foliage height diversity in adjacent forested areas,
- canopy cover over breeding and foraging areas,
- deep deciduous leaf litter for moisture retention and feeding,
- cool and moist conditions.

General reptile microhabitat requirements

- coarse woody debris (standing and down),
- small open patches for basking, mixed with well shaded refugia for warm weather and feeding,
- undisturbed areas in and around wetlands for feeding and breeding,
- access to safe denning areas.

Many studies have examined the relationships between different timber management practices and amphibian richness and abundance (see review by deMaynadier and Hunter 1995). Most work supports the finding that amphibian richness and abundance decrease in clearcuts and similar shelter wood cuts (Ash 1988, Howard and Caschetta 1999, Petranka et al. 1993) but gradually return to pre-cut levels with time (60 to 120 years) **as long as source populations and travel corridors are maintained intact**. deMaynadier and Hunter (1998) also showed that these declines extend 25-35 m beyond the edges of the affected area cut. General recommendations for the maintenance of reptile and amphibian habitat relative to timber harvesting practices are listed below. They will benefit the common amphibian and reptile species that use this parcel.

<u>General forest management recommendations for reptiles and amphibians</u>

- Maintain large down trees (>2 per acre, 7 per hectare), dead standing trees (> 4 per acre), and a future supply consisting of older standing trees.
- Maintain standing trees with knotholes and dead branches.
- Within areas that are heavily cut, patches of older trees should be left in addition to the scattered mature trees.
- Maintain a thick layer of deciduous litter.
- Softwood plantations limit the number and diversity of amphibians (decreased coarse woody debris, decreased structural diversity, decreased hardwood leaf litter, increased acidity). In these situations maintaining pockets of hardwoods and leaving large debris on the ground would help to minimize the impact.
- Long rotations provide the old mature growth and dense forest cover amphibians prefer. As forests age they show increasing amphibian abundance up to an age of 60 to 70 years old in wet cool habitats and up to 120 years in warm, dry, lowland habitats (deMaynadier and Hunter 1995).
- Minimize compaction of the soil and direct mortality by keeping heavy equipment off the site when the ground is saturated. Winter logging or logging in late summer and early fall should help minimize this effect.
- Protect and maintain shrub cover in the forest and on forest edges (vertical complexity).

- Do not create ditches and ruts that will hold water only briefly. Amphibians often lay their eggs in these small patches of water, which dry too soon to permit the larvae to transform and leave. They should either be prevented or they should be deep and shaded enough to hold water through July.

The recommendations above are also included in the handout Forest Management Practices for Vermont Reptiles and Amphibians. I have included a copy (Appendix B).

Rarely is there a species of amphibian that benefits from large openings. A few species such as Spring Peepers, Pickerel Frogs, and American Toads will use small openings for at least part of the season. Most of our snakes will benefit from small openings.

Almost all herptiles will benefit from the protection and maintenance of **buffers for all streams and wetlands**. These buffers minimize siltation, absorb nutrients, maintain shade, maintain undisturbed soil, and deep leaf litter, provide patches of older growth as sources for recolonization, and provide movement corridors. Buffer strips should be widest where wetlands and streams are larger, where the intensity of harvest is greatest, where the surrounding terrain is steepest, or where rare, threatened, or endangered species are found.

Connectivity, fragmentation, roads, and development

The wetlands (including seepage areas) of SWMA primarily provide breeding areas and a moisture refuge in periods of drought for amphibians, which in turn provide food for some of the reptiles and many other species. However, most of the year, the amphibians and reptiles are using the surrounding woodlands. One of the reasons some herptiles can persist in the area is the current connectivity of habitat types within the WMA; the amphibians located can still move between overwintering, breeding, and foraging grounds safely. The herptiles with larger ranges (e.g., Timber Rattlesnakes) can not. As mentioned earlier, as **development** increases on the private parcels adjacent to this parcel, so does the fragmentation of the habitat, making it more and more difficult for these species to move to and from their required habitats. Not only does increased development affect an individual herptile moving from one habitat type to another; it can also affect an entire population. As patches of suitable habitat are destroyed or broken into smaller and smaller pieces, local diminished populations die off, and recolonization and immigration (the ability of an existing population to "rescue" the declining or extinct population) decreases. As cited in Sjogren 1991, "the fragmentation process poses a twofold extinction threat at local and regional levels. In addition to the increased risk of extinction following the reduction in population size, increased isolation of the remaining populations beyond a critical degree is likely to increase the risks of local and regional extinction further" (Sjogren 1991, 144). Therefore, "reserves should include sets of interconnected local populations and vacant suitable habitats, or be located in groups so that connectivity is achieved" (Sjogren 1991, 144). The state should work to maintain connections within and, if Rattlesnakes are verified, try to create movement corridors in and out of this parcel. This would establish an area large enough to contain the different habitats used during the annual movements of many of the species discussed here. Connections to additional protected lands outside of the usual range of these populations would allow for genetic exchange and recolonization over the long term.

Road mortality is a serious threat to a wide variety of wildlife, including herptiles, through direct mortality, migrational barriers, hydrologic disruption, pollution, construction impacts, spread of exotics, and increased human usage (Trombulak and Frissell, 2000). Much of the February 2000 issue of Conservation Biology is dedicated to the ecological effects of roads and a variety of websites have sprung up with useful bibliographies (see End of the Road: www.nrdc.org/publications). As traffic increases, so do the negative effects on local amphibian densities (Fahrig et al, 1995). Heine (1987) calculated that 26 cars per hour could reduce the survival rate of toads crossing roads to zero.

With increased road traffic and numbers of roads, the chances of road mortality are much greater. When road mortality pushes the total mortality beyond the production capability of the herptile populations, they disappear. The greatest concentration of mortality takes place on wet, warm, and humid nights (all herptiles) and on sunny mornings after the first frosts of fall in late September and October (snakes).

Although I did not identify any specific locations of concentrated crossing activity, I have included information on designs that could be useful. Properly designed **tunnels and underpasses** built under roads can guide young

and adult herptiles under roads. This involves the combined use of fencing or walls and underpasses for reptiles, amphibians, (Langton 1989) and some small to medium sized mammals. Underpasses have been very effective when carefully designed and strategically placed. They are expensive. The design that makes the most sense based on my experience and observations would be that used in Payne's Prairie in Florida (reptile wall and culverts). The continuous wall is a valuable addition to the design and it is aesthetically more pleasing than a fence.

For more information on the Payne's Prairie design, visit the website below and open the chapters on Tortoise Underpasses, Salamander tunnels, and Amphibian-Reptile wall and culverts.

Critter Crossings (Federal Highway Administration)
www.fhwa.dot.gov/environment/wildlifecrossings/index.htm

There is a large and growing body of literature on the impacts of roads on herptiles. I have attached a bibliography in Appendix C.

Other construction-related threats are **amphibian-breeding traps**. These can result when pools are created in gravel pits, construction sites, or road beds that hold water long enough to entice amphibians to breed but not long enough for the young to metamorphose. Even if these pools hold water through the time of metamorphosis, some of them are too frequently disturbed by vehicles to produce metamorphs. The drainage of man-made pools that are frequently disturbed (roadbeds) should be altered so that they do not gather any water in the spring. **Pools could also be created in areas that are not disturbed.** I don't suggest this as a method to replace significant pools but as a way to enhance amphibian breeding at disturbed sites such as old logging headers. If so, care should be taken to make sure they are deep enough to hold water through July of most years (>70 cm).

Sedimentation of streams from road construction also diminishes the abundance and diversity of salamanders present (Bury and Corn, 1988 and Corn and Bury, 1989) and the effects may last for many years. Among other effects, silt fills the spaces in stream beds where larval amphibians hide and feed.

Other options to minimize road impacts on herptiles in critical areas include signage to alert traffic to wildlife of all types and to ask drivers to avoid or assist wildlife crossing roads, lowered speed limits, speed control bumps, narrowing of roads, removal of blacktop, closing of roads after dark or on rainy evenings after dark, limiting the amount or type of vehicles (bicycles instead of cars), and hiring or training volunteers to act as conservation officers. Clearly, the impact on wildlife of building, improving, or relocating roads should be taken into consideration and the effects of increased traffic flow should also be taken into account.

<u>General thoughts on conservation design for reptiles and amphibians</u>

Most mobile species use a variety of community types over the course of the year and over the course of their lives. In addition, they need to be able to recolonize areas where populations have been eliminated due to drought, winterkill, disease, or anthropogenic forces. They need to be able to find alternative cover, food sources, breeding, or over wintering sites when natural disasters occur. Genetic diversity also needs to be maintained by allowing different populations to interact. Permeability is a term that I think should be used when thinking of the ability of a species to move comfortably across the landscape. Does the intended use leave the landscape permeable to the wide variety of species you wish to maintain? When details about the permeability of landscape uses are not known for many species, I believe that the safest and most logical way to proceed to maintain natural biodiversity is to maintain a network of interconnected sites where natural processes are allowed to occur. Efforts to maintain permeability and connectivity on surrounding lands should be considered necessary to maintain the biodiversity of this parcel over the long term. Working with land trusts and conservation organizations to obtain development rights on surrounding lands will help conserve its wildlife.

Summary

This site has been fairly well surveyed for overall herptile diversity. Significant populations of species at this WMA other than those found or listed as possible seems highly unlikely. All of the species located were common and wide spread in the state. The historic presence of Timber Rattlesnake suggests cautionary management for the species and additional targeted survey efforts for it. Two other unusual species may be using the site but it seems unlikely that there could be significant populations of them. They are the Four-toed Salamander (S2, special concern) and the Jefferson Salamander (S2, special concern). Spring trapping and survey in breeding areas could help determine if they are present, however, first priority for additional survey effort should be for Timber Rattlesnakes in appropriate denning habitat on the WMA and on nearby private land in May and September. **Management for herptiles at this site should be focused on the potential for Timber Rattlesnake and the protection of vernal pools and adjacent upland habitat for known and possible vernal pool breeders.** Significant seepage areas occur and should also be maintained. A variety of specific recommendations are made above.

Appendices

Attached are: a printout of the current status and accepted names for reptiles and amphibians in Vermont (Appendix A), forest management recommendations for reptiles and amphibians (Appendix B), a bibliography of road impact literature (Appendix C), suggested resources for herptile identification, natural history, and management (Appendix D) locations and brief descriptions of significant herptile habitat (Appendix E) and historic Rattlesnake records (Appendix F).

Recommended management guides that include reptiles and amphibians

Management guides are just beginning to be available. All of the following include reptile and amphibian related information.

Biebighauser, T. 2002. A guide to creating vernal ponds. USDA Forest Service in cooperation with the Izaak Walton League of America. Morehead, Kentucky. 33 pp. (Call 606-784-6428 to order or find it on the web.)

Calhoun, A.J.K. and M. W. Klemens. 2002. Best Development Practices: Conserving pool-breeding amphibians in residential and commercial developments in the Northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York. 57 pp. (Call 914-925-9175 to order.)

deMaynadier, P. and M. Hunter. 1995. The relationship between forest management and amphibian ecology: a review of the North American literature. Environmental Reviews 3: 230-261.

Evink, G. 2002. National Cooperative Highway Research Program Synthesis 305, Interaction between roadways and wildlife ecology, A synthesis of highway practice. Transportation Research Board, Washington D.C. 78 pp. (Impacts of roads on herptiles and some conservation strategies. A big problem, good information. Order at 202-334-3213 or on the web.)

Flatebo, G., C. Foss, and S. Pelletier. 1999. Biodiversity in the forests of Maine: Guidelines for land management. University of Maine Cooperative Extension Bulletin #7147. C. Elliot editor, University of Maine Cooperative Extension, Orono, Maine. 168 pp. (Contact UME Extension Office at 207-581-3188.)

Kingsbury, B. and J. Gibson. 2002. Habitat management guidelines for amphibians and reptiles of the Midwest. Midwest Partners in Amphibian and Reptile Conservation (Midwest PARC). 57 pp. (Visit the PARC website for more information: www.parcplace.org.)

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Table 1. Reptiles and amphibians found or suspected on Skitchawaug WMA as a result of the 2006 reptile and amphibian survey. The site was visited on three different days in 2006: May 2, July 29, and Sept 27 using one survey method. Additional records from visits in the last 10 years are included.

Species Found

Common name	Scientific name	State Rank & Status
Amphibians		
Frogs		
American Toad	*Bufo americanus*	S5
Spring Peeper	*Pseudacris crucifer*	S5
Green Frog	*Rana clamitans*	S5
Wood Frog	*Rana sylvatica*	S5
Salamanders		
Spotted Salamander	*Ambystoma maculatum*	S5
Northern Dusky Salamander	*Desmognathus fuscus*	S4
Northern Two-lined Salamander	*Eurycea bislineata*	S5
Eastern Newt	*Notophthalmus viridescens*	S5
Eastern Red-backed Salamander	*Plethodon cinereus*	S5
Reptiles		
Snakes		
Ring-necked Snake	*Diadophis punctatus*	S4
Milksnake	*Lampropeltis triangulum*	S5
Common Gartersnake	*Thamnophis sirtalis*	S5

Other Possible Species based on habitat observed and other records from Springfield and towns in the area.

Amphibians		
Frogs		
Gray Treefrog (Possible)	*Hyla versicolor*	S5
Salamanders		
Jefferson Salamander (Possible)	*Ambystoma jeffersonianum*	S2
Four-toed Salamander (Possible)	*Hemidactylium scutatum*	S2
Reptiles		
Snakes		
Timber Rattlesnake (Probably Extirpated)	*Crotalus horridus*	S1
DeKay's Brownsnake (Possible)	*Storeria dekayi*	S4
Red-bellied Snake (Possible)	*Storeria occipitomaculata*	S5

Appendix A

Current Status and Accepted Names of Vermont Reptiles and Amphibians

Reptiles and Amphibians of Vermont
Accepted Name, State Rank, and State Status, as of July 2006

Common Name	Scientific Name	State Rank	State Status
Amphibians	**Amphibia (Class)**		
Salamanders	**Caudata (Order)**		
Jefferson Salamander	*Ambystoma jeffersonianum*	S 2	SC
Blue-spotted Salamander	*Ambystoma laterale*	S 3	SC
Spotted Salamander	*Ambystoma maculatum*	S 5	
Northern Dusky Salamander	*Desmognathus fuscus*	S 4	
Northern Two-lined Salamander	*Eurycea bislineata*	S 5	
Spring Salamander	*Gyrinophilus porphyriticus*	S 4	
Four-toed Salamander	*Hemidactylium scutatum*	S 2	SC
Mudpuppy	*Necturus maculosus*	S 2	SC
Eastern Newt	*Notophthalmus viridescens*	S 5	
Eastern Red-backed Salamander	*Plethodon cinereus*	S 5	
Frogs (including toads)	**Anura (Order)**		
American Toad	*Bufo americanus*	S 5	
Fowler's Toad	*Bufo fowleri*	S 1	SC
Gray Treefrog	*Hyla versicolor*	S 5	
Spring Peeper	*Pseudacris crucifer*	S 5	
Western Chorus Frog	*Pseudacris triseriata*	S 1	E
American Bullfrog	*Rana catesbeiana*	S 5	
Green Frog	*Rana clamitans*	S 5	
Pickerel Frog	*Rana palustris*	S 4	
Northern Leopard Frog	*Rana pipiens*	S 4	
Mink Frog	*Rana septentrionalis*	S 4	
Wood Frog	*Rana sylvatica*	S 5	
Reptiles	**Reptilia (Class)**		
Turtles	**Testudines (Order)**		
Spiny Softshell	*Apalone spinifera*	S 1	T
Snapping Turtle	*Chelydra serpentina*	S 5	
Painted Turtle	*Chrysemys picta*	S 5	
Spotted Turtle	*Clemmys guttata*	S 1	E
Wood Turtle	*Glyptemys insculpta*	S 3	SC
Northern Map Turtle	*Graptemys geographica*	S 3	SC
Stinkpot	*Sternotherus odoratus*	S 2	SC
Lizards and Snakes	**Squamata (Order)**		
Lizards	**Lacertilia (Suborder)**		
Common Five-lined Skink	*Eumeces fasciatus*	S 1	E
Snakes	**Serpentes (Suborder)**		
Eastern Racer	*Coluber constrictor*	S 1	T
Timber Rattlesnake	*Crotalus horridus*	S 1	E
Ring-necked Snake	*Diadophis punctatus*	S 4	
Eastern Ratsnake	*Elaphe alleghaniensis*	S 2	T
Milksnake	*Lampropeltis triangulum*	S 5	
Northern Watersnake	*Nerodia sipedon*	S 3	
Smooth Greensnake	*Opheodrys vernalis*	S 4	
DeKay's Brownsnake	*Storeria dekayi*	S 4	
Red-bellied Snake	*Storeria occipitomaculata*	S 5	
Eastern Ribbonsnake	*Thamnophis sauritus*	S 2	SC
Common Gartersnake	*Thamnophis sirtalis*	S 5	

Hypothetical Species

Salamanders

Allegheny Mountain Dusky Salamander *Desmognathus ochrophaeus*

One specimen of a juvenile from central Vermont may be of this species. Otherwise, the distribution of this species is believed to have an eastern boundary of the Hudson River and Lake Champlain. No populations have been located.

Northern Slimy Salamander *Plethodon glutinosus*

Specimens labeled from Caledonia County in Vermont at the Carnegie Museum in Pittsburgh have long been questioned. They are believed to be mislabeled. No populations have been located.

Marbled Salamander *Ambystoma opacum*

One historic photo of this species is labeled Vermont and an historic field record from Fair Haven is from a credible source. A population of this species may eventually be located in southern Vermont, most likely along the Connecticut River drainage. No populations have been located.

Turtles

Eastern Box Turtle *Terrapene carolina*

The occasional reports of single adult animals are assumed to be released pets. Reports near the southern Connecticut River Valley could possibly be native turtles. No populations have been located.

Blanding's Turtle *Emydoidea blandingii*

Widely disjunct populations of this species suggest that populations could potentially exist in Vermont. One well-documented record could be a released pet. No populations have been located.

Explanation of Legal Status & Information Ranks

State Status: As per the Vermont Endangered Species Law

- E: Endangered--In immediate danger of becoming extirpated in the state.
- T: Threatened--High possibility of becoming endangered in the near future.

Information Categories: Not established by law

- PE: Proposed for endangered.
- PT: Proposed for threatened.
- SC: Special Concern--rare; status should be watched.

State Ranks of Plants, Animals, and Natural Communities

State ranks are assigned by the Nongame & Natural Heritage Program based on the best available information. They are not established by law. Ranks are reviewed annually.

- S1: Very rare, generally only 1 to 5 populations believed to occur in the state and/or some factor(s) making it especially vulnerable to extirpation.
- S2: Rare, generally 6 to 20 populations believed to occur in the state and/or some factor(s) making it vulnerable to extirpation.
- S3: Uncommon, but believed to be more than 20 populations in the state and/or there is some threat to it.
- S4: Apparently secure in the state, often with more than 100 populations.
- S5: Demonstrably secure in the state.

J. Andrews, 7/2006

Appendix B

General Forestry Practices for Reptiles and Amphibians

Forest Management Practices
for
Vermont Reptiles and Amphibians

Most amphibians spend the majority of their lives away from water in the surrounding woods. The wetlands, vernal pools, and ponds are critical for breeding of most species but the forests are also critical for the foraging and wintering of those species. Some local amphibians migrate 300 meters or more from wintering and foraging areas to breeding ponds. Most snakes, some turtles, and Vermont's only lizard spend the majority of their lives away from water. Hence management of wetlands and the surrounding woods both have an impact on reptiles and amphibians. Some species of larger snakes and most land turtles require many years to reach breeding age. Direct mortality or removal of breeding adults can have a devastating impact on a population.

Specific management plans for rare, threatened, or endangered species

Learn to recognize Vermont's rare, threatened, and endangered species.

(habitat in which they are found should be managed specifically for them)

(contact the Vermont Non-game and Natural Heritage Program, they will be interested in the distribution information and may be able to make specific management suggestions)

General

Maintain large down trees (2 per acre, 7 per hectare), dead standing trees, and a future supply consisting of older standing trees.

Maintain standing trees with knotholes and dead branches.

Within areas that are heavily cut, patches of older trees should be left in addition to the scattered mature trees.

Maintain a thick layer of deciduous litter.

Softwood plantations limit the number and diversity of amphibians.

(decreased coarse woody debris, decreased structural diversity, decreased hardwood leaf litter, increased acidity)

(in these situations maintaining pockets of hardwoods and leaving large debris on the ground would help to minimize the impact)

Long rotations provide the old mature growth and dense forest cover amphibians prefer.

(as forests age they show increasing amphibian abundance up to an age of 60 to 70 years old in wet cool habitats and up to 120 years in warm, dry, lowland habitats)

Minimize compaction of the soil and direct mortality by keeping heavy equipment off the site when the ground is saturated.

(winter logging or logging in late summer and early fall conditions should help minimize this effect)

Protect and maintain shrub cover in the forest and on forest edges.

Openings

Maintain a natural pattern of forest cover with small forest breaks.

Large clear-cuts regularly show fewer amphibians than adjacent older growth.

(successive short rotation clear-cuts showed the lowest abundance of amphibians)

(natural disasters such as diseases and storms seem to have less of an effect on amphibian abundance as clear-cuts, probably because of the amount of coarse woody debris left behind)

(large clear-cuts seem to block the movements of some amphibian species)

Small upland meadows with nearby woods provide partial habitat requirements for some snake species.

In small upland meadows exposed rock piles, sawdust piles, and coarse woody debris can provide good habitat for snakes.

Wetland areas

Maintain the ability of swamps, vernal, and semipermanent pools to hold water.

Do not create ditches and ruts that will hold water only briefly. Amphibians often lay their eggs in these small patches of water which dry too soon to permit the larvae to transform and leave. They should either be prevented or they should be deep and shaded enough to hold water through July.

Streams, ponds, and vernal pools should be kept shaded and silt should be kept out.

(among other effects, silt fills the spaces in stream beds where the larval amphibians hide and feed)

(direct sun may speed the rate of evaporation in vernal pools)

Equipment and logs should be kept out of vernal pools and other wetlands.

(small amounts of coarse woody debris or single trees that fall into a wetland are not harmful but vernal pools should not be filled with debris)

Buffer strips should be maintained around all water bodies including streams, ponds, and vernal pools.

(these strips minimize siltation, maintain shade, maintain undisturbed soil and deep leaf litter, provide patches of older growth as sources for recolonization, and provide movement corridors)

(the width of uncut buffer strips should be a minimum of 30 meters, with a wider zone of up to 100 meters where cutting and its impacts are limited)

(deMaynadier and Hunter suggest no more than 25% of the basal area should be cut in this second tier buffer)

(buffer strips should be widest where streams are larger, where the intensity of harvest is greatest, where the surrounding terrain is steepest, or where rare, threatened, or endangered species are found)

Equipment should be kept out of forested seepage areas.

Forest cover over seepage areas should be maintained.

Chemicals

Amphibians absorb any chemicals which are in the water (dew, ground water, streams etc.) around them.

(minimize use of herbicides, pesticides, etc.)

(one study suggests that CaCl spread on roads to minimize dust may be a barrier to amphibian movement)

Roads

Minimize the number of roads, size of roads, and the amount of traffic on roads.

(a rural paved road in upstate New York killed between 50 and 100 percent of migrating amphibians breeding near it)

Permanent roads should be planned not to intercept the annual movements of reptiles and amphibians between breeding, foraging and wintering habitats.

Other Species

Allow only moderate grazing after the breeding season.

Keep livestock out of the riparian zone and away from vernal pools and ponds.

If livestock need access to a pond or a lake, limit it. Maintain as much naturally vegetated shoreline as possible.

Don't introduce fish in streams and ponds where they were not previously found.

(many fish feed on amphibian eggs and larvae, and absence of predacious fish is a primary requisite of vernal pool breeders)

Open areas with dense annual or shrubby growth near water bodies or on the edge of woods provide foraging areas for some species

open areas that are to be kept open should be cut high and either not raked or raked by hand, (direct mortality should be minimized)

these areas could be cut after the ground is frozen and before the first snows (reptiles and amphibians would no longer be active)

General amphibian microhabitat requirements include;

breeding locations that hold water at least through July,
coarse woody debris in adjacent forested areas,
foliage height diversity in adjacent forested areas,
canopy cover over breeding and foraging areas,
deep deciduous leaf litter for moisture retention and feeding,
cool and moist conditions.

General reptile microhabitat requirements include;

coarse woody debris (standing and down),
small open patches for basking, mixed with well shaded refugia for warm weather and feeding,
undisturbed areas in and around wetlands for feeding and breeding,
access to safe denning areas.

Many of the above ideas were taken from a recent review of the literature regarding amphibians and forest management. This review includes an extensive bibliography that might be of interest.

deMaynadier, P. and M. Hunter. 1995. The relationship between forest management and amphibian ecology: a review of the North American literature. Environmental Reviews 3: 230-261.

Additional suggestions for this list were provided by the author (J. Andrews), P. Bartelt, S. Droege, S. Jackson, L. Raw, and R. Waldick.

James Andrews, 7/96
Format #2

Biological Delineation of Terrestrial Buffer Zones for Pond-Breeding Salamanders

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Abstract: *Many semi-aquatic organisms, such as salamanders, depend on both aquatic and terrestrial habitats to complete their life cycle and maintain viable populations. But current U.S. federal and state regulations protect only the wetland itself or arbitrarily defined portions of terrestrial habitat, if any. Part of the reason terrestrial habitats adjacent to wetlands are not protected is the lack of a clear understanding of the distances from shorelines that are biologically relevant to wetland fauna. Such information is critical for delineation of terrestrial "buffer zones" for wetlands, and thus for the conservation of semi-aquatic organisms. I summarized data from the literature on terrestrial habitat use by one group of pond-breeding salamanders, especially distances individuals traveled away from ponds. The results provide a basis for setting terrestrial buffer zones determined from actual habitat use by adult and juvenile salamanders. The mean distance salamanders were found from the edge of aquatic habitats was 125.3 m for adults of six species and 69.6 m for juveniles of two of these species. Assuming that the mean distance encompasses 50% of the population, a buffer zone encompassing 95% of the population would extend 164.3 m (534 ft) from a wetland's edge into the terrestrial habitat. Data from other amphibians suggest that this buffer zone is applicable to a range of species, but caution should be taken for taxa suspected to be more vagile. Wetland managers and policymakers must recognize the special needs of semi-aquatic organisms during their entire life cycle, not just during the breeding season. To maintain viable populations and communities of salamanders, attention must be directed to the terrestrial areas peripheral to all wetlands. Data on habitat use from salamanders and other semi-aquatic species make it increasingly apparent that maintaining the connection between wetlands and terrestrial habitats will be necessary to preserve the remaining biodiversity of our vanishing wetlands.*

Delineación Biológica de Zonas Terrestres de Amortiguamiento para Salamandras con Reproducción en Charcas

Resumen: *Muchos organismos semi-acuáticos, como son las salamandras, dependen tanto de hábitats acuáticos como terrestres para completar su ciclo de vida y mantener poblaciones viables. Sin embargo, las actuales regulaciones federales y estatales en los Estados Unidos protegen unicamente a los humedales o a porciones de hábitat terrestres (de ser posible). Parte de las razones por las cuales los hábitates terrestres adyacentes a humedales no son protegidos se debe a la carencia de un claro entendimiento de las distancias biológicamente relevantes partiendo de los bordes y que son utilizados por la fuana del humedal. Esta información es crítica para delinear zonas terrestres de "amortiguamiento" para humedales, y en consecuencia para la conservación de organismos semi-acuáticos. Resumo datos de la literatura sobre el uso de hábitat terrestre por un grupo de salamandras con reproducción en charcas, especialmente de distancias individuales viajadas hacia afuera de las charcas. Los resultados proveen las bases para establecer zonas terrestres de amortiguamiento determinadas a partir del uso actual del hábitat por salamandras adultas y juveniles. La distancia media a partir del borde de los hábitats acuáticos en la cual las salamandras fueron encontradas fue de 125.3 m para adultos de seis especies y de 69.6 m para juveniles de dos de estas especies. Asumiendo que la distancia media abarca un 50% de la población, una zona de amortiguamiento que abarque 95% de la población podría extenderse hasta los 164.3 m (534 pies) partiendo del borde del humedal hacia el hábitat ter-*

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Effects of Silvicultural Edges on the Distribution and Abundance of Amphibians in Maine

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Abstract: *Amphibians share several biological characteristics that may cause them to be sensitive to abrupt transitions in microhabitat and microclimate that occur across forest edges. To better understand the importance of edge effects on amphibians in a forested landscape, we sampled the distribution of populations along drift fences placed perpendicular to silvicultural edges of varying contrast in central Maine. Within the community of amphibians sampled (14 species), salamanders generally were more sensitive to even-aged harvesting and associated edge effects than were anurans, but forest habitat generalists and specialists were identified within both groups. We conservatively estimated the depth of edge effects at 25–35 m for a subset of management-sensitive species (*Plethodon cinereus, Ambystoma maculatum, A. laterale, *and* Rana sylvatica*). An index of edge contrast, calculated using ambient light penetration levels, was valuable in predicting the magnitude of edge effects among sites that included silvicultural edges of different age and origin (old field plantations versus recent clearcuts). Some structural microhabitat variables relevant to forest management were identified as potentially limiting to amphibians near forest edges, including canopy cover, litter cover, and a measure of stumps, snags, and their root channels. Our observations are consistent with the results of other work on biotic edge effects in the eastern United States and suggest that impacts from intensive forest management practices extend beyond the boundaries of harvested stands.*

Efectos de Bordes Silviculturales en la Distribución y Abundancia de Anfibios en Maine

Resumen: *Los anfibios comparten diversas características biológicas que pueden ser la causa de que sean sensitivos a transiciones abruptas en microhábitats y microclimas que ocurren a lo largo de los bordes de bosques. Para entender mejor la importancia de los efectos de bordes en anfibios en un paisaje boscoso, muestreamos la distribución de poblaciones a lo largo de vallas de desvío colocadas perpendicularmente a bordes silviculturales de contrastes variantes en la parte central de Maine, USA. Dentro de la comunidad de anfibios muestreados (14 spp), las salamandras generalmente fueron más sensitivas a la tala de edad constante y efectos asociados al borde que los anuros, pero tanto especies generalistas y especialistas de hábitat boscoso fueron identificadas dentro de ambos grupos. Conservativamente estimamos la profundidad del efecto de borde a 25–35m para un subset de especies sensitivas al manejo (*Plethodon cinereus, Ambystoma maculatum, A. Laterale *y* Rana sylvatica*). Un índice de constraste de borde, calculado usando niveles de penetración de luz ambiental fue valioso para predecir la magnitud de los efectos de borde entre sitios que incluyeron bordes silviculturales a diferentes edades y orígenes (plantaciones viejas contra clareados recientes). Algunas variables estructurales de microhábitat relevantes para el manejo forestal fueron identificadas como potencialmente limitantes para anfibios cercanos a los bordes de bosques, incluyendo la cobertura del dosel, cobertura de hojarasca y una medición de varas, tocones y sus canales de raíces. Nuestras obsevaciones son consistentes con los resultados de otro trabajo en efectos bióticos de borde en el este de los Estados Unidos y sugieren que los impactos de prácticas de manejo forestal intensivo se extienden mas allá de los límites de los sitios cosechados.*

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Appendix C

A Bibliography of the Literature Dealing with Reptiles, Amphibians, and Roads

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INTERNET RESOURCES

Government Sites

US Department of Agriculture. Forest Service, San Dimas Technology and Development Center, and Utah State University. Wildlife Crossing Toolkit.
http://www.wildlifecrossings.info/beta2.htm

US Department of Transportation, Federal Highway Administration
Critter Crossing: Linking Habitats and Reducing Roadkills.
www.fhwa.dot.gov/environment/wildlifecrossings/main.htm
www.fhwa.dot.gov/environment/wildlifecrossings/amphibin.htm
www.fhwa.dot.gov/environment/wildlifecrossings/tortoise.htm
www.fhwa.dot.gov/environment/wildlifecrossings/salamand.htm
Keeping it Simple: Easy Ways to Help Wildlife Along Roads
http://www.fhwa.dot.gov/environment/wildlifeprotection/index.cfm

US Geological Survey. Paynes Prairie Ecopassage Project.
www.fcsc.usgs.gov/Amphibians_and_Reptiles/Paynes_Prairie_Project/paynes_prairie_project.html

Private Sites

Berryman Institute. Wildlife and Highways: Seeking solutions to an ecological and socio-economic dilemma.
http://gulliover.trb.org/publications/nchrp/nchrp_syn_305.pdf

Center for Transportation and the Environment
Searchable Database of Wildlife Ecology Literature and Web Sites.
http://itre.ncsu.edu/cte/wildlife.htm
Wildlife, Fisheries, and Transportation Web Gateway.
http://www.itre.ncsu.edu/cte/gateway/home.html
http://www.itre.ncsu.edu/cte/gateway/links.html
International Conference on Ecology and Transportation.
http://www.itre.ncsu.edu/cte/icoet/index.html
Evaluation of a Wildlife Underpass on Vermont State Highways 289 in Essex, Vermont
http://utre.ncsu.edu/cte/icoet/downloads/Posters.pdf
Wildlife Crossing Structures Field Course
http://itre.ncsu.edu/cte/gateway/banff_index.html

Converge: Where Transportation and the Environment Meet. Wildlife, Fisheries, Ecosystems.
http://www.converge.ncsu.edu/topics/topics_display.asp?topic_ref=21

Defenders of Wildlife. Habitat and Highways Campaign.
www.defenders.org/habitat/highways/
www.defenders.org/habitat/highways/new/sub/library/laurie's%20bridge%20paper.pdf

Eco Network Europe. Cost 341 – Habitat Fragmentation caused by Transportation Infrastructure.
www.cordis.lu/cost-transport/src/cost-341.htm

Natural Resource Defense Council. The End of the Road – Bibliography.
http://www.nrdc.org/land/forests/roads/refer.asp

Surface Transportation Policy Project
www.tea3.org

Wildland Center for Preventing Roads
http://www.wildlandscpr.org/databases/biblionotes/toads.html

World Bank. Roads and the Environment Handbook.
http://www.worldbank.org/transport/publicat/reh/toc.htm

Specific Articles

Wildlife Habitat Connectivity Across European Highways
http://www.international.fhwa.dot.gov

Twinning of the Trans Canada Highway: Highway Service Center: Parks Canada Agency
http://www.hsctch-twinning.ca/Environental/inex.htm

Interaction Between Roadways and Wildlife Ecology: A Synthesis of Highway Practice National Cooperative Highway Research Program (NCHRP): synthesis 305
http://gulliver.trb.org/publications/nchrp/nchrp_syn_305.pdf

Appendix D

Additional Resources on Reptiles and Amphibians

Useful Sources of Information on New England Reptiles and Amphibians

Identification. A few good field guides to reptiles and amphibians exist. These help you identify herptiles but do not give you life history information. One that is easy to find, and up to date is:

Conant, R., and J.T. Collins. 1998. A field guide to reptiles and amphibians of eastern and central North America. Third Edition, expanded, Houghton Mifflin Company, Boston Massachusetts 616 pp.

Natural History. These guides focus less on identification and more on natural history, local distribution, and conservation.

DeGraaf, R.M., and D.D. Rudis. 1983. Amphibians and reptiles of New England. The University of Massachusetts Press, Amherst, Massachusetts 85 pp.

Harding, J.H. 1997. Amphibians and reptiles of the Great Lakes Region. The University of Michigan Press, Ann Arbor, Michigan 378 pp. (All our species are included.)

Hulse, A., C. J. McCoy, and E. Censky. 2001. Amphibian and reptiles of Pennsylvania and the Northeast. Cornell University Press, Ithaca, New York 419 pp. (Most of our species are included.)

Hunter, M.L., A. Calhoun, and M. McCullough (eds.). 1999. Maine amphibians and reptiles. The University of Maine Press, Orono, Maine 272 pp. (This edition includes a CD of local frog calls. Call 207-866-0573 to order.)

Klemens, M.K. 1993. Amphibians and reptiles of Connecticut and adjacent regions. State Geological and Natural History Survey of Connecticut, Bulletin No. 112 318 pp. (Unfortunately this is currently out of print.)

Tyning, T.F. 1990. A guide to amphibians and reptiles. Little, Brown and Company. Boston Massachusetts 400 pp.

Calls. A very useful tool to help you learn the calls of frogs and toads is:

Eliot, L. 2004. The calls of frogs and toads. Stackpole Books. Mechanicsburg, Pennsylvania. (call 1-800-732-3669 to order)

Websites. Many useful sites exist. Some provide more reliable information than others. A few reliable sites, some with many links to other resources are:

Amphibiaweb (an excellent source of information on amphibians)
http://elib.cs.berkeley.edu/aw/

North American Amphibian Monitoring Program (NAAMP)
http://www.pwrc.usgs.gov/naamp

FrogWeb
http://frogweb.nbii.gov/

Society for the Study of Amphibians and Reptiles (SSAR)
http://www.ssarherps.org/

The snakes of Massachusetts (a downloadable guide that includes all our local snakes)
http://www.umass.edu/nrec/fish_wildlife_biodiversity/fish_wildlife_online_docs.html

Management Information. Management guides are just beginning to be available. All of these include reptile and amphibian related information.

Biebighauser, T. 2002. A guide to creating vernal ponds. USDA Forest Service in cooperation with the Izaak Walton League of America. Morehead, Kentucky. 33 pp. (Call 606-784-6428 to order or find it on the web.)

Calhoun, A.J.K. and M. W. Klemens. 2002. Best Development Practices: Conserving pool-breeding amphibians in residential and commercial developments in the Northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York. 57 pp. (Call 924-925-9175 to order.)

Calhoun, A.J.K. and P. deMaynadier. 2004. Forestry habitat management guidelines for vernal pool wildlife. MCA Technical Paper No. 6, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York. 32 pp. (Call 924-925-9175 to order.)

Evink, G. 2002. National Cooperative Highway Research Program Synthesis 305, Interaction between roadways and wildlife ecology, A synthesis of highway practice. Transportation Research Board, Washington D.C. 78 pp. (Impacts of roads on herptiles and some conservation strategies. A big problem, good information. Order at 202-334-3213 or on the web.)

Flatebo, G., C. Foss, and S. Pelletier. 1999. Biodiversity in the forests of Maine: Guidelines for land management. University of Maine Cooperative Extension Bulletin #7147. C. Elliot editor, University of Maine Cooperative Extension, Orono, Maine. 168 pp. (Contact UME Extension Office at 207-581-3188.)

Kingsbury, B. and J. Gibson. 2002. Habitat management guidelines for amphibians and reptiles of the Midwest. Midwest Partners in Amphibian and Reptile Conservation (Midwest PARC). 57 pp. (Visit the PARC website for more information: www.parcplace.org.)

J. Andrews, 6/2005

Additional Reading on Reptiles and Amphibians

Amphibians

Bishop, S.C. 1941 (June). The salamanders of New York. New York State Museum bulletin No. 324. The University of the State of New York, Albany, New York 365 pp. (This book is currently out of print, but contains excellent information on Vermont's salamanders.)

Bishop, S.C. 1994. Handbook of salamanders: The salamanders of the United States, of Canada, and of lower California. Comstock Publishing Associates, A Division of Cornell University Press, Ithaca, New York 555 pp. (A reprint of an old classic. It does not contain as much information on each species as The Salamanders of New York.)

Dickerson, M.C. 1969. The frog book: North American toads and frogs, with a study of the habits and life histories of those of the northeastern states. Dover Publications, Inc., New York 253 pp. (A reprint of an old classic. Still excellent information but some of it is outdated. No newer comprehensive works on frogs are available.)

Epple, A.O. 1983. The amphibians of New England. Down East Books, Camden, Maine 138 pp. (A good book for the beginner but without plates or photos.)

Petranka, J.W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington, DC 587 pp. (The most current source for detailed information on salamanders.)

Pfingsten, R.A. and F.L. Downs. 1989. Salamanders of Ohio. Bulletin of the Ohio Biological Survey Vol. 7, No. 2. College of Biological Sciences, The Ohio State University, Columbus, Ohio 315 pp, 29 plates. (This contains detailed information on the many species of salamander that we share with Ohio.)

Wright, A.H. and A.A. Wright. 1995. Handbook of frogs and toads of the United States and Canada. Comstock Publishing Associates, A Division of Cornell University Press, Ithaca, New York 640 pp. (A reprint of an old classic. No newer comprehensive works on frogs are available.)

Reptiles

Carr, A. 1995. Handbook of turtles: The turtles of the United States, Canada, and Baja California. Comstock Publishing Associates, A Division of Cornell University Press, Ithaca, New York 542 pp. (A reprint of an old classic.)

Ernst, C.H. and R.W. Barbour. 1989. Snakes of eastern North America. George Mason University Press, Fairfax, Virginia. 282 pp. (An excellent source for detailed information.)

Ernst, C. H., and E. Ernst. 2003. Snakes of the United States and Canada. Smithsonian Institution Press, Washington D.C. 668 pp. (The latest and most complete source for snakes.)

Ernst, C.H., J.E. Lovich, and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington D. C. 578 pp. (The best current source for detailed information.)

Klauber, L.M. 1982. Rattlesnakes: their habits, life histories, & influence on mankind, abridged edition. University of California Press, Berkeley and Los Angeles, California 350 pp. (An edited reprint of an old classic.)

Klemens, M. (ed.) 2000. Turtle conservation. Smithsonian Institution Press. Washington 334 pp. (A current discussion of conservation challenges.)

Mitchell, J.C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington 352 pp. (This book provides excellent information on the species of reptile that we share with Virginia; most of our species are found in this book.)

Smith, H.M. 1995. Handbook of lizards: lizards of the United States and Canada. Comstock Publishing Associates, A Division of Cornell University Press, Ithaca, New York 557 pp. (A reprint of an old classic.)

Tennant, A. 2003. Snakes of North America: eastern and central regions. Lone Star Books, Lanham, Maryland. 605 pp. (One of a two excellent new snake resources.)

Wright, A.H. and A.A. Wright. 1994. Handbook of snakes of the United States and Canada, volumes 1 and 2. Comstock Publishing Associates, A Division of Cornell University Press, Ithaca, New York 1105 pp. (A reprint of an old classic.)

Texts

Duellman, W.E. and L. Trueb. 1994. Biology of amphibians. The Johns Hopkins University Press, Baltimore, Maryland 670 pp. (The standard text for amphibians.)

Heyer, W.R., M.A. Donnelly, R.W. McDiarmid, L-A. C. Hayek, and M.S. Foster. 1994. Measuring and monitoring biological diversity: standard methods for amphibians. Smithsonian Institution Press, Washington 364 pp. (Useful information for researchers.)

Mitchell, J.C. 2000. Amphibian monitoring methods and field guide. Smithsonian National Zoological Park's Conservation & Research Center, Front Royal, Virginia 56 pp. (Very accessible, designed for citizen scientists.)

Stebbins, R.C. and N.W. Cohen. 1995. A natural history of amphibians. Princeton University Press, Princeton, New Jersey 316 pp. (Lots of interesting information in an accessible and easy to read format.)

West, L. and W.P. Leonard. 1997. How to photograph reptiles & amphibians. Stackpole Books, Mechanicsburg, Pennsylvania 118 pp.

Zug, G.R. 1993. Herpetology: an introductory biology of amphibians and reptiles. Academic Press, A Division of Harcourt Brace & Company, San Diego, California 527 pp. (A standard text.)

Novels

Phillips, K. 1994. Tracking the vanishing frogs: an ecological mystery. St. Martin's Press, New York 244 pp. (A good background read on amphibian decline.)

Other Regional Atlases

Bider, J.R. and S. Matte. 1996. The atlas of amphibians and reptiles of Quebec. St. Lawrence Valley Natural History Society and Ministere de l'Environnement et de la Faune du Quebec, Direction de la faune et des habitats, Quebec 106 pp.

Taylor, J. 1993. The amphibians and reptiles of New Hampshire with keys to larval, immature and adult forms. Nongame and Endangered Wildlife Program, New Hampshire Fish and Game Department, Concord, New Hampshire 71 pp. (Contains some simple and useful keys).

J. Andrews, 2/2005

Appendix E

Notes on Significant Herptile Habitat with GPS locations

Appendix E: Significant herptile habitat found on Skitchawaug WMA as a result of the 2006 reptile and amphibian survey.

Site Category	N	W	Site description
Swamp	N. 43.29827	W072.41884	Swamp with areas for spring breeding. Lots of logs, course woody debris, and moss. No standing water, but it is a minimum of 70 m x 40 m of wet area. There is royal fern sphagnum moss, and potential Four-Toed salamander habitat.
Wetlands	N. 43.30677	W072.42075	The pool is large with cattails and phragmites, willow, sphagnum mass, **cannabis**, ferns, annual vegetation.
Semi-permanent Pool	N. 43.30696	W072.42097	Cattails on edge, big (6-7 feet) tire in water. This pool is on the northwestern edge of the WMA. Shagbark Hickory found nearby.
Forested Swamp	N. 43.30153	W072.42372	Extending along edge near interstate. Standing water is about 10 cm, hummocks seen throughout swamp. Barberry found. GPS points taken from southern end of wetland. No amphibian movement seen and no larvae found.
Talus	N. 43.29372	W072.41238	Quite a lot of talus slope, although in many places the vegetation had grown up and is fairly dense. GPS points are from an area that was in the sun. (We could also later see this spot looking east while on Rte 5.) Found Hackberry near the top, also found Bobcat, Coyote, Porcupine and Fox scat.
Vernal Pool	N. 43.29466	W072.41983	Could also be called a small-forested swamp. Found Sphagnum Moss, Royal Fern, and Cinnamon Fern.
Vernal Pool	N. 43.29832	W072.41882	Has standing water, about 4" deep plus muck. Pool measures 9 m x 20 m and is just south of northern boundary of the WMA. We found Ambystoma larvae in the water.
Vernal Pool	N. 43.30534	W072.42171	Pool measured 15m x 18m. No standing water but mucky with blackened leaves, some Sensitive Ferns. Pool is east of interstate. Some boulders and fallen logs in pool area. Pool was in vicinity of wet area with moss covered rocks and logs.
Vernal Pool	N. 43.30537	W072.42144	Pool measured 15m x 20m. Standing water could be about 8 inches deep plus muck. Some open area that gets direct sun, surrounded by trees on hummocks. We found a Rana tadpole, Ambystoma larvae, and unknown larvae in water.

Appendix F

Records of Timber Rattlesnake from Skitchawaug

Crotalus horridus | 1/1/1890 | Windsor | Springfield | Spencer Hollow

Sight | Interview | 2

West of Skitchawaug - see attached map

Farm

All info told to Andrews, James S. over the phone in February 2005

When his dad was 8-10 years old they caught and put 2 rattlesnakes in a barrel.
Dan is elderly himself.

Whitney, Don

Crotalus horridus | 1/1/1890 | Windsor | Springfield | Skitchawaug

Sight | Interview | 13

1 mile or so north of the toll bridge on the east side of the mountain, rock slide area

Rocky cliffs near floodplain

All info told to Andrews, James S. over the phone in February 2005

Used to be a large cave in this area that collapsed. In talus slope area. The area was also mined since then.

A professional rattlesnake hunter came one spring and killed 13 snakes with a rubber whip. His dad used a pitchfork on the side at his farm.

Whitney, Don

Crotalus horridus | 10/9/1891 | Windsor | Springfield | Skitchawaug Mt.

Sight | Literature | >3

Information found in a Forest and Stream magazine article dated May 18, 1895, Vol. 44, No. 20. The article was located first through the Reader's Guide

Peculiarly rough and precipitous mountain in Windsor county, masses of loose rock at the base of a cliff

Information found in a Forest and Stream magazine article dated May 18, 1895, Vol. 44, No. 20. The article was located first through the Reader's Guide to Periodical Literature at CSC, then through First Search Interlibrary Loan by Carol Scott, Fair Haven librarian.
Article within an article :

On October 9, 1891, I was hunting on Skitchewaug, peculiarly rough and precipitous mountain in Windsor county, famous, among other things, for its rattlesnakes, although they are seldom seen so late in the season as that. The morning sun beat warmly in among the masses of loose rock at the base of a cliff, and this I presume had brought out the snakes. Hearing a slight rustle in the leaves, I turned and saw a big rattler gliding slowly along within a dozen feet of me. I had never killed one, and rejoicing in the opportunity, I gave him a charge of No. 8 shot. The report of the gun seemed to raise all snakedom! The air fairly vibrated with the locust-like rattle of I know not how many snakes. They were all around me, one so close the contents of the second barrel cut him in three piece as he lay coiled up. Some of them got away into the loose rocks, but I shot two more as soon as I could reload, and had my eye on the fifth. He was coiled up about 20 feet away, with his head raised and his rattle in the air. I spent a few minutes in studying his habits, and am prepared to contribute something to the cause of science and rattlesnake literature. At my slightest motion the rattle buzzed and the head was thrown back as one would raise his arm to throw a ball. I had heard that the rattler would never leave his coil to come towards one, but I wish to refute that statement. Twice this one straightened out and approached me,each time returning to his coil as quick as a flash at a sudden motion on my part. Having settled this point and thinking that further inquisitiveness might not be wholesome, I put a charge of shot where I thought it would do the most good. As there was no bounty on this sort of game, I got out of the locality as quickly as possible, after tying four of the biggest snakes together, as evidence of my sobriety. The largest one was 50 in long, the next 41, and the others smaller. The odor they sent forth when the shooting began was decidedly offensive, something like that of a skunk, less powerful, but more sickening. Unless the bounty hunters happen upon that spot, I think I know where I could clear my vacation expenses in a few hours.

Rice, A. F.

Crotalus horridus | 10/9/1891 | Windsor | Springfield | "up on Skitchewaug." "Skitchewaug Trail" is that road that goes from route 5 to Springfield (Route 143)

Unverified

This is the rocky hill area that lies in Springfield between Route 5 and Spencer Hollow area.

Woodbury, Philip and Barbara Forwarded by: Tucker, Forwarded by: Cillo, Elizabeth

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Crotalus horridus 1/1/1892 Windsor Springfield Spencer Hollow

Sight Interview 1

Greeley Road

All info told to Andrews, James S. over the phone in February 2005

His father and his father's sister were walking to school when they found a rattlesnake in the road. They killed it and took it to school. They placed it in the teacher's path on the way to school and made it move with a string tied to it. They did not succeed in scaring the teacher. His dad was 11 years old.

Dan believes the interstate was built in the 1960's.

Whitney, Don

Crotalus horridus 12/31/1896 Windsor Springfield

Unverified Literature 39

"Bounties on Rattlesnakes:

1	Fair Haven	$ 54.00
2	Springfield	39.00
3	Benson	3.00
4	West Haven	13.00
5	Castleton	1.00
	Total	$110.00

Number Total bases on bounty $1 per snake.
from: "Report of the Auditor of Accounts State of Vermont, for 1895-1896 " (found at the Vt. Dept. of Libraries - Reference and Law information services:
Class No. 336
Book No. V59a 1895/96
Publisher:
The Tuttle Company, Official Printers, 1896

Hon. Hale, Franklin D. State Vt. Dept. Of Libraries forwarded by: Cillo, Elizabeth

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Crotalus horridus | 12/31/1898 | Windsor | Springfield

Unverified | Literature | 18

"Bounties on Rattlesnakes:

Fair Haven	$71.00
Benson	1.00
West Haven	6.00
Springfield	18.00
Total	$96.00

"

Number Total bases on bounty $1 per snake.
from: "Report of the Auditor of Accounts State of Vermont, for 1897-1898 " (found at the Vt. Dept. of Libraries - Reference and Law information services:
Class No. 3336
Book No. V59a 1897/98
Publisher:
The Tuttle Company, Official Printers, 1896

Hon. Hale, Franklin D. State | Vt. Dept. Of Libraries | forwarded by: Cillo, Elizabeth

Crotalus horridus | 1/1/1900 | Windsor | Springfield | Putnam Farm, Skitchawaug Mt.

Unverified | Interview | 2

East of Skitchawaug along Rte 5. North of toll bridge.

Floodplain of the Connecticut River

All info told to Andrews, James S. over the phone in February 2005

Two rattlesnakes found in lumber pile at Putnam Farm, (Hollis, Hugh). Whitney, Don's mother taught school nearby. She heard that a hired man was asked to help with the lumber. A rattlesnake was found under the first and second boards that the man picked up. He then quit.

Whitney, Don

Crotalus horridus 11/8/1900 Windsor Springfield

Sight Bounty 15

Reports of the Auditor of Accounts for Vermont
From 07/01/1900
To 06/30/1901
No. 3798
page 22

Hon. Hale, Franklin D. State Forwarded by: Zunder, Marjorie

Crotalus horridus 7/6/1901 Windsor Springfield

Sight Bounty 11

Reports of the Auditor of Accounts for Vermont
From 07/01/1901
To 06/30/1902
No. 5318
page 49

Hon. Hale, Franklin D. State Forwarded by: Zunder, Marjorie

Crotalus horridus 1/1/1902 Windsor Springfield Skitchewaug Mountain

Unverified Literature

Skitchawaug Mountain

Exact date not provided (before 1903).
Information from Eureka: The First Village in Springfield, Vermont compiled by Mary W. Ellis, 1959, page 8. Miss Luthera Whitney (1847-1903) historian, poetess, teacher, and the only lady to serve Springfield as School Superintendent, wrote, "...of noxious animals it is not believed that Springfield had any not common to all the towns in the country, except the rattlesnake, which has always lived on Skitchawaug Mountain..." Page 21 mentions a Rattlesnake Hill. Submitted by Cillo, Elizabeth.

Whitney, Miss Luthers (Cillo, Elizabeth (forwarded by)

Crotalus horridus 6/27/1902 Windsor Springfield

Sight Bounty 13

Reports of the Auditor of Accounts for Vermont
From 07/01/1901
To 06/30/1902
No. 6852
page 76

Hon. Hale, Franklin D. State Forwarded by: Zunder, Marjorie

Crotalus horridus 5/21/1903 Windsor Springfield

Sight Bounty 14

Reports of the Auditor of Accounts for Vermont
From 10/09/1902
To 06/30/1904
No. 1387
page 64

List of Orders Drawn by Forwarded by: Zunder, Marjorie

Crotalus horridus 6/18/1904 Windsor Springfield

Sight Bounty 12

Reports of the Auditor of Accounts for Vermont
From 10/09/1902
To 06/30/1904
No. 3674
page 133

List of Orders Drawn by Forwarded by: Zunder, Marjorie

Crotalus horridus 6/15/1905 Windsor Springfield

Sight Bounty 4

Reports of the Auditor of Accounts for Vermont
From 07/01/1904
To 06/30/1905
No. 5418
page 74

List of Orders Drawn by Forwarded by: Zunder, Marjorie

Crotalus horridus 1/1/1910 Windsor Springfield Skitchawaug Mountain

Unverified

Dated used of publication.

1910 - "History and Condition of the State Cabinet." *Report of the State Geologist, 1909-1910* Bellows Falls, VT
The P. H. Gobie Press, page 26

Perkins, G. H. [author] Countryman, William Douglas

Crotalus horridus | 12/31/1926 | Windsor | Springfield | Skitchawaug Mountain

Sight | Literature | 7

Article from "The Rutland Daily Herald" dated *Tuesday Morning August 28,1929*
Vol. 76, No. 189 p. 3 found at CSC Calvin Coolidge Library on microfilm entitled "Rattler Captured Near Springfield" reads:
" A rattlesnake measuring four feet two inches in length and having 11 rattles, was brought here today by Frank Blood, Boston aviator, who killed the reptile with a cane on Skitchewaug Mountain, four miles from here. Blood, who flies out of the Weston, Mass, airport, is a former resident of Springfield where he flew with Capt. H. C. Stickney, World war..."
"This is the seventh rattler Blood has killed on Skitchewaug in the past six years and he never makes a visit to this town without engaging in a snake-hunting expedition."

Blood, Frank

Crotalus horridus | 1/1/1930 | Windsor | Springfield | Skitchawaug

Unverified | Interview | >1

East of Skitchawaug

Floodplain of Connecticut River, farm, rocky ledges and cliffs

All info told to Andrews, James S. over the phone in February 2005

Dan used to hear annual stories about killing rattlesnakes east of Skitchawaug near the Connecticut River back in the 1930's.

Most were south of the Putnam Farm, perhaps on the Kendall Farm, 1 or 2 miles north of the toll bridge

Whitney, Don

Crotalus horridus | 1/1/1950 | Windsor | Springfield | Skitchewaug Trail area

Unverified | Literature

Information obtained during 2 phone conversations between Clyde Barton and Cillo, Elizabeth on January 6 and 16, 2004.

1940's and 1950's. Suggested by his brother, Fred Barton. Graduated from Springfield High School in 1950 with Norma Woodruff. Was born in Vermont and has lived most of his life in Perkinsville. the "Lead" Hal Smith of W. Windsor/Brownsville remembers his mother, Norma Woodruff (now deceased), telling of catching rattlesnakes on Little Ascutney on weekends as a "moneymaking thing" back in the 1940's. Mr. Barton remembered Norma Woodruff, but he didn't remember ever hearing of her or anyone hunting rattlesnakes on Little Ascutney. He never heard of the Blood Family regarding rattlesnakes, and was vaguely aware of Blood Hill in Brownsville. He said there's a Blood that runs/owns a bulldozer in W. Windsor. He did remember hearing "more that once" in the 1940's and 1950's ("there was a lot of talk back then"), and "ever since" about rattlesnakes in the Skitchewaug Trail are of Springfield. He described getting there by starting at what he said used to be a toll bridge that connected Springfield and Charlestown, New Hampshire on old Rt. 5; then head north until you come to a ridge where there was rattlesnakes. (An atlas shows Skitchewaug Trail as being part of Rt. 143 that begins at the intersection with Spencer Hollow Rd and runs northeast to the intersection with Rt. 5. He also mentioned 2 farmers in Springfield who both own land on a hill on which rattlesnakes have been seen: Keith Ferguson; and someone by the name of Lockwood. (When I looked up Keith Ferguson in the phone book, there was one listed on Spencer Hollow Road. When I looked up Lockwood, there were 3 listed in the area: Alan on Spencer Hollow Rd; Francis and Jamie at different locations on the Skitchawaug Trail.)

Barton, Clyde | Cillo, Elizabeth

Crotalus horridus | 8/15/1994 | Windsor | Springfield | Route 5, near Skitchawaug

Sight

Along Route 5 north of the toll bridge and ~0.3 kilometers south of the junction with Connecticut River Road.

Habitat: Mixed hardwood slope and uncut meadow along the Connecticut River.

Exact date not provided: 8/94

Magoon, Dan

Crotalus horridus | 1/1/1940 | Windsor | Springfield | Near Skitchewaug Trail

Unverified | Literature | >1

Excerpt[s]:
"Odgen said he has heard that rattlers live in "cliffy areas" beside the Skitchewaug Trail linking Springfield and Route 5. Prof. William Ballard, ... , said rattlesnakes lived among the Skitchewaug ledges "in the early 1900's" adding that he did not know that any had been seen recently."
"Henry Ferguson of Springfield, a farmer with property bordering the Skitchewaug Trail, said he has never seen rattlers but he knows of men who hunted them "25 or 28 years ago. There used to be quite a lot of them" (snakes), Ferguson said: "There is a possibility one or two may still be there although I haven't heard of any"

Ferguson, Henry | Odgen, Herbert | Ballard, William, Prof | forwarded by: Cillo, Elizabeth

Crotalus horridus | 3/15/1941 | Windsor | Springfield | Skitchawaug Mountain

Field | Literature

Near the Cheshire Bridge

New England Naturalist, No. 10, March - June 1941, "The Timber Rattlesnake in Vermont" pages 26-27, by Harold Trapido, Harold

Harold Trapido, Harold | Griggs, Leland