

By: Chris Slesar

MOVIN' LIZARDS

"HEY, YOU MOVIN' LIZARDS? ARE THE LIZARDS OUT TONIGHT?"



Spotted Salamander. Photo: Chris Slesar

I definitely wasn't about to argue taxonomy with a truck full of young good ol' boys. I had heard the arrhythmia-inducing bass from their truck fading in long before their headlights came into my view - and was instantly looking forward to it fading away. One can feel pretty small on the side of a pitch-black rural connector road in the middle of a rainy early-spring night. And despite the fact that I have trouble remembering the password to my computer on a regular basis, I can dredge up details from every slasher movie I have ever seen as soon as I am alone on the side of that road on an inky black night. And so small talk with strangers in this context, and for this card-carrying introvert, is very near to the bottom of my

to-do list. The truck slowed down and pulled into the wrong lane to get closer to me. The music stopped. And my own heartbeat pounding inside my skull replaced the bass. As the window rolled down, and skunky PBR-infused smoke cleared, I could feel my adrenals drain and I braced myself for what I expected was the next logical step...a beer bottle to my head. So, when the driver asked me about lizards, I figured it was a trick to get me within striking range. Stupidly, I stepped closer to their rig - right up to the window.

"Yeah. Just moving them out of the road." I showed them the Spotted Salamander that I was jockeying to the wetland side of the road. It was truly a beautiful specimen of

our flagship species. It was hard to believe it had just spent the entire long winter underground, likely in an old rodent burrow. It was just so utterly fresh and pristine looking. Nearly perfectly round spots of brilliant yellow popped on a shiny black background. The gravid female did her PR work well.

Genuine sounds of admiration from an encounter with wildlife followed. "Thanks! We'll be extra careful...good luck with that tunnel you're trying to build!" Cue music in the cab...and I was once again alone - just me and hundreds of migrating amphibians. This was two years before S. D. Ireland Construction finally broke ground for the project in 2015. I was suddenly profoundly



Spotted Salamander. Photo: Chris Slesar

struck, by a realization rather than a beer bottle, by how successful our small cadre of conservation-minded local volunteers had been with messaging. Our grassroots effort garnered attention from the coffee counter at the Monkton General Store to Senatorial banter in Washington D.C. and well beyond that to banners of news outlets as far away from the small town of Monkton as Sidney, Australia and Taipei, China. To be clear, that attention wasn't always supportive, but here in Monkton there was a genuine sense of ownership and stewardship for this site and the diverse population of amphibians, as evidenced by my new friends out for a late-night drive. That was good news. Very good news indeed. And then I got back to moving and counting amphibians.

The Monkton Road Site

The effort to retrofit Monkton Road in Addison County, Vermont with wildlife crossing culverts was a marathon of data collection, fundraising, public meetings, and engineering design that began sometime in 1997 when Jim Andrews,

Coordinator of the Vermont Reptile and Amphibian Atlas Project, encouraged Monkton resident and wildlife biologist Steve Parren to field check Jim's topographical hunch he had noticed while looking at a map. Steve confirmed that this indeed is a significant site. It turns out that the combination of upland hardwood habitat adjacent to a spectacular wetland complex, known locally as the Huizenga Swamp, in Addison County in the Champlain Valley of Vermont, was the perfect mix to provide everything a cornucopia of amphibians could possibly need to thrive for centuries. These topographic and biological scenarios are played out thousands of times throughout the northeast, but very few to the scale of the Monkton Road site. This site is truly a gem; a regional treasure of biodiversity; a whopper of a population that had gone virtually unnoticed. It only reveals itself so unabashedly during the spring, and to a lesser extent during the fall, migrations. The generalized equation is simple: most (not all) of the amphibians spend the winter in the upland forest

underground and under cover. In the early spring, during the first soaking rains when the ice on the wetlands begins to recede, the amphibians are triggered to emerge and head to the wetlands to breed. In the spring of 1997, Steve began regularly visiting the site on nights when the weather foretold prime crossing conditions and kept careful data on the amphibian movement observed. The count was uncomplicated: date, time, weather conditions, number of animals, species, direction travelling, number of cars passing, and successful crossing vs. roadkill. The list of amphibians regularly documented on crossing counts consists of Spotted Salamander (*Ambystoma maculatum*), Blue-Spotted Salamander (*Ambystoma laterale*), blue-spotted/Jefferson Salamander hybrid group (*Ambystoma jeffersonianum* x *laterale* complex), Four-toed Salamander (*Hemidactylium scutatum*), Eastern Newt (*Notophthalmus viridescens*), Spring Peeper, (*Pseudacris crucifer*) Wood Frog (*Lithobates sylvaticus*), American Toad (*Anaxyrus americanus*), Leopard Frog (*Lithobates pipiens*), Green Frog (*Lithobates clamitans*), and

Gray Tree Frog (*Hyla versicolor*).

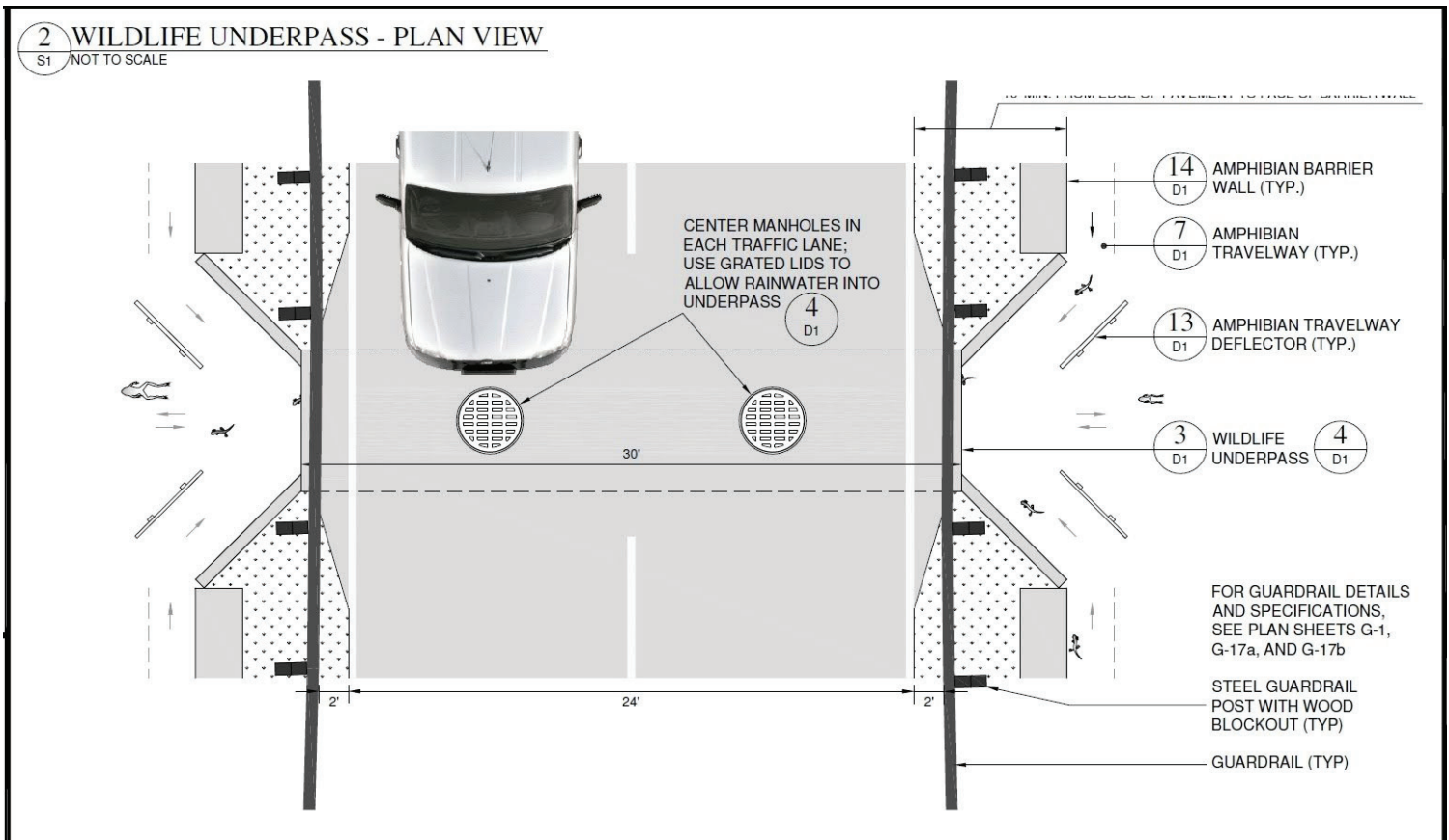
The curveball to the long-term sustainability of this population is that for 8-tenths of a mile an increasingly busy road bisects two critical pieces of amphibian habitat. The Monkton Road travels directly between the upland habitat and the wetland habitat, thus forcing amphibians to cross this road to breed. For decades, local traffic on the Monkton Road was light enough to have a negligible impact on this population. While individual amphibians would regularly have taken a hit, the population was stable - i.e. more animals were being reproduced than were being killed. This had been a rural dirt road for over 100 years, until evolution of the Vermont landscape required the paving of this road. As the population of Vermont, especially in Chittenden County (the population hub of VT) and Addison County increased, so too did the numbers of cars. Moreover, savvy drivers and impartial navigation

systems identified Monkton Rd as a pleasant shortcut and detour around the Burlington metro area. With an annual average daily traffic (AADT in transportation engineer parlance) of between 2,000 – 3,000 vehicles, this is not a terribly busy road by US standards. However, it is unquestionably and significantly busy if your lifecycle requires you to crawl slowly across the road on your belly in the dark, sans reflective apparel, at least twice a year. Monitoring of amphibian crossings at Monkton Road during spring migration demonstrated a grim reality. On a busy migration night, with anywhere from one to a dozen volunteers moving amphibians, traffic was claiming around 50% of the animals counted. The detailed and consistent data that Steve Parren had collected for over a decade at this site was a critical factor, perhaps “the” critical factor, in demonstrating the need for an infrastructure fix at this site. Similarly, it cannot be overstated how

important that data was in justifying the expenditure of public funds from two large federal grants for the wildlife crossings. Without Steve’s data, it is unlikely that we would have had a project.

Fundraising...

Steve and I were collecting data one spring night around 2005 and discussing, among other things, how unsustainable the situation seemed for both amphibians and volunteers. The cost to amphibians was becoming crystal clear. From our bipedal perspective, cars and trucks hurtled by us at speeds considerably higher than the posted 45 mph. And despite our flashlights, ANSI Class 2 reflective vests, ad hoc temporary warning signs, and our commitment to step off the pavement when cars approached, it just didn’t feel safe. It was asking a lot for drivers to expect a couple of herpetological shepherds around the next curve. Moreover, the data was demonstrating that even with



Monkton Road Bypass Diagram Graphic: Chris Slesar



Spring Peeper. Photo: Chris Slesar

our help, nearly half of the migratory attempts ended in a one-way ticket out of the gene pool. Having been to the 2003 International Conference on Ecology and Transportation in Lake Placid, NY, I knew that there were potential retrofits that could keep amphibians off the road and provide safe passage under the road. Scott Jackson's famous salamander crossing in Amherst, MA, was proof positive. So, an idea was hatched. Maybe we could build something like that here if we could raise the money. How hard could that be? Joining forces with the Monkton Conservation Commission and the Lewis Creek Association (a regional watershed conservation group), Steve and I dialed in on the Federal Highway Administration Transportation Alternatives Program. This program is administered in Vermont by the Vermont Agency of Transportation (VTrans) Municipal Assistance Bureau.

In the interest of full disclosure, it is important for me to point out that I am gainfully and gratefully employed by VTrans. While I am deeply involved in habitat connectivity issues in my role at VTrans, this Monkton Road crossing was not part of a programmed VTrans project, or my responsibilities at VTrans. My involvement was as a Monkton resident on the Conservation Commission, and as a board member of the Lewis Creek Association. And while I tried to keep my professional and volunteer roles very separate on this project, my worlds did inevitably converge. It certainly helped the success of this project that I understand the transportation project development process well; and the Transportation Alternatives process well enough to know that this was feasible - but luckily not well enough to know how hard it would be to bring these crossings from an idea to construction as a volunteer.

The Transportation Alternative (TA) grants have a grant category for Environmental Mitigation to "reduce vehicle-caused wildlife mortality or to restore and maintain connectivity among terrestrial or aquatic habitats." TA grants are competitive grants that allocate federal transportation dollars to several project categories that enhance the surface transportation system in the US. These grants come from a stand-alone dedicated funding source as mandated by the Federal Transportation Bill, and do not extract dollars from a state's transportation budget.

Our first attempt at a TA grant ended in utter disappointment. According to the rumor mill our proposal generated a few laughs. We quickly learned that the Environmental Mitigation category was not frequently used. We also learned that the notion of salamander crossings seemed quite fringe at the



Culvert construction progress. Photo: Chris Slesar

time, and that raising money for an amphibian crossing was going to be an incredibly difficult task. And so began our informal campaign of education and salamander crossing PR. Our second attempt, juiced up with a little support from friendly reporters at local and regional media outlets, resulted in a 2008 \$25,000 TA grant to conduct a “feasibility study” that resulted in the drafting of conceptual plans. The feasibility part of the Feasibility Study was a critical reality check. We knew that with careful engineering it was possible to use infrastructure to cross animals under a road. What we didn’t realize was how utterly expensive it would be to retrofit that entire 8-tenths of a mile stretch of road. Complete mitigation of that site was not feasible for a grassroots effort. It was possible in terms of engineering and construction; it was just not feasible for a local group of volunteers to fund it. Back to the proverbial drawing board and the TA program.

Our next attempt at TA money was to fund final design and construction of two crossings within the site at the most critical locations—a north culvert and a south culvert. Our estimates put that price tag somewhere around

\$400,000. We were asking for the maximum TA amount of \$300,000, with the understanding that the TA grant would be supported by a local match. That 2009 attempt resulted in \$0.00. Motivated by the grim spring ritual of counting amphibians at this site, we beefed up our application package and resubmitted for the 2010 cycle and were awarded \$150,000 in construction funds. Euphoria! While this was still not enough to build the project, we knew that this federal grant was going to be the catalyst that leveraged the rest of the money.

Weathering the “Wasteful Spending” Storm

Word of the grant award spread fast. The story was picked up by a Burlington Associated Press reporter and by noon the day after announcement of the award the story appeared globally from the Burlington Free Press and Vermont Public Radio (VPR) to the New York Times online, Taipei Times, Sidney (Australia) Journal. The response was largely positive, sometimes neutral, and sometimes negative. The negativity was mostly reserved for the comment sections, and the Monkton Conservation Commission and Lewis Creek Association salamander crossing crew felt like nothing

could scuttle our success now. Our overconfidence was short-lived. Listening to VPR on my way to work the next day, I learned that Senator Tom Coburn, (R) Oklahoma, had included our Monkton Road project on page 15 of Wastebook 2010; A Guide to Some of the Most Wasteful Spending of 2010 - his infamous list of wasteful government spending. As a river of sweat trickled down my spine and a feeling of complete and utter defeat permeated my being, I finished the drive. When I got to my office, I noticed a couple of messages on my cell phone. One message was informing me that at least one VT legislator was not happy with this news and wanted to pull back the grant. The second message was from Tom Berry from Senator Patrick Leahy’s (D) Vermont office. Tom’s message said something like, “Give me a call, Chris. We are going to push back on this.” Over the next couple of days an overwhelming flood of support attempted to stop the bleeding as we perceived it. Apparently, the VTrans Secretary’s phone mail and email were clogged with messages saying “Please don’t pull this grant.” Secretary David Dill called me in to his office and sat me down. The beloved leader of VTrans looked me in the eye and said. “We

made a commitment with that grant. With something like this we can expect 50% of the people are going to love it and 50% of the people will not. That grant application was backed by science and data, it was reviewed by a committee of professionals. We're not going to back out of our commitment. Now see what you can do about getting those emails to stop."

Throughout the fundraising process, project partners from Monkton Conservation Commission, Lewis Creek Association, and the project design team were on the hook to answer difficult questions from skeptics. We took this on enthusiastically, and we felt it was perfectly acceptable to be skeptical and ask us tough questions. Most of the time the questions were absolutely fair, except for the time, shortly after the unwelcome notoriety from Wastebook 2010, when Jim Andrews was invited by Fox and Friends for a live interview and subsequently subjected to sophomoric jokes about salamander sex. Jim handled the ambush on live national TV with grace and resisted the urge to take the bait. I personally had many conversations with neighbors while buying gas, milk, or beer at the Monkton General Store. I stood in front of the Monkton Select Board and public meetings describing the project and reassuring folks that this was not a whimsical undertaking, but a serious contribution to the well-being of Vermont's biodiversity. One particular 2011 Select Board meeting stands out in my mind as a turning point. Just back from my father's funeral, I was in a surly mood and definitely less patient than I should have been. There were some new members of the Select Board who had legitimate questions and were considering not accepting the 2010 TA grant. Feeling righteously indignant did not serve me well. And while I felt like I made some good



Culvert construction. Photo: Chris Slesar

points, I knew I was not doing a good job at communicating. Mercifully, a local contractor who had asked some of the same questions at a previous meeting stood up and bailed me out. "Look," he said. "This is a legitimate project. The Conservation Commission did their homework and won a competitive grant to bring this work into our town to do some good. This project brings real money to our community – at no cost to us. If we don't take this project the money goes elsewhere." The Select Board voted unanimously to continue supporting the project.

Onward!

Thankfully the rest of the fundraising was less dramatic, albeit arduous and slow. The US Fish & Wildlife Service through a \$70,000 State Wildlife Grant became an enthusiastic federal partner in the project. Over the next four years we banked smaller, but not less significant, private grants from Defenders of Wildlife/TransWild Alliance, Central Vermont Public Service (CVPS) Zetterstrom Award, and the Davis Conservation Foundation to the wonderful tune of \$61,500. Direct appeal donations managed through the Lewis Creek Association brought in another \$67,676.69 and an immeasurable amount of

goodwill including a heartwarming bake sale from a daycare. Our final push was to reach beyond Vermont with a crowdsourcing Indiegogo campaign supported with a video from Peregrine Productions and artwork from Woody Jackson. This netted another \$42,780. With nearly \$350,000 in the bank, it was time to make a difficult decision: build what we can with what we have, or keep on fundraising.

We had tapped our funding well dry, and the price of concrete wasn't going down. Our 2010 TA grant (which is a reimbursement program) had been waiting patiently, and the grant administrators were pushing us for movement on the project. We had enough money to put this project out to bid, in the hopes that bids would come in slightly lower than our projected cost.

The most flexible, but completely indispensable, component of our design are the retaining walls that keep the animals off the road and direct them into the culverts. Without retaining walls (a.k.a. drift fencing) it would be utterly dumb luck for the animals to find the culverts. The number of animals that we collect and direct through the crossings is in direct proportion to the length of the

walls we provide.

We now faced a crossroads: do we build the length of walls that we want, or do we build the length of walls that we can afford? Some passionate and heated debates followed. After consulting with Scott Jackson, who helped guide the design of the project, we decided, not unanimously, to put the project out to bid with the money we had and then change the length of walls to suit our budget and the successful bid. Scott's advice still resonates a reassuring tone. To paraphrase his guidance, "You have an excellent design. It is going to work. These animals might not have the time to wait for enough money for the perfect outcome. It might be more important to get something in the ground sooner rather than later."

Design

One of our goals was to develop a design that could be transferrable to other locations throughout the world. Moreover, one of our pitches was that we were going to make these crossing structures big enough that they would provide safe passage to other taxonomic groups beyond amphibians. So, while our primary customers are the amphibians that

come in and out of the Huizenga Swamp, and our flagship species is the Spotted Salamander, we branded this project as a wildlife crossing. We hired the design firm of Lamoureux & Dickinson Consulting Engineers from Essex Junction, Vermont, to develop the design in close collaboration with herpetologist Jim Andrews. Together they brought together the best ideas from similar projects around the world and applied them to Monkton, Vermont. The biggest challenge was designing cost-effective and low maintenance retaining walls. The elegant solution was to utilize stackable waste concrete blocks. Installed, these blocks cost approximately \$30.00/linear foot.

The culverts themselves are 5' x 5' pre-cast concrete bottomless box culverts. These are large enough to allow for ambient light to penetrate the entire length of the culverts. The boxes are buried into the natural substrate that follows the topographical contours of the landform. To help facilitate airflow and moisture into the culverts, two slotted grates (a.k.a. manhole covers) are installed in the center of each lane at each crossing structure. Squares of slate are placed along the retaining

walls and within the culverts as cover objects, so that migrating amphibians may find refuge during migrations.

Success!

Low bid on the project was S. D. Ireland Companies of Vermont, who broke ground for construction in September of 2015. Construction was smooth and the project was buttoned up, seeded, and mulched before the snow flew that winter. By the spring Jim had two Reconyx cameras, one in each culvert, mounted and set to take time lapse photos at night throughout the crossing season. Throughout the fundraising and design, we were asked many times "Are these things going to work?" My response was a consistent, "Of course they are going to work. They are backed by solid science and engineering." But I would be lying if I said I wasn't absolutely elated and amazed when I saw the first Spotted Salamander walk through. Jim's cameras recorded over 2,000 animals that first spring. The camera counts have been consistent in subsequent years with over 2,000 amphibians crossed each year. But we pitched these culverts as "wildlife crossings," and they haven't let us down. We consistently capture images of bobcat, mink, Virginia opossum, porcupine, ermine, Milk Snakes, Garter Snakes, groundhog, eastern cotton tail, raccoon, and mice sharing the space with amphibians.

In 2017 the Monkton Road Wildlife Crossing Project was recognized by the Federal Highway Administration with an Environmental Excellence Award for "exemplary achievement ecosystems, habitat, and wildlife." 🌿



Culvert finalization. Photo: Chris Slesar



Spotted Salamander. Photo: Chris Slesar



Monks Salamander. Photo: Chris Slesar