

Field Notes – Summer 2008

Hopkins Forest: A Salamander's Tale

Though no one knew it at the time, the morning of April first, 2006 turned out to be a critical one for the 66 acres of land, known as "Buxton Lane," along the southeast corner of Hopkins Forest. It was a morning like any other--researchers from Williams and local volunteers rubbed their eyes, pulled on their Wellingtons, gathered their buckets, and made the soggy seven-minute schlep south from the Rosenberg Center through the woods and fields to the adjoining parcel of land where there lay a pair of small, partially frozen ponds.

What they would soon discover would set the fate of this scenic assemblage of rolling fields, woods and wetlands on a winding and unsettled course for the next year-and-a-half. This saga--which was brought to its conclusion in the fall of 2007--does have a propitious ending thanks, in part, to a most unlikely four-legged character.

There in a bucket set in the ground (part of a pit-fall/drift-fence array designed to survey migrating amphibians) on the edge of the smaller pool lay a Jefferson's salamander (*Ambystoma jeffersonianum*), a species never before noted in Hopkins Forest or its environs. The crew greeted its stocky, seven-inch long discovery with excitement and surprise. Since that April Fools day 2006, several more chocolate-



Jefferson's Salamander

brown, bluish flanked Jefferson's salamanders have been found during routine checks of the pitfall traps. By contrast, thousands of closely related spotted salamanders, in addition to thousands of wood frogs and hundreds of red-spotted newts, green frogs and spring peepers, have been counted as part of this ongoing study. But why are there so few Jefferson's salamanders at this site; what are they doing here and what do they signify about the pools and surrounding lands? The ensuing 2 ½ years of studies of these wetlands and their inhabitants by Williams students, faculty and collaborators, have begun to shed some light on these questions.

Of the dozen species of amphibians found at "Buxton Lane," the Jefferson's are the most mysterious in many ways. First of all, what we call the "Jefferson's salamander" is not a true species at all, but a "complex" of two or more species—namely the Blue-spotted salamander and "true" Jefferson's salamander—and their hybrid offspring. The "parent" species have historically occupied largely separate ranges with a narrow zone of overlap in what is now Western New England, where hybridization has been occurring for thousands of years. This long history of hybridization events has left the Berkshires with a population that is a true genetic oddity: one that is made up of 99 percent triploid females--that is females that possess a third set of chromosomes.

As you might suspect, this unusually structured population faces some serious challenges in reproduction and self-perpetuation. Comprised of so few males, "unisexual hybrid" populations of Jefferson's salamanders appear to have evolved a tendency toward asexual reproduction or gynogenesis, by which females produce clones of themselves. The downside to this strategy is that it cannot take advantage of the genetic recombination that sexual reproduction affords and is subsequently fraught with problems. This can sometimes be seen on an early spring walk in the Berkshires where--if you come across a mass of Jefferson's salamander eggs clinging spiral-like around a stick in a clear vernal pool--most will become unviable: the embryos will turn cloudy and die within a few days or weeks. Thus, of the few females that

manage to find pools and deposit their eggs in the spring, most will fail to bring offspring into the world. This reproductive deficiency is clearly a major reason why Jefferson's salamanders are so sparse compared to other amphibians in our local breeding pools and throughout the Berkshires.

Due to its rarity and, in part, to its scientific intrigue, the Jefferson's salamander complex has been designated a "Species of Special Concern" in Massachusetts; this includes both parent species and the hybrid population found in the Berkshires. This status as a protected species means that state regulators view its habitat, both wet and dry, as unique and worthy of protection as well. It makes sense: how do you preserve an animal without protecting its home? Enter the 66 acres on the edge of Hopkins Forest...

When Massachusetts state biologists received verification of the Jefferson's salamanders at Buxton Lane, they moved to designate a zone of protection covering a 300 meter radius from the pools where there were found. This prompted the partnership of investors who owned the land at the time--after much time conducting studies, consulting with state officials and environmental specialists, and analyzing their options--to sell it rather than forge ahead with a proposed development, which would have become more complicated in having to accommodate endangered species provisions. At that point, Williams stepped in to purchase the section of the parcel that included the vernal pools used by the Jefferson's salamanders and other amphibians; these 9 acres were added to Hopkins Forest. At the same time, local buyers anteed up to purchase the remaining 57 acres and enter it into a conservation restriction. Their actions will allow the wild denizens of the land to continue to roam free and future generations of Williams students and others to study and otherwise enjoy this distinctive area, much as they were doing on that fateful April morning in 2006.

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