

Streamside Salamander Monitoring Protocols

SHENANDOAH NATIONAL PARK STREAMSIDE AMPHIBIAN MONITORING PROTOCOLS

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Parks.
USGS Patuxent Wildlife Research Center, Laurel, MD.
<http://www.mp2-pwrc.usgs.gov/naamp//primenet/shenstreamside.html>

Electroshocking

Two 100 m transects for each of nine streams were electroshocked by the fish crews at Shenandoah National Park from June-August 1998. Two amphibian technicians work behind the fish crews to capture and identify all amphibians encountered during the three-pass electroshocking period. All amphibians are identified to species, measured for snout-vent length (measured to posterior end of cloaca) and total length, and weighed using a field portable Ohaus scale (200 ± 0.01 g). If individuals escape prior to measurement, record age class (larva, juvenile, adult) on the data sheet.

Leaf litter bags

We use the leaf litter bag method designed by Tom Pauley to survey streamside salamanders (Pauley 1995). Leaf litter bags are placed at 5 m intervals along 100 m transects adjacent to yet upstream of the 100 m electroshocking transects. At each 5 m interval along the 100 m transect, two bags are placed on the right and left sides of the stream, yielding a total of 42 bags per 100 m transect. Leaf litter bags are placed in streams two weeks prior to the first check. Leaf litter bags are constructed of plastic netting (Deer Block, 7' x 100' roll, 1.5 cm² mesh, \$12.83/roll, available at Lowe's), which are cut into 50 cm² squares. In the field, approximately 0.5 pounds of small rocks, leaves, and moss are placed in the center of the netting, and the sides are gathered together and cinched together using a cable tie to make a sac. A 12" piece of orange flagging tape is tied through the netting at the top of the leaf litter bag so that they are more visible in the stream. The bags are placed at the edge of the stream and surrounded and topped with large rocks to keep them in place.

To check leaf litter bags, the rocks are carefully moved away from the bag (noting if any salamanders are under the rocks), and a dipnet is immediately placed underneath the leaf litter bag. Shake the bag for 10 seconds inside the dipnet. During the shaking, salamanders tend to fall out of the leaf litter bag. Pick through leaf debris that falls into the dipnet to make sure you don't miss salamanders. Salamanders in the dipnet are caught and placed into a ziploc bag. The leaf litter bag is subsequently shaken for 10 seconds in a bucket of water. This water is then poured through the dipnet to check for

salamanders. On the data sheet, record whether the salamander is caught from the initial shake or from the water bucket.

In 1998, leaf litter bags at each of the nine streams were checked twice, initially two weeks after placement, and again two weeks later. On the second check, leaf litter bags were opened to make sure salamanders were not missed during the dipnet and water bucket shakes. At two streams (North Fork Thornton and Jeremy's Run), leaf litter bags were checked weekly until the end of October. Over time, leaf litter often disintegrates in the bags. Therefore, it is necessary to replace leaf litter once a month.

In 1999, we plan to continue monitoring leaf litter bags at the nine streams as well as other sites. We will also use VIE marking to conduct capture-recapture studies of streamside salamanders at a subset of sites where leaf litter bags will be placed in clumps of three every 2 m along a 20 m transect. We will also try a new technique of placing elongated leaf litter bags (0.25 m x 1 m) on the bank perpendicular to the stream channel. We noted in 1998 that adult salamanders and anurans liked to hide under leaf litter bags in dry channels. These will be checked weekly for amphibians.

Streamside 1 m² Quadrats

At five meter intervals next to the leaf litter bags, we use streamside 1 m² quadrat sampling (Mitchell 1998). Quadrats are conducted on both sides of the stream, yielding 42 quadrats per 100 m transect. This technique was previously used by Dr. Joe Mitchell at Shenandoah National Park at three streams (Staunton, Piney, and Paine). In 1998, we repeated his sampling at these three streams, and initiated sampling at 6 new streams. This sampling is destructive, as all stones within a 1 m² quadrat are overturned, and the area is raked. Data collected within the quadrat is recorded on the Shenandoah Stream Quadrat and the Shenandoah Stream Habitat data sheets.

50 m x 1 m Streamside Transects

A team of two people turn over rocks and other objects on the right and left sides of the stream along a 50 m x 1 m transect. One person conducts the survey on the right side and one person works on the left side. Time begin and time end are noted (search usually takes from 30 minutes to 1 hour), and the number of overturned objects is recorded on the data sheet. A clicker assists the observer by counting the number of overturned objects within the 50 m transect. When salamanders are found, the size of the cover object is recorded. Salamander species, age class, and size class are recorded.