Spring 2020

Difficult Creek, Difficult Management Choices

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Virginia is blessed with many botanical wonderlands; see Chapter 4 of the Flora of Virginia (Weakley et al. 2012) for thumbnail sketches describing 50 of these special places. One such treasure, Difficult Creek Natural Area Preserve, is home to a thriving population of the 2019 VNPS Wildflower of the year, *Ceanothus americanus* (New Jersey Tea). Paradoxically, however, our featured wildflower of last year is inextricably linked to a difficult conservation management decision.

Difficult Creek Natural Area Preserve is located in Halifax County, between the Dan and Roanoke Rivers, a few miles northwest of their now inundated confluence, known as Buggs Island Lake (Kerr Reservoir). In pre-settlement days, it is believed that the natural plant community in this part of Virginia was open, fire-adapted, savanna, consisting of scattered Shortleaf Pines, Oaks, and Hickories, interspersed with a diverse assemblage of grasses and other herbaceous plants. When Alton Harvill and his wife, Barbara, botanized the area in the early 1970s, a long tradition of fire suppression had certainly altered to some degree the original nature of the vegetation; nevertheless, they were able to document many rare plant species from the area. A few years later, circa 1980, a new force of change entered the scene: much of this botanical treasure was converted to Loblolly Pine plantation. As the canopy of Loblollies closed, the original assemblage of herbaceous species that thrive in sunny conditions became restricted to smaller and smaller patches. In June of 1993, Chris Ludwig of the Division of Natural Heritage first visited the site; he was able to relocate many of the rare plants found by the Harvills, but only along a power line right-of-way and on roadsides, places where periodic mowing kept shade-casting woody plants in check. But that was enough to demonstrate the site's potential for conservation of rare plants. Over time, 819 acres of land encompassing the power line right-of-way and adjoining parcels was acquired and new management practices, primarily selective cutting of trees and periodic controlled burns, were instituted to restore the pre-settlement savanna habitat.

How special is the Difficult Creek preserve? Here grow: Tall Barbara's Buttons (*Marshallia legrandii*), known from one other extant population in nearby Mecklenburg County (and two other, now extirpated, populations); Carolina Thistle (*Cirsium carolinianum*), the only other known Virginia population of which is in Franklin County; and American Ipecac (*Gillenia stipulata*), a rare outlier from its range further west—to name just a few noteworthy plant species.

The Difficult Creek Natural Area Preserve also supports a vigorous population of New Jersey Tea (*Ceanothus americana*) which, though relatively common in Virginia, thrives at this site because of the periodic controlled burns that constitute a core feature of the current management regime. Fire consumes above-ground shoots of *Ceanothus*, but this is a fire-adapted plant; well-established plants rebound quickly from resources stored in stout roots. Fire benefits such plants by removing saplings of trees that, if permitted to grow, would shade out the sun-loving herbs. In this habitat, burning is good, not just for New Jersey Tea, but also for other herbaceous species of the region, many of which are both rare and fire-adapted.

But, are controlled burns beneficial for **all** the biodiversity

New Jersey Tea, *Ceanothus americanus* (John Hayden)

deserving of protection at Difficult Creek? Mottled Duskywing butterflies (*Erynnis martialis*) present a complicating factor. These butterflies were discovered at Difficult Creek in 2008 by Virginia Natural Heritage zoologist, Anne Chazal. The Mottled Duskywing is a type of Skipper, and it is completely dependent on *Ceanothus* species as its larval food plant. Notably, this species of Duskywing is in decline throughout most of its historic range in eastern North America.

Here is the problem: Controlled burns, necessary to maintain healthy populations of New Jersey Tea and the other rare plants of Difficult Creek, will inevitably have some adverse effect on populations of Mottled Duskywings. The problem is that, as fall approaches, second brood Mottled Duskywing caterpillars, having eaten their fill of New Jersey Tea leaves, form weak cocoons of silk-bound, folded, leaves; these cocoons are soon shed from the plant with the rest of its leaves and become part of the

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Mottled Duskywing, *Erynnis martialis*, on New Jersey Tea (Mike Reese, wisconsinbutterflies.org)

(Continued from page 8)

leaf litter where the fully-grown caterpillars overwinter. Pupation and metamorphosis to adult Mottled Duskywing butterflies occur in the spring. Controlled burns for rare plants, generally scheduled during the dormant season, will inevitably incinerate the cocooned caterpillars. As a matter of fact, fire at just about any time of year can be a catastrophe for this Duskywing; fire during the growing season would remove eggs and actively growing caterpillars. Fire would also temporarily remove oviposition sites. The irony is that Mottled Duskywings need fire for their only food plants, *Ceanothus americanus,* to thrive, but those same fires inevitably reduce the population of this already rare butterfly.

What is the responsible land manager to do? The management question becomes, not whether to burn or not burn, but how best to manage fire in this critical habitat. The solution is to treat the Difficult Creek preserve as a series of patches, each to be burned in different years. The idea is that, yes, some rare Mottled Duskywing pupae will go up in smoke with every fire, but if only a portion of the reserve is burned, only a portion of the butterfly population will be eliminated in any given year. Every year, unburned portions of the reserve will produce new generations of Duskywings, some of which will disperse into recently burned regions where vigorously regenerated shoots rising from the unharmed roots of New Jersey Tea will beckon egg-laying females. The idea is to sacrifice some portion of the Mottled Duskywing population at the preserve in order to maintain the habitat at large, thus ensuring the long-term survival of the butterflies and their required larval food plant. In the big picture, small controlled burns make sense. Nevertheless, it must be difficult to strike a match knowing that the ensuing fire will destroy some portion of this rare butterfly's population.

Why, one might ask, are Mottled Duskywings rare when their host food plant, New Jersey Tea, is relatively common? Four factors have been implicated in the decline of Mottled Duskywings: 1) competition for *Ceanothus* foliage by voracious deer; 2) fire, which at any season, will exact a toll on population size; 3) lethal sprays intended to control Gypsy Moths; and 4) decline of open grassland and savanna habitats. Of these factors, the fourth may be most critical.

Mottled Duskywings not only require New Jersey Tea, but they require their only food plant to be in or adjacent to open, not densely forested, habitat. This requirement springs from the butterfly's mating strategy. Male Mottled Duskywings are "hilltoppers;" during the mating season, they seek high points like open hilltops, or perhaps an isolated shrub or tree, from which to watch for the approach of females. Evidently, this innate mating behavior does not work well in forested areas where New Jersey Tea could well be present. Certainly, there are multiple factors involved, but the Mottled Duskywing's requirement for a rare open habitat that also supports New Jersey Tea places a stringent limit on the habitats where it can thrive.

At Difficult Creek, fire is essential. Fire helps New Jersey Tea to thrive, and vigorous New Jersey Tea plants feed the Mottled Duskywings, and fire keeps the habitat sufficiently open so that Mottled Duskywings can mate efficiently. But the amount of fire needs to be carefully controlled, lest this one essential environmental factor, now in the hands of human land managers, inadvertently wipes out these rare and declining Skippers. (Johnny Townsend and Chris Ludwig provided information useful in preparation of this article.)❖

—John Hayden, Botany Chair

Tallamy discusses new book, *Nature's Best Hope*

The Prince William Wildflower Society recently hosted a talk by Dr. Doug Tallamy, author of *Bringing Nature Home*, published in 2007, and now *Nature's Best Hope: A New Approach to Conservation that Starts in Your Yard*. With a capacity crowd that left many people unable to attend, B.J. Lecrone of Loudoun Wildlife Conservancy volunteered to livestream the February 23 event on YouTube. The recording is now available online at https://youtu.be/EuNyc4Itni0. See our blog for Sue Dingwell's review of the book as well. Remember, WE are nature's best hope.