

## **Growing Jewels – Managing for Harris’ Checkerspot and Other Lepidoptera**

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I used to leave butterflies to the experts. After all, they’re ephemeral bugs that just happen to be decorative, unless of course you’re a hungry bird or perhaps a parasitic wasp. Occasionally I’d stumble across an intriguing, oddly-shaped pupa that I could pick up. They twitched a little when you held them and I assumed that surrounding yourself with a tough shell was the only way these creatures survived the long cold winters. Then I discovered Harris’ Checkerspots, in all their larval glory. Here were caterpillars that overwintered in the leaf litter, tiny but tough miracles of springtime resurrection. Here were caterpillars munching away with not a care in the world, visible to anyone out for a spring jaunt in the right place. Not only that, here were big, orange caterpillars with black spikes serious enough to make a teen Goth jealous. I was hooked.

Unlike their larvae, Harris’ Checkerspot adults (*Chlosyne harrisii*) don’t stand out to the untrained eye. Small, with orange and black wing patterns, they could be confused with Pearl Crescents or perhaps a couple of the smaller fritillaries. They only fly for a couple of weeks. Neither they nor their host plant are state-listed species - yet. Yet this little butterfly was the impetus behind the efforts at Mass Audubon’s Broad Meadow Brook Sanctuary to manage powerline habitat. This paper details aspects of the management plan and some of the results.

Harris' Checkerspots lay wedding-cake tiers of bright yellow eggs on their host plant, tall flat-topped aster (*Aster umbellatus*). The caterpillars hatch in early July and are social creatures -- a young caterpillar isolated from its brethren will starve rather than dine alone. In the process they spin loose webs, messier than those of Eastern tent caterpillars, which provide the most visible clue to the small gray-green larvae. Occasionally they defoliate their birth plant and must find another, which they search for with random success (Dethier, 1959). By mid-August they are in the 3<sup>rd</sup> instar, and drop to the ground to diapause, or stay dormant, in the leaf litter. They re-emerge in May when the asters have sprouted to about 1.5 feet tall. Instars complete their development and pupate, and in our area, the short flight period begins mid-June.

Cech (2005) characterizes Harris' as a "medium specialist", because of a specialized lifestyle. Its single host plant tends to be widely but spottily distributed. In part due to this disjunct distribution, Harris' Checkerspot as a whole is thought to fit a metapopulation concept, in which a large population provides the source of individuals for smaller, outlying populations which occasionally become extinct but can recolonize from the source. The source in our area appears to be in Holden, MA, although population levels there have dropped in recent years due to a change in mowing regime (Choiniere, pers. comm.)

Massachusetts is near the southern edge of the species' range, which looks to be contracting (Stichter, this volume). Here Harris' Checkerspots are locally common but patchy and fluctuating. The populations at Broad Meadow Brook are in two non-contiguous areas about 0.5 miles apart. They have been present at least since 1991, when the Sanctuary came into being and monitoring began (Figure 1).

Flat-topped aster, *Aster umbellatus*, the Harris' Checkerspot host plant, is an erect perennial forb that can grow up to 8 feet tall. It is distinguished from other asters by narrow leaves, a slightly hairy, usually purplish stem, and an early bloom period that begins in late July. It also grows comparatively faster than the co-occurring New England aster, which makes it the tallest aster in the field. Apart from height, the inflorescence is distinctive, large and flat with multiple flowers sporting sparse white or pale pink/blue petals. *A. umbellatus* favors moist well-drained soil (though it is also in dry meadows) and is a typical plant of moist meadows or riverbanks, or tall-grass prairie further west. It is also found in waste areas where the soil has been disturbed. Like many things, it's fairly common if you have the search image. I have seen it growing on cliffs with sweetfern (*Comptonia*), on our powerlines in thin, poor soil, and in wet meadows.

Broad Meadow Brook Wildlife Sanctuary and Conservation Center (BMB), in Worcester, is one of 45 Mass Audubon sanctuaries. With 422 acres of conservation land, it is in fact the largest urban wildlife sanctuary in all of New England, but despite public outreach efforts, it remains the best-kept secret in the city. (Some would argue this is a good thing.) The land is owned in part by National Grid, in part by the City of Worcester and the Greater Worcester Land Trust, and in part by Mass Audubon, which manages the whole as a wildlife sanctuary. The working relationship among these entities is a model of a highly successful 21<sup>st</sup> century conservation partnership.

BMB currently leads Mass Audubon sanctuaries in butterfly diversity, with 78 species documented to date, thanks to the efforts of dedicated Massachusetts Butterfly Club [MBC] members. The variety of habitats makes this possible. Within the sanctuary are several types of marshes, black oak savannah and oak/hickory

forests, wooded and open wetlands, and grasslands. Most of the grasslands are part of a powerline running north-south along the sanctuary.

The powerline is a long, narrow swath of open land along a ridgetop. Longitudinally bisected by a service road, it contains several distinct habitats, including vernal pools that support spotted turtles, grasslands with dry, poor soils, and occasional shrubby areas. Nesting boxes have drawn Eastern Bluebirds; summer residents also include Prairie Warblers, Rufous-sided Towhees and Red-tail Hawks. The soils are generally thin, characterized by communities of lichen, sweetfern, and lowbush blueberry, or wild indigo and fern-leaved false foxglove. In various places, sand cherry, ferns, sweetfern, or blueberry relatives dominate the flora.

*A. umbellatus* is found in two areas of the Sanctuary, along the powerline and in a low, wet meadow near the northern end of Broad Meadow Brook itself. Harris' Checkerspot has been recorded in both places; the wet meadow population is generally minimal and sporadic while the larger upland habitat supports more individuals. The 2-acre upland field is aptly named the "hill-top meadow", and contains an approximately equal mix of goldenrods, milkweed, Joe-Pye weed and flat-topped aster. Sanctuary records show spring Harris' larvae appearing from May 7 – June 5 and adult butterflies between May 26 – July 4, just as this field is coming into bloom. Larvae have also been found on asters that crop up in the southern, less floristically diverse region of the powerlines closer to Route 20.

The area is managed by National Grid in conjunction with input from Mass Audubon. The company has been an enthusiastic partner in the sanctuary's land management. Company personnel have carefully delineated sensitive areas during their operations

and have donated interpretive kiosks along the powerlines, a wonderful introduction for visitors to the area.

Selective herbiciding by National Grid every 5 years or so as part of standard powerline management practices has helped maintain the habitat. Perhaps more effective, frequent accidental fires kept the grasslands in an early successional state. However, in recent years the fire incidence has declined, likely as neighborhood children outgrew their after-school hobbies.

Without fires, blackberry and bittersweet began encroaching on the meadow, and the Harris' Checkerspot counts began to decrease (Table 1). In 2005 the Sanctuary's Ecomanagement Committee approached National Grid about mowing the area. We needed to decide when to mow and how best to do it, with the goal of maintaining the aster and thus the butterflies.

The Committee felt that late autumn would give herbaceous plants time to go to seed, insects to enter diapause, and migrating birds to leave the area. To decide mowing borders and equipment, we walked the area with National Grid's Tom Sullivan. Tom is Manager of Transmission Forestry, in charge of regional powerline management. We discussed mowing low to the ground in order to deter woody vegetation, especially blackberries, while using equipment that disturbed the soil just a little would aid seed germination and establishment of the asters without damaging the diapausing insects too greatly. Agonizing over the amount of habitat to treat, we decided to mow the entire meadow because caterpillars were present in other areas of the powerline and the wet meadow, providing potential refugia in case the target population was damaged.

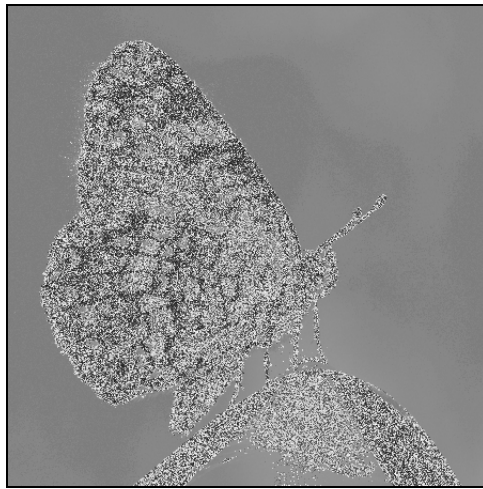
Accordingly, National Grid sent their crew in late November 2005 when all was dry and brown. In the space of a day they reduced everything to about 4", using a small Bobcat with a 4-5' wide mowing attachment and bulldozer treads. One crew member operated the machine, the second hand-cut around rocks and utility poles. They were thorough. To put it bluntly, the meadow seemed to have become a moonscape. MBC members toured the next weekend and were shocked to see the "devastation"; someone gathered dried aster seedheads and scattered them over the open ground. Sanctuary staff were also taken aback by the sight (imagine bulldozing over defenseless caterpillars), but we reassured ourselves that all would be well, we had done the right thing. To assuage our guilt, we piled up the cut brush for wildlife shelters.

When spring finally came, the meadow looked lush and green, but what about the caterpillars? We could hardly wait till May to find out. To our delight, we gleefully counted nearly 80 late instar caterpillars that had survived the mowing treatment, made it through the winter and were busy chomping on tender young *A. umbellatus* leaves. A healthy number of adults followed in a few weeks (Figure 2), and webs with early instars after that.

We informally monitored the meadow for asters and blackberry and elected to follow a biennial mowing regime simply because it was effective in maintaining conditions for the asters and other forbs, but less intrusive than annual treatment. Accordingly, National Grid graciously agreed to mow again in November 2007. Because of a heavy rain, we delayed the process for a day, to prevent the mowing machine from tearing up the soft ground. We used the same equipment and techniques this time (see photos), and are looking forward with much less anxiety to another bountiful year of Harris' Checkerspots.

As grasslands and their associated fauna decline in Massachusetts, it becomes increasingly important to implement conservation measures for these habitats. Keeping meadows in an early successional state by mowing in late fall not only benefits Harris' and many other butterfly species but also promotes the highest diversity of orthoptera, herps, and small mammals that use these habitats.

Harris' Checkerspots are uncommon enough to be exciting. Now whenever I guide groups through the area during web season, I point out the webs and talk about the butterfly and its life cycle. It's really special that our Sanctuary is host to several viable populations, and I am hopeful that the management experience we are gaining by focusing on Harris' Checkerspots will trickle up to the other 77+ butterfly species that use the Sanctuary.



*Photo: Tom Whelan, Martin Burns WMA, 6-18-06*

Year	Harris Adults	Spring Larvae	Observation Hours
1991	23		
1992	5		
1993	5		
1994	11		
1995	n.d.		
1996	n.d.		
1997	16		
1998	8		
1999	6		
2000	2	81	38
2001	24	31	47
2002	7	56	16
2003	21	n.d.	17
2004	44	n.d.	13
2005	8	2	7
2006	29	78	22
2007	19	35	14

Table 1. Harris Checkerspot population, maximum counts of adults and 4<sup>th</sup> instar (spring) larva at Broad Meadow Brook Wildlife Sanctuary, 1991-2007. Observation hours are total monitoring time during May and June, when late instar caterpillars and adults are active. n.d. = no data (no observations were made during the flight period, larval counts not made). Source: Broad Meadow Brook and Massachusetts Butterfly Club records.



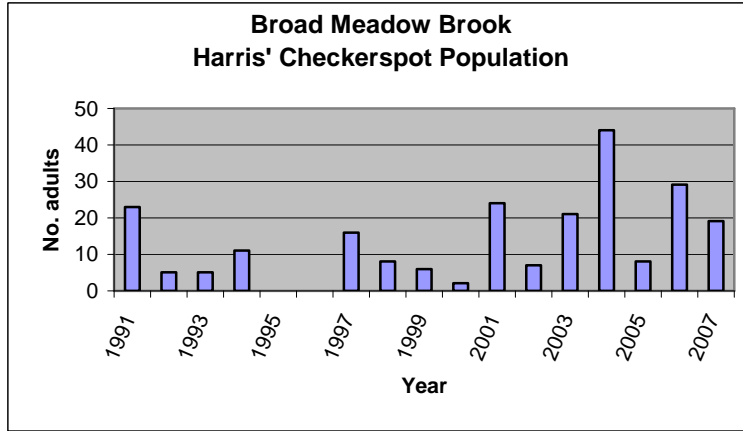


Figure 1. Broad Meadow Brook Harris' Checkerspot Population, high counts of adult butterflies, late May – early July, 1991-2007.

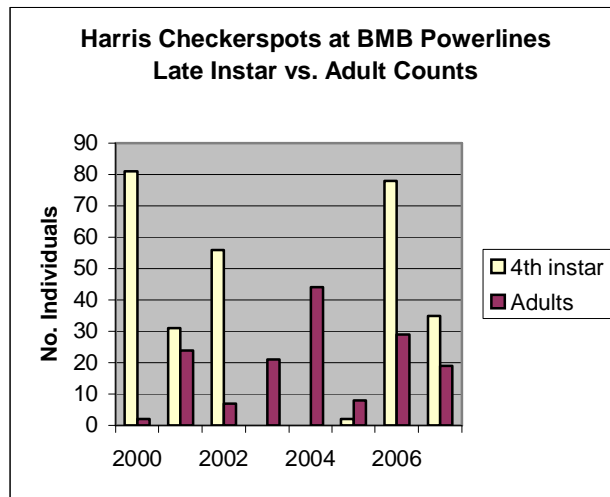


Figure 2. Harris' Checkerspot counts at Broad Meadow Brook's hill-top meadow, spring instar vs. adults, 2000-2007. Mowing occurred in the fall of 2005, prior to the appearance of 2006 instars.



The Crew at Work -- Photos: M. Gach, November 2007

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