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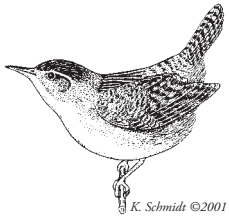
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CONTENTS

FARM MANAGEMENT FOR BIODIVERSITY AND PROFIT
Part I: Pastures and Hayfields

By Kristen Bell Travis*

Working farms in the Hudson Valley and throughout the Northeast are important for local economies, cultural heritage, and food security, and also for conservation of our native biodiversity. Although agricultural areas are shrinking and residential development is on the rise, farming is still a major land use across large parts of the Hudson Valley. Columbia County is about 20% open land,[16] (that is, unforested and undeveloped) and some towns in Dutchess County are more than 30% meadow and cropland.[7] On-farm habitats such as fields, forests, and wetlands support an abundance of both common and rare species,[6] in addition to the crops and livestock they sustain. Too often, however, conservationists and farmers see each other as opponents rather than collaborators.

This need not be so. Recent research and time-honored common sense both point to practices that can maintain or increase profitability for the farmer while improving habitat for native plants and animals and reducing wildlife mortality. Such measures are best planned on a farm-by-farm basis, because the management solutions will depend both on the type of farm operation and on the habitats and species present on the farm and across the wider landscape. Here I present some general solutions that may be helpful under a wide range of conditions. Part 1 of this article will address hayfield and pasture management, with ways to improve habitat for birds, butterflies, and turtles. Part 2 (in the next issue of *News from Hudsonia*) will continue with discussions of on-farm water conservation and its effects on stream life, and how wild borders along fields, roads, and streams can serve as habitat for native and beneficial insects, birds, and bats.

Pastures and hayfields make up a large proportion of farmland in the Northeast. These fields devoted to feeding livestock can also be critical

Continued on page 2

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Farm Management continued from page 1

habitats for a set of grassland-breeding birds, openland butterflies, small mammals and their predators, and nesting and foraging turtles. But there are crises on both fronts: farms are imperiled because of current economics, and meadow-dependent creatures are imperiled because of shrinking areas of farmland and the management of remaining farms. Without oversimplifying these complex problems, I would like to pass along some solutions that others have proposed and implemented for addressing both issues.

Fallow fields provide important habitat for nesting birds, butterflies, small mammals, turtles, and other wildlife. Kristen Bell Travis © 2012.

HAYFIELDS: EARLY HARVEST FOLLOWED BY A DELAYED SECOND HARVEST

Farmers time their haying to maximize the nutritional content of the forage and the total yield during a given year. Increasingly, farmers are mowing hayfields earlier and more frequently.[15] This greatly elevates the risks for animals using hayfields, and may reduce bird nesting success to almost zero. A set of grassland-dependent birds (including bobolink, savannah sparrow, and eastern meadowlark) in the Northeast are in serious decline, and the survival of many species will depend on improving hayfield and pasture management so that these birds are able to nest and raise young successfully.[1] The best habitats for these birds are large meadows (at least 10 acres [4 ha], but the larger the better), dominated by grasses, located in largely agricultural landscapes.[15] One strategy to improve nesting success in hayfields is to delay harvest—the later in the season mowing occurs, the greater percentage of young will have fledged. In Vermont, about 70% of bobolink nests will have fledged by July 13.[15]

To be sure, this strategy is not feasible for most farmers, because later cuttings yield lower-quality hay. There is a mowing schedule, though, that presents a decent compromise between good quality hay for farmers and successful nesting for birds: an early harvest followed by a delayed second harvest. Maximum protein content (and thus hay value) for the first cutting is generally obtained by a late-May harvest. This destroys birds' nests fairly early in their cycle, and most will then re-nest. Delaying the second cutting gives those birds time to successfully fledge young. In Vermont, nest success was greatly increased by an early cutting (prior to June 1) followed by a delayed cutting (at least 65 days later).[13] Delayed cutting results in a larger quantity of lower-quality hay. Lower-quality hay, although less valuable, does have uses: for livestock with lower protein needs, for bedding, or for mulch. A third high-quality cutting is possible on productive land. This mowing schedule has been incentivized in Vermont so that enrolled farmers receive a payment of $135/acre ($334/ha) to make up for lost revenue.[15]

HAYFIELDS: MOWING PRACTICES

Many turtles nest in sunny areas with sparse vegetation or bare soil on farms and, for some species such as wood turtle and box turtle, both adults and juveniles spend significant time foraging in pastures and hayfields.[10,14] Adults are most likely to be found in farm fields from early May through early September. At a site in New Jersey, hatchling wood turtles emerged from nests in cornfields in mid- to late August and remained in the same fields for up to two months before moving to creeks to hibernate.[2] In agricultural landscapes, mowing appears to be a much greater source of turtle mortality than roadkill.[3] A population of wood turtles may see 10% annual mortality due to farming activities,[14] a rate that would spell local extinction. (Snakes, including the NYS Endangered timber rattlesnake, may also suffer significant mortality from mowing equipment.[19]) Tractors are indisputably dangerous to turtles. Using turtle models placed in experimentally-mowed hayfields, a mortality rate for turtles present in a field was estimated at 46% per cutting due to tractor tires alone.[3] This impact can only be mitigated by reducing tractor use.

Attention to attachment type and mowing height, however, can improve turtles' chances of surviving an encounter with mowing equipment. In the same study, sickle bar mowers caused substantially less mortality than rotary disc, mulching, or flail mowers. The sickle bar set at 4 inches (10 centimeters) caused no mortality, and mulching and rotary mowers set at 6 inches (15 cm) resulted in reduced mortality. Mortality with the flail mower was 100% at any height.[3]

How would raising mower blades to 4–6 inches (10–15 cm) affect hay yield? Although many farmers mow grass down to 2 inches (5 cm) or shorter, leaving more stubble often leads to quicker regrowth and higher yields in subsequent harvests. Higher stubble also reduces blade wear, increases soil moisture retention, and reduces erosion potential.[14] Forage specialists recommend setting a mower height of 4 inches (10 cm) for cool-season grasses,[4] 5–6 inches (13–15 cm) for warm-season grasses, and 6–8 inches (15–20 cm) if harvesting when plants are dormant in late

fall.[9] Moreover, in a farmscape where livestock are grazing in management-intensive rotations (see below), relatively less hay will be needed, reducing tractor use.

Mowing pattern is another variable that maintains yield and has potential benefits for turtles and other wildlife in the hayfield at mowing time. Fields can be mowed in a way that allows animals to flee toward the field edge, forest, or stream, and away from the road: either start mowing in the center of a field and work out in a circular pattern (the opposite of what is usually done), or start at the edge farthest from an adjacent forest or stream, or nearest to an adjacent road, and work back and forth toward the far side of the field.[11]

MANAGEMENT-INTENSIVE GRAZING WITH FALLOW PADDOCKS

Management-intensive grazing, a growing trend in dairy and meat production, is a type of rotational grazing in which the pasture is subdivided into paddocks (with either permanent or moveable fencing) and animals are moved frequently among the sections. Because animals are more confined, they are less selective, and use the available forage more efficiently; the resting time between grazing periods also promotes a diverse mixture of plants in the paddock. As a result, the same acreage can support more livestock (an increase of 35–60% in stocking rate), and livestock can use pasture longer into the fall or winter, reducing hay needed by around 30%.[5]

This intensive grazing system is not, by itself, beneficial for most of the wildlife that depends on grasslands; however, the potential gains in production and offsetting of feed costs mean that a conservation-minded farmer can afford to alter the grazing rotations in ways that provide real benefits to species of conservation concern. For example, some paddocks can be left fallow each year, and mowed after mid-July for low-protein forage.[15] This gives birds time to nest and fledge young, simultaneously providing habitat for a host of insects (including crop pollinators, pest predators, and butterflies), mammals, snakes, and turtles. Delaying mowing until fall is even better.

A study of nesting savannah sparrows and bobolinks in rotationally-grazed pastures in Vermont concluded that successful breeding of these species could be achieved if the minimum paddock size was 230 feet x 230 feet (70 meters x 70 meters), and paddocks were allowed to rest for at least 42–50 days after the first grazing.[12] Also, livestock can be rotated out of a field or paddock before grass is grazed shorter than five inches, which leaves some cover for nesting birds and speeds the regrowth of forage.[15]

Continued on page 9

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Farm Management continued from page 3

SUBOPTIMAL FARMLAND: LATE-CUT REFUGES OR LOW-INTENSITY GRAZING

Often, a farm has fields or portions of fields that are less productive, or more difficult to mow. Examples include seasonally wet places, steep slopes, and areas with shallow, poor soils. These areas often provide better habitat for native species than rich, well-drained fields, where non-native grasses can outcompete native plants. For example, steeper, drier, pastures with poor soils in Columbia County tend to support many native plants (including grasses such as little bluestem) and insects (for instance, cobweb skipper and Leonard's skipper), but in general provide poorer forage for livestock.[18] Because they are less profitable for the farmer, these areas would be prime candidates for habitat conservation through low-intensity grazing or late haying.

Reductions in stocking rate (for example, 0.6 cattle/acre [1.5 cattle/ha] or less on poor soils) result in increased diversity and abundance of herbivorous insects and the insects that prey on or parasitize them.[8] Leaving areas unmowed until late fall benefits most meadow-dependent species, and even delaying mowing until mid-July benefits the birds mentioned above. When deciding where to locate such late-cut refuges, consider that field-dwellers may have strong preferences for different microhabitats; for instance, field edges (box turtle) or centers (savannah sparrow); wet spots (leopard frogs) or dry, rocky spots (cobweb skipper). Also, the active seasons or critical times for different species vary—different openland butterflies, for example, have very different life cycles—so no single cutting time is good for all.[17]

Although this type of low-intensity land management will reduce income for farmers, it may also reduce costs through decreasing equipment use and increasing ecosystem services (such as soil and water conservation and more beneficial insects—more on this in the next issue). In some cases there are funds available for farmers to manage their open lands for wildlife; for instance, the New York State Department of Environmental Conservation, US Department of Agriculture Natural Resources Conservation Service, and US Fish and Wildlife Service have programs with incentives or cost-shares to help landowners improve grassland bird habitat. ■

Reduced grazing intensity can benefit the biodiversity of herbivorous insects and their insect predators. Ingrid B Haeckel © 2013

REFERENCES CITED

1. Askins, R.A. 1993. Population trends in grassland, shrubland, and forest birds in eastern North America. Current Ornithology 11:1-34.
2. Castellano, C.M., J.L. Behler, and G.R. Ultsch. 2008. Terrestrial movements of hatchling wood turtles (*Glyptemys insculpta*) in agricultural fields in New Jersey. Chelonian Conservation and Biology 7:113-118.
3. Erb, L. and M.T. Jones. 2011. Can turtle mortality be reduced in managed fields? Northeastern Naturalist 18:489-496.
4. Fransen, S.C. and T.C. Griggs. 2002. Management of cool-season grasses for hay production and quality. Proceedings, Western Alfalfa and Forage Conference, 11-13 December, Sparks, NV. UC Cooperative Extension, University of California, Davis.
5. Hancock, D. and J. Andrae. [no date.] What is management-intensive grazing (MiG) and what can it do for my farm? University of Georgia College of Agricultural and Environmental Sciences, Cooperative Extension, Athens. http://www.caes.uga.edu/topics/sustainag/grazing. (Viewed April 2013.)
6. Kiviat, E. and G. Stevens. 2001. Biodiversity assessment manual for the Hudson River estuary corridor. New York State Department of Environmental Conservation, Albany. 508 p.
7. Knab-Vispo, C., K. Bell, and G. Stevens. 2008. Significant habitats in the Town of North East, Dutchess County, New York. Report to the Town of North East, the Millbrook Tribute Garden, the Dyson Foundation and the Dutchess Land Conservancy. Hudsonia Ltd., Red Hook, NY. 150 p.
8. Kruess, A. and T. Tscharntke. 2002. Grazing intensity and the diversity of grasshoppers, butterflies, and trap-nesting bees and wasps. Conservation Biology 16:1570-1580.
9. Morrison, J. [no date] Hay and pasture. Chapter 6, p. 65-81, *in* [no editors] Illinois Agronomy Handbook. http://extension.cropsci.illinois.edu/handbook. (Viewed April 2011.)
10. Nadrowicz, N.H., J.L. Bowman, and R.R. Roth. 2008. Population ecology of the eastern box turtle in a fragmented landscape. Journal of Wildlife Management 72:745-753.
11. Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife. 2009. Mowing advisory guidelines in rare turtle habitat: Pastures, successional fields, and hayfields. Draft. Massachusetts Division of Fisheries and Wildlife, West Boylston. 4 p. http://www.mass.gov/dfwele/dfw/nhesp/conservation/pdf/mowing_guidelines.pdf. (Viewed April 2013.)
12. Perlut, N.G. and A.M. Strong. 2011. Grassland birds and rotational-grazing in the Northeast: Breeding ecology, survival and management opportunities. Journal of Wildlife Management 75:715-720.
13. Perlut, N.G., A.M. Strong, and T.J. Alexander. 2011. A model for integrating wildlife science and agri-environmental policy in the conservation of declining species. Journal of Wildlife Management 75:1657-1663.
14. Saumure, R.A., T.B. Herman, and R.D. Titman. 2007. Effects of haying and agricultural practices on a declining species: The North American wood turtle, *Glyptemys insculpta*. Biological Conservation 135:565-575.
15. U.S. Department of Agriculture, Natural Resources Conservation Service. 2010. Management considerations for grassland birds in northeastern haylands and pasturelands. Wildlife Insight No. 88. Washington, DC. 7 p.
16. Vispo, C. 2011. Columbia County NY openland butterflies: A draft ecological classification. Hawthorne Valley Farmscape Ecology Program, Ghent, NY. http://hawthornevalleyfarm.org/fep/Openland%20butterflies.pdf. (Viewed April 2013.)
17. Vispo, C. 2012. Personal communication.
18. Vispo, C. and C. Knab-Vispo. 2012. Profiles of on-farm creatures in Columbia County, NY: The effects of nature on farm production; the effect of farm use on nature. Hawthorne Valley Farmscape Ecology Program, Ghent, NY. 39 p. http://hawthornevalleyfarm.org/fep/Farming%20&%20Nature%20Report.pdf. (Viewed April 2003.)
19. Wittenberg, R.D. 2012. Foraging ecology of the timber rattlesnake (*Crotalus horridus*) in a fragmented agricultural landscape. Herpetological Conservation and Biology 7:449-461.