Deer Management and Bird Conservation

The Problem

Only a century ago, deer populations in North America were very low, with possibly as few as 500,000 deer of all species across the continent. White-tailed deer had completely disappeared from Kansas and Indiana. Careful management by state game agencies and the US Fish and Wildlife Service has brought all deer populations back very strongly throughout the country, so much so that in many areas deer are over-populated. Current population estimates of white-tailed deer in the US exceed 30 million deer, and in some areas can reach densities up to 250 deer per square mile[1]. Over much of the south-eastern US, in particular, white-tailed deer densities are greater than 15 deer per square mile[2]. Black-tailed deer overpopulations tend to be more localized than for white-tailed deer, but some areas have significant overpopulation, and introduced deer may also have excessive populations locally.

Overpopulation of deer sets up a conflict between hunters, who may be interested in maintaining large populations of deer for hunting, and farmers, gardeners, and conservationists interested in protecting crops, cultivated plants, and biodiversity. These two groups can, however, find common ground in the need to maintain a healthy habitat which benefits birds and other wildlife and plants and cultivated crops.

Background

Effects of Deer Overpopulation on Habitat and Birds

Many wildlife biologists consider that white-tailed deer populations above about 20 deer per square mile[3] can cause significant damage to an area's biodiversity, including its bird populations; for other species the overpopulation densities may be different. Deer overpopulation leads to habitat damage, which can then harm populations of birds and other wildlife. Heavy browsing by deer immediately reduces vegetation density and diversity in the understory, removing food sources and nesting sites for midstory and ground nesting birds. Some bird communities are sensitive to changes in forest understory, especially foliage density. Not only can the understory be affected in the short term, but over the long term tree species composition can also be altered by deer browsing, which does not allow natural recruitment, and only unpalatable (to deer) tree species are allowed to successfully reproduce[4]. Because deer forage selectively, they strongly affect competitive relationships among plant species, favoring some plant species at the expense of others, which can cause loss over time of plant species birds need as food or cover.

Ecologists have carried out a variety of studies of the effects of deer overpopulation on habitat, and also on bird populations.

- Using Breeding Bird Survey data for all of North America, a group of 73 widespread species including both neotropical migratory and non-migratory species showed declining numbers as deer (white-tailed deer, black-tailed deer, and moose) numbers increased. Bird species that are known to be sensitive to higher deer densities declined more strongly in states with more deer[5].

- In England, a country-wide analysis showed that deer population increases over only ten years were related to population declines of five dense-understory bird species[4]. Experiments also showed that the Blackcap, an understory bird in England, preferred sites not browsed by deer, and the birds' body condition (weight and body fat) was better on plots where deer were excluded[6].
- On islands off the coast of British Columbia, islands that had had introduced Sitka black-tailed deer populations for more than 50 years had bird populations only 30% to 45% as high as populations of deer-free islands. On islands with long-term deer populations the bird species with the highest dependence on understory vegetation were most affected, and their abundance was only 7% of those on deer-free islands. Deer overabundance decreased bird food resources and reduced nest site quality[7]. In the islands of Puget Sound, black-tailed deer regulated cover and structure of the understory, which, in turn affected bird populations, and deer-free islands supported the most abundant and diverse bird faunas[8].
- In experiments in Pennsylvania, white-tailed deer were maintained at densities of between about 10 and 64 deer per square mile. Deer density had no effect on ground- or upper canopy-nesting bird populations, but midstory-nesting bird numbers declined 37%, and the number of midstory-nesting bird species declined by one-quarter. Effects were seen when deer population densities exceeded about 20 deer per square mile[3]. Negative effects on vegetation became significant at deer impact levels well below those observed in many eastern forests[9].
- On a group of 10 acre sites in Virginia, when white-tailed deer were excluded the density and diversity of understory vegetation increased, and bird numbers increased as well. The number of bird species did not increase, because open-vegetation species such as Chipping Sparrows were replaced by species such as Ovenbirds that preferred forests. Most species responded positively to the increase in vegetation that resulted from deer exclusion; these included Hooded Warbler, Ovenbird, American Redstart, Eastern Towhee, and Wood Thrush. In contrast to these mostly migratory species, several resident birds, such as Tufted Titmouse, Blue Jay, Northern Cardinal, and Carolina Wren, decreased in abundance in response to deer removal[10].

Direct Effects of Deer on Birds

White-tailed deer are also known to depredate songbird nests, eating both eggs and nestlings. Deer found and depredated both ground- and above-ground nests, and open bowl-type and covered-bowl nests[11, 12]. Although white-tailed deer are herbivores and such behavior may be uncommon, direct deer effects on birds could be significant at high deer population densities.

American Bird Conservancy Recommendations

ABC does not support the introduction of non-native deer.

Because of the significant effects native or introduced deer overabundance can have on bird populations, both threatened bird species and common species alike, American Bird Conservancy recommends and supports humane control of excessive deer populations. This may include non-lethal methods such as reproduction control, deer-proof fencing, or trap/relocate programs. Management practices specifically undertaken to increase deer populations in areas

with overpopulations should be discontinued. Control may also include humanely-administered lethal methods such as increased and controlled hunting (using non-lead ammunition) or reintroduction of deer predators (wolves, mountain lions). Deer populations should be controlled at levels where natural understory and vegetation is maintained, to ensure the health of bird populations and of the entire ecosystem.

Comment [DW1]: Link this to ABC lead policy statement

Sources

[1] Rooney, T. P. May 2010. What do we do with too many white-tailed deer? http://www.actionbioscience.org/biodiversity/rooney.html

[2] Quality Deer Management Association's Whitetail Map Guide: http://www.i-maps.com/Qdma/frame/default1024_ie.asp?C=48449&LinkID=0&NID=0&cmd=map&TL=100000&GL=010100&MF=11000

[3] deCalesta, D.S. 1994. Impact of white-tailed deer on songbirds within managed forest in Pennsylvania. Journal of Wildlife Management 58: 771-718.

[4] Newson, S. E., A. Johnston, A. R. Renwick, S. R. Baillie, and R. J. Fuller. 2012. Modelling large-scale relationships between changes in woodland deer and bird populations. Journal of Applied Ecology 49: 278–286.

[5] Chollet, S., and J.-L. Martin. 2012. Declining woodland birds in North America: should we blame Bambi? Diversity and Distributions DOI: 10.1111/ddi.12003 http://onlinelibrary.wiley.com/doi/10.1111/ddi.12003/full

[6] Holt, C. A., R. J. Fuller, and P. M. Dolman. 2013. Deer reduce habitat quality for a woodland songbird: evidence from settlement patterns, demographic parameters, and body condition. Auk 130: 13−20.

[7] Allombert, S., A. J. Gaston, and J.-L. Martin. 2005. A natural experiment on the impact of overabundant deer on songbird populations. Biological Conservation 126: 1-13.

[8] Martin, T. G., P. Arcese, and N. Scheerder. 2011. Browsing down our natural heritage: deer impacts on vegetation structure and songbird assemblages across an island archipelago. Biological Conservation. 144:459-469.

[9] Horsley, S. B., S. L. Stout, and D. S. deCalesta. 2003. White-tailed deer impact on the vegetation dynamics of a northern hardwood forest. Ecological Applications 13: 98–118.

[10] McShea, W. J., and J. H. Rappole. 2000. Managing the abundance and diversity of breeding bird populations through manipulation of deer populations. Conservation Biology 14: 1161–1170.

[11] Pietz, P. J., and D. A. Granfors. 2000. White-tailed deer (*Odocoileus virginianus*) predation on grassland songbird nestlings. American Midland Naturalist 144(2):419-422. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/birds/deerpred/index.htm (Version 09MAR2001)

[12] Ellis-Felege, S. N., J. S. Burnam, W. E. Palmer, D. C. Sisson, S. D. Wellendorf, R. P. Thornton, H. L. Stribling, and J. P. Carroll. 2008. Cameras identify white-tailed deer depredating Northern Bobwhite nests. Southeastern Naturalist 7: 562-564. [See also many citations referenced in this article.]