



U.S. Fish and Wildlife Service



Fact Sheet – The Effect of Trees and Shrubs on Grassland Nesting Birds: An Annotated Bibliography by Kristel K. Bakker, Assistant Professor, Dakota State University

It is generally accepted among resource managers that trees are detrimental to grassland nesting birds. Yet published evidence is sparse and scattered among studies with numerous objectives. Dr. Bakker undertook a project, funded by HAPET, to compile published information on trees and shrubs and grasslands birds. Effects of trees and shrubs were summarized by 4 factors:

- 1) trees and shrubs within the grassland patch,
- 2) perimeter of the patch comprised of shrubs (usually under 6 ft. tall) or trees,
- 3) distance from woodland habitat, and
- 4) the proportion of woodland habitat within the landscape.

Some of the highlights of the bibliography are summarized here. General management recommendations are marked with an arrow (➤), and supporting studies are given below (●). Specific guidelines regarding patch size or allowable amounts of trees and shrubs are generally lacking, but suggestions can be found in some articles. The full bibliography is available from HAPET (www.fws.gov/midwest/hapet/treebiolog.pdf or see contact information below) and in the Proceedings of the South Dakota Academy of Science.

Pheasants and Ducks:

Although pheasants sometimes use trees and shrubs for thermal cover, it is not always preferred and usually does not enhance survival or nesting success.



- **Most food plots for pheasants should be established in areas of dense grass and cattail winter cover, rather than near shelterbelts.**
- **Trees should be removed or not established near pheasant nesting cover.**
 - Food plot use in 4 consecutive South Dakota winters was associated with the amount of wetland and grass cover in the surrounding area. Trees and shrubs appeared to be negatively associated with use.
 - During a typical South Dakota winter, cattail wetlands, tall grass, and food plots ranked highest in hen use. Tree cover was used only at the end of a severe winter (a 1 in 10 year event) and may have prevented total mortality of hens that year.
 - Nesting success was lower in and near shelterbelts in South Dakota and Colorado.
- **Trees along ponds may decrease use by mallard broods.**
 - A study in western South Dakota found that trees along pond edges decreased use by mallard broods.



➤ **Trees should be controlled before predators are attracted to a nesting area.**

- Nest success in Idaho was negatively affected by the density of Russian olive, mostly due to use by nesting magpies that destroyed duck nests. After removing the trees, magpies switched to sagebrush and duck nesting success did not improve.

Prairie Chickens and Sharp-tailed Grouse:

All studies on prairie-chickens and sharp-tailed grouse indicated a negative association with trees.

- **Trees in or near active mating display grounds (leks) and potential nesting areas should be removed.**
- **Maintenance of leks requires suppressing tree establishment in the surrounding landscape.**
- **Restoration areas for prairie-chickens should target treeless landscapes.**
 - Active prairie-chicken leks in Wisconsin and Minnesota had less forest cover in the surrounding landscape than random points.
 - Prairie-chicken leks in Minnesota that were used annually had less forest cover (average 1.6% in 2,000 acres) than leks used sporadically (average 3.2%).
 - Only 3 of 17 prairie-chicken nests in southwestern Missouri hatched when tree and shrub cover near the nest was >5%. When tree and shrub cover was ≤5%, 15 of 26 nests hatched.



- Tree and shrub encroachment on the Sheyenne National Grasslands in North Dakota is believed to be reducing the quality of prairie-chicken nesting cover.
- Landscapes with declining lesser prairie-chicken populations had more juniper encroachment than landscapes with stable populations in Oklahoma and Texas.
- Sharp-tailed grouse in Minnesota were sensitive to even small increases (1-2%) in the amount of tree and shrub vegetation in their home range.
- In Manitoba, the habitat surrounding a sharp-tailed grouse lek must be <44% closed aspen forest and must be >23% prairie to sustain a population of grouse. Once aspen succeeds to >56% forest and less than 15% prairie remains, the lek will likely be abandoned.

Nongame Birds:



Nongame bird studies usually looked at the amount of tree and shrubs within a grassland patch in relation to the occurrence or density of birds.

➤ **Trees and shrubs within fields should**

be controlled to make patches more attractive to grassland nesting birds.

- In twelve studies, birds were less likely to occur in fields that had trees and shrubs. Four studies found no effect (positive or negative) on species occurrence.
- Four studies concluded that although species may occur in fields with shrubs, they will be less numerous. One study found both negative and neutral effects on bird abundance, depending on the species.

➤ **Some low shrub cover is tolerable and should be allowed for grassland species that nest in shrubs.**

- Clay-colored sparrows and dickcissels may be more likely to inhabit fields with some shrub cover. Both of these species will build nests in shrubs.
- A study on northern harriers found that they preferred to nest in fields with some shrub cover.

Distance to trees and the proportion of field edge surrounded by trees have also been studied, usually to determine the effect on nest success or bird abundance. Most authors speculated that trees and shrubs surrounding fields provides a travel lane for mammalian predators and perch sites for avian predators and brown-headed cowbirds.

➤ **Trees and shrubs surrounding grassland patches should be removed to decrease nest predation and brood parasitism.**

➤ **Patches for restoration of grassland habitat should be as large as possible to decrease contact with edge predators.**

- Predation rates on nests increased (1) when nests were closer to trees or shrubs in 4 of 4 studies, and (2) in fields with a higher proportion of edge in trees or shrubs in 2 of 3 studies.
- One third of nest predations caught on video tape were by predators associated with wooded edges.
- Cowbird brood parasitism increased (1) when nests were closer to trees or shrubs in 2 of 2 studies, and (2) in fields with a higher proportion of edge in trees or shrubs in 2 of 2 studies.
- Bird densities were higher in areas that were far from trees and shrubs (3 of 3 studies).
- In 4 studies, bird densities were higher in fields with fewer trees and shrubs surrounding the field; another study found no effect for some species. One study found more eastern meadowlarks in fields with more hedgerows.



Researchers are just beginning to study the effects of landscape on nongame grassland birds.

➤ **Restoration focus areas for nongame grassland birds should be in landscapes with few trees and high amounts of grass to increase attractiveness of grass patches.**

- Four of five studies found that bird densities were higher in landscapes with fewer trees; the fifth study found no differences.
- Two studies found that as the amount of trees in the landscape increased, the less likely nongame birds would occur there.
- Nesting success was found to be unrelated to the amount of trees in the landscape in one study.

For a copy of the bibliography contact:

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