
Management Guidelines for the Golden-cheeked Warbler in Rural Landscapes

The descriptions presented in this document are intended to help landowners determine if they have Golden-cheeked Warbler habitat on their property. Not all sites within the habitat types described will be used by Golden-cheeked Warblers. It is only where individuals of this species occupy the identified habitat types during the breeding season that special management considerations such as those provided in these guidelines need to be considered.

Private landowners have a tremendous opportunity to conserve and manage the fish and wildlife resources of Texas. The objective of these guidelines is to provide landowners with recommendations about how typically-used agricultural land management practices could be conducted so that it would be unlikely that Golden-cheeked Warblers would be adversely impacted. The guidelines will be updated periodically to make them more practical and useful to rural landowners. The guidelines are based on the best available information and current understanding about the biology of the warbler, but may be refined as more complete biological data are collected. TPWD biologists have prepared these guidelines in consultation with USFWS biologists to assure landowners who carry out agricultural land management practices within the guidelines that they would know, with the greatest certainty possible, that they would not be in violation of the Endangered Species Act.

This document also provides information on land management practices that are appropriate for protection and/or enhancement of habitat. The categories were chosen to represent commonly encountered vegetation types and to address common questions regarding the effect of management practices on Golden-cheeked Warblers. In addition, suggestions are offered that promote conservation of soil, water, plant, and wildlife resources.

Habitat Descriptions

Habitat Types Where Warblers Are Expected To Occur (Protection efforts should be focused in these habitat types)

Woodlands with mature Ashe juniper (cedar) in a natural mix with oaks, elms, and other hardwoods, in relatively moist (mesic) areas such as steep canyons and slopes, and adjacent uplands are considered habitat types that are highly likely to be used by warblers. Mature Ashe junipers are trees that are at least 15 feet in height with a trunk diameter of about five inches at four feet above the ground (dbh). These areas generally will have a nearly continuous canopy cover of trees with 50-100% canopy closure and an overall woodland canopy height of 20 feet or more. This habitat type is also important for deer, turkey, other songbirds, and a variety of other wildlife due to the diversity of vegetation and topography and, in many cases, proximity to water. Woodlands of this description should be retained wherever they occur, especially along creeks and draws, and on steep slopes and generally rough terrain. Landowners with woodlands that fit the above description should assume that warblers may be using the area and are advised to follow the management guidelines presented here. Additional information regarding habitat types and their potential to support Golden-cheeked Warblers is presented in Table 1.

Habitat Types That May Be Used By Warblers

It is relatively easy to recognize the above described high quality habitat types where Golden-cheeked Warblers are likely to occur. However, there are a number of other vegetation types that may also be used by warblers, depending on the location, size of tract, land use, adjacent landscape features, and vegetation structure. These habitat types are most often used by warblers when they are located adjacent to or near areas of high quality habitat.

The four habitat types discussed below can be associated with a variety of tree canopy covers, ranging from 35-100%. Also, all four habitat types can contain mature Ashe juniper. Although not representative of what is typically thought of as the “best” warbler habitat, these areas may support Golden-cheeked Warblers, especially fledglings (young birds that have left the nest). These habitats may be relatively more important to warblers nesting in the western and northern portions of the species’ breeding range, or in areas where optimal habitat no longer exists. Although these habitat types may occupy a large geographic area within the Hill Country, little is known about warbler occupancy when the sites are not close to the optimal habitat types. Landowners are advised to treat the following vegetation types as occupied habitat until technical assistance is obtained or a survey done to determine whether or not specific areas support warblers:

1. Stands of mature Ashe juniper (trees with shredding bark), over 15 feet in height and dbh of about 5 inches, with scattered live oaks (at least 10% total canopy cover), where the total canopy cover of trees exceeds 35% and overall woodland canopy height is at least 20 feet.
2. Bottomlands along creeks and drainages which support at least a 35% canopy of deciduous trees (average canopy height of 20 feet), with mature Ashe juniper (at least 15 feet and 5 inches dbh) growing either in the bottom or on nearby slopes.
3. Mixed stands of post oak and/or blackjack oak (10-30% canopy cover), with scattered mature Ashe juniper (15 feet in height and 5 inches dbh), where the total canopy cover of trees exceeds 35% and

overall woodland canopy height is 20 feet.

4. Mixed stands of shin (scaly-bark) oak (10-30% canopy cover) with scattered mature Ashe juniper (15 feet in height and 5 inches dbh), where the total canopy cover of trees exceeds 35% and overall woodland canopy height is 20 feet. (See Table 1).

Areas Where Warblers Are Not Expected To Occur

The following types of areas are not typical warbler habitat and are unlikely to be used by warblers unless adjacent to warbler habitat areas. This is important because areas consisting of non-typical warbler habitat that are adjacent to occupied habitat may in fact be used for

foraging. This is especially true for sparsely wooded grassland or low-impact agriculture, but much less so for industrial, commercial, and medium to high density residential areas (Coldren 1998). Further, although junipers occur abundantly over much of the Hill Country, a relatively small portion of them are actually a part of usable warbler habitat.

1. Stands of small Ashe juniper, averaging less than 15 feet in height and 5 inches dbh, are not habitat. This includes small juniper that invades open rangelands, previously cleared areas, or old fields. These areas are often dry and relatively flat, and lack oaks and other broad-leaved trees and shrubs. Generally, areas such as those described above

that have been cleared within the last 20 years are not considered habitat.

2. Pure stands of larger (greater than 15 feet in height and 5 inches dbh) Ashe juniper, with few or no oaks or other hardwoods.
3. Open park-like woodlands or savannahs (even with old junipers) where canopy cover of trees is less than 35%. These areas often have scattered live oaks and other trees.
4. Small junipers and other trees coming up along existing fence lines.
5. Small junipers (less than 15 feet tall) coming up under larger hardwoods where junipers have been removed in the past 20 years.

Table 1. Ecological site types and Range Sites with plant communities that may provide habitat for Golden-cheeked Warblers. On flat or rolling uplands, warblers are most likely to occupy larger patches of woodlands adjacent to canyon systems. Most of the flat and rolling uplands within these Range Sites have other plant communities, like open savannahs, that do not support warblers. Sites that are not used by warblers are described in the Habitat Descriptions section of this leaflet.

Site Description	Range Site	Typical Plant Communities that may support Golden-cheeked Warblers	Potential for Golden-cheeked Warblers
Slopes and canyons, and associated creek bottoms	Adobe Clay Loam ¹ Loamy Bottomland ¹ Steep Adobe Steep Rocky	Continuous canopy woodland* of Ashe Juniper, Texas Oak, Live Oak, Lacey Oak, Chinkapin Oak, Cedar Elm, Escarpment Blackcherry, Texas Ash, Bigtooth Maple, Redbud, Hackberry, Pecan, and other deciduous trees	Highly likely to be used
Flat or rolling uplands with shallow, rocky soils of variable depth	Adobe Low Stony Hill Shallow Very Shallow	Continuous canopy woodland* of Live Oak, Blackjack Oak, Post Oak, Shin Oak, Lacey Oak, Texas Oak, Cedar Elm, Hackberry, Texas Madrone, and Ashe Juniper Patchy woodlands+ or interspersed mottes of mature Live Oak, Blackjack Oak, Post Oak, and Ashe Juniper	Highly likely to be used May be used
Flat or rolling uplands with reddish soils	Deep Redland ² Gravelly Redland ² Redland ²	Continuous canopy woodland* of Live Oak, Blackjack Oak, Post Oak, Shin Oak, Lacey Oak, Texas Oak, Cedar Elm, Hackberry, Texas Madrone, and Ashe Juniper Patchy woodlands+ or interspersed mottes of mature Live Oak, Blackjack Oak, Post Oak, and Ashe Juniper	Highly likely to be used May be used
Flat or rolling uplands with shallow but more continuous rocky soils over limestone ³	Low Stony Hill	Continuous canopy woodland* of Ashe Juniper, Live Oak, and Shin Oak Patchy woodlands+ or interspersed mottes of mature Live Oak, Ashe Juniper, Hackberry, Cedar Elm, and Mesquite	May be used May be used

* Defined as 50-100% canopy cover of trees at least 15 feet in height or greater.
 + Defined as 35-50% canopy cover of trees at least 15 feet in height or greater.
¹ Stream bottoms in and near canyon systems.
² Golden-cheeked Warblers may occur on Redland Range Sites adjacent to slope and canyon habitat. It is not known whether or not warblers occur on Redland Sites isolated from canyon systems.
³ Common woody plants include Hackberry, Texas Persimmon, Texas Ash, Live Oak, Texas Oak, Ashe Juniper, Evergreen Sumac, Cedar Elm, and Mesquite

Controlling juniper on these areas by prescribed burning, hand cutting, or well-planned mechanical methods is often desirable to improve range condition and plant diversity, and is compatible with protection and conservation of adjacent Golden-cheeked Warbler habitat. Maintaining a minimum 300 feet wide buffer of woodland vegetation adjacent to and around Golden-cheeked Warbler habitat is beneficial to minimize predation. This recommendation stems from studies which suggest that avian predation is greatest within 300 feet of the edge of an occupied habitat patch than farther inward (Arnold et al. 1996). However, when brush management and maintenance activities near habitat are necessary, they should not occur during the March-August nesting season to avoid adverse impacts such as disturbance of nesting and feeding birds. Since brush management activities can affect habitat for the Black-capped Vireo as well as the Golden-cheeked Warbler, landowners are encouraged to learn about the habitat requirements of both endangered songbirds (see TPWD leaflet on the Black-capped Vireo).

It is important in wildlife management in general, and in endangered species management in particular, to consider the “big picture” with regard to how land types relate to one



Open savannah - not habitat
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Regrowth cedar - not habitat
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another. For example, when brush management practices are planned in non-habitat areas, one should consider the proximity of the area to habitat used by warblers. These guidelines encourage landowners to keep natural, mature woodland sites wooded while allowing for the restoration of former savannah and grassland habitats that have been invaded by small juniper (or other invasives).

Agricultural Practices in Golden-cheeked Warbler Habitat

Disruption of the tree canopy should be avoided when planning ranch improvements or maintenance work in Golden-cheeked Warbler habitat. It is recommended that new fence lines and livestock watering facilities (pipelines, storage tanks, ponds, and troughs) be planned to avoid areas of habitat whenever possible. However, narrow linear openings, such as those needed for traditional agricultural management (fence lines, ranch roads, and livestock water pipelines) will not harm Golden-cheeked Warblers if openings (spaces between trunks or stems at breast height) are no greater than 16 feet in width. This width is large enough to allow for maintenance, while permitting the hardwood tree canopy to grow over the gap. Permanent electric fencing may enable landowners to cross fence areas of rough terrain with little or no disturbance to the tree canopy. Often, these power fences are the most cost effective way to cross fence areas of steep topography and shallow soils. Fencing and other ranch improvement work in Golden-cheeked Warbler habitat should only be done during the non-nesting period (September-February).

Dozing or hand cutting in habitat with closed tree canopy and steep slopes not only destroys warbler habitat, but mechanical disturbance also can create serious soil erosion problems. In addition, clearing these areas is generally not cost effective due to higher clearing costs; lower forage production potential, and grazing distribution problems associated with steep slopes. Selective removal of small juniper less than 15 feet in height and 5 inches dbh within habitat is not a problem as long as the tree canopy is not disturbed. Any selective removal of juniper within or adjacent to habitat should be done

during the non-nesting period (September-February).

When mature juniper trees are abundant in the habitat, incidental removal of juniper for use as fence posts on the ranch will have little impact on warbler habitat. The number of trees cut depends on the density of Ashe juniper in the habitat. For example, more trees could be removed from an area with a high density of juniper compared with the density of hardwoods. The idea should always be to provide a mix of juniper and hardwoods. When posting is done, trees should be selected to avoid disturbance to the tree canopy. One way to do this is to select trees with a relatively small individual canopy and scatter your tree selections over the area. Posting should not occur in habitat during the nesting period (March-August).

In habitat areas and on rangelands immediately adjacent to habitat, it is important to manage grazing pressure by deer and livestock to prevent over browsing of broad-leaved shrubs and trees, and to maintain plant diversity and productivity. Controlling the number of browsing animals (deer, exotic animals, and livestock) is important to maintain hardwood seedlings and ensure eventual replacement of deciduous trees in the canopy. Range condition improvement in and adjacent to habitat areas, through proper grazing management and planned deferral, will likely prove beneficial to livestock and wildlife, including the Golden-cheeked Warbler.

Landowners with questions regarding how ranch improvements and management practices will affect habitat are advised to seek technical assistance from the Texas Parks and Wildlife Department, USDA Natural Resources Conservation Service, or U.S. Fish and Wildlife Service. For activities other than those described above, land managers should seek assistance from the U.S. Fish and Wildlife Service, since permits may be needed.

Other Management Suggestions

Reducing Impacts from Predation and Cowbird Parasitism

Reducing the impacts of predation and brood parasitism by Brown-

headed Cowbirds may be important for successful reproduction in some populations of Golden-cheeked Warblers. This is particularly true where warblers nest near grazed land or grain crops

Planned grazing systems designed to rotate livestock away from known nesting areas during the breeding season (March-August) may be desirable to reduce cowbird impacts. Periodic rest also has important benefits for improving range condition and productivity. Since cowbirds are attracted to easily available food sources, spilling or scattering grain should be avoided. Supplemental feeding areas for livestock should be moved frequently, located away from nesting habitat, and kept free from accumulations of waste grain.

Maintaining woodland vegetation adjacent to Golden-cheeked Warbler habitat is often desirable to reduce predation and brood parasitism by Brown-headed Cowbirds. Woodland strips of 300 feet or more are preferable. These strips should be composed of both the physical structure (height and canopy cover) and species composition similar to warbler habitat (Arnold, et. al. 1996).

Finally, controlling cowbirds through trapping is effective in reducing warbler brood parasitism. Mounted mobile traps, placed near watering sites as livestock are rotated through pastures, have been used successfully to reduce cowbird numbers. Properly placed stationary traps have also proven effective in reducing cowbird numbers and parasitism in a local area. Other methods, such as shooting, can be used to supplement trapping efforts where needed. Persons trapping cowbirds need to be certified for the handling of non-target birds under the general trapping permit held by TPWD. Preventing mortality of non-target birds is of paramount concern, so traps must be carefully monitored and checked frequently. Contact Texas Parks and Wildlife Department for information and assistance in implementing a cowbird control program.

Habitat Restoration

The following suggestions are offered for landowners wishing to

restore or create habitat for the Golden-cheeked Warbler in areas that currently do not support warblers. One type of restorable habitat is the relatively mesic (moist) area, with a diversity of deciduous trees, where junipers have been previously removed. Allowing the reestablishment of juniper on these sites would eventually result in the mature oak-juniper woodland preferred by Golden-cheeked Warblers.

Other situations where restoring habitat may be a possibility include relatively mesic areas dominated by juniper, where heavy browsing pressure by deer or livestock has prevented the establishment of hardwood seedlings. In these areas, control of deer numbers and planned deferment from livestock grazing would help promote reestablishment of broad-leaved shrubs and trees, eventually resulting in mature juniper-oak woodland.

In mesic areas where small junipers (15 ft. or less) are dominant, small junipers could be thinned to favor faster growth of remaining trees. Thinning would encourage hardwood regeneration, especially if some slash is left in place to provide protection for hardwood seedlings. If large junipers are dominant, several small openings per acre would encourage hardwood regeneration. These openings should be protected from browsing and left to regenerate naturally, or planted to native hardwoods. In each of these examples, the idea is to restore areas that may once have provided habitat to the natural oak-juniper woodland capable of growing on the site.

Further Guidance Concerning the ESA

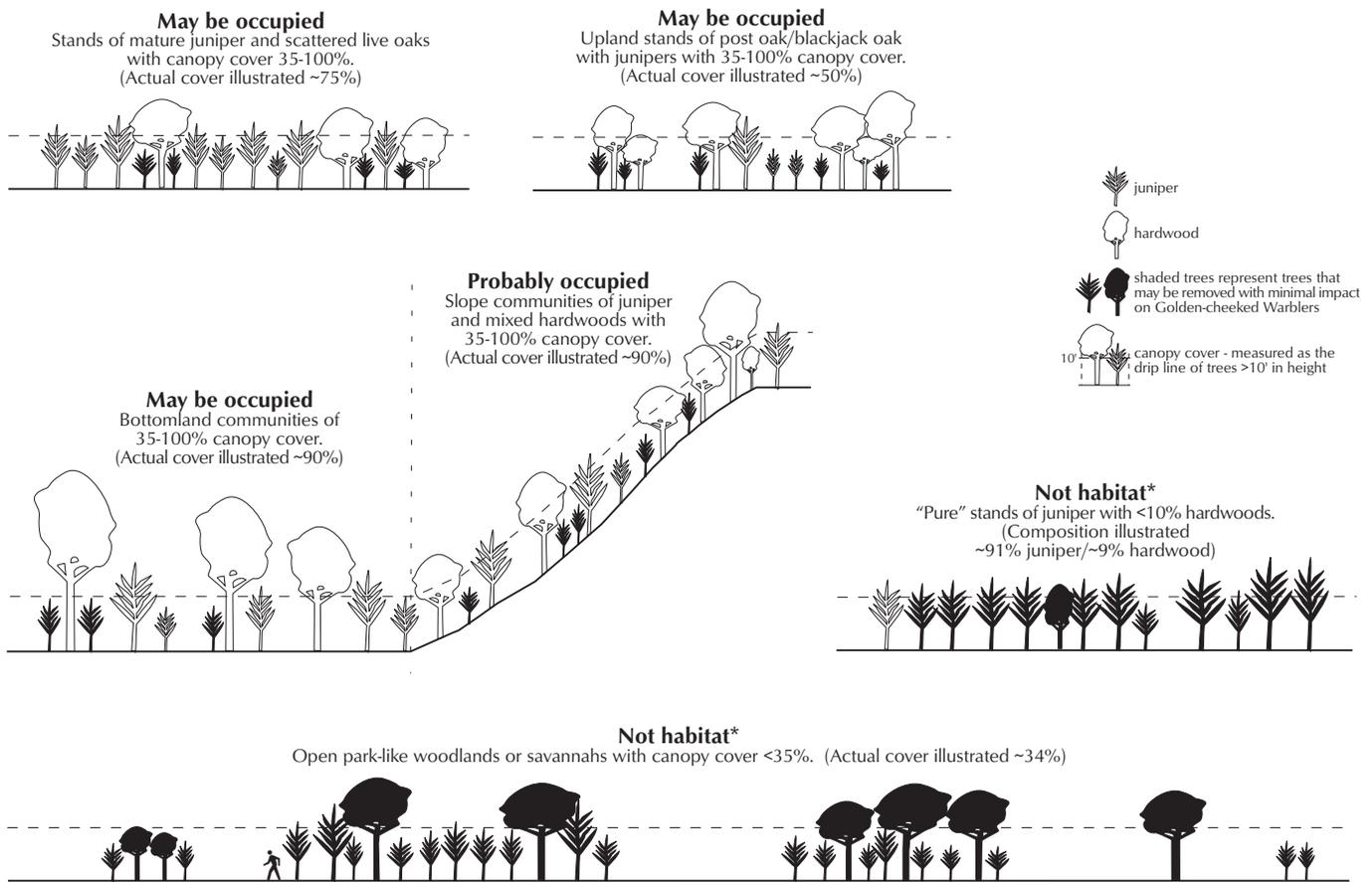
Good range management practices such as proper stocking, rotational grazing, prescribed burning, periodic deferments, carefully planned brush control, and attention to plant and animal resource needs will help prevent loss of Golden-cheeked Warbler habitat. Habitat where Golden-cheeked Warblers are likely to occur should be protected from activities that alter the composition or structure of trees and shrubs, except as provided for in these guidelines. Likewise, management activities in areas that may be used by warblers should be carefully planned to avoid altering vegetation composition and

structure and timed to avoid the breeding season until a survey is done to determine if warblers are using the area. Important habitat components such as the ratio of mature juniper to deciduous trees, and canopy structure and height, should be retained whenever possible to enable population recovery.

Landowners who are not sure whether or not they have suitable Golden-cheeked Warbler habitat, or whether a planned activity will affect these birds, may want to consult a biologist familiar with the species. An on-site visit by a biologist familiar with the warbler can determine if warbler habitat is present and whether the planned activity falls under the guidelines presented here. Also, a biologist who has a scientific permit from the U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department to do Golden-cheeked Warbler survey work will know how to conduct a breeding season survey to determine if warblers are present in the area for which a management activity is planned.

Technical Assistance

Technical assistance in range and wildlife management, including management for endangered species, is available to landowners and managers by contacting the Texas Parks and Wildlife Department, USDA Natural Resources Conservation Service, Texas Cooperative Extension, or U.S. Fish and Wildlife Service. Further guidance and specific questions concerning Golden-cheeked Warbler research, endangered species management and recovery, and landowner responsibilities under the Endangered Species Act, should be directed to the Texas Parks and Wildlife Department or U.S. Fish and Wildlife Service.



*As long as these areas are not in close (within 300 feet) proximity to "probably occupied" or "may be occupied" habitat, neither surveys nor permits are required for activities within these areas.