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TECHNICAL MEMORANDUM

To: Gary Boyd, Williamson County Conservation Foundation
From: Paul Sunby, SWCA Environmental Consultants
Date: October 3, 2019
Re: **Hidden Springs Ranch / Golden-cheeked Warbler Habitat Assessment**

This technical memorandum (memorandum) presents the results of a habitat assessment for the federally endangered golden-cheeked warbler (*Setophaga chrysoparia*) on the approximately 932.5-acre Hidden Springs Ranch. SWCA Environmental Consultants (SWCA) visited the ranch on September 19, 2019 and viewed its vegetation by driving and walking the ranch.

Hidden Springs Ranch lies mostly in Williamson County, but extends north into Burnet County, and is located approximately 4 miles northwest of the City of Florence, Williamson County. SWCA Environmental Consultants (SWCA) is aware that Williamson County is familiar with the golden-cheeked warbler and its habitat; therefore, we are not providing detailed background information on the species in this memorandum. However, for reference, it is noted that the golden-cheeked warbler typically occurs in mature woodland that has a closed or nearly closed canopy and that is composed of a combination of Ashe juniper (*Juniperus ashei*) and hardwood trees, particularly oaks (*Quercus* spp.).

Hidden Springs Ranch lies within the Cross Timbers ecoregion and the Lampasas River watershed of the Brazos River basin. The ranch has frontage to the south on Williamson County Road 224. Roughly the southern third of the ranch lies on a broad, relatively flat top of a ridge formed from the Keys Valley Marl. Elevations on the ranch generally descend toward the north away from the top of this ridge. The central and northern portions of the ranch contain the headwaters of the McDaniel Branch of Mill Creek, with this creek running generally northward through the center of the ranch. Topography in the central and northern portions of the ranch is hilly, with rolling uplands incised by McDaniel Branch and many short tributaries that combine to form a dendritic pattern. Stream erosion has removed the Keys Valley Marl from these portions of the ranch to expose, in descending order, the underlying Cedar Park Limestone, Bee Cave Marl, and upper Glen Rose formations.

The Keys Valley Marl is a soft carbonate formation that degrades to form comparatively deep soils suitable for agricultural uses. For this reason, the broad ridge top on which the southern portion of the ranch lies has been widely converted to pasture, both on and adjacent to Hidden Springs Ranch. Maintenance of these pastures on Hidden Springs Ranch appears to not have been performed in recent times, and these pastures are being invaded by shrubby Ashe juniper and mesquite (*Prosopis glandulosa*). This portion of the ranch does not contain woodland habitat suitable for use by golden-cheeked warblers.

In contrast to the southern portion of the ranch, geology in the central and northern portions of Hidden Springs Ranch consists mostly of hard limestones that form thin soils. Probably owing to a combination of thin soils and hilly topography, these portions of the ranch appear to have historically been used as rangeland and mostly without having been converted to pasture. Review of the Soil Survey of Williamson County, Texas, which contains aerial photography circa 1980, indicates that approximately 40 years ago these portions of the ranch mostly contained open woodland with some nearly barren hillsides, none of which would have provided habitat for golden-cheeked warblers. Based on current conditions as discussed below, it appears possible that over the past 40 years, vegetation in the central and northern portions of Hidden Springs Ranch has been allowed to naturally succeed into a more wooded state.

McDaniel Branch is contained within a long, branched canyon. The floor of this canyon now mostly supports closed or nearly closed woodland composed primarily of Ashe juniper and plateau live oak (*Quercus fusiformis*) trees, although along and near the creek channel the woodland also contains cedar elm (*Ulmus crassifolia*), American sycamore (*Platanus occidentalis*), and Arizona black walnut (*Juglans major*) trees, some of the latter of which are in excess of 40 feet tall. Across the floor of the canyon, the Ashe juniper and live oak trees in this woodland are mostly 16 to 30 feet tall. This closed or nearly closed woodland provides habitat suitable for use by golden-cheeked warblers.

One relatively large pasture is present on the floor of canyon that contains the McDaniel Branch, mostly in Burnet County and on the east side of the creek channel. This pasture is rather long and narrow and is crossed by a set of low berms, presumably built historically to control erosion. This pasture mostly contains grasses and forbs, but is being invaded by some shrubby Ashe juniper, particularly along its eastern edge. This pasture does not provide habitat for golden-cheeked warblers.

The dendritic pattern of drainages in the central and northern portions of the ranch have created a fingered series of ridges that confine the drainage system. These ridges have something of a stair-step topography, with steeper slopes in some places separated by relatively flat benches. The steeper slopes largely support open, scrubby Ashe juniper woodland, with most trees ranging from 6 to 18 feet tall. These slopes are formed of hard limestone that likely promotes surface water runoff rather than water retention, resulting in comparatively xeric conditions that do not favor growth of oak or other hardwood trees and appear to stunt the growth of the Ashe juniper. These open scrubby woodlands do not currently provide habitat suitable for golden-cheeked warblers. The topographic benches support stands of semi-open to relatively dense Ashe juniper/live oak woodland with very low densities of Texas oak (*Quercus buckleyi*) trees. Some of these stands of woodland have a nearly closed canopy and are essentially contiguous with the closed/nearly closed woodland developed in the canyon that contains McDaniel Branch. These stands may provide habitat suitable for use by golden-cheeked warblers. Other stands occur at greater distance from the canyon and have a more open canopy. These stands of woodland, if allowed to continue to succeed naturally, can be expected to gain suitability as golden-cheeked warbler habitat. A few of the topographic benches support open grassy clearings, perhaps a result of past land management activities performed to support livestock grazing. These clearings do not constitute golden-cheeked warbler habitat.

The attached Figure 1 depicts the distribution of woodland on Hidden Springs Ranch that currently appears suitable for use by golden-cheeked warblers. Approximately 240.1 acres of woodland present on the ranch currently appears suitable for use by the golden-cheeked warbler. Based on the configuration and extent of this woodland, SWCA believes it is highly probable that golden-cheeked warblers occur as breeding season residents of Hidden Springs Ranch.

Figure 1 also depicts the distribution of woodland on Hidden Springs Ranch that with time could gain suitability for use by the warbler. These woodlands are divided into three categories: Future Short-Term, Future Long-Term, and Future Long-Term Dependent.

Approximately 125.6 acres of woodland on the ranch were identified as Future Short-Term. These woodlands generally are composed of live oak, Ashe juniper, and some Texas oak trees that currently are a little too open to provide habitat suitable for use by golden-cheeked warblers, or in which the Ashe juniper is still a bit too young or short to provide suitable habitat. It is expected that these woodlands, if allowed, will succeed into golden-cheeked warbler habitat in the “short-term,” although that term might be 15 or 20 years.

Another approximately 197.0 acres of Hidden Springs Ranch were identified as Future Long-Term. These areas generally contain open woodlands, including the scrubby Ashe juniper present on steeper slopes, that could eventually gain suitability as golden-cheeked warbler habitat. However, the time needed for that to happen is likely more than 20 years and it is possible that some of the vegetation identified within this category may never gain suitability as warbler habitat, particularly some of the scrubby Ashe juniper woodland on the steeper slopes that appears to be stunted by low water availability.

Approximately 13.5 acres of semi-open Ashe juniper/live oak woodland on the southwest side of the ranch was identified as Future Long-Term, Dependent. This woodland is formed on slopes of moderate gradient and with time it appears it could grow into closed canopy woodland possessing characteristics of golden-cheeked warbler habitat. These woodlands are bordered to the east by the broad ridge top underlain by the Keys Valley Marl that has been converted to pasture, and bordered to the west by off-site ridges that support similar semi-open Ashe juniper/live oak woodland. It is not expected that vegetation on the broad ridge top to the east will ever grow into suitable golden-cheeked warbler habitat, and the woodland identified as Future Long-Term, Dependent is not extensive enough on its own to provide habitat that could be used by golden-cheeked warblers. The ability of this woodland to eventually become viable as golden-cheeked warbler habitat is dependent upon the adjacent off-site woodland also being allowed to succeed into closed canopy woodland so that together enough woodland would be available to support the warbler.

As seen on Figure 1, most of the central and northern portions of Hidden Springs Ranch were identified as containing potentially suitable golden-cheeked warbler habitat or having potential to support warbler habitat with time. Areas in those portions of the ranch not identified as having potential to grow into golden-cheeked warbler habitat were largely limited to the floors of impounded stock tanks and what now consist of stands of nearly pure grassland, although with enough time even the grasslands could be taken over by Ashe juniper and succeed into warbler habitat. Because of recurring impoundment by water, the stock tanks would not be capable of supporting woodland vegetation unless their dams were breached.

In summary, SWCA identified approximately 240.1 acres of woodland on Hidden Springs Ranch as potentially suitable golden-cheeked warbler habitat. Another approximately 125.6 acres of the ranch appear likely to succeed into suitability as warbler habitat over the next couple of decades. With even more time, another 197.0 acres or more could develop into suitable golden-cheeked warbler habitat.

Thank you for the opportunity to perform this assessment. If you have any questions or would like any additional information, please do not hesitate to contact me at 512-476-0891 or via email at psunby@swca.com.

