

**Southwestern Willow Flycatchers: Habitat Features
and Effects of Livestock Grazing on their Habitat**



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Summary

In the southwestern United States, the Natural Resources Conservation Service chose the endangered southwestern willow flycatcher (*Empidonax traillii extimus*) as focal species for the Working Lands for their Wildlife initiative, which seeks to conserve listed species on private lands. To help inform that effort, we sought to identify key vegetation features used by breeding willow flycatchers and to evaluate how seasonal livestock grazing in riparian areas, when managed carefully, would affect vegetation features important to habitat of willow flycatchers. Our goal was to provide information to help develop management strategies to meet the needs of livestock producers and willow flycatchers.

To identify key vegetation features used by breeding willow flycatchers and other riparian obligate species, we surveyed birds and vegetation along 86 transects (810 survey points) established in riparian areas throughout southern Arizona and southwestern New Mexico in 2016 and 2017. We recorded 5,148 detections of 86 unique bird species, including 115 detections of willow flycatchers. We explored habitat features important to 15 species associated with riparian areas. In general, areas that were occupied by willow flycatchers were characterized by higher woody cover (69.4 vs. 55.6%) and canopy height (7.7 vs. 6.0 m) than unoccupied areas. Abundance of willow flycatchers increased as cover of midstory and canopy vegetation increased, with the strongest increases associated with cover of salt cedar, and to a lesser extent, willow, at heights of 2-4 m.

To evaluate how time-controlled grazing and conservative stocking rates during the growing season affects habitat features critical to maintaining and recovering the southwestern willow flycatcher, we surveyed vegetation in four grazed pastures on three ranches in Yavapai County, AZ between 2015 and 2017. We established 12, 250-m² plots that we surveyed 2-4 times per year, with the timing of surveys varying among pastures and years depending on the grazing schedule of each ranch. On plots, we estimated canopy cover and composition of woody plants, dry-weight (biomass) of herbaceous plants, mean density of seedlings of the primary woody species, and mean utilization of herbaceous and woody species. Pastures 1-3 were dominated by willow and seepwillow, whereas Pasture 4 was dominated by sycamore and one-seed juniper, an upland species. Total woody cover in riparian areas ranged from 23-38%, well below levels that typically promote use by willow flycatchers. Only two woody species, Fremont cottonwood and seep willow, were observed as seedlings in appreciable numbers and both were more abundant in early 2015 relative to late 2015 and 2016, ostensibly due to flooding events. Herbaceous vegetation was dominated by Bermuda grass, rabbitsfoot grass, water speedwell, and two species of buckwheat.

Although our original goal was to evaluate the influence of grazing on vegetation across a wide range of stocking rates, the low number of participating ranches made reaching that goal impossible. Ultimately, the timing and intensity of grazing on each pasture was dictated by the participating ranches, which in turn governed the range of treatments we were able to evaluate. During the study, cattle and horses were grazed at 27 different stocking rates, all of which were relatively low (range = 0.1 to 89.3 AUD/ha). These conservative stocking rates with relatively short seasonal grazing periods resulted in very light

levels of utilization on both herbaceous and woody plants in riparian areas for all sampling periods (i.e., <14%). Within these limited stocking rates, we found some evidence of a positive association between stocking rate and herbaceous utilization, but we found no evidence that stocking rates were associated with utilization of woody plants or cover of early successional shrubs, woody species used commonly as nesting substrates by willow flycatchers, or all woody species combined.

Protecting breeding willow flycatchers and their habitat from detrimental effects of livestock grazing during the growing season requires that grazing does not reduce important vegetation components below thresholds that promote occupancy, alter vegetation in ways that reduce habitat quality, decrease recruitment of important plant species that would provide key habitat features in the future, and result in direct harm to flycatchers or nests. In the context of riparian management for the southwestern willow flycatcher, the appropriateness of a particular livestock grazing regime should be evaluated based on current ecological conditions, the ecological potential for an area to support flycatcher habitat currently or in the future, and the overall grazing strategy and underlying tactics. The information we collected can help to inform management of grazing in riparian areas, but identifying specific thresholds where grazing adversely impacts current or future breeding habitat for willow flycatchers would require surveying a larger set of sample units in areas more representative of willow flycatcher habitat, with a wider range of stocking rates, and with adequate controls that include measuring changes in vegetation throughout the growing season.

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