Willow Flycatcher
Empidonax traillii

Photo by Martin Meyer

NOTE: Information specific to the Southwestern Willow Flycatcher (E. t. extimus) is coded “SWFL”; Information specific to E. t. adastus and brewsteri in the Great Basin is coded “GB”

Habitat Use Profile

Habitats Used in Nevada

<table>
<thead>
<tr>
<th>Mojave and Great Basin Lowland Riparian Montane Riparian, Springs (Marsh)</th>
</tr>
</thead>
</table>

Key Habitat Parameters ●

| Plant Composition | Willows, salt cedar, Fremont cottonwood, alder, ash |
|---|
| Plant Density & Height | Dense riparian vegetation > 4 m [13 ft] high (or 2-4 m [6.5.-13 ft] in montane areas); > 50% cover in territory, > 80% cover at nest; tall canopy trees scattered or absent |
| Mosaic | Extensive thickets of willow or other riparian shrubs with saturated soils and nearby surface water |
| Distance to Water Response to Vegetation Removal | < 40 m [130 ft] Negative, including defoliation of saltcedar |

Area Requirements ●

| Minimum Patch Size | 0.4 ha [1 ac] for GB; > 1 ha [2.5 ac] in montane areas; 0.8 ha [2 ac] for SWFL |
|---|
| Recommended Patch Size | > 6 ha [15 ac] |
| Territory Size | 0.3 -0.6 ha [0.7 -1.5 ac] for GB; 0.1 – 2.3 ha [0.25 – 5.7 ac] for SWFL |

Confidence in Available Data: ● High ◀ Moderate ○ Low

Conservation Profile

Priority Status
Conservation Priority Species

Species Concerns
ESA listing: Endangered Priority Species (SWFL)
Historical and recent declines
Habitat threats Small population size

Other Rankings
Continental PIF Watch List
Audubon Watchlist Yellow
NV Natural Heritage S3B (SWFL: S1B)
USFWS Endangered subspecies (SWFL), Bird of Conservation Concern, Migratory Bird
BLM Sensitive Species
USFS Sensitive Species (SWFL)
NDOW Conservation Priority, Endangered (SWFL)
Other Covered by several HCPs, see below

Trends
Historical ● Rangewide declines
Recent ◀ Declining at 3% / year for GB; SWFL probably stable

Population Size Estimates

| Nevada (BBS) | 1,500; SWFL: 90 |
| Global | 3,300,000; 2,400 for SWFL |

Percent of Global < 1%; 7.5% for SWFL

Population Objective Increase by 50%

Monitoring Coverage
Source SWFL surveys by USBR, USFWS, NDOW and others; Nevada Bird Count for GB
Coverage in NV Good

Key Conservation Areas
Protection & Restoration See Overview, below
See Overview, below

Natural History Profile

Seasonal Presence in Nevada
Spring – Summer

Known Breeding Dates in Nevada
Late May – August

<table>
<thead>
<tr>
<th>Nest and Nesting Habits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nest Placement</td>
</tr>
<tr>
<td>Site Fidelity</td>
</tr>
</tbody>
</table>

Food Habits

Basic Fly-catcher
Primary Diet Variety of flying insects
Secondary Diet n/a

Spp-59-1
Willow Flycatcher
Empidonax traillii

*E. t. adastus* and *E. t. brewsteri*
Willow Flycatcher
Empidonax traillii

*E. t. extimus*

Knowledge of Distribution

- Moderate

Darker colors represent critical Spring - Summer habitat designated by USFWS. Lighter colors represent the area within which the species could occur in appropriate habitat types.

Spp-59-3
Willow Flycatcher
*Empidonax traillii*

**Overview**

Although fairly common in states to the north and east of Nevada, the Willow Flycatcher is far less abundant in the arid West, where much of its historical riparian habitat has been lost or degraded. Three subspecies breed in Nevada: the endangered Southwestern Willow Flycatcher, *E. t. extimus* (SWFL) in the Mojave region along the Colorado, Virgin, and Muddy Rivers, and in the Meadow Valley Wash, Pahranagat Valley, and Ash Meadows NWR; *E. t. adastus* throughout the Great Basin portion of Nevada in small numbers; and *E. t. adastus* may be replaced in far-western Nevada by *E. t. brewsteri*, from which it is difficult to distinguish. NBC data show that in far-western Nevada, Willow Flycatchers are primarily found in montane riparian habitat, with some spillover into lowland riparian areas. In central, eastern, and northern Nevada, the rare *E. t. adastus* is found in both lowland and montane riparian habitats, and occasionally in other inundated areas such as aspen stands or wet meadows. All three subspecies use the lower Colorado River corridor during migration.

Because of its listing under the ESA, SWFL has been intensively studied, and detailed recovery strategies have been developed. *E. t. brewsteri* in the Sierra Nevada has also been studied in some depth. However, there have been no studies in Nevada of the increasingly rare *E. t. adastus* subspecies, despite the substantial declines it has suffered over recent decades. Consequently, the Great Basin lowland populations of Willow Flycatcher receive little conservation attention.

All three Willow Flycatcher subspecies are riparian-obligates and have undergone large historical declines because of the widespread loss of dense, shrubby riparian habitat with water-saturated soils. Willow Flycatchers were common in the Sierra Nevada until 1910, and at least locally abundant through 1940, with noticeable declines occurring after 1950. In recent surveys, birds were absent from 53 of 135 previously known sites, and there may now be only 300-400 individuals left in the entire Sierra Nevada, with only a small fraction of these in our state. Willow Flycatchers in Nevada’s Great Basin have become exceedingly rare in recent decades, and historical data from the lower Truckee River indicate that the species was considered abundant in the late 1800s, but is absent as a breeder today. Similar declines almost certainly occurred along other Great Basin rivers as well, and remaining populations are small and fragmented.

Willow Flycatchers breed in tall dense shrubs, and in most studies, occupancy and nesting success is related to shrub cover and volume. Willows are the traditionally preferred vegetation, but other shrub species are also used, although riparian mesquite bosques are usually avoided (except in Ash Meadows NWR). The SWFL will readily nest in saltcedar stands, as long as they are sufficiently tall and dense. About 25% of all known SWFL breeding territories are now located at sites dominated by salt cedar, and intensive studies in Arizona have found no apparent drop in any measure of foraging or nesting success for birds nesting in saltcedar stands. Cover of overstory trees is variable across occupied sites, but they are generally only scattered and often absent.
subspecies are tied to wet areas (standing water or highly saturated soils),\(^\text{10}\) and the SWFL is particularly dependent on the presence of permanent surface water.\(^\text{30}\) For example, a severe drought in 2002 may have completely eliminated SWFL reproduction in some areas.\(^\text{15}\) Heterogeneity of vegetation structure may be an important factor in determining habitat suitability,\(^\text{15}\) as large patches of riparian shrubs without interspersed openings are often avoided.\(^\text{10,31}\) Willow Flycatchers can breed in very small patches (0.1 ha \([0.25 \text{ ac}])\),\(^\text{10,31}\) but aggregations of suitable patches promote healthy population dynamics. Individuals will readily move among patches within a drainage, sometimes up to 30-40 km \([19-25 \text{ mi}]\).\(^\text{15}\) The width and continuity of the riparian vegetation can also be important.\(^\text{19,22}\) Narrow strips < 10 m \([33 \text{ ft}]\) wide are generally not occupied.\(^\text{30}\)

Most threats to Willow Flycatchers and lowland riparian habitats have been well-documented (see Main Threats and Challenges, below).\(^\text{30}\) Threats to montane populations are less well-studied, but probably center upon the dewatering of riparian or meadow patches as a result of water diversions, or lowering of local water tables (and the consequent impacts on riparian shrubs) by gully erosion from heavy livestock use, road building, or natural runoff events.\(^\text{10}\) Cowbird parasitism is low in montane populations, but it can be problematic in lowland populations, and has been a major concern for SWFL.\(^\text{33}\) Cowbird trapping has been shown to increase the local reproductive output of SWFL in the short-term, but it is not clear that it has benefits to long-term population recovery. Trapping is therefore an expensive and short-term solution recommended only in emergencies.\(^\text{17}\)

The SWFL currently makes extensive use of saltcedar stands, and would suffer if large areas of saltcedar were removed without restoring suitable replacement habitat.\(^\text{24}\) A new threat has therefore emerged with the release of the tamarisk leaf beetle (\textit{Diorhabda spp.}) as a biocontrol agent.\(^\text{11}\) The tamarisk beetle continues to expand across the southwestern landscape, defoliating large expanses of saltcedar fairly rapidly, and consequently increasing the need to accelerate the process of restoring native vegetation in areas of defoliation. Saltcedar is not only common in southern Nevada, but also has significant presence in the Great Basin, where releases of tamarisk beetles have also occurred. Because \textit{E. t. adastus} has received such limited study, impacts of saltcedar defoliation on the Great Basin populations are not known.

Habitat restoration plays a key role in conservation planning for the Willow Flycatcher in Nevada. SWFL in particular seem to prefer relatively young vegetation, and new sites can become suitable just 3-5 years after disturbance,\(^\text{15}\), providing an unusually rapid return on habitat restoration efforts. Indeed, restoration projects conducted to benefit SWFL in the Mojave region have been quite successful. In the Great Basin, however, recovery of Willow Flycatcher populations following habitat restoration could be hindered by the relative lack of sufficient regional source populations. In general, given the species’ need for both specific microhabitats and a favorable landscape mosaic, it is important that long-term management plans consider the geomorphology, hydrology, and successional dynamics of whole river reaches.\(^\text{9,30}\)
The SWFL is a covered species under the Clark County MSHCP, the Lower Colorado River MSCP, the Southeastern Lincoln County HCP (Jeri Krueger, pers. comm.), and the Virgin River Habitat Conservation and Recovery Plan (HCRP) (Jeri Krueger, pers. comm.). Key conservation and restoration areas for SWFL include the Muddy and Virgin River corridors and Pahranagat Valley. Key conservation and restoration areas for the Great Basin populations include the Humboldt, Carson, Truckee, and Walker River systems.

### Abundance and Occupancy by Habitat

#### Birds / 40 ha on NBC Transects in the Great Basin and Mojave Regions

<table>
<thead>
<tr>
<th>Primary Habitat at Transect</th>
<th>Transects Occupied</th>
<th>Birds/40 ha (95% C.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Great Basin</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowland Riparian</td>
<td>12% (8/66)</td>
<td>2.7 (0.0 – 5.4)</td>
</tr>
<tr>
<td>Montane Riparian</td>
<td>6% (4/88)</td>
<td>1.6 (0.3 – 2.9)</td>
</tr>
<tr>
<td><strong>Mojave</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowland Riparian</td>
<td>14% (5/36)</td>
<td>0.5 (0.2 – 0.8)</td>
</tr>
</tbody>
</table>

- Additional information on abundance is available in the sources listed in the following section
- Because Willow Flycatchers are late breeders, standard breeding season surveys such as NBC and BBS detect a large number of spring migrants that ultimately breed outside of Nevada. Population size estimates derived from these surveys are therefore significantly inflated and unreliable.

### Nevada-Specific Studies and Analyses

Numerous sources document the Willow Flycatcher (particularly SWFL) in great detail, although few are exclusively focused on Nevada. The most important and useful resources include:

- USGS SWFL site
- US Fish and Wildlife Service SWFL Home Page
- US Fish and Wildlife Service Arizona Ecological Services SWFL site
- Final Recovery Plan for the Southwestern Willow Flycatcher
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- A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher (newly updated 2010)\textsuperscript{25}  
  \url{http://pubs.usgs.gov/tm/tm2a10/}
- Status, Ecology, and Conservation of the Southwestern Willow Flycatcher\textsuperscript{7}  
  \url{http://www.fs.fed.us/rm/pubs/rmrs_gtr060.html}
- Southwestern Willow Flycatcher Surveys, Demography, and Ecology Along the Lower Colorado River and Tributaries, 2003 – 2007\textsuperscript{13}  
  \url{http://www.lcrmscp.gov/worktasks/systemmonitoring/D2/5year0307.pdf}

Main Threats and Challenges

Great Basin

Habitat Threats

- Loss, degradation, and fragmentation of lowland riparian habitat due to
  - Surface water diversions impoundments, and flood control\textsuperscript{6, 21}
  - Heavy livestock grazing\textsuperscript{26}
- Desiccation of montane riparian and wet meadow habitat from water diversion, drought, or gullying\textsuperscript{10}
- Increase in nest predator access due to meadow desiccation and conifer encroachment\textsuperscript{10}

Research, Planning, and Monitoring Challenges

- The detailed distribution, population sizes, and current trends of Willow Flycatchers in the Great Basin need to be more thoroughly studied
- Lack of knowledge about the geographical boundaries between \textit{adastus} and \textit{brewsteri} subspecies, and uncertainty as to whether distinctions between these subspecies have conservation implications
- Lack of knowledge about the possible impacts of saltcedar defoliation on Great Basin populations
- Lack of conservation urgency despite significant (and probably continuing) declines

Mojave (SWFL)

Habitat Threats

- Surface water diversion, flood control activities, groundwater pumping that dewater habitat
- High-intensity, habitat-converting fire
- Sudden removal of large amounts of saltcedar as a result of biocontrol agents or restoration efforts, if timely revegetation cannot occur
- Brown-headed Cowbird parasitism
Willow Flycatcher
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Research, Planning, and Monitoring Challenges

- None currently identified; because of SWFL’s ESA status, managers can draw on a large number of studies, data sets, and planning documents

Conservation Strategies

Great Basin

Habitat Strategies

- Great Basin Lowland Riparian (p. Hab-7-1), Montane Riparian (p. Hab-13-1), and Springs (p. Hab-19-1) habitat conservation strategies benefit these subspecies
- Manage shrub willow habitat to maintain or restore patches > 6 ha [15 ha], preferably multiple patches along a given riparian reach\textsuperscript{4,26}
- Manage grazing at sustainable levels that do not significantly fragment or reduce the density of willow patches
- Maintain the presence of wet soils and nearby surface water\textsuperscript{10, 26}
- Emphasize restoration of vegetation and hydrology in potential habitat, especially in areas within easy colonization distance from currently-occupied habitat\textsuperscript{26}
- Where necessary, limit or manage human activities to allow for the recovery of degraded areas\textsuperscript{26, 28}
- Reduce nest predator access by preventing conifer encroachment into montane nesting habitat, and by maintaining or restoring hydrology and vegetation as described above\textsuperscript{10, 26}

Research, Planning, and Monitoring Strategies

- Expand current monitoring protocol to cover all known or likely breeding sites of Great Basin subspecies. The following protocol may be appropriate, particularly if it can be adapted to multi-species monitoring protocols: \textit{A Willow Flycatcher Survey Protocol for California}\textsuperscript{3} \texttt{http://dfg.ca.gov/wildlife/nongame/docs/wifl_2003_protocol.pdf}
- Conduct research on the distribution, trends, population size, subspecies ranges, and specific ecological needs of Willow Flycatcher in Nevada’s Great Basin
- Determine the extent to which Willow Flycatchers in the Great Basin use saltcedar habitat, and, if necessary, develop strategies to compensate for losses of both saltcedar and native riparian shrubs.

Public Outreach Strategies

- None identified
Conservation Strategies
Mojave (SWFL)

Established Strategies


Habitat Strategies

- The Mojave Lowland Riparian (p. Hab-11-1) habitat conservation strategy benefits this subspecies.
- Protect all known nesting habitat from disturbances, habitat conversion, and other threats.
- Restore lost or degraded riparian habitat to a willow-dominated condition. Phase restoration projects to avoid removing large amounts of saltcedar before creating suitable replacement habitat. Creating even as little as 20% cover by native vegetation in saltcedar stands has significant value for Willow Flycatchers.
- Develop strategies to address the potential loss of current saltcedar breeding habitat to biocontrol agents.

Research, Planning, and Monitoring Strategies

- Develop comprehensive fire management strategies emphasizing initial attack to protect important breeding habitat.
- Continue current monitoring and research efforts, as described in A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher (http://pubs.usgs.gov/tm/tm2a10).

Public Outreach Strategies

- None identified.
Willow Flycatcher
Empidonax traillii

References: 1Ammon (2002); 2Bergstrom (1998); 3Bombay et al. (2003a); 4Bombay et al. (2003b); 5Clark County (2000); 6Dobkin and Sauder (2004); 7Finch and Stoleson (2000); 8GBBO unpublished Atlas data; 9Graf et al. (2002); 10Green et al. (2003); 11Hatten et al. (2010); 12Hultine et al. (2010); 13McLeod et al. (2008); 14NDOW (2009); 15Paxton et al. (2007); 16Rich et al. (2004); 17Rothstein et al. (2003); 18Rourke et al. (1999); 19Sanders and Edge (1998); 20Sauer et al. (2008); 21Sedgwick (2000); 22Sedgwick and Knopf (1992); 23Sogge et al. (2003); 24Sogge et al. (2008); 25Sogge et al. (2010); 26Stefani et al. (2001); 27Swett (1999); 28Taylor and Littlefield (1986); 29LCRMSCP (2004); 30USFWS (2002); 31USFWS (2005); 32Van Riper (2008); 33Whitfield and Sogge (1999); 34Yong and Finch (1997); 35EO Expert opinion

Willow Flycatcher habitat in the Mojave region. Photo by Jen Ballard.