

# Willow Flycatcher

## *Empidonax traillii*



Photo by Martin Meyers

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	
Mojave and Great Basin Lowland Riparian Montane Riparian, Springs (Marsh)	
Key Habitat Parameters •	
Plant Composition	Willows, salt cedar, Fremont cottonwood, alder, ash
Plant Density & Height	Dense riparian vegetation $\geq$ 4 m [13 ft] high (or 2-4 m [6.5.-13 ft] in montane areas <sup>26</sup> ); > 50% cover in territory, > 80% cover at nest <sup>4, 30, 31</sup> tall canopy trees scattered or absent <sup>21, 25</sup>
Mosaic	Extensive thickets of willow or other riparian shrubs with saturated soils and nearby surface water <sup>21</sup>
Distance to Water	< 40 m [130 ft] <sup>21</sup>
Response to Vegetation Removal	Negative, including defoliation of saltcedar <sup>EO</sup>
Area Requirements •	
Minimum Patch Size	0.4 ha [1 ac] for GB; <sup>21</sup> > 1 ha [2.5 ac] in montane areas; <sup>26, 31</sup> 0.8 ha [2 ac] for SWFL <sup>25</sup>
Recommended Patch Size	> 6 ha [15 ac] <sup>4, EO</sup>
Territory Size	0.3 -0.6 ha [0.7 -1.5 ac] for GB; <sup>10, 21</sup> 0.1 – 2.3 ha [0.25 – 5.7 ac] for SWFL <sup>25</sup>

### Conservation Profile

Priority Status	
Conservation Priority Species	
Species Concerns	
ESA listing: Endangered subspecies (SWFL) Historical and recent declines Habitat threats Small population size	
Other Rankings	
Continental PIF Audubon Watchlist NV Natural Heritage USFWS	Watch List Yellow S3B (SWFL: S1B) Endangered subspecies (SWFL), Bird of Conservation Concern, Migratory Bird
BLM USFS NDOW	Sensitive Species Sensitive Species (SWFL) Conservation Priority, Endangered (SWFL)
Other	Covered by several HCPs, see below <sup>5, 29</sup>
Trends	
Historical • Recent ◦	Rangewide declines <sup>21</sup> Declining at 3% / year for GB; <sup>20</sup> SWFL probably stable <sup>21</sup>
Population Size Estimates	
Nevada (BBS) • Global • Percent of Global	1,500; SWFL: 90 <sup>27</sup> 3,300,000; <sup>16</sup> 2,400 for SWFL <sup>15</sup> < 1%; 7.5% for SWFL
Population Objective	
Increase by 50% <sup>16, EO</sup>	
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

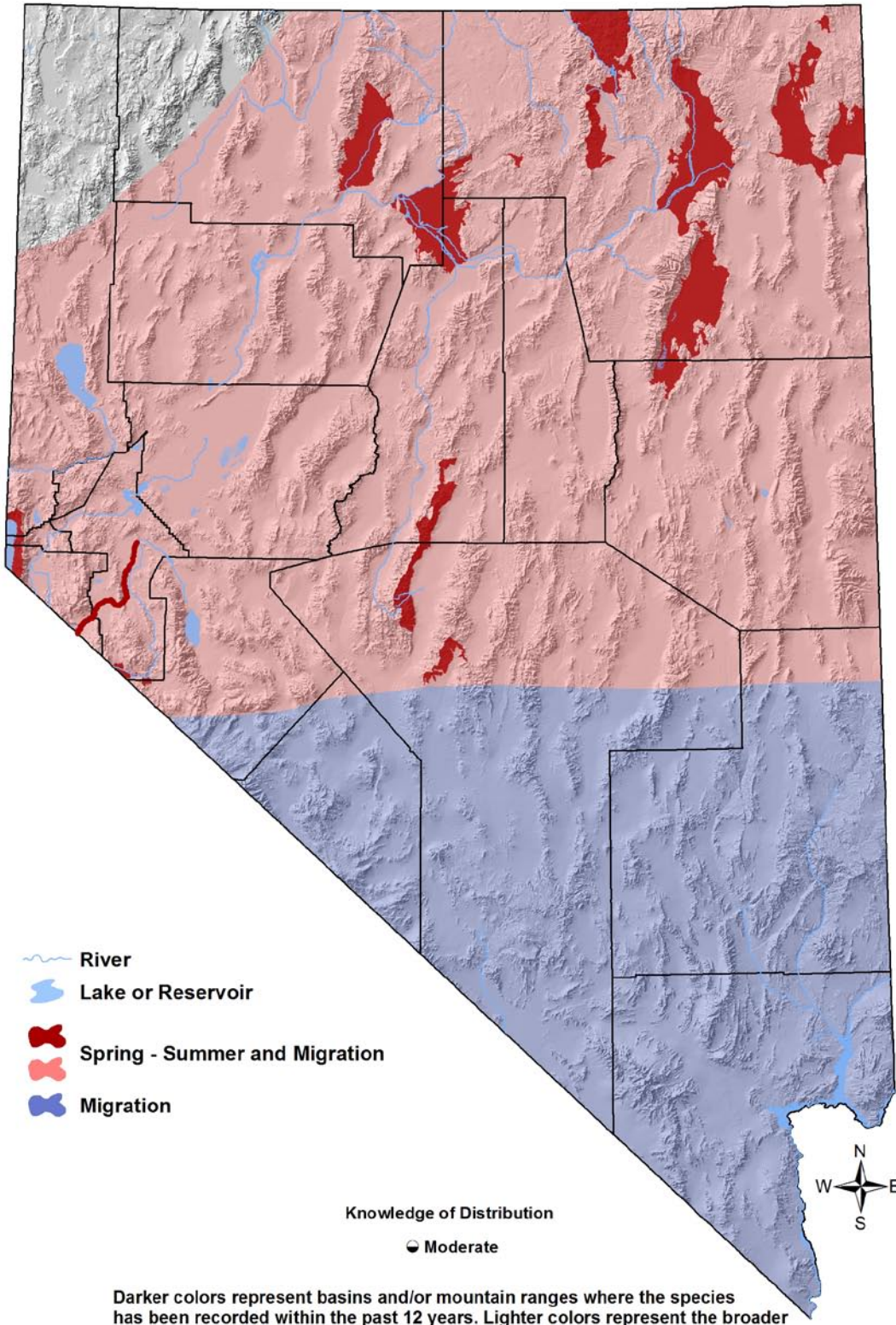
### Natural History Profile

Seasonal Presence in Nevada	
Spring – Summer	
Known Breeding Dates in Nevada	
Late May – August <sup>8, 27</sup>	
Nest and Nesting Habits	
Nest Placement	In crotch of tall (> 4 m, [13 ft]), very dense riparian shrub <sup>21</sup>
Site Fidelity	High for specific drainage
Food Habits	
Basic	Fly-catcher
Primary Diet	Variety of flying insects <sup>21</sup>
Secondary Diet	n/a

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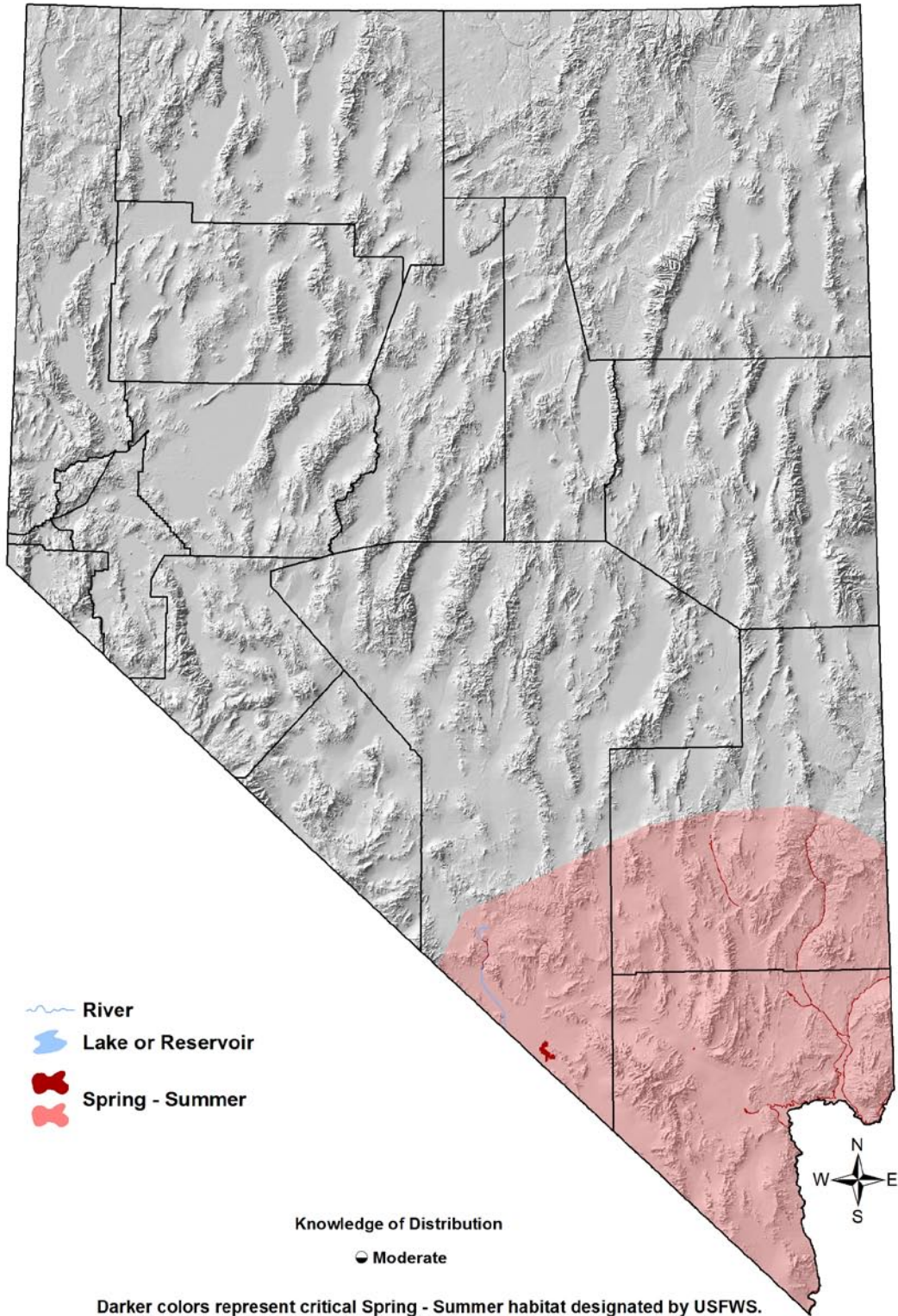
*E .t. adastus* and *E .t. brewsteri*



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*E .t. extimus*



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.

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### 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.<sup>16</sup> 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, Pahrnagat Valley, and Ash Meadows NWR<sup>14,27</sup>; *E. t. adastus* throughout the Great Basin portion of Nevada in small numbers<sup>2</sup>; and *E. t. adastus* may be replaced in far-western Nevada by *E. t. brewsteri*, from which it is difficult to distinguish.<sup>10</sup> 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.<sup>30</sup>

Because of its listing under the ESA, SWFL has been intensively studied, and detailed recovery strategies have been developed.<sup>30</sup> *E. t. brewsteri* in the Sierra Nevada has also been studied in some depth.<sup>4, 10, 26</sup> 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.<sup>15</sup> In recent surveys, birds were absent from 53 of 135 previously known sites,<sup>10</sup> and there may now be only 300-400 individuals left in the entire Sierra Nevada,<sup>10, 26</sup> 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.<sup>1</sup> Similar declines almost certainly occurred along other Great Basin rivers as well, and remaining populations are small and fragmented.<sup>6, 10</sup>

Willow Flycatchers breed in tall dense shrubs, and in most studies, occupancy and nesting success is related to shrub cover and volume.<sup>4, 15, 22</sup> Willows are the traditionally preferred vegetation,<sup>25</sup> but other shrub species are also used, although riparian mesquite bosques are usually avoided (except in Ash Meadows NWR).<sup>30</sup> 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,<sup>24</sup> and intensive studies in Arizona have found no apparent drop in any measure of foraging or nesting success for birds nesting in saltcedar stands.<sup>15</sup> Cover of overstory trees is variable across occupied sites, but they are generally only scattered and often absent. All

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subspecies are tied to wet areas (standing water or highly saturated soils),<sup>10</sup> and the SWFL is particularly dependent on the presence of permanent surface water.<sup>30</sup> For example, a severe drought in 2002 may have completely eliminated SWFL reproduction in some areas.<sup>15</sup> Heterogeneity of vegetation structure may be an important factor in determining habitat suitability,<sup>15</sup> as large patches of riparian shrubs without interspersed openings are often avoided.<sup>10,31</sup> Willow Flycatchers can breed in very small patches (0.1 ha [0.25 ac]),<sup>10,31</sup> 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 mi].<sup>15</sup> The width and continuity of the riparian vegetation can also be important.<sup>19,22</sup> Narrow strips < 10 m [33 ft] wide are generally not occupied.<sup>30</sup>

Most threats to Willow Flycatchers and lowland riparian habitats have been well-documented (see Main Threats and Challenges, below).<sup>30</sup> 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.<sup>10</sup> Cowbird parasitism is low in montane populations, but it can be problematic in lowland populations, and has been a major concern for SWFL.<sup>33</sup> 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.<sup>17</sup>

The SWFL currently makes extensive use of saltcedar stands, and would suffer if large areas of saltcedar were removed without restoring suitable replacement habitat.<sup>24</sup> A new threat has therefore emerged with the release of the tamarisk leaf beetle (*Diorhabda* spp.) as a biocontrol agent.<sup>11</sup> 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 *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,<sup>15</sup> 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.<sup>9,30</sup>

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The SWFL is a covered species under the Clark County MSHCP,<sup>5</sup> the Lower Colorado River MSCP,<sup>29</sup> 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 Pahrangat 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

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

- 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  
<http://sbsc.wr.usgs.gov/cprs/research/projects/swwf/>
- US Fish and Wildlife Service SWFL Home Page  
<http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?sPCODE=B094>
- US Fish and Wildlife Service Arizona Ecological Services SWFL site  
<http://www.fws.gov/southwest/es/arizona/Southwes.htm>
- Final Recovery Plan for the Southwestern Willow Flycatcher<sup>30</sup>  
[http://www.fws.gov/southwest/es/arizona/SWWF\\_RP.htm](http://www.fws.gov/southwest/es/arizona/SWWF_RP.htm)

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- A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher (newly updated 2010)<sup>25</sup>  
<http://pubs.usgs.gov/tm/tm2a10/>
- Status, Ecology, and Conservation of the Southwestern Willow Flycatcher<sup>7</sup>  
[http://www.fs.fed.us/rm/pubs/rmrs\\_gtr060.html](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<sup>13</sup>  
<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<sup>6, 21</sup>
  - Heavy livestock grazing<sup>26</sup>
- Desiccation of montane riparian and wet meadow habitat from water diversion, drought, or gullying<sup>10</sup>
- Increase in nest predator access due to meadow desiccation and conifer encroachment<sup>10</sup>

#### 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 *adastus* and *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

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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<sup>4,26</sup>
- 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<sup>10, 26</sup>
- Emphasize restoration of vegetation and hydrology in potential habitat, especially in areas within easy colonization distance from currently-occupied habitat<sup>26</sup>
- Where necessary, limit or manage human activities to allow for the recovery of degraded areas<sup>26, 28</sup>
- Reduce nest predator access by preventing conifer encroachment into montane nesting habitat, and by maintaining or restoring hydrology and vegetation as described above<sup>10, 26</sup>

#### **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: *A Willow Flycatcher Survey Protocol for California*<sup>3</sup>  
[http://dfg.ca.gov/wildlife/nongame/docs/wifl\\_2003\\_protocol.pdf](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

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## Conservation Strategies Mojave (SWFL)

### Established Strategies

- Extensive conservation measures outlined in the USFWS's 2002 *Final Recovery Plan for Southwestern Willow Flycatcher*<sup>30</sup> and the 2005 Designation of Critical Habitat<sup>31</sup>

### 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<sup>32</sup>
- 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>)<sup>25</sup>

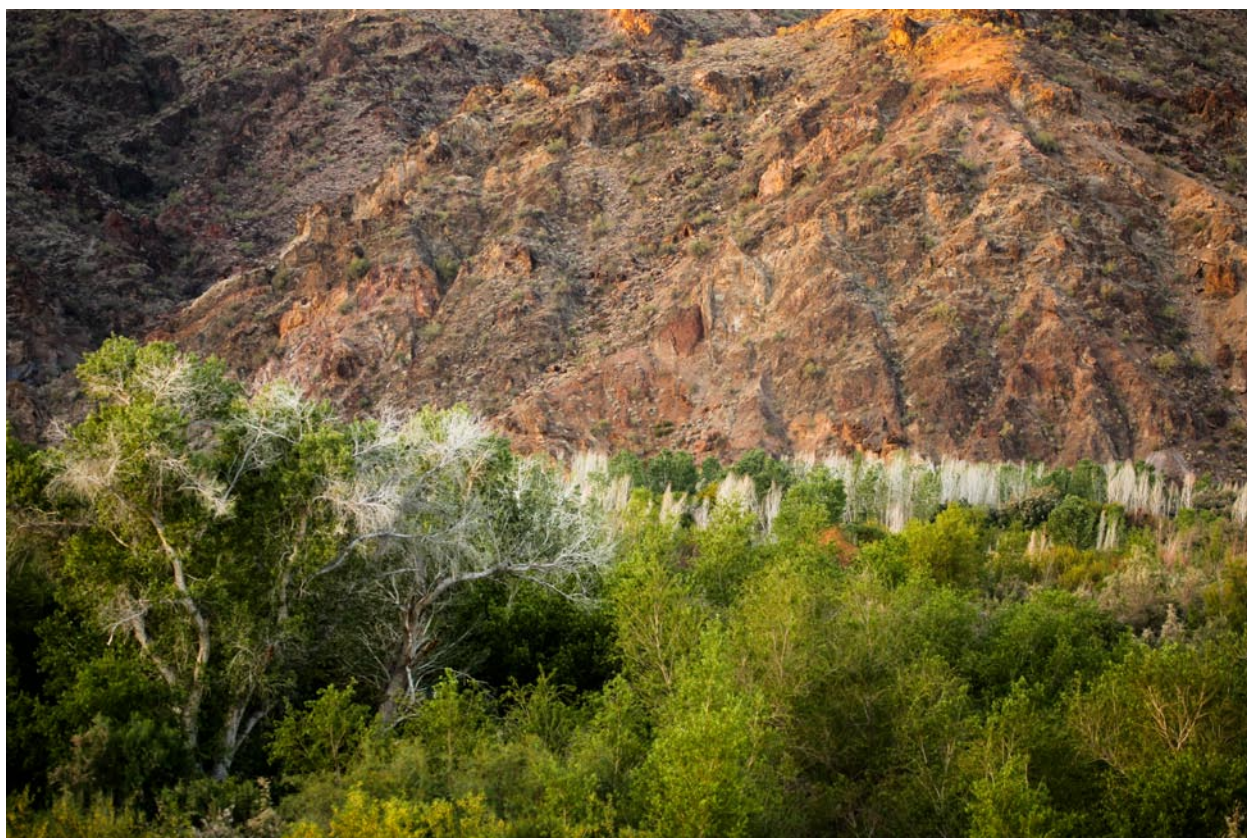
### Public Outreach Strategies

- None identified

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



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