Southwestern Willow Flycatcher Habitat Classification
Lower Rio Grande from Elephant Butte Dam, NM to El Paso, TX
Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation’s natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.
Southwestern Willow Flycatcher
Habitat Classification
Lower Rio Grande from Elephant Butte Dam, NM to El Paso, TX

prepared for
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Technical Service Center
Fisheries and Wildlife Resources
Denver, Colorado

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Executive Summary

Bureau of Reclamation personnel classified the suitability of riparian habitat for breeding Southwestern Willow Flycatchers within the active floodplain of the Rio Grande between Elephant Butte Dam, New Mexico and El Paso, Texas during the spring of 2016. Seven different study reaches were delineated based on geographic landmarks, habitat characteristics and ongoing surveys for the endangered Southwestern Willow Flycatcher. All ground within the active floodplain (i.e. not separated from the river channel by roads, levees, etc.) was visually classified based on its suitability as breeding habitat. Classification was performed either via kayak or on foot by biologists intimately familiar with habitat requirements of the species. Habitat classes ranged from zero (unsuitable) to five (highly suitable) and took into consideration patch width, vegetation height, structural diversity and hydrology; classes 2 and below were considered unsuitable and classes 3 through 5 were considered at least moderately suitable.

Within the study area’s 216 kilometers of riparian corridor, approximately 48 percent of the linear distance of riverbank was classified as zero. The Caballo Reach (between Elephant Butte Dam and Caballo Dam) and Mesilla Reach had the highest percentages of non-habitat due to ongoing and historic land use and management activities. Overall, approximately 129 hectares of suitable habitat were mapped within the study area, with the majority of it located within the Caballo Reservoir delta and Hatch Reach. Not surprisingly, these reaches were also home to the majority of resident flycatchers detected during the 2016 surveys. Data generated during 2016 documented a decrease in habitat quality and quantity when compared to 2012 data, presumably due to recent drought and lower flows in the river.
Introduction

The Southwestern Willow Flycatcher (*Empidonax traillii extimus* – hereafter called SWFL or flycatcher) is a federally endangered subspecies of the Willow Flycatcher (*Empidonax traillii*). It is a neotropical migrant that winters in Central and northern South America and spends its breeding season (May to August) in riparian habitat of the southwestern United States and, presumably, Mexico. Typical flycatcher breeding habitat consists of patches of dense trees and shrubs, whether native or exotic, within the first five meters (m) above ground. These dense patches are often interspersed with small openings consisting of open water, marsh, or less dense vegetation and the highest quality habitat generally contains either surface water or saturated soils caused by overbank flooding or an elevated water table (USFWS 2002). High-quality, productive SWFL habitat found along the Rio Grande often consists of young patches of Goodding’s willow (*Salix gooddingii*) occasionally mixed with coyote willow (*Salix exigua*), saltcedar (*Tamarix ramosissima*), and/or Russian olive (*Eleagnus angustifolia*).

The SWFL was listed as endangered under the Endangered Species Act in 1995 (USFWS 1995). Bureau of Reclamation biologists began work with the SWFL along the Rio Grande soon thereafter and a formal survey protocol was issued by the U.S. Fish and Wildlife Service. During the following 10 years, a sizeable population of SWFLs developed in the delta of Elephant Butte Reservoir as reservoir levels receded and bare mineral soil was colonized by vast expanses of primarily native vegetation. A flycatcher habitat mapping effort conducted in 2008 documented 4200 acres [1700 hectares (ha)] of suitable habitat within the San Marcial reach (which encompasses Elephant Butte Reservoir) of the Middle Rio Grande (Ahlers et al. 2010). The San Marcial population is currently the largest known breeding population within the range of the subspecies. An update to the mapping effort conducted over a larger study area in 2012 documented more than 9300 acres (3700 ha) of suitable habitat between the Isleta Pueblo and Elephant Butte Dam (Siegle, Ahlers and Ryan 2013). Habitat mapping was again conducted in 2016 and an update is forthcoming.

In comparison, suitable SWFL habitat along the Lower Rio Grande (downstream of Caballo Dam) is very limited due to river and floodplain management activities. Flycatcher surveys have been conducted by various entities within certain portions of this reach since the species was listed in 1995 (Ahlers and Moore 2013, Blackburn 2010). However, little was known about the habitat values within much of this reach. During the summer of 2011, Reclamation biologists conducted a cursory review of potential SWFL habitat between Elephant Butte Dam and El Paso, Texas. Several additional patches of suitable habitat were located and occupation by breeding SWFLs was confirmed. This prompted formal flycatcher surveys within portions of the reach and a full, but simplified (compared to that conducted in San Marcial), habitat classification in 2012. Habitat within the active floodplain between Caballo Dam and El Paso, Texas was classified based on six levels of habitat suitability ranging from 0 (woody vegetation sparse, short or entirely lacking) to 5 (high quality SWFL breeding habitat). This mapping effort found the largest quantities of suitable SWFL habitat to be located in the Hatch and Radium Springs reaches; suitable SWFL habitat was nearly nonexistent downstream of Leasburg Diversion Dam.
Methods

Study Area

During the 2016 study, riparian habitat classification was conducted within the Lower Rio Grande from Elephant Butte Dam, New Mexico to the international boundary (River mile 0) adjacent to El Paso, Texas (Figure 1). This stretch of river is highly managed and regulated by flow releases from Elephant Butte and Caballo Dams. The river channel is typically dry in the winter and carries water during the irrigation season (generally May to September). If water is available, releases are sufficient to provide irrigation water but rarely are of the magnitude to flood the surrounding floodplain. Thus, much of the floodplain within this stretch of river is more xeric than upstream reaches and typically dominated by exotic saltcedar or upland species. All habitats within the active floodplain of the Rio Grande (i.e. not separated hydrologically from the active river channel by a major impediment such as a road or levee) were classified based on a system initially developed for use in the Upper Rio Grande (Ahlers 2009). This system consisted of habitat classes ranging from zero to five and was modified to account for the differences in habitat characteristics at the lower elevations of southern New Mexico.

Habitat Classification

All habitats were assessed based on their potential for providing SWFL breeding habitat. Classifications were developed in consideration of habitat availability and characteristics of occupied SWFL habitat upstream within the Rio Grande and included structure, density and species composition. Generally, patches greater than 10 m in width containing dense, woody vegetation greater than 3 m in height are considered potentially suitable habitat (Sogge et al. 2010). All habitats were classified into one of the following six classes:

Class 0 (Unsuitable) = Woody vegetation is absent, very sparse, or generally less than 3 m in height (i.e. bare ground, herbaceous vegetation, scoured river bars or islands).

Class 1 (Unsuitable) = Vegetation height is greater than 3 m and patch width is less than 10 m (i.e. patch width is limiting factor). Habitat of this class generally consists of narrow bands of coyote willow or saltcedar within the river channel prism.
Figure 1. 2016 Lower Rio Grande SWFL habitat classification study area.
Methods

Class 2 (Unsuitable) = Vegetation height is greater than 3 m and patch width is greater than 10 m but vegetation lacks sufficient structure and density (i.e. patch size and vegetation height are sufficient; vegetation lacks overall structure/density; relatively dry and not subject to overbank). Habitat of this class generally consists of older, drier patches of saltcedar scattered throughout the study area.

Class 3 (Moderately suitable) = Habitat meets minimum suitable vegetation height (3 m) and patch width (10 m) and has sufficient density/structure (i.e. patch size and height are moderately sufficient; vegetation density is adequate). This class is typically comprised of smaller river bars and islands with young to mid-aged vegetation.

Class 4 (Suitable) = Vegetation height is between 3 and 7 m and patch width is between 10 and 30 m (i.e. all necessary habitat characteristics are present; overbank flooding somewhat common; relatively high water table). This class is comprised generally of coyote willow dominated patches of sufficient height and width that are seasonally flooded or with a high water table.

Class 5 (Highly suitable) = Structurally diverse vegetation between 3 and 10 m in height with a patch width greater than 30 m (i.e. all necessary habitat characteristics are present; large patch size; high water table with backwater channels). This class has the same general characteristics as Class 4, but is more structurally diverse and contains openings with marsh and/or backwater habitat. Patches may also be larger in aerial extent than those in Class 4.

Habitat classifications also included a species designation denoting the dominant woody vegetation. A species was considered dominant if it composed more than 90 percent of the woody vegetation within a given habitat class (i.e. CW-3 denotes a coyote willow dominant Class 3). If no species constituted greater than 90 percent of the woody vegetation, a mixed (MX) designation was given (i.e. MX-3). Species documented include cottonwood (*Populus deltoides* – C), coyote willow (*Salix exigua* – CW), Russian olive (*Eleagnus angustifolia* – RO), and saltcedar (*Tamarix ramosissima* – SC).

When classifying habitats in the field, both sides of the active floodplain and any islands were assessed visually and accessed either via vehicle, kayak or on foot. Habitat polygons of Class 1 or above were delineated on 2014 aerial photography encompassing the entire study area. Large, complex habitat polygons were entered on foot in order to fully assess habitat characteristics. Any habitat within the active floodplain not assigned a Class 1 or above was considered a zero. Data recorded on aerial photos in the field were subsequently double-checked for accuracy and digitized into Geographic Information Systems (GIS) files overlain on the 2014 aerial photos. The size of all polygons in hectares (ha) was calculated and summed by reach and structure class. Zeros were mapped as linear distance (in kilometers) along each bank not occupied by a habitat polygon (Figure 2) and tallied by reach.
Results

In total, 215.8 kilometers (km) of the Lower Rio Grande was classified during 2016. Of this, 48.4 percent of the linear distance of the active floodplain was devoid of significant woody vegetation and classified as Class 0. The Caballo and Mesilla reaches (Figure 1) contained the highest percentages of Class 0, with 78 and 49 percent, respectively (Table 1). Of the non-zero habitat classes, classes 1 and 2 were most abundant throughout the study area (Table 2). Classes 3 and 4 were present in much lower abundance and no Class 5 habitat was located. In total, approximately 129 ha of suitable habitat was documented within the study area during 2016 and the majority was located within the Caballo and Hatch reaches. Detailed maps of the habitat classification are included as an Attachment to this report and the following is a summary of habitat documented within each study reach.

Note: The classifications of these habitats are intended for general planning purposes and are not intended to substitute for site-specific project-related assessments. The primary objectives of this study were to generally assess habitat quality and quantify the extent of suitable breeding habitat for the SWFL within this stretch of the Lower Rio Grande Basin.

Figure 2. Example of SWFL habitat classification system used in Lower Rio Grande 2016.
Table 1. Extent of Class 0 habitat within the active floodplain of Lower Rio Grande study reaches.

<table>
<thead>
<tr>
<th>Reach</th>
<th>Reach length (km)</th>
<th>Total linear length of Class 0 (km – both banks)</th>
<th>Percentage of Class 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caballo</td>
<td>42.6</td>
<td>66.2</td>
<td>77.7</td>
</tr>
<tr>
<td>Percha</td>
<td>24.0</td>
<td>20.5</td>
<td>42.6</td>
</tr>
<tr>
<td>Hatch</td>
<td>29.6</td>
<td>17.8</td>
<td>30.3</td>
</tr>
<tr>
<td>Rincon Valley</td>
<td>11.3</td>
<td>8.6</td>
<td>38.0</td>
</tr>
<tr>
<td>Radium Springs</td>
<td>8.4</td>
<td>4.7</td>
<td>28.0</td>
</tr>
<tr>
<td>Las Cruces</td>
<td>31.7</td>
<td>24.6</td>
<td>38.7</td>
</tr>
<tr>
<td>Mesilla</td>
<td>68.2</td>
<td>66.5</td>
<td>48.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>215.8</strong></td>
<td><strong>208.9</strong></td>
<td><strong>48.4</strong></td>
</tr>
</tbody>
</table>

Note: Percentage of Class 0 calculated by dividing the total length of 0’s by the doubled reach length, accounting for both banks.

Table 2. Hectares of non-zero habitat within the active floodplain of Lower Rio Grande study reaches.

<table>
<thead>
<tr>
<th>Reach</th>
<th>Class 1 (Unsuitable)</th>
<th>Class 2 (Unsuitable)</th>
<th>Class 3 (Moderately Suitable)</th>
<th>Class 4 (Suitable)</th>
<th>Class 5 (Highly Suitable)</th>
<th>Sum classes 3,4,5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caballo</td>
<td>12.0</td>
<td>201.4</td>
<td>9.2</td>
<td>53.7</td>
<td>0</td>
<td>62.9</td>
</tr>
<tr>
<td>Percha</td>
<td>25.2</td>
<td>22.9</td>
<td>4.2</td>
<td>0.7</td>
<td>0</td>
<td>4.9</td>
</tr>
<tr>
<td>Hatch</td>
<td>25.5</td>
<td>19.8</td>
<td>31.2</td>
<td>14.2</td>
<td>0</td>
<td>45.4</td>
</tr>
<tr>
<td>Rincon Valley</td>
<td>10.6</td>
<td>22.8</td>
<td>0.2</td>
<td>0</td>
<td>0</td>
<td>0.2</td>
</tr>
<tr>
<td>Radium Springs</td>
<td>5.7</td>
<td>22.9</td>
<td>7.7</td>
<td>6.0</td>
<td>0</td>
<td>13.7</td>
</tr>
<tr>
<td>Las Cruces</td>
<td>33.3</td>
<td>11.6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mesilla</td>
<td>52.5</td>
<td>21.9</td>
<td>0.9</td>
<td>1.3</td>
<td>0</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>164.8</strong></td>
<td><strong>323.3</strong></td>
<td><strong>53.4</strong></td>
<td><strong>75.9</strong></td>
<td><strong>0</strong></td>
<td><strong>129.3</strong></td>
</tr>
</tbody>
</table>

The Caballo Reach (43 km) is the second longest reach in the study area and contains the highest degree of habitat diversity. This reach consists of two sections: (1) upstream of Caballo Reservoir between Elephant Butte Dam and the Caballo Reservoir pool and (2) the conservation pool of Caballo Reservoir. Floodplain habitat within these two sections is markedly different. The floodplain within the Caballo Reach upstream of Caballo Reservoir is constricted by human development and consists primarily of bare riverbank or narrow stringers of woody vegetation. The floodplain is perched above a river heavily regulated by releases from Elephant Butte Dam, so the water table is relatively deep and overbank flooding nearly nonexistent. Thus, non-native saltcedar or lower stature coyote willow compose the majority of the woody vegetation and are typically found on lower river banks. Within the Caballo Reservoir pool, the active floodplain is less constrained and is up to three km wide. River flows are regulated by Elephant Butte Dam releases, but rising and falling reservoir levels in addition to occasional localized inflows from the adjacent uplands provide for a shallower water table and occasional flooded conditions. These conditions have promoted the growth of native willows in many areas and large patches of highly suitable SWFL breeding habitat have developed. However, nearly 78 percent of the linear length of this reach was classified as a Class 0. Most of this occurs in the upper end of the reach or along unvegetated banks of Caballo Reservoir. Conversely, the Caballo Reach also contains the largest amount of suitable SWFL habitat within the study area; 9.2 ha of Class 3 and 53.7 ha of Class 4 habitat were mapped in 2016.
The **Percha Reach** (24 km), lying immediately downstream of Caballo Dam, consists primarily of an elevated floodplain that is relatively disconnected from the river channel due to flow regulation and a lower groundwater table. A large percentage (42.6) of the linear distance of the floodplain within the reach was devoid of significant woody vegetation and classified as a zero. Due to the hydrological characteristics of the reach, the majority of the non-zero habitat occurs in the form of narrow bands of vegetation along the riverbank (Class 1) or larger, relatively dry patches of saltcedar farther from the river channel (Class 2). Suitable habitat occurs sporadically within this reach and is generally located near Percha Diversion Dam or the mouths of arroyos where flows are slowed and a higher water table exists.

The **Hatch Reach** (29.6 km) contains the second highest abundance of suitable SWFL habitat within the study area. Suitable habitat in this reach is found on islands and lower riverside terraces adjacent to either the main river channel or high flow channels. This habitat consists of either dense stands of large (8 to 10 cm diameter) coyote willow or a coyote willow/saltcedar mix. These areas are often either flooded due to a high water table and/or beaver activity, or are adjacent to or interspersed with marsh habitat. In total, 45.4 ha of Class 3 or better SWFL habitat was located in this reach, which represents 35 percent of the suitable habitat within the Lower Rio Grande study area.

The **Rincon Valley Reach** (11.3 km) is another reach dominated by an elevated floodplain that is disconnected from the active river channel. Woody riparian vegetation, when present, consists almost entirely of narrow bands along the riverbanks (Class 1) or larger patches of dry, decadent saltcedar (Class 2). However, 38 percent of the reach was classified as a zero. Only 0.2 ha of suitable habitat was mapped within this reach in 2016.

The **Radium Springs Reach** (8.4 km) is immediately upstream of Leasburg Diversion Dam and encompasses the Radium Springs and Selden Canyon SWFL survey sites. Floodplain habitat in this reach is less constrained by anthropomorphic activities and has a higher degree of connectivity to the river channel. Portions of this reach have been surveyed for SWFLs sporadically during the past 24 years and occupancy by resident SWFLs has been confirmed on a regular basis. These flycatchers have been located in patches of moderately suitable or suitable habitat consisting of a mix of coyote willow and saltcedar. Due to a higher water table and reduced human activity, this reach has the lowest percentage of Class 0 habitat within the study area. Class 3 and 4 habitat was mapped in nearly equal proportions within this reach for a total of 13.7 ha of suitable habitat. This habitat is typically located on lower terraces or river bars with a higher water table and also has a more prominent saltcedar component than that found in the Hatch Reach.

The **Las Cruces Reach** (31.7 km) is a relatively long reach that extends from Leasburg Diversion Dam to Mesilla Diversion Dam. Flycatcher habitat within this reach is very limited due to hydrological conditions (i.e. regulated flows, perched floodplain) and floodplain management activities. The active floodplain is restricted in many areas by levees. Periodic mowing of the riparian area has reduced woody vegetation growth along most of the length of this reach. Nearly 40 percent of the linear distance of the floodplain in this reach is devoid of
significant woody riparian vegetation and was classified as zero. No suitable SWFL habitat was mapped in this reach in 2016.

The Mesilla Reach (68.2 km) is immediately downstream of the Las Cruces Reach and is the longest, by far, of the six study reaches. It is very similar to the Las Cruces Reach in terms of river and floodplain management and flycatcher habitat characteristics. Almost half of the linear distance of the floodplain was devoid of significant woody riparian vegetation and was classified as Class 0. The majority of non-zero habitat documented in this reach consisted of narrow, linear bands of riparian vegetation along the river banks (Class 1). Several small patches of suitable flycatcher habitat classified as Class 3 or 4 were located during 2016. Flycatcher surveys have been conducted in these patches periodically during the past five years but no flycatchers have been documented.

Discussion

Flycatcher surveys have been conducted within portions of the Lower Rio Grande study area for the past 18 years. Aside from these surveys, little was known about the quality and quantity of flycatcher habitat present within much of the Lower Rio Grande. Field reconnaissance conducted by Reclamation personnel in 2011 documented areas that appeared to be suitable for breeding SWFLs; these patches were formally surveyed for flycatchers during 2012 and an initial habitat mapping study was conducted. Within the Lower Rio Grande downstream of Caballo Dam, a total of 81.6 ha of Class 3, 4, and 5 suitable habitat was mapped (Table 3). The bulk of this habitat was located in the Hatch and Radium Springs reaches with the Hatch Reach containing nearly all of the highest quality Class 5 habitat (Figure 3).


<table>
<thead>
<tr>
<th>Reach</th>
<th>2012 Suitable Habitat</th>
<th>2016 Suitable Habitat</th>
<th>Percentage Gain or Loss*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caballo</td>
<td>N/A</td>
<td>62.9</td>
<td>N/A</td>
</tr>
<tr>
<td>Percha</td>
<td>5.1</td>
<td>4.9</td>
<td>4%</td>
</tr>
<tr>
<td>Hatch</td>
<td>52.4</td>
<td>45.4</td>
<td>13%</td>
</tr>
<tr>
<td>Rincon Valley</td>
<td>0.2</td>
<td>0.2</td>
<td>0</td>
</tr>
<tr>
<td>Radium Springs</td>
<td>14.6</td>
<td>13.7</td>
<td>6%</td>
</tr>
<tr>
<td>Las Cruces</td>
<td>1.2</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Mesilla</td>
<td>8.1</td>
<td>2.2</td>
<td>73%</td>
</tr>
<tr>
<td>Total</td>
<td>81.6</td>
<td>129.3</td>
<td>19%</td>
</tr>
</tbody>
</table>

*Numbers in red indicate habitat loss.

During the two years following the 2012 mapping effort, a severe drought greatly reduced the duration of releases from Caballo Dam. During 2013, water only flowed in the Lower Rio Grande from June 1st to July 17th. Groundwater levels dropped out of the root zone for native vegetation within many portions of the Lower Rio Grande. Native willows began to suffer and many of them either exhibited signs of water stress or had died by the summer of 2014. Flows in the Rio Grande were more regular during the 2014 and 2015 growing seasons and many of the
willow patches showed signs of recovery. However, as shown in Table 3 and Figure 3, a reduction in suitable SWFL habitat was documented in nearly all of the study reaches during the 2016 mapping effort.

Mapping conducted in 2016 emphasized two important aspects concerning SWFL habitat development within the Lower Rio Grande. First, while the SWFL recovery goal for the Lower Rio Grande Management Unit of 25 territories has been met annually since 2012 and the population has grown for the past five years, suitable SWFL habitat within the Lower Rio Grande is in short supply. Within nearly 216 km of river corridor, 129.3 ha of suitable SWFL habitat was mapped in 2016, and nearly 50 percent of the riverbank length was classified as Class 0. Secondly, although restoration efforts have been initiated within the Lower Rio Grande, between 2012 and 2016 the abundance of suitable habitat has decreased (Table 3 and Figure 3).

Habitat within the Lower Rio Grande is limited by a highly regulated river and, recently, drought conditions. Additionally, floodplain management plays a large role in habitat suitability and abundance. The active floodplain of the Lower Rio Grande is often narrowed by levees and/or roads and is, for much of its length, kept devoid of woody vegetation by regular mowing. This stretch of river is also likely more susceptible to drought as a lack of winter releases from Caballo Dam, in combination with reduced tributary inputs and a lowered water table, could have negative consequence for the relatively small patches of native vegetation. Floodplain management via restoration is currently being conducted at various sites within this reach. Efforts to achieve efficient water delivery while promoting the establishment of native woody vegetation are being considered as part of a joint multi-agency restoration effort within the Lower Rio Grande.
Conclusions

The habitat classification conducted in 2016 documented suitable SWFL habitat within the Lower Rio Grande. Similar to the 2012 mapping effort, the quality of several of these habitat patches was confirmed by documenting use by territorial flycatchers during subsequent presence/absence surveys. Conversely, the quantity of suitable habitat is very low in comparison to that available upstream in the Middle Rio Grande above Elephant Butte Dam. As was observed in this mapping study and as compared to the 2012 data, habitat can be quickly lost if unfavorable hydrologic conditions persist for an extended period and additional habitat would buffer this impact. However, riparian restoration activities incorporating changes to river and floodplain management within the Lower Rio Grande would be needed in order to maintain and increase this population of breeding SWFLs. The ongoing drought affects this population’s ability to remain active. Continued monitoring of this population, including surveys and nest monitoring, will provide insight into its sustainability, limiting factors to growth, and the effectiveness of restoration activities. Additionally, this mapping effort should be periodically repeated in order to monitor changes in abundance and quality of SWFL breeding habitat, particularly in light of potential changes due to defoliation of saltcedar by Diorhabda (tamarisk beetle) species along the Rio Grande.
Literature Cited


Blackburn, D. 2010. Summary of Findings — 2010 Southwestern Willow Flycatcher and Yellow-billed Cuckoo Surveys. TRC under contract with USIBWC.


## Attachment – Habitat Classification Maps

### Contents

<table>
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<tr>
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<td>Percha Reach</td>
<td>25</td>
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<tr>
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<tr>
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<td>41</td>
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<tr>
<td>Radium Springs Reach</td>
<td>45</td>
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<tr>
<td>Las Cruces Reach</td>
<td>48</td>
</tr>
<tr>
<td>Mesilla Reach</td>
<td>58</td>
</tr>
</tbody>
</table>
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

Source: Esri, DigitalGlobe, GeoEye, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS user community. © OpenStreetMap contributors, and others.

MX-1

SC-1

View SWFL Habitat Classes and corresponding Scale.
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

Legend:
- Red: Class 0
- Pink: Class 1
- Light Yellow: Class 2
- Medium Yellow: Class 3
- Light Green: Class 4
- Blue: Class 5

0.0 0.1 0.2 0.4 Miles
0 0.1 0.2 0.4 0.6 Kilometers

SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

2016 SWFL Territory

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS user community.
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5


User Comments:
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SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5


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**SWFL Habitat Classes**

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

Scale:
- 0.1 Miles
- 0.1 Kilometers

North Arrow

SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

0 0.1 0.2 0.4 Miles

0 0.1 0.2 0.4 0.6 Kilometers

2016 SWFL Territory
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

2016 SWFL Territory

Source: Esri, iFood, NOAA NCEI, NPS, USDA, USGS, USFWS, National Geographic, GEBCO, GeoEye, Earthstar Geographics, CNES/AEROSPOT, IGN, IGN, swisstopo, © OpenStreetMap contributors, and the GIS user community.
SWFL Habitat Classes

Class 0
Class 1
Class 2
Class 3
Class 4
Class 5

2016 SWFL Territory

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS user community

© OpenStreetMap contributors
SWFL Habitat Classes

- Class 0
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- Class 5

SWFL Habitat Classes

Class 0
Class 1
Class 2
Class 3
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Class 5

0 0.1 0.2 0.4 Miles
0 0.1 0.2 0.4 0.6 Kilometers

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, the GIS User Community, © OpenStreetMap contributors.
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
SWFL Habitat Classes

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2016 SWFL Territory
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
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- Class 4
- Class 5

Source: Esri, USDA, USGS, User Community Contributors, and the GIS User Community.
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

Source: Esri, Data: USDA, USGS, Aerial Photography, User Community Contributors, and Esri
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5

SWFL Habitat Classes

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- Class 5

SWFL Habitat Classes

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- Class 4
- Class 5

Scale:
- 0.1 Miles
- 0.6 Kilometers

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geospatial, CNES/Airbus DS, IGP, swisstopo, and the GIS user community, © OpenStreetMap contributors.
SWFL Habitat Classes

- Class 0
- Class 1
- Class 2
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- Class 4
- Class 5

Source: Esri, USDA, USGS, User contributions
SWFL Habitat Classes

- Class 0
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- Class 4
- Class 5

Source: Esri, USDA, USGS, User Community Contributions
SWFL Habitat Classes

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Source: Esri, CNES/Airbus DS, swisstopo, and the GIS user community.

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