

RECLAMATION

Managing Water in the West

Southwestern Willow Flycatcher Habitat Suitability 2018 – Caballo Reach

**Elephant Butte Dam to Caballo Dam, Lower Rio Grande,
New Mexico**



Suitable SWFL habitat in the Lower Rio Grande



**U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center
Fisheries and Wildlife Resources Group
Denver, Colorado**

July 2019

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Southwestern Willow Flycatcher Habitat Suitability 2018 – Caballo Reach

**Elephant Butte Dam to Caballo Dam, Lower Rio
Grande, New Mexico**

Report No. ENV-2019-060

Prepared for:

**Bureau of Reclamation Albuquerque Area Office
Albuquerque, NM**

Prepared by:

**Bureau of Reclamation Technical Service Center
Fisheries and Wildlife Resources Group
Denver, CO**

**Rebecca Siegle, Natural Resource Specialist
Darrell Ahlers, Wildlife Biologist**

With funding from:

**Bureau of Reclamation Policy and Administration
Environmental Compliance Division
Lakewood, CO**



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Contents

Introduction/Background	1
Methods.....	2
Vegetation Mapping.....	2
Habitat Modeling	7
Results and Discussion	10
Recommendations.....	14
References.....	15

Appendices

Appendix A— Southwestern Willow Flycatcher Habitat Suitability and Major Plant Communities Maps and Associated Tables; Elephant Butte Dam to Caballo Dam 2018

Tables

	<i>Page</i>
Table 1. Plant species codes.	4
Table 2. Codes used for non-woody vegetation and land types.	4
Table 3. Descriptions of community types used in the Modified Hink and Ohmart classification.	5
Table 4. Vegetation types classified within suitable, moderately suitable, unsuitable, and non- habitat for Southwestern Willow Flycatchers.	11
Table 5. Summary of vegetation types in which SWFL territories were detected from 2015 to 2018.	13

Figures

	<i>Page</i>
Figure 1. Data form used for the Modified Hink and Ohmart vegetation classification and mapping.....	3
Figure 2. The number of acres of suitable and moderately suitable SWFL habitat mapped in 2014 and 2018 in the Caballo Reach, Lower Rio Grande, New Mexico..	12

Introduction/Background

In 2018, the Bureau of Reclamation (Reclamation) conducted field-based vegetation mapping in conjunction with a Geographic Information Systems (GIS)-based inventory in riparian areas along the Lower Rio Grande from Elephant Butte Dam to Caballo Dam in New Mexico (hereafter referred to as the Caballo Reach). This mapping project used 2016 aerial photography. Mapping methods employed a classification system created by the Middle Rio Grande Biological Survey (Hink and Ohmart 1984) with minor modifications. Hink and Ohmart conducted an exhaustive biological analysis of the Rio Grande that included a classification of vegetation community and structure in the riparian zone of the river (levee to levee). In addition, bird and mammal abundance were correlated with vegetation types, making this system useful for determining wildlife - habitat associations. Prior to vegetation mapping in 2018, a mapping project was conducted by Reclamation along the Caballo Reach in 2014 (Siegle and Ahlers 2015).

The objectives of these mapping efforts were to capture trends in the development of vegetation within the study area as well as to identify potentially suitable habitat for the endangered Southwestern willow flycatcher (*Empidonax traillii extimus*; SWFL), which were first detected in 2012 within this reach of the Rio Grande. Development of a SWFL habitat suitability model was initiated in the Middle Rio Grande (MRG) in 1998 (Ahlers and White 2000) and has been updated with five mapping projects conducted within the MRG reach through 2016. The intent of the model was to provide data that could be used for making land management decisions in areas that were either occupied or likely to be occupied by SWFLs. Data could also be used to determine the extent of improving or deteriorating habitat conditions within the study area.

Evaluation of habitat conditions is an ongoing process carried out through comparisons of past and present mapping efforts. Assessment of vegetation mapping data over time can aid in identifying factors that may cause trends in vegetation development, such as changes in density, structure, and species composition. As the SWFL habitat model has evolved over time, it has become apparent that an adaptive management approach to address changing habitat conditions in formulation of the model is essential. This model was developed for general planning purposes and was not intended to be used as a substitute for site specific assessment.

Methods

There were two stages of this mapping project: vegetation mapping and habitat modeling. The vegetation mapping phase began with on-the-ground verification, during which biologists were in the field collecting information pertaining to characteristics of the vegetation within the mapping area. Aerial photos were used to delineate different vegetation types as data were gathered. These data were then used to classify each vegetation community type. Data were converted to GIS and vegetation maps were created using the recently delineated aerial photos. In the modeling phase, SWFL detections from 2015 to 2018 were overlaid onto the vegetation maps to apply the SWFL habitat suitability model.

Vegetation Mapping

Fieldwork was conducted in May and June 2018 along approximately 26.5 river miles (RM) – from RM 26.5 (Elephant Butte Dam, NM) downstream to RM 0 (Caballo Dam, NM).

Aerial photographs were used as base maps for fieldwork. Aerial photography was acquired in 2016 by the U.S. Department of Agriculture, National Agriculture Imagery Program (NAIP New Mexico 1 meter [m] Natural Color). A field map was created using 2016 aerial photography overlaid with polygons from 2014 vegetation maps. Polygon boundaries were revised as needed based on photo interpretation of the recent imagery. Center points were marked for each polygon, which provided a waypoint to navigate towards on the ground while evaluating vegetation in the area.

Biologists used Garmin Oregon 650 GPS units onto which polygon maps were downloaded. These devices allowed mappers to navigate towards waypoints with the ability to know their location on the ground and proximity to the previously mapped polygons at all times. If ground-truthing proved that vegetation boundaries had changed since previous mapping, polygons were revised on the field map and the extent of similar vegetation was estimated. In general, polygons larger than 1 acre were mapped. The GPS unit was used to mark locations that best represented the polygon (typically near the center of the polygon). A photograph was taken at the waypoint to document the vegetation community and structure in each polygon.

Biologists completed data sheets for each polygon (Figure 1). The Modified Hink and Ohmart vegetation classification process included categorizing vegetation polygons into community types and structure classes using an alphanumeric descriptive code. Each woody riparian plant species was assigned a letter code (i.e. the species code, see Table 1, which also includes scientific names for all species detected). Codes were also assigned for certain non-woody vegetation types and non-vegetated land types which were considered non-habitat (Table 2).

H&O Classification Form						
Date				Time		
Recorder						
Polygon ID				Photo Number		
UTM NAD 83 Coordinates	x					
	y					
Riparian Woody Vegetation						
Species Codes ATX = Fourwing Saltbush AW= Arrowweed B = Baccharis ssp. C = Cottonwood CAT = Cattail CR = Creosote CW = Coyote Willow HB=Hackberry HMS = Honey Mesquite NMO = New Mexico Olive RB=Rabbit brush RO = Russian Olive SBM = Screwbean Mesquite SC = Salt cedar TW=Tree willow VA=Velvet ash	>40 ft	Total % Cover	1-24%	25-49%	50-74%	75-100%
		Total % Dead	1-24%	25-49%	50-74%	75-100%
	Species (Relative foliage cover) - Circle one for each species present List with most dominant 1st then decreasing dominance					
	>40 Species #1		1-24%	25-49%	50-74%	75-100%
	>40 Species #2		1-24%	25-49%	50-74%	75-100%
	>40 Species #3		1-24%	25-49%	50-74%	75-100%
	15-40 ft	Total % Cover	1-24%	25-49%	50-74%	75-100%
		Total % Dead	1-24%	25-49%	50-74%	75-100%
	Species (Relative foliage cover) - Circle one for each species present					
	15-40 Species #1		1-24%	25-49%	50-74%	75-100%
	15-40 Species #2		1-24%	25-49%	50-74%	75-100%
	15-40 Species #3		1-24%	25-49%	50-74%	75-100%
	15-40 Species #4		1-24%	25-49%	50-74%	75-100%
	5-15 ft (*if SC, see below)	Total % Cover	1-24%	25-49%	50-74%	75-100%
		Total % Dead	1-24%	25-49%	50-74%	75-100%
	Species (Relative foliage cover) - Circle one for each species present					
	5-15 Species #1		1-24%	25-49%	50-74%	75-100%
	5-15 Species #2		1-24%	25-49%	50-74%	75-100%
	5-15 Species #3		1-24%	25-49%	50-74%	75-100%
	5-15 Species #4		1-24%	25-49%	50-74%	75-100%
	<5 ft	Total % Cover	1-24%	25-49%	50-74%	75-100%
		Total % Dead	1-24%	25-49%	50-74%	75-100%
	Species (Relative foliage cover) - Circle one for each species present					
	<5 Species #1		1-24%	25-49%	50-74%	75-100%
	<5 Species #2		1-24%	25-49%	50-74%	75-100%
<5 Species #3		1-24%	25-49%	50-74%	75-100%	
<5 Species #4		1-24%	25-49%	50-74%	75-100%	
Circle types of cover for polygons with vegetation < 25 % total woody species						
Wetlands/ Herbaceous Vegetation/ Woody Vegetation < 25% cover						
Cattail marsh	Wet Meadow (e.g. sedges, rushes)		Grass Meadow (grasses ~ 75 % cover or more)			
Open Water	Open Area (woody vegetation < 25%)					
Notes						

*Saltcedar in 5-15' understory layer: 5-12' or 12-15'

Figure 1. Data form used for the Modified Hink and Ohmart vegetation classification and mapping.

Table 1. Plant species codes.

Species code	Common name	Scientific name
ATX	Fourwing saltbush	<i>Atriplex canescens</i>
AW	Arrow weed	<i>Pluchea sericea</i>
B	<i>Baccharis</i> spp.	<i>B. salicifolia</i> , <i>B. salicina</i>
BB	Singlewhorl burrobrush	<i>Ambrosia monogyra</i>
BD	Broom dalea	<i>Psoralea scoparius</i>
C	Cottonwood	<i>Populus</i> spp
CAT	Cattail	<i>Typha</i> spp
CR	Creosote	<i>Larrea tridentata</i>
CW	Coyote willow	<i>Salix exigua</i>
HB	Hackberry	<i>Celtis occidentalis</i>
HMS	Honey mesquite	<i>Prosopis glandulosa</i>
RB	Rabbitbrush	<i>Chrysothamnus</i> spp
RO	Russian olive	<i>Elaeagnus angustifolia</i>
SBM	Screwbean mesquite	<i>Prosopis pubescens</i>
SC	Saltcedar	<i>Tamarix</i> spp
TW	Tree willow/Goodding's willow*	<i>Salix gooddingii</i>
VA	Velvet ash	<i>Fraxinus velutina</i>







**Salix gooddingii* is referred to as tree willow (TW) in Hink and Ohmart classification but is more widely known as Goodding's willow, which is how it is referenced throughout this report unless related to a Hink and Ohmart vegetation type.

Table 2. Codes used for non-woody vegetation and land types.

Code	Non-woody vegetation or land type
MS	Dry meadow (saltgrass)
MH	Wet meadow/marsh with cattail, sedge, rush or other wetland species
OP	Open area (woody vegetation <25% aerial coverage)
OW	Open water
Channel	Rio Grande
Road	Road

The Modified Hink and Ohmart code consisted of species codes for the canopy layer, species codes for the understory layer, and a community type number signifying the height and density of each layer. Community type classifications are described in Table 3. Overall, Types 1 and 2 were mature forest, Types 3 and 4 were intermediate-aged forest or woodland, and Types 5 and 6 were shrub habitats (Hink and Ohmart 1984). Types 1 and 3 had a substantial understory while Types 2 and 4 had sparse understory.

Table 3. Descriptions of community types used in the Modified Hink and Ohmart classification.

Type 1 Tall/mature trees with well-developed understory	Tall or mature-aged trees (>40 ft) with canopy covering $\geq 25\%$ of the area of the community (polygon) <u>and</u> understory layer (0-15 ft) covering $\geq 25\%$ of the area of the community (polygon). <i>Type 1d</i> – Type 1 with $\geq 50\%$ total cover of one of the layers (canopy or understory)	
Type 2 Tall/mature trees with little or no understory	Tall or mature-aged trees (>40 ft) with canopy covering $\geq 25\%$ of the area of the community (polygon) <u>and</u> understory layer (0-15 ft) covering $< 25\%$ of the area of the community (polygon). <i>Type 2d</i> – Type 2 with $\geq 50\%$ total cover of the canopy layer	
Type 3 Intermediate-sized trees with well-developed understory	Intermediate-sized trees (15-40 ft) with canopy covering $\geq 25\%$ of the area of the community (polygon) <u>and</u> understory layer (0-15 ft) covering $\geq 25\%$ of the area of the community (polygon). <i>Type 3d</i> – Type 3 with $\geq 50\%$ total cover of one of the layers (canopy or understory)	
Type 4 Intermediate-sized trees with little or no understory	Intermediate-sized trees (15-40 ft) with canopy covering $\geq 25\%$ of the area of the community (polygon) <u>and</u> understory layer (0-15 ft) covering $< 25\%$ of the area of the community (polygon). <i>Type 4d</i> – Type 4 with $\geq 50\%$ total cover of the canopy layer	
Type 5 Shrub-sized stands	Understory layer (5-15 ft) covering $\geq 25\%$ of the area of the community (polygon) with no overstory layer. <i>Type 5d</i> – Type 5 with $\geq 50\%$ total cover of the understory layer	
Type 6 Very young and low growth	Understory layer (0-5 ft) covering $\geq 25\%$ of the area of the community (polygon) with no overstory layer.	

In the field, the mapping process began by estimating total percent canopy cover within 4 layers of woody vegetation which included 2 overstory layers (i.e. >40 ft and 15-40 ft; >12 meters (m) and 4.6-12 m) and 2 understory layers (i.e. 5-15 ft, and 0-5 ft; 1.5-4.6 m and 0-1.5 m). Plant species were recorded based on relative percentage of cover within each layer, with the most dominant species listed first. Species within the same layer were separated by a hyphen (-). Canopy and understory layers were separated by a backslash (/). Typically, one or two species were recorded for each layer, but as many as four species could qualify. Each height category in both layers (i.e. canopy and understory) had to comprise at least 25 percent total cover to qualify as a component in classification types and only one of the height categories in each layer was used for classification purposes (whichever was dominant). Each species had to cover at least 25 relative percent of the vegetation to be included in the Modified Hink and Ohmart classification code. Plant cover, along with tree and shrub height, was determined by visual estimates.

The Modified Hink and Ohmart code was written in the following format:

When a canopy and understory layer of $\geq 25\%$ total cover were present:

Canopy Layer / Understory Layer + Type (1 or 3)

Example: C-TW/SC3

When a canopy layer was present but no understory:

Canopy Layer + Type (2 or 4)

Example: C-TW4

When a canopy layer was not present:

Shrub or Young Growth Layer + Type (5 or 6)

Example: SC-HMS5

As aforementioned, the Hink and Ohmart methodology was modified to meet the needs of this particular mapping effort. The following were either exceptions or revisions to the original Hink and Ohmart study.

- a) Typically, polygons were greater than 1 acre (ac) in size.
- b) For all “non-woody” vegetation classes, no community type number was attached to the code. “MH” was defined to mean “marsh” or an area that was inundated with water for most of the survey season.
- c) Only live canopy trees were included in the classification - the Modified Hink and Ohmart classification pertained solely to green, growing woody vegetation. The percentage of dead trees in the stand was documented.
- d) If a polygon had two understory components that were greater than 25 percent in cover, the community type fell under the height/age class of the layer with the highest cover. For example, if an understory layer that was 5-15 ft in height had a canopy cover of 25-50 percent and an understory layer that was less than 5 ft in height had a canopy cover of 51-75 percent, then the polygon was classified as a ‘Type 6’. This protocol only applied to the understory layers since only one overstory layer was documented within the project area (i.e. 15-40 ft). If both

height categories in each of the canopy or understory layers were < 25% total cover, then that layer was not classified.

- e) A “d” qualifier was added to the Modified Hink and Ohmart code following type number if total vegetative cover was equal to or greater than 50 percent. The “d” signified “dense” and was meant to be an indicator for potential SWFL habitat.
- f) A “t” qualifier was added to the SC5d Modified Hink and Ohmart code if saltcedar height was between 12 and 15 ft (3.7-4.6 m). The “t” signified “tall” and was meant to be an indicator for potential SWFL habitat in monotypic saltcedar stands.

Field maps were digitized with ArcMap software. Using the digital aerial photos as a backdrop, the 2014 polygon boundaries were revised if necessary based on the current field maps. This part of the process involved photo-interpretation. In many places, the polygon boundary was clearly delineated on the aerial photo by an obvious change in vegetation that was not distinguished by biologists in the field. In areas where the boundary was not distinct, the location of the line was estimated based either on mapping notes and drawings or photo interpretation.

Vegetation maps were produced incorporating the updated information with each polygon assigned a classification code and a major plant community type code.

Habitat Modeling

The criteria for the current habitat suitability model was developed by evaluating the distribution and habitat use of more than 1000 SWFL territories detected in surveys in the MRG from 2006 through 2009. Biological expertise was also a variable in determining optimal breeding habitat. Although SWFL surveys began in 1995 and continued through 2018, only territories that were detected from 2006 through 2009 were used in creating the current habitat suitability model. The region suffered severe to extreme drought conditions from approximately 2011 into 2015 (NMSU 2017), a factor that appeared to affect vegetation, in particular an increase in saltcedar. A change in vegetation as well as the species’ strong site fidelity resulted in SWFLs often nesting in less than ideal habitat since 2009. Therefore, territories and associated habitat from more recent years were not used as a measure of suitability for the model, although there have been minor alterations to adjust for changing habitat over time.

When initially creating the model, some vegetation types that were occupied by SWFLs were not considered to be suitable habitat. Factors other than the location of territories were sometimes used to identify habitat suitability of vegetation types. It is important to recognize that the ultimate measure of habitat suitability is not simply whether or not a site is occupied (Sogge et al. 2010). Habitat suitability occurs along a gradient from high to poor to unsuitable; the optimum habitats are those in which flycatcher reproductive success and survivorship result in a growing population. Therefore nest success was an important factor in determining suitability of habitat. For example, a site in which habitat deteriorated over time may have continued to attract

SWFLs due to site fidelity, but the ability to successfully fledge young decreased based on site conditions. Conversely, some types in which no SWFL detections occurred were not necessarily considered unsuitable. It is also important to note that not all unoccupied habitat is unsuitable; some sites with suitable habitat may be geographically isolated or newly established, such that they are not yet colonized by breeding flycatchers (Sogge et al. 2010). In general, however, the areas determined to provide the most suitable habitat were logically those that were the most heavily occupied by SWFLs. Four habitat suitability classes were identified and categorized as suitable, moderately suitable, unsuitable, and non-habitat. Factors used in making these determinations are explained below.

Suitable—Suitable habitat included vegetation in which a high percentage of SWFL territories were detected from 2006 to 2009. Areas with a significant structural component - community types 3 and 4 – were considered suitable, especially if a high percentage of territories occurred within the vegetation type. Other qualifying vegetation types were those that included a combination of important plant species, especially Goodding’s willow, coyote willow, Russian olive, and saltcedar and also vegetation classes with a “d” qualifier, which indicated > 50 percent aerial vegetation cover.

Moderately Suitable—Moderately suitable habitat included vegetation in which a fairly high percentage of territories occurred from 2006 to 2009. Areas that provided a good structural component (primarily community types 3, 4, and 5 and occasionally community type 1) could also be considered moderately suitable. Vegetation types that fell within a community type 5 were only considered moderately suitable if vegetative cover was greater than 50 percent (i.e. with the “d” qualifier) or if there was a Goodding’s willow component. This category required an adequate combination of vegetation species with at least 50 percent of the species composition made up of the more desirable plant species (those listed under “Suitable” habitat).

Unsuitable—Unsuitable habitat included vegetation in community types 2, 6 and frequently in community type 1. Vegetation in community type 5 was considered unsuitable unless it had dense cover (greater than 50 percent) and/or had a Goodding’s willow component. Unsuitable habitats were those in which vegetation was either too sparse or too mature or the majority of the polygon consisted of the lower priority plant species. If plants typically found in uplands, such as saltbush, mesquite, creosote, New Mexico olive, or wolfberry, were a component of the classification, then the vegetation type was determined to be unsuitable.

Non-Habitat—Non-habitat for SWFLs included six classifications that were either open areas with no woody overstory (e.g. open water or marsh) or human developments (e.g. roads and railroads).

GIS maps were also used to calculate the number of acres by vegetation type and SWFL suitability class within each river reach and survey site. Within the suitability classes, the number of acres of habitat within 50 m of surface water was also calculated. SWFLs are most likely to nest above or near water, which is likely due to slightly greater vegetation density, higher relative humidity, cooler overall temperatures, and perhaps greater insect abundance within this zone (Smith and Johnson 2007, Peterson 2013, Moore and Ahlers 2018). Consequently, the potential for overbank flooding is an important characteristic in SWFL habitat. Therefore, acreages within 50 m of water provided estimates of the highest quality habitat in the suitable and moderately suitable classes available within the study area.

Results and Discussion

Results of the 2018 mapping effort are provided in Appendix A. This information is organized by river mile and is separated into 3 sections (i.e. Upper, Middle, and Lower Reach) for presentation and analysis purposes. The Upper Section extended from RM 27 to 12 and mostly included a channelized portion of the river bordered by thin strips of riparian vegetation. The Middle Section extended from RM 12 to 6 and included the upper portion of the Caballo Reservoir delta. The Lower Section extended from RM 6 to 0 (Caballo Dam) and included the lower portion of the delta and vegetation surrounding the reservoir. Data include the number of acres of each habitat suitability type; the number of acres of each dominant vegetation type; the number of SWFL territories from 2015 through 2018; and vegetation and SWFL habitat suitability maps.

The project area encompassed 11,464 acres; a total of approximately 2,811 acres included the channel and reservoir. All Hink and Ohmart vegetation communities and suitability types mapped within the Caballo Reach are shown in Table 4. Most of the vegetation was classified as community types 5 or 6 (less than 15 feet in height). The most common plant species recorded were saltcedar and mesquite.

There were 8 vegetation classifications considered to be suitable SWFL habitat (Table 4) that covered approximately 356 ac of the project area (an increase from 100 ac in 2014). Moderately suitable SWFL habitat covered 375 ac (an increase from 136 ac in 2014) and included 11 vegetation classifications. The area was predominately comprised of unsuitable SWFL habitat due to the combination of unsuitable plant species and an average height that was too short to provide adequate nesting habitat. Reclamation management practices include routine mowing of riparian vegetation within the Caballo Reach, which results in a majority of the vegetation less than 15 ft in height (approximately 5,044 acres or 66 percent of the survey area). There were 113 vegetation types considered to be unsuitable SWFL habitat that covered approximately 5,513 ac (a decrease from 6,319 ac in 2014). Finally, non-habitat was documented in 2,410 acres (excluding 2,811 acres of channel and reservoir). Areas around the reservoir that fluctuated between open ground and open water depending on water levels were classified as Open water/Open (OW/OP) to represent changing conditions. This classification was considered non-habitat.

Assessment of data associated with vegetation mapping and SWFL nesting habitat in the MRG resulted in changes to the model in 2016. A steady increase in saltcedar within SWFL territories over the years was identified; due to this apparent shift in habitat use and to nest success rates that appeared to be sufficient to sustain populations, saltcedar dominated habitat types SC/SC3d and SC4d were reclassified from unsuitable to moderately suitable SWFL breeding habitat (Siegle and Ahlers 2017). SWFLs will occupy dense stands of saltcedar from 4-10 m (13-33 ft) in height (Sogge et al 2010), which is the range into which these vegetation types fall. The SC5d vegetation type is identified as 5-15 ft (1.5-4.6 m) in height, although only patches of SC5d which are roughly 12-15 ft (3.7-4.6 m) in height actually provide suitable breeding habitat. The average height of saltcedar within SC5d polygons was documented in the field as of 2018

Table 4. Vegetation types classified within suitable, moderately suitable, unsuitable, and non- habitat for Southwestern Willow Flycatchers.

	GENERAL DESCRIPTION OF VEGETATION	MODIFIED HINK AND OMART CODES
SUITABLE 8 classifications 356 acres	Tree willow dominant	TW/SC3d, TW/SC-TW3, TW/TW-SC3d, TW4, TW4d, TW-C/SC3d
	Cottonwood dominant	C-TW/SC3d
	Coyote willow dominant	CW/CW3d
MODERATELY SUITABLE 11 classifications 375 acres	Tree willow dominant	TW5, TW-SC5, TW-SC5d
	Coyote willow dominant	CW5d, CW-SC-B5d,
	Cottonwood dominant	C-TW-SC/SC3d, C-TW-SC/TW-SC3d
	Saltcedar dominant	SC/SC3d, SC4d, SC5dt
	Cattail dominant	CAT-CW5d
UNSUITABLE 113 classifications 5,513 acres	Arrow weed dominant	AW6d, AW-HMS6d
	Saltbush dominant	ATX6, ATX-HMS6
	Seep willow dominant	B5d, B6, B6d, B-SBM5
	Bricklebush dominant	BB5, BB6
	Broom dalea dominant	BD-SC6d
	Cottonwood dominant	C/B1, C/ SBM1, C/ SBM3, C/ SBM3d, C/SC1, C/SC3d, C/SC-B1d, C/SC-HMS3d, C/SC-SBM3d, C/SC-TW1, C/TW-SC-SBM1, C2, C4d, C-SBM/SC-SBM-B3d, C-SC/SBM-SC3, C-SC/SC3d, C-SC4, C-SC5d, C-TW/HMS3d, C-TW2, C-TW4
	Creosote dominant	CR-HMS6d
	Honey mesquite dominant	HMS5, HMS5d, HMS6, HMS6d, HMS-AW6, HMS-B5, HMS-B5d, HMS-CR5d, HMS-CR6d, HMS-CR-ATX6, HMS-CW5d, HMS-RB6, HMS-SBM5, HMS-SC5, HMS-SC5d, HMS-SC6, HMS-SC6d, HMS-SC-B6d, HMS-SC-CR5d, HMS-WB6, HMS-WB-AW6d
	Screwbean mesquite dominant	SBM/HMS3, SBM/ SBM-SC3d, SBM/SBM-SC-HMS3, SBM5, SBM5d, SBM6, SBM-B5, SBM-B5d, SBM-HMS5, SBM-SC5, SBM-SC5d, SBM-SC6d, SBM-SC-B5
	Saltcedar dominant	SC/HMS3, SC/NMO3, SC/SBM-SC3d, SC/SC3, SC/SC-B3, SC/SC-B3d, SC/SC-SBM3, SC/SC-SBM3d, SC4, SC5, SC5d, SC6, SC6d, SC-AW6d, SC-B5, SC-B5d, SC-B6, SC-B6d, SC-BB5d, SC-B-HMS6d, SC-HMS/HMS-AW3, SC-HMS5, SC-HMS5d, SC-HMS6, SC-HMS6d, SC-HMS-B6, SC-HMS-SBM5, SC-HMS-SBM-TW5d, SC-RO-CW/CW-NMO3d, SC-SBM4, SC-SBM5, SC-SBM5d, SC-SBM6, SC-SBM6d, SC-VA/SC-HMS-B3
	Tree willow dominant	TW/SBM-SC5d, TW2d, TW-C/SC1, TW-SBM/SBM-SC3, TW-SC/HMS-SC3d, TW-SC-SBM/SBM-TW3d
	Velvet ash dominant	VA/VA-CW3d, VA-HB/CW-HMS3d, VA-SC/NMO-SC3d, VA-TW/CW-NMO3, VA-TW/HMS-CW3
NON-HABITAT 5 classifications	<25% woody plant cover or not vegetated	OP, OW, MS, MH, RD

*See Table 1 for species codes and Table 3 for community types.

(i.e. this mapping project) in an attempt to better identify suitable SWFL habitat. The SC5d types that were greater than 12 ft (3.7 m) in height were given a modified Hink and Ohmart classification of SC5dt and were reclassified from unsuitable to moderately suitable. The SC5d type in which saltcedar was less than approximately 12 ft (3.7 m) in height remained unsuitable SWFL habitat.

The inclusion of SC/SC3d, SC4d, and SC5dt vegetation types as moderately suitable habitat types affected comparisons of habitat to the 2014 Caballo Reach vegetation maps in which all monotypic saltcedar vegetation types were classified as “unsuitable.” For example, the increase in moderately suitable SWFL habitat from 136 ac in 2014 to 375 ac in 2018 (Figure 2) can mostly be attributed to recategorizing saltcedar types (see acreage above yellow line in 2018 in Figure 2) and was not necessarily related to actual changes in vegetation on the ground. That said, acres of monotypic saltcedar within all vegetation types (not just those reclassified to moderately suitable habitat) increased from 1,590 acres in 2014 to 1,799 acres in 2018, indicating that cover of saltcedar stands did increase within the 4 year time period. There was also a considerable increase in “suitable” habitat (from 100 to 356 ac) in comparison to the last mapping period, however, which appeared to be related to growth of Goodding’s willow that matured from an understory layer into an overstory layer, providing optimal nesting habitat for the SWFL.

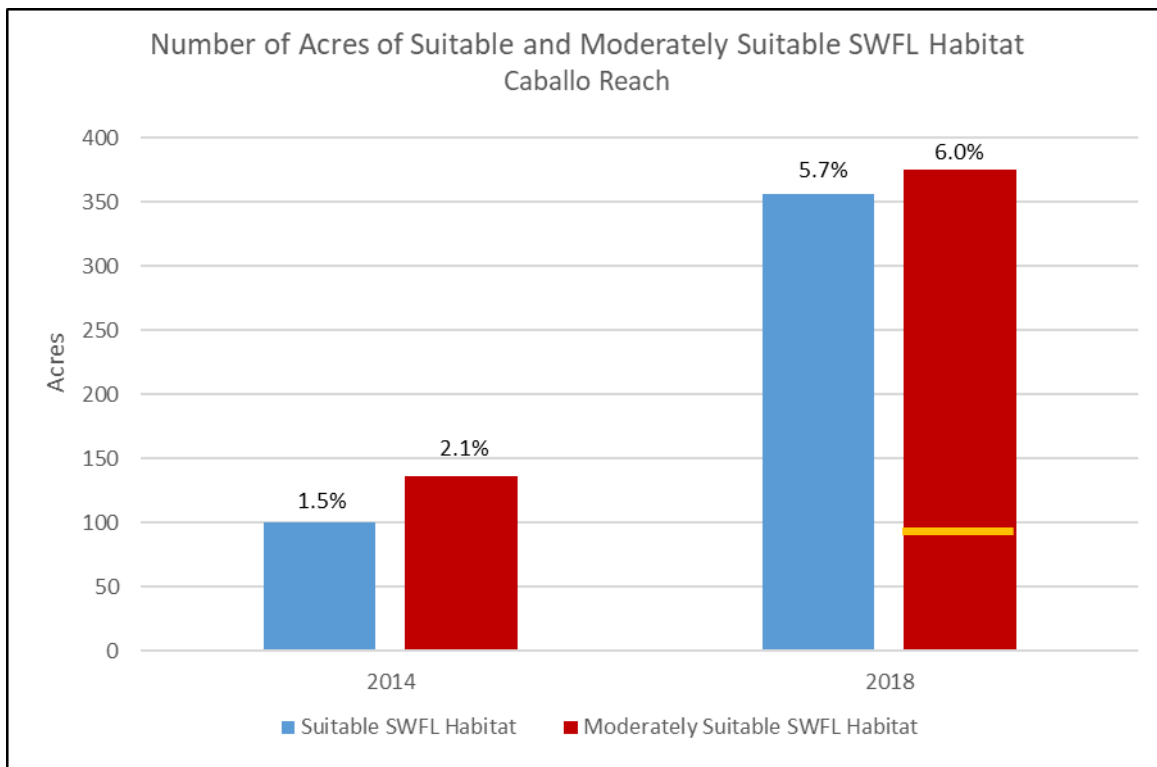


Figure 2. The number of acres of suitable and moderately suitable SWFL habitat mapped in 2014 and 2018 in the Caballo Reach, Lower Rio Grande, New Mexico. The percentage above each column is the percent of total woody riparian vegetation that provides suitable or moderately suitable habitat. Acreage above the yellow line in 2018 is the number of acres of SC/SC3d, SC4d, and SC5dt, vegetation types reclassified in 2018 from unsuitable to moderately suitable habitat.

From 2015 to 2018, 38 SWFL territories were documented in the Caballo Reach of the Lower Rio Grande. Based on the habitat model, 26 of those territories were found in suitable habitat while the other 12 territories were detected in moderately suitable habitat (Table 5).

Table 5. Summary of vegetation types in which SWFL territories were detected from 2015 to 2018.

H&O Classification 2018	# WIFL Territories	% of Territories	Habitat Suitability
TW/SC3d	22	57.9	Suitable
TW/TW-SC3d	4	10.5	Suitable
CAT-CW5d	12	31.6	Moderately Suitable
Total	38	100.0	

Along the Middle Rio Grande, Goodding's willow is typically the most important plant species for providing SWFL habitat. Results from previous mapping and modelling in the upstream sections of the river demonstrated this, with 78, 69, and 64 percent of all territories located in communities with a Goodding's willow component from 2006 to 2009, 2010 to 2012, and 2013 to 2016, respectively (Siegle and Ahlers 2017). Within the Caballo Reach, 68.4 percent of territories (26 of 38) were within communities where Goodding's willow not only occurred but was the dominant species. The other 31.6 percent of territories were found in coyote willow stands within a cattail marsh in an area that was fenced and therefore not subject to grazing and/or mowing.

Within the survey area, Goodding's willow was a component of species composition in approximately 531 acres (a decrease from 730 ac in 2014). All but one acre of habitat classified as suitable for SWFLs included a Goodding's willow component (355 out of 356 ac), while 73 ac of moderately suitable habitat included Goodding's willow. Of the 102 ac of unsuitable habitat that included Goodding's willow in the species composition, 52 ac also included mesquite as part of the vegetation type, which is generally an undesirable species for SWFL nesting habitat.

Based on the presence of Goodding's willow within 531 acres of the project area and in areas upstream of Elephant Butte, there appears to be an adequate seed source for the species which indicates potential for Goodding's willow to increase in cover if hydrology and land management practices are favorable.

Recommendations

In general, due to the SWFLs ability to occupy young age classes (3 to 5 years old) of developing riparian vegetation and the relatively short-lived nature of high quality habitat, the habitat suitability model output has a limited application of 3 to 5 years.

Periodic photography and mapping of SWFL habitat should be conducted at a 5 year minimum, based on the availability of funding. Vegetation mapping along the Middle Rio Grande riparian corridor has shown that some areas have experienced significant changes in structure, density, and species composition while other areas have been far more static, experiencing little or no change. Riparian areas subject to dynamic changes in the Lower Rio Grande, such as those found within the delta of Caballo Reservoir, should be considered as priority areas for future photography, mapping, and modeling efforts. Climatic conditions, such as drought and flooding, as well as effects from the saltcedar biological control beetle *Diorhabda* that has recently populated portions of the Rio Grande basin, can also lead to relatively rapid changes in vegetation.

Land management practices conducted on the Lower Rio Grande, such as mowing and grazing, affect the type of vegetation found there. For example, saltcedar is an invasive species that benefits from disturbance due to reproductive traits such as abundant seed production and resprouting. Once established, saltcedar can out-compete stressed native plants and cover large areas of formerly native habitat, resulting in a less productive and less diverse environment (Inyo County Water Department 2018, Zouhar 2003). These land management practices result in riparian vegetation that lacks diversity with regards to species composition, age-class, and height.

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Appendix A

Southwestern Willow Flycatcher
Habitat Suitability and Major Plant Communities Maps and Associated Tables
Elephant Butte Dam to Caballo Dam, Lower Rio Grande
2018

Contents

Upper Section (River Miles 27 to 12).....	1
River Mile 26 - 27.....	3
River Mile 25 - 26.....	5
River Mile 24 - 25.....	7
River Mile 23 - 24.....	9
River Mile 22 - 23.....	11
River Mile 21 - 22.....	13
River Mile 20 - 21.....	15
River Mile 19 - 20.....	17
River Mile 18 - 19.....	19
River Mile 17 - 18.....	21
River Mile 16 - 17.....	23
River Mile 15 - 16.....	25
River Mile 14 - 15.....	27
River Mile 13 – 14 North.....	29
River Mile 13 – 14 South.....	31
River Mile 12 – 13 North.....	33
River Mile 12 – 13 South.....	35
Middle Section (River Miles 12 to 6)	37
River Mile 11 – 12 North.....	39
River Mile 11 – 12 South.....	41
River Mile 10 - 11.....	43
River Mile 9 - 10.....	45
River Mile 8 – 9 North.....	47
River Mile 8 – 9 South.....	49
River Mile 7 – 8 North.....	51
River Mile 7 – 8 South.....	53
River Mile 6 – 7 North.....	55
River Mile 6 – 7 South.....	57
Lower Section (River Miles 6 to 0)	59
River Mile 5 – 6 North.....	61
River Mile 5 – 6 South.....	63
River Mile 4 - 5.....	65
River Mile 3 - 4.....	67
River Mile 2 - 3.....	69
River Mile 1 – 2 North.....	71
River Mile 1 – 2 South.....	73
River Mile 0 - 1 North	75
River Mile 0 – 1 South.....	77

Upper Section

River Miles 27 to 12

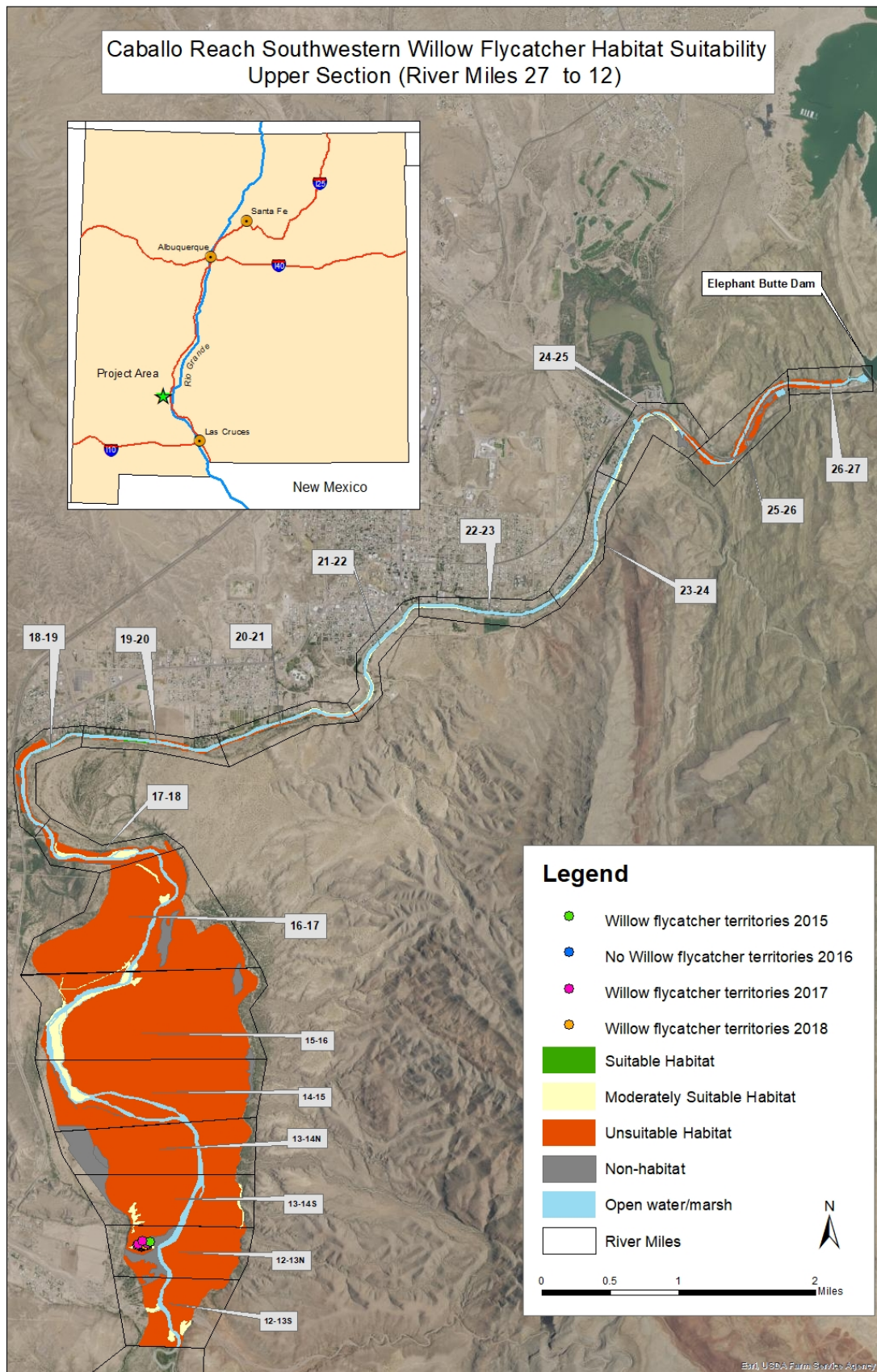
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	1	0	1	0
Moderately Suitable	93	4	69	3
Unsuitable	2195	82	290	16
Total Habitat Area	2289	86	359	16
Non-habitat	128	5	-	-
Channel/Reservoir	249	9	-	-
Total Area	2666	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C/B1, C/SBM1, C/SBM3, C/SBM3d, CW/CW3d, SBM/HMS3, VA/VA-CW3d, VA-HB/CW-HMS3d, VA-TW/CW-NMO3, VA-TW/HMS-CW3	285	12
Native Canopy/Mixed Understory	C/SC-SBM3d, C/SC-TW1, SBM/SBM-SC3d, TW-SBM/SBM-SC3	100	4
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	SC-HMS/HMS-AW3, SC-RO-CW/CW-NMO3d	5	0
Mixed Canopy/Mixed Understory	VA-SC/NMO-SC3d, SC-VA/SC-HMS-B3	8	0
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	SC/NMO3	2	0
Exotic Canopy/Mixed Understory	SC/SBM-SC3d, SC/SC-SBM3, SC/SC-SBM3d	19	1
Exotic Canopy/Exotic Understory	SC/SC3, SC/SC3d	22	1
Native Canopy	C-TW2	9	0
Mixed Canopy	SC-SBM4	30	1
Exotic Canopy	SC4d	60	3
Native Understory	AW6d, AW-HMS6d, BB5, CAT-CW5d, CW5d, HMS5, HMS5d, HMS6, HMS-AW6, HMS-B5, HMS-B5d, HMS-CW5d, HMS-SBM5, HMS-WB6, HMS-WB-AW6d, SBM5, SBM5d, SBM-B5, SBM-HMS5	915	40
Mixed Understory	BD-SC6d, CW-SC-B5d, HMS-SC5d, HMS-SC6, HMS-SC-CR5d, SBM-SC5, SBM-SC5d, SC-B5, SC-B5d, SC-B6, SC-HMS5, SC-HMS6, SC-HMS6d, SC-HMS-SBM5, SC-SBM5, SC-SBM5d, SC-SBM6d	566	25
Exotic Understory	SC5, SC5d, SC5t, SC6	278	12

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	3	0	3
2016	0	0	0
2017	1	4	5
2018	0	4	4



River Mile 26 - 27

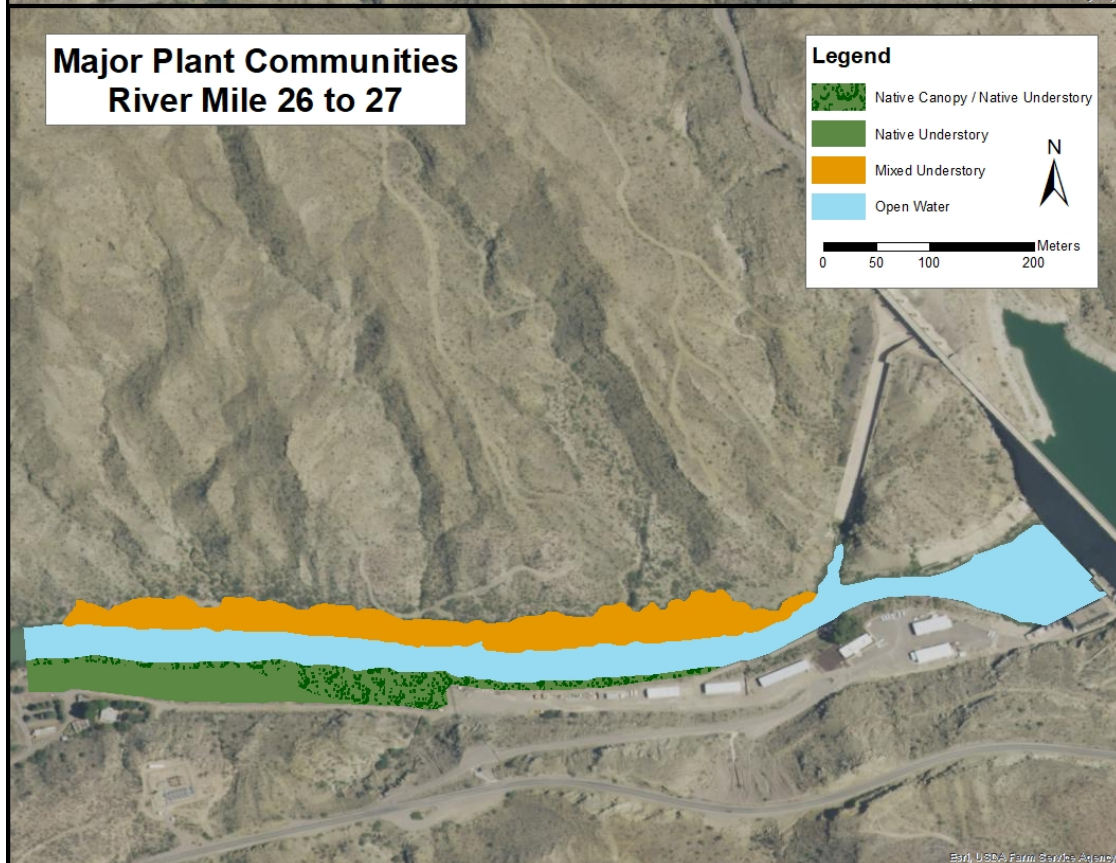
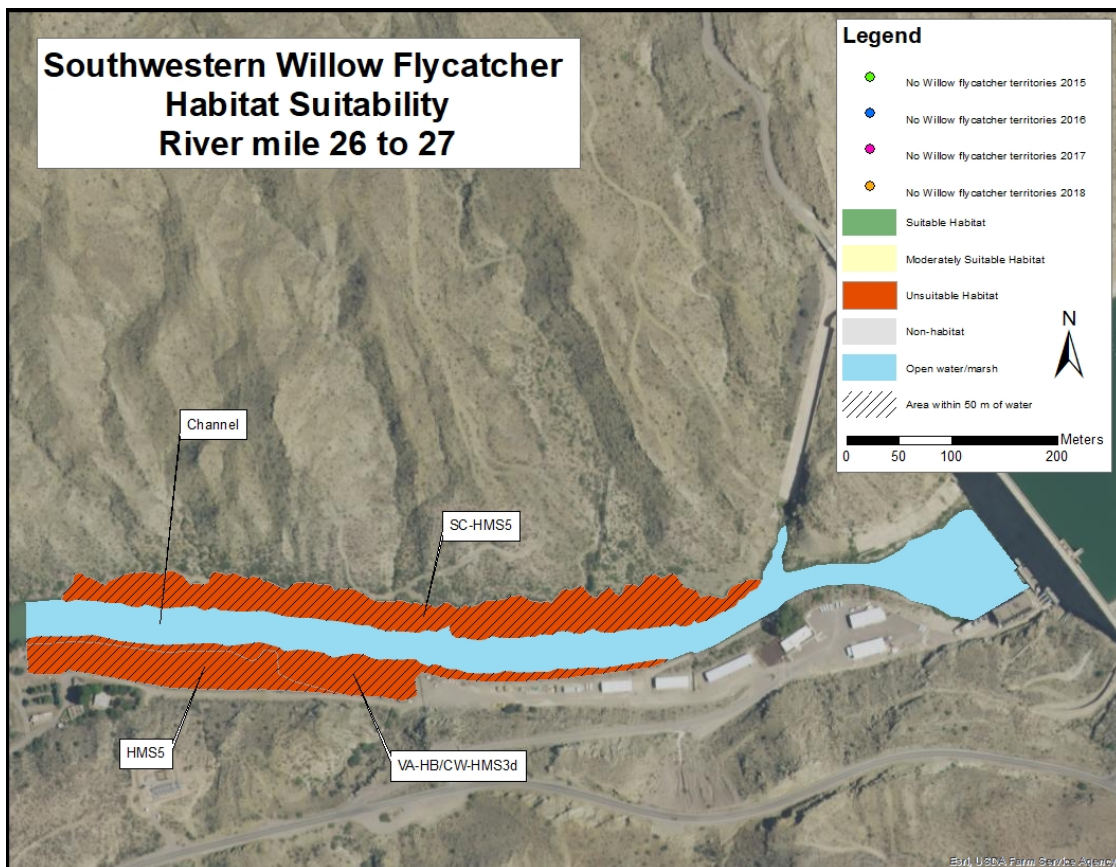
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	0	0	0	0
Unsuitable	9	53	9	9
Total Habitat Area	9	53	9	100
Non-habitat	0	0	-	-
Channel	8	47	-	-
Total Area	17	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	VA-HB/CW-HMS3d	2	23
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	HMS5	2	22
Mixed Understory	SC-HMS5	5	56
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 25 - 26

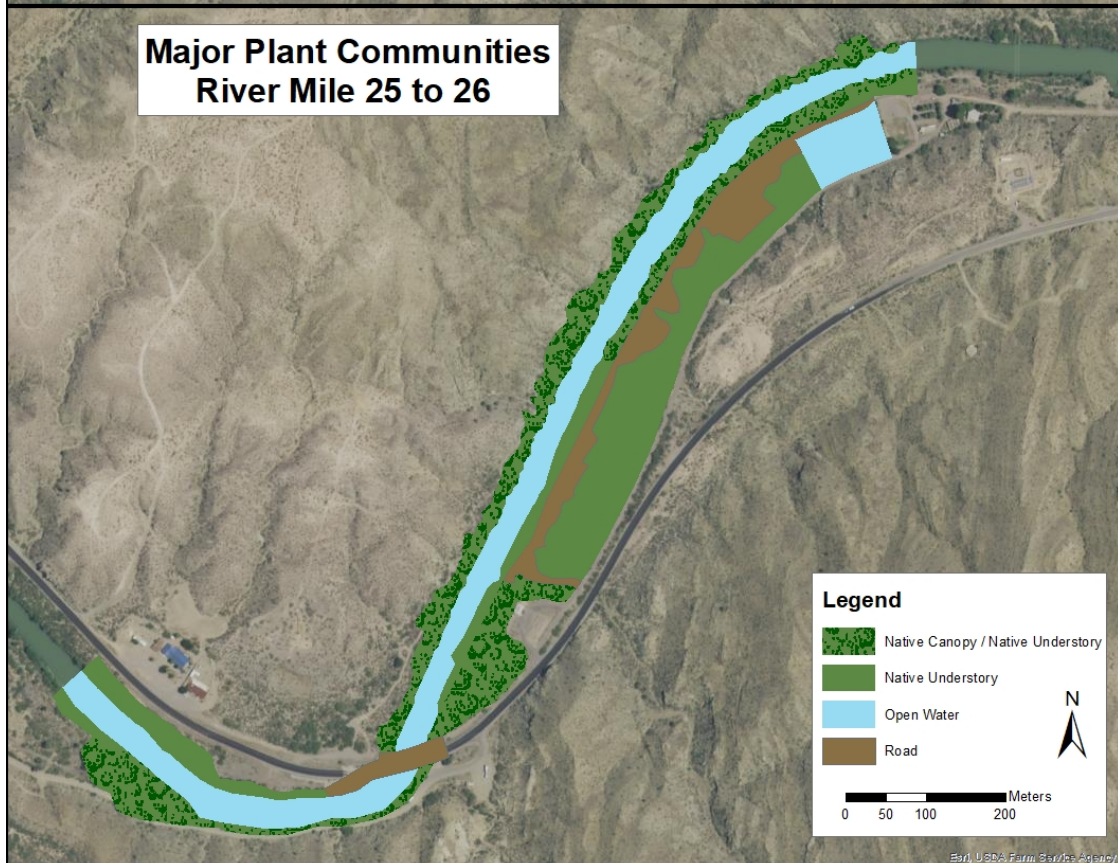
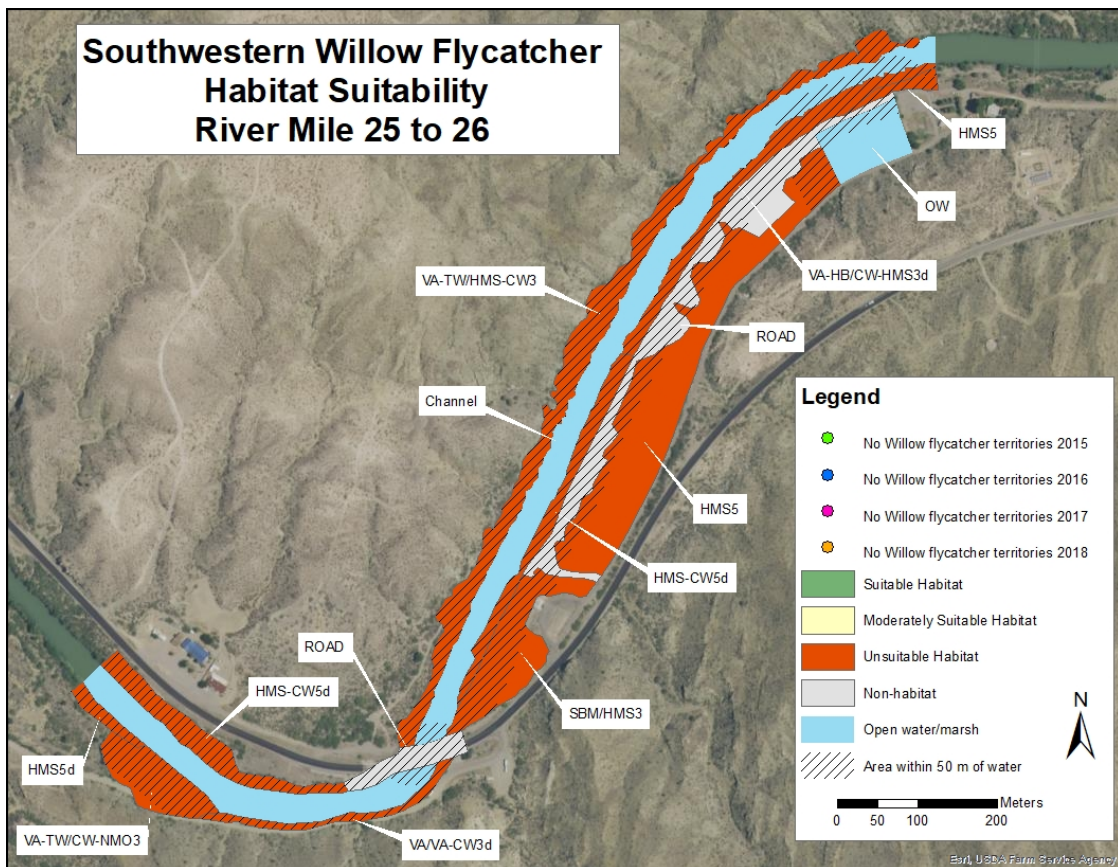
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	0	0	0	0
Unsuitable	26	57	19	73
Total Habitat Area	26	57	19	73
Non-habitat	6	13	-	-
Channel	14	30	-	-
Total Area	46	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	SBM/HMS3, VA/VA-CW3d, VA-HB/CW-HMS3d, VA-TW/CW-NMO3, VA-TW/HMS-CW3	14	52
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	HMS5, HMS5d, HMS-CW5d	13	48
Mixed Understory	-		
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 24 - 25

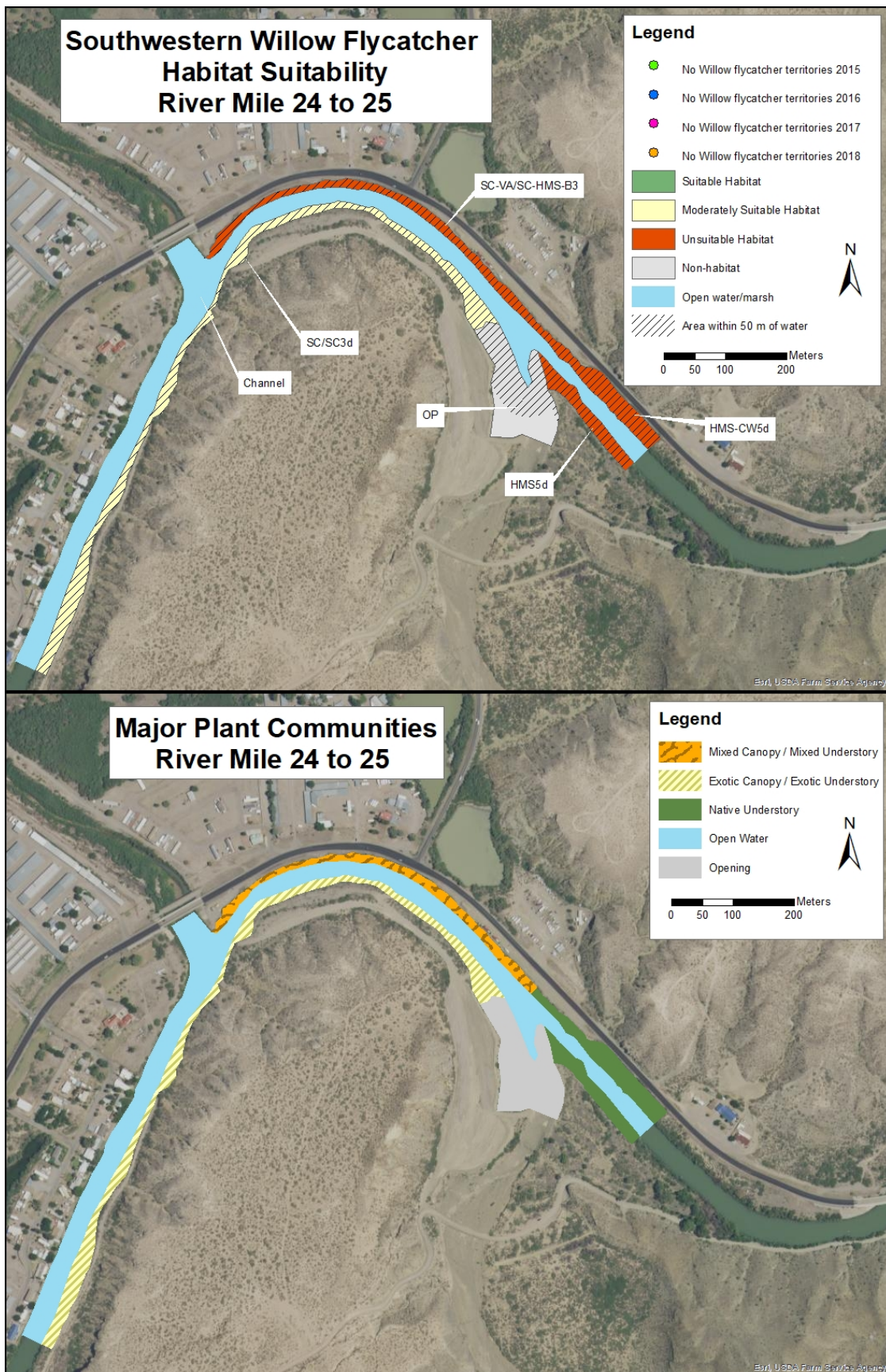
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	5	18	5	49
Unsuitable	5	19	1	11
Total Habitat Area	10	38	6	60
Non-habitat	3	12	-	-
Channel	13	51	-	-
Total Area	26	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	SC-VA/SC-HMS-B3	2	22
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	SC/SC3d	5	49
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	HMS5d, HMS-CW5d	3	29
Mixed Understory	-		
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 23 - 24

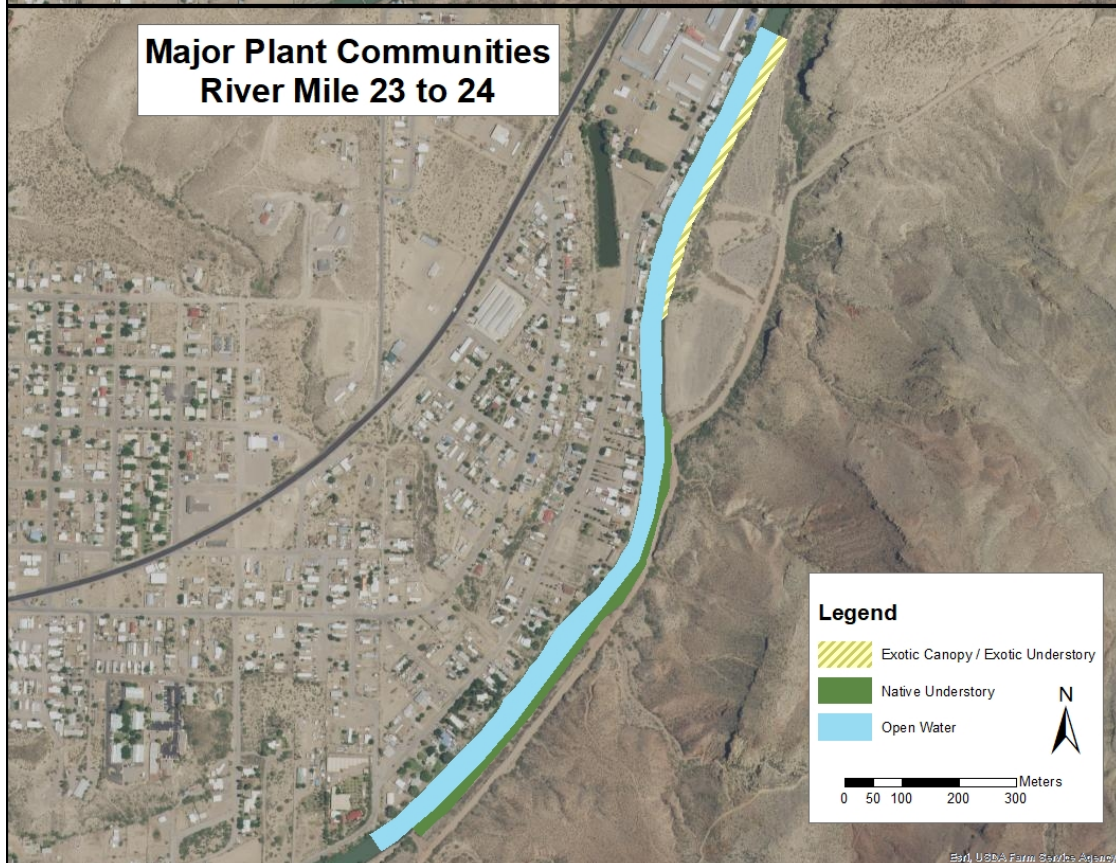
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	5	26	5	100
Unsuitable	0	0	0	0
Total Habitat Area	5	26	5	100
Non-habitat	0	0	-	-
Channel	14	74	-	-
Total Area	19	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	SC/SC3d	2	38
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	CW5d	3	62
Mixed Understory	-		
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 22 – 23

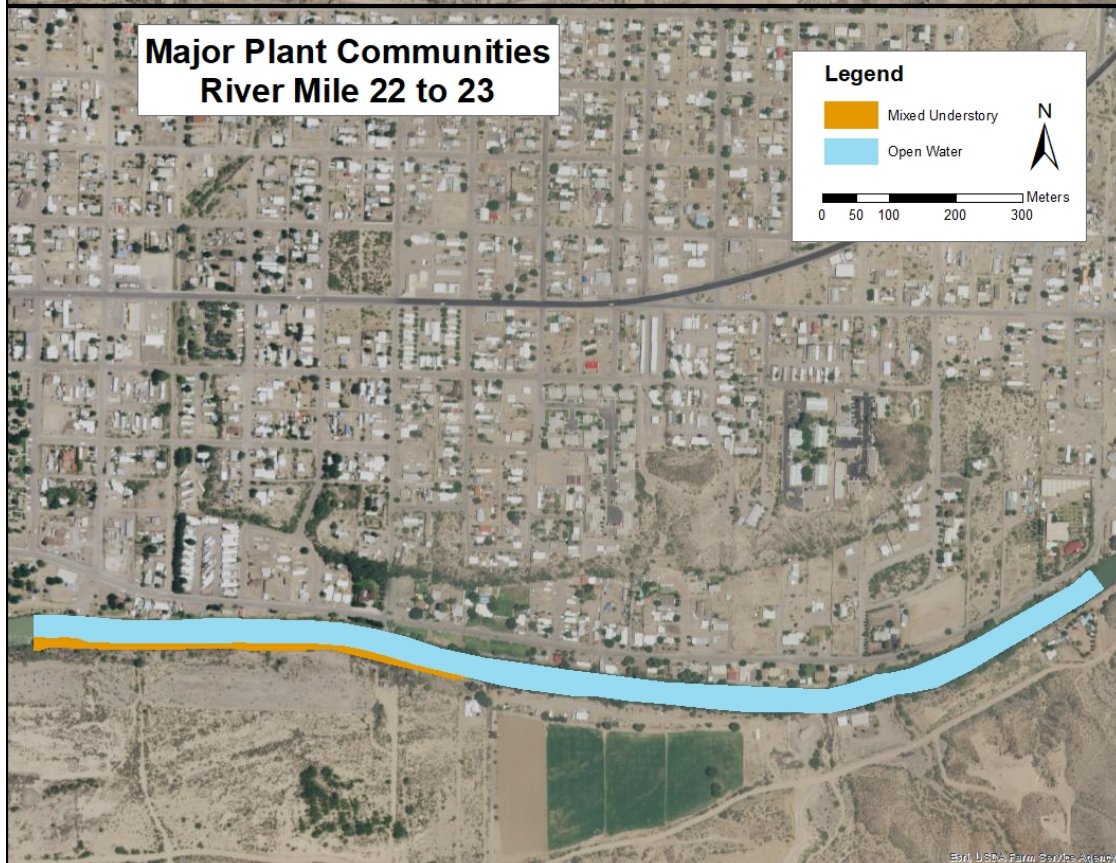
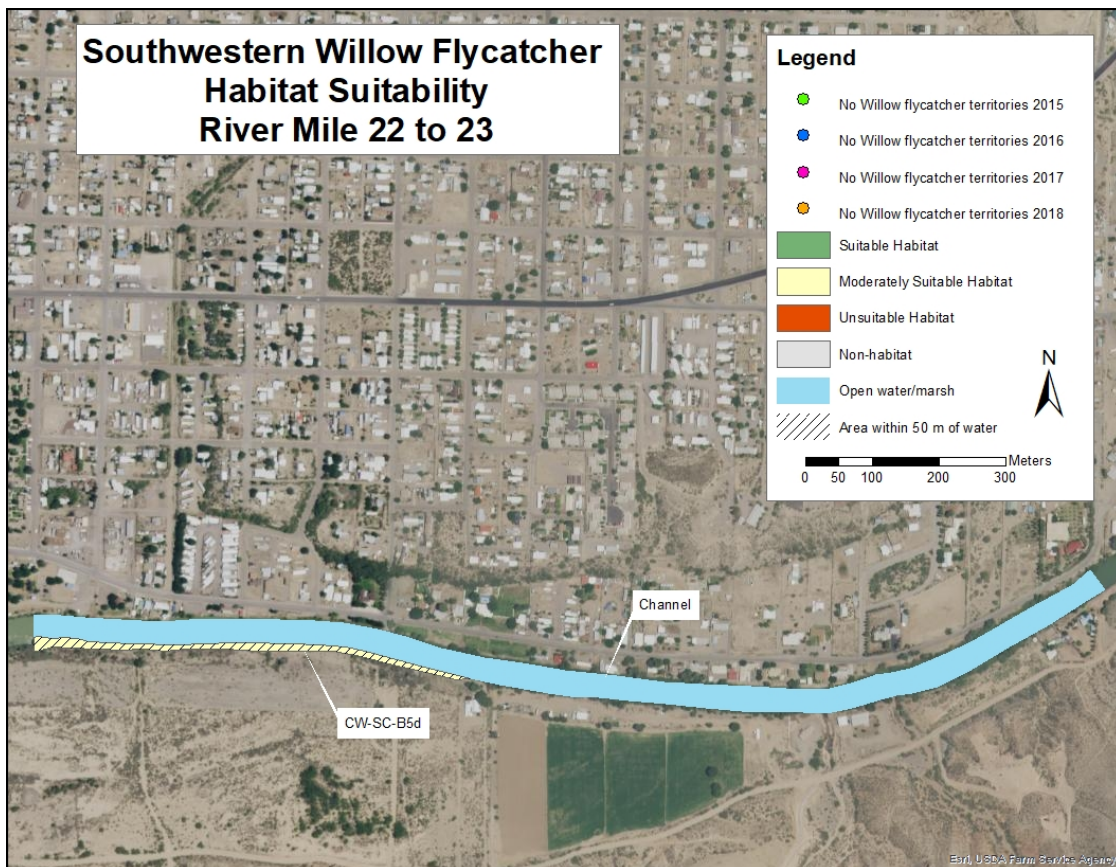
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	2	10	2	100
Unsuitable	0	0	0	0
Total Habitat Area	2	10	2	100
Non-habitat	0	0	-	-
Channel	15	90	-	-
Total Area	17	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	-		
Mixed Understory	CW-SC-B5d	2	100
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 21 - 22

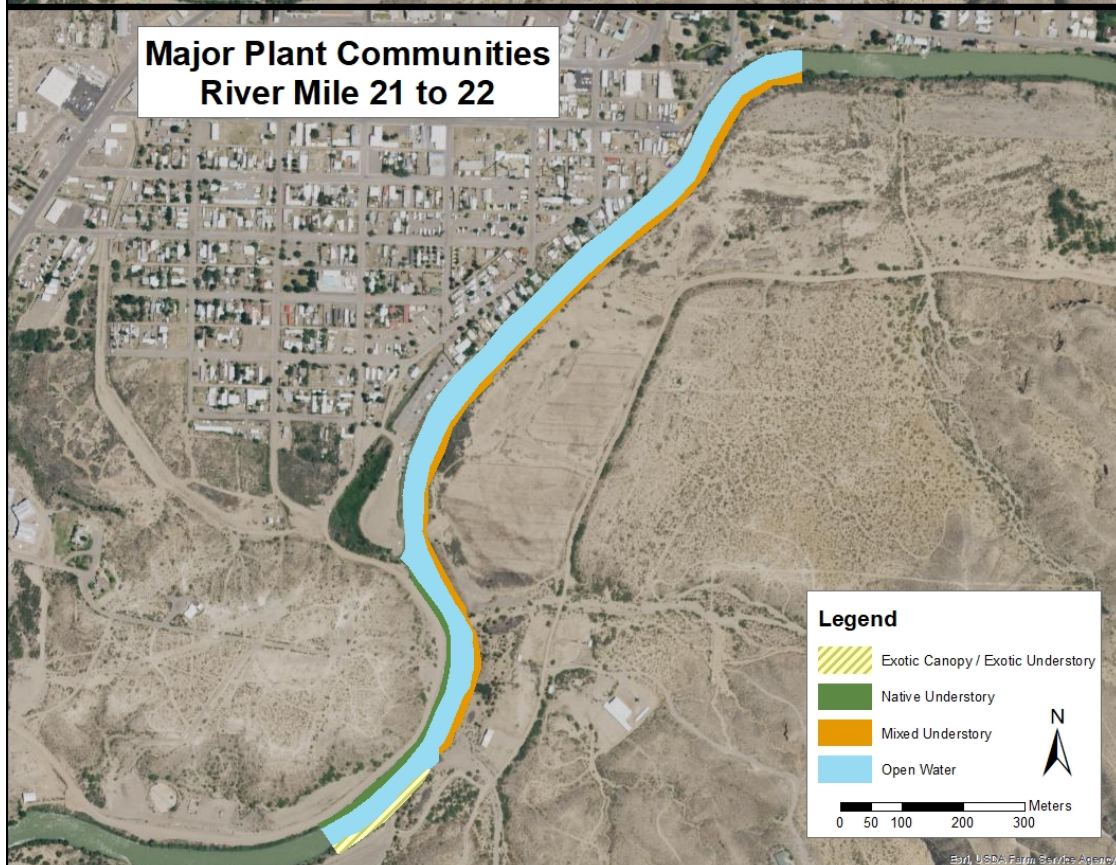
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	5	26	5	100
Unsuitable	0	0	0	0
Total Habitat Area	5	26	5	100
Non-habitat	0	0	-	-
Channel	14	74	-	-
Total Area	19	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	SC/SC3	1	13
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	CW5d	1	22
Mixed Understory	CW-SC-B5d	3	65
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 20 - 21

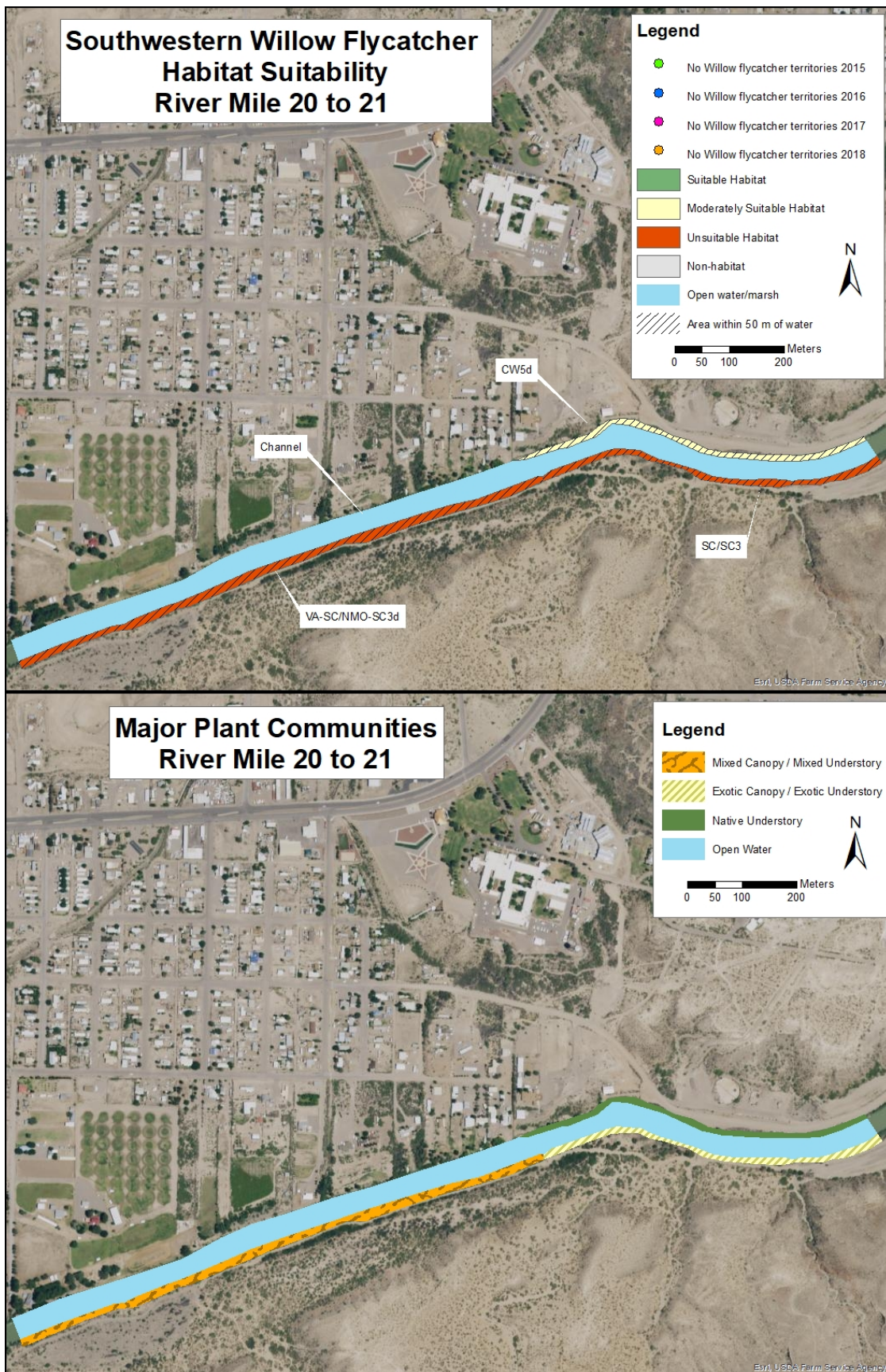
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	2	9	2	29
Unsuitable	5	22	5	71
Total Habitat Area	7	31	7	100
Non-habitat	0	0	-	-
Channel	16	69	-	-
Total Area	23	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory			
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	VA-SC/NMO-SC3d	6	51
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	SC/SC3	2	25
Native Canopy	CW5d	2	24
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory			
Mixed Understory			
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 19 - 20

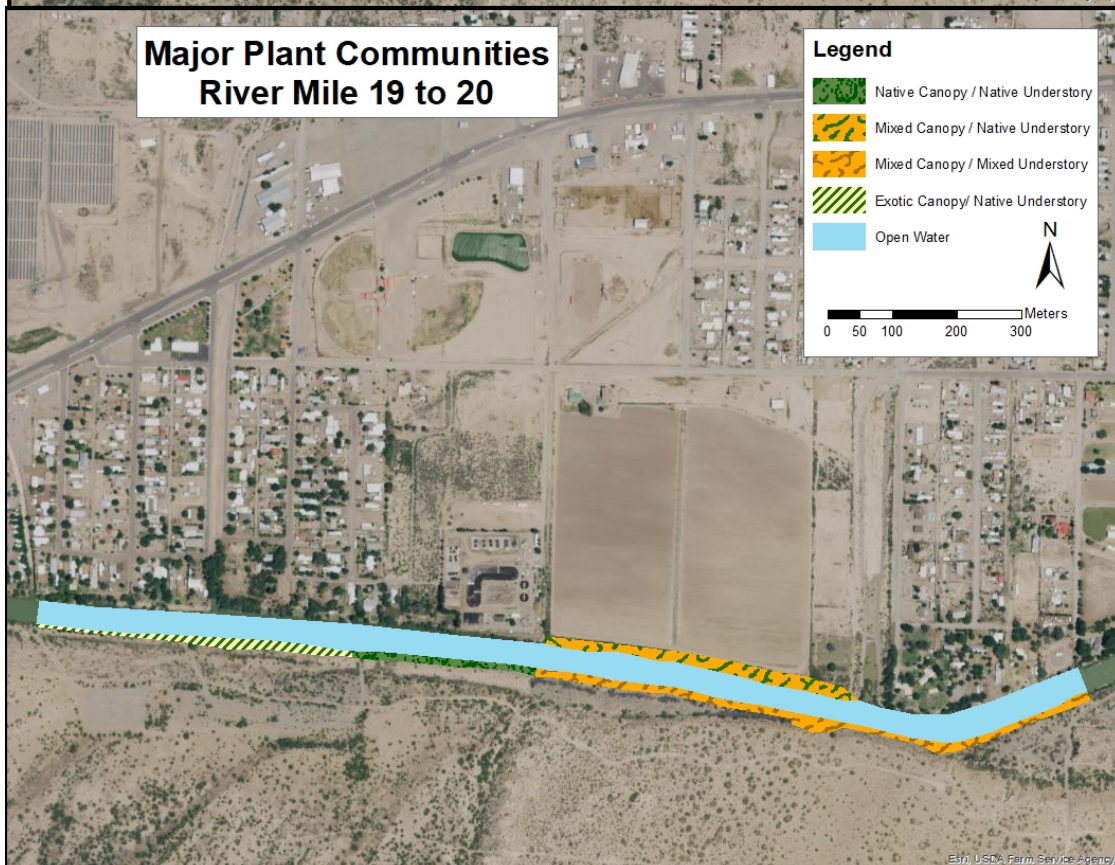
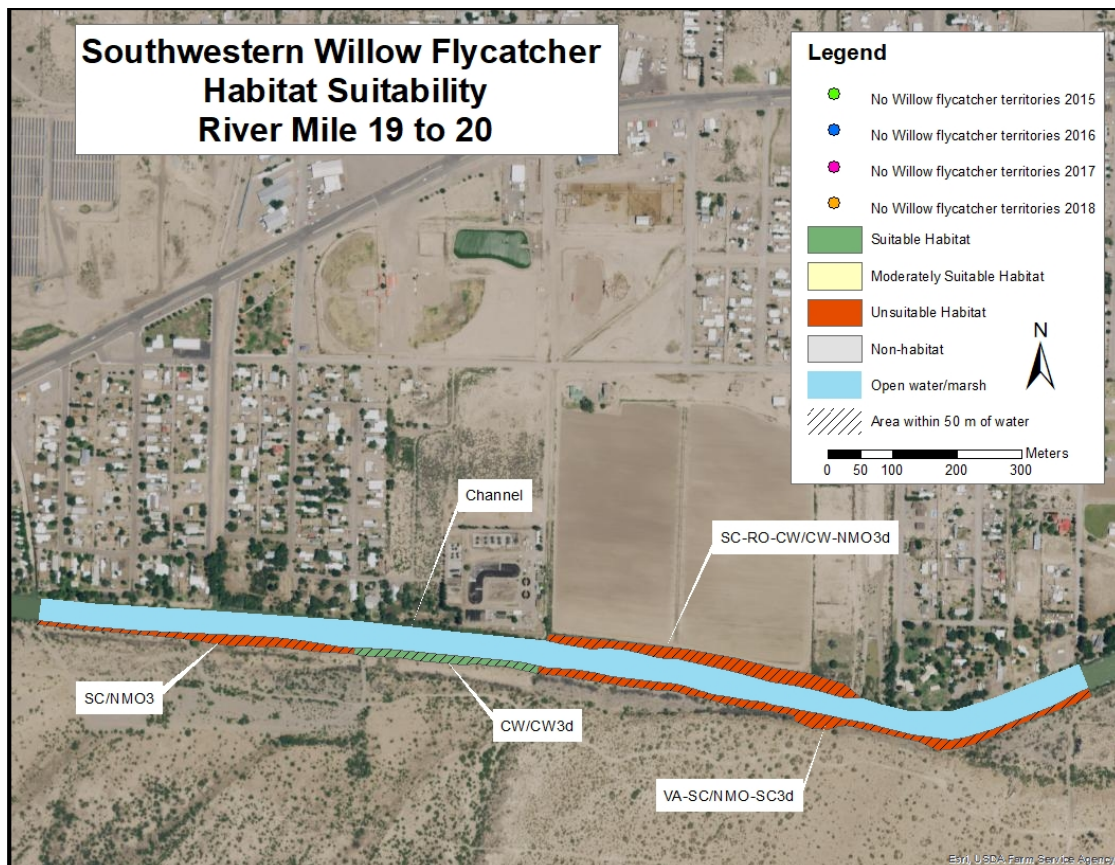
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	1	4	1	14
Moderately Suitable	0	0	0	0
Unsuitable	6	26	6	86
Total Habitat Area	7	30	7	100
Non-habitat	0	0	-	-
Channel	16	70	-	-
Total Area	23	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	CW/CW3d	1	12
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	SC-RO-CW/CW-NMO3d	2	32
Mixed Canopy/Mixed Understory	VA-SC/NMO-SC3d	3	38
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	SC/NMO3	1	18
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	-		
Mixed Understory	-		
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 18 - 19

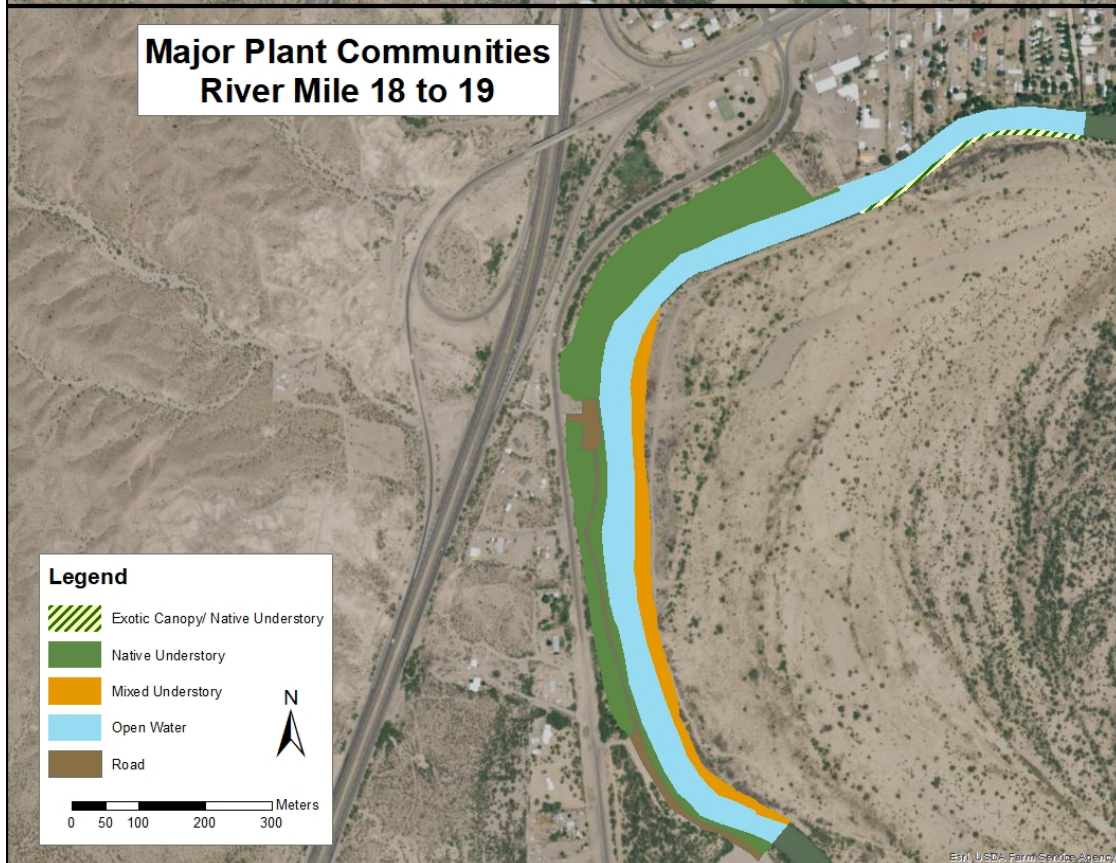
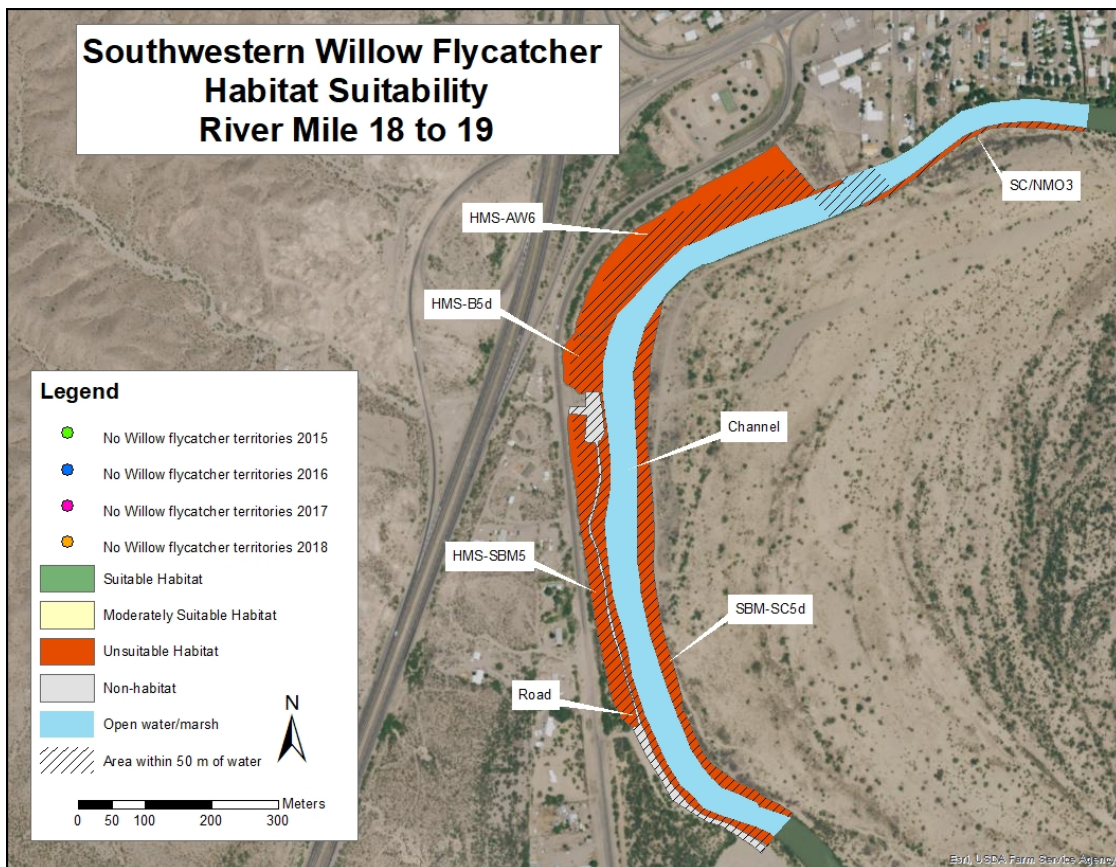
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	0	0	0	0
Unsuitable	18	50	16	89
Total Habitat Area	18	50	16	89
Non-habitat	2	6	-	-
Channel	16	44	-	-
Total Area	36	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	SC/NMO3	1	4
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	HMS-AW6, HMS-B5d, HMS-SBM5	13	74
Mixed Understory	SBM-SC5d	4	22
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 17 - 18

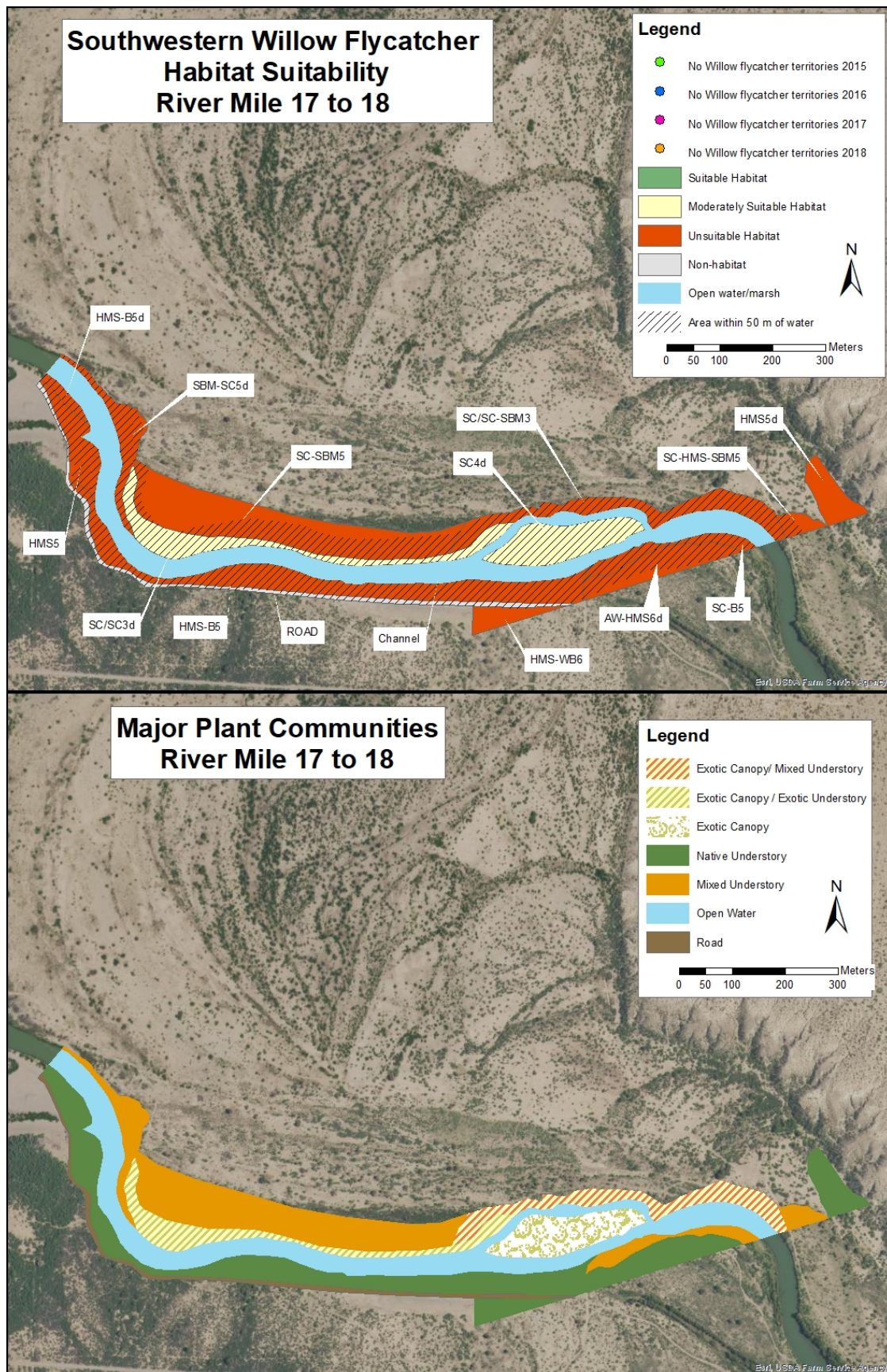
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	8	13	8	18
Unsuitable	36	58	26	59
Total Habitat Area	44	71	34	77
Non-habitat	2	3	-	-
Channel	16	26	-	-
Total Area	62	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	SC/SC-SBM3	4	10
Exotic Canopy/Exotic Understory	SC/SC3d	4	10
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	4	9
Native Understory	AW-HMS6d, HMS5, HMS5d, HMS-B5, HMS-B5d, HMS-WB6	17	38
Mixed Understory	SBM-SC5d, SC-B5, SC-HMS-SBM5, SC-SBM5	15	33
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 16 - 17

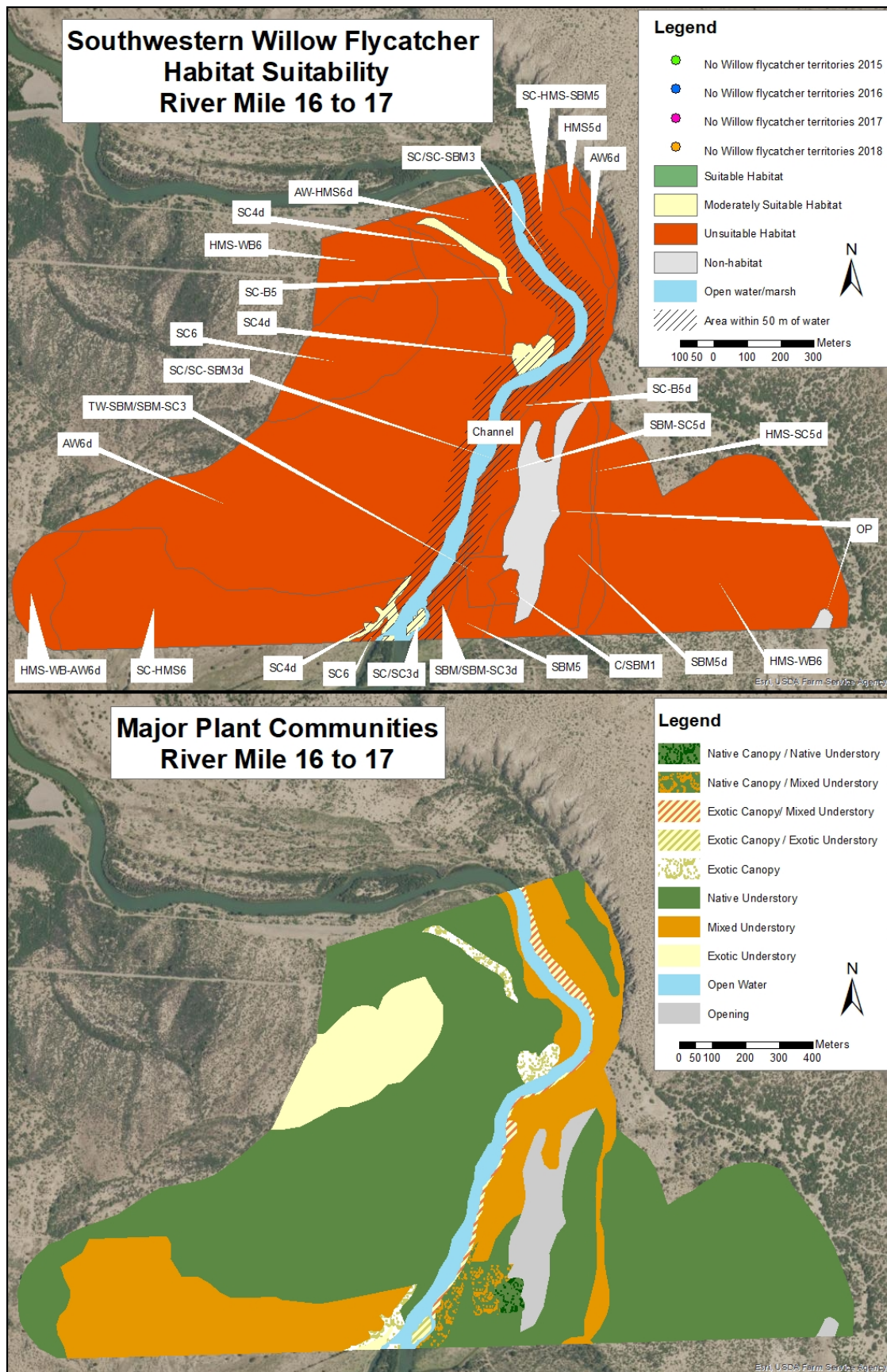
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	7	1	4	1
Unsuitable	444	92	36	8
Total Habitat Area	451	93	40	9
Non-habitat	16	3	-	-
Channel	17	4	-	-
Total Area	484	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C/SBM1	2	0
Native Canopy/Mixed Understory	SBM/SBM-SC3d, TW-SBM/SBM-SC3	6	1
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	SC/SC-SBM3, SC/SC-SBM3d	5	1
Exotic Canopy/Exotic Understory	SC/SC3d	1	0
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	6	1
Native Understory	AW6d, AW-HMS6d, HMS5d, HMS-WB6, HMS-WB-AW6d, SBM5, SBM5d	303	67
Mixed Understory	HMS-SC5d, SBM-SC5d, SC-B5, SC-B5d, SC-HMS6, SC-HMS-SBM5	99	22
Exotic Understory	SC6	29	6

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 15 - 16

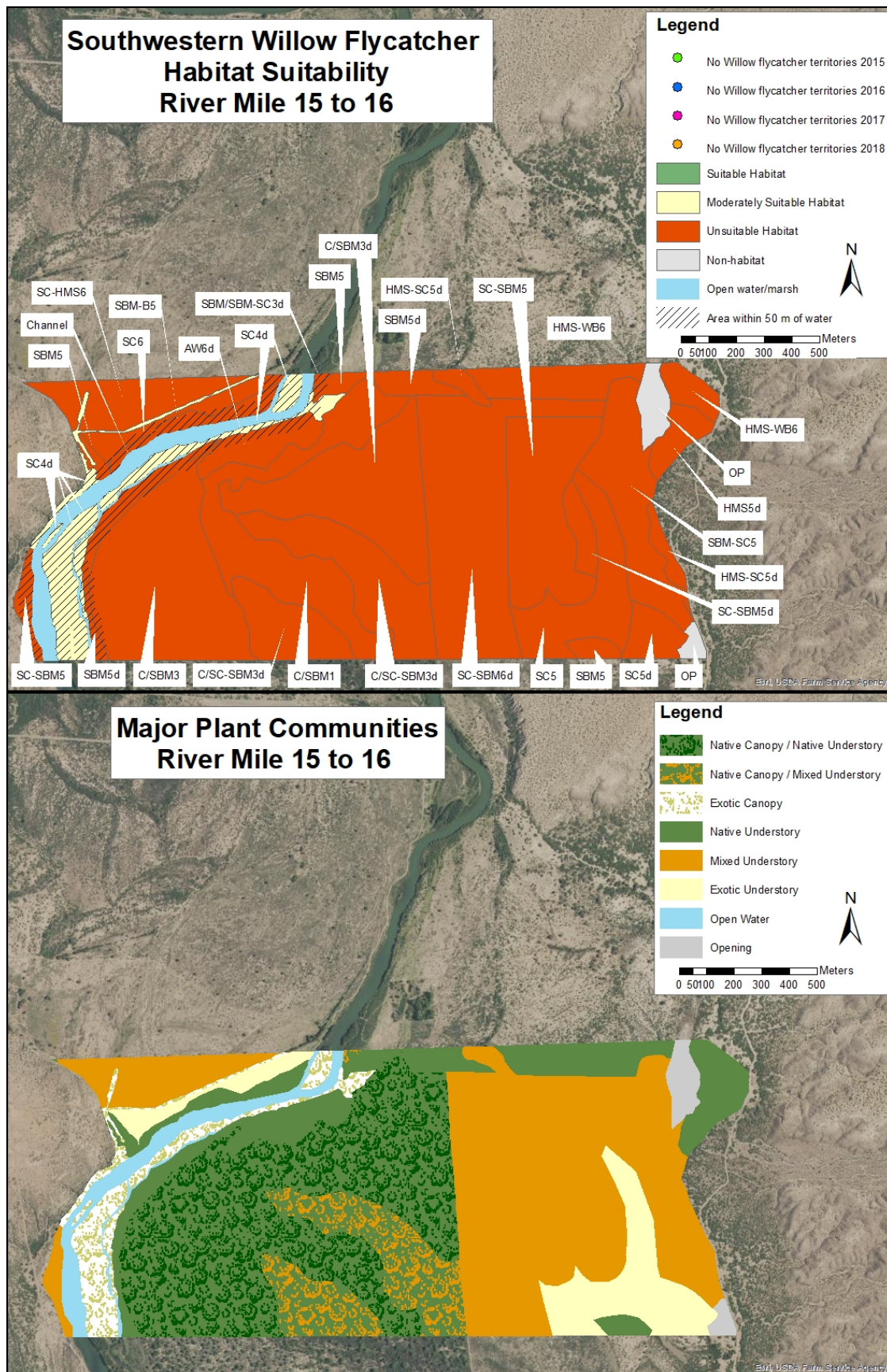
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	30	5	26	5
Unsuitable	536	90	29	5
Total Habitat Area	566	95	55	10
Non-habitat	9	2	-	-
Channel/Reservoir	22	4	-	-
Total Area	597	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C/SBM1, C/SBM3, C/SBM3d	172	30
Native Canopy/Mixed Understory	C/SC-SBM3d, SBM/SBM-SC3d	53	9
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	30	5
Native Understory	AW6d, HMS5d, HMS-WB6, HMS-WB-AW6d, SBM5, SBM5d, SBM-B5	71	13
Mixed Understory	HMS-SC5d, SBM-SC5, SC-HMS6, SC-SBM5, SC-SBM5d, SC-SBM6d	193	34
Exotic Understory	SC5, SC5d, SC6	46	8

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	N/A	N/A	Not Surveyed
2016	N/A	N/A	Not Surveyed
2017	N/A	N/A	Not Surveyed
2018	N/A	N/A	Not Surveyed



River Mile 14 – 15

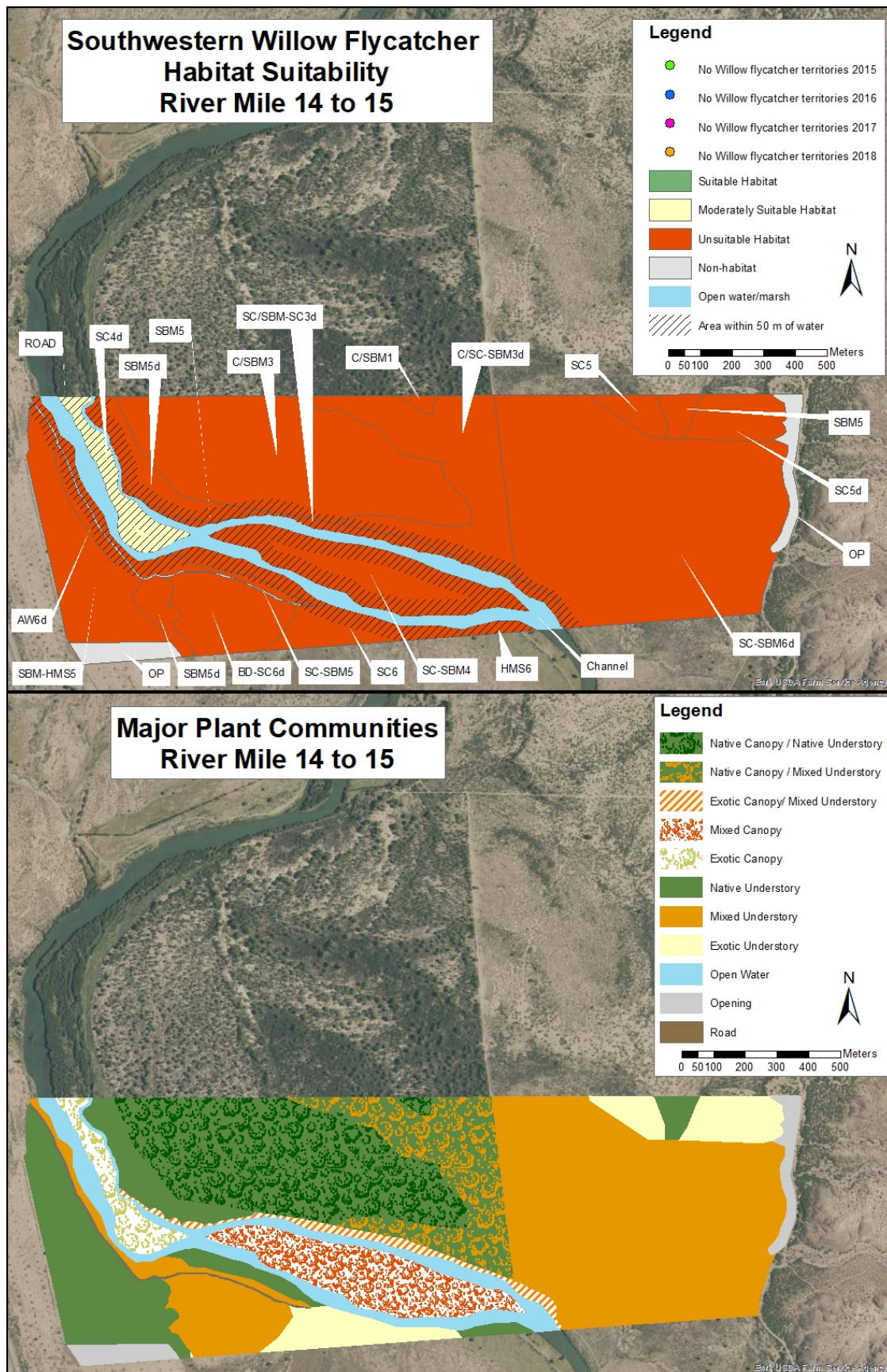
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	10	2	10	3
Unsuitable	392	89	65	16
Total Habitat Area	402	91	75	19
Non-habitat	11	2	-	-
Channel/Reservoir	30	7	-	-
Total Area	443	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C/SBM1, C/SBM3	76	19
Native Canopy/Mixed Understory	C/SC-SBM3d	39	10
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	SC/SBM-SC3d	7	2
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	SC-SBM4	30	8
Exotic Canopy	SC4d	10	3
Native Understory	AW6d, HMS6, SBM5, SBM5d, SBM-HMS5	61	15
Mixed Understory	BD-SC6d, SC-SBM5, SC-SBM6d	155	39
Exotic Understory	SC5, SC5d, SC6	20	5

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 13 – 14 North

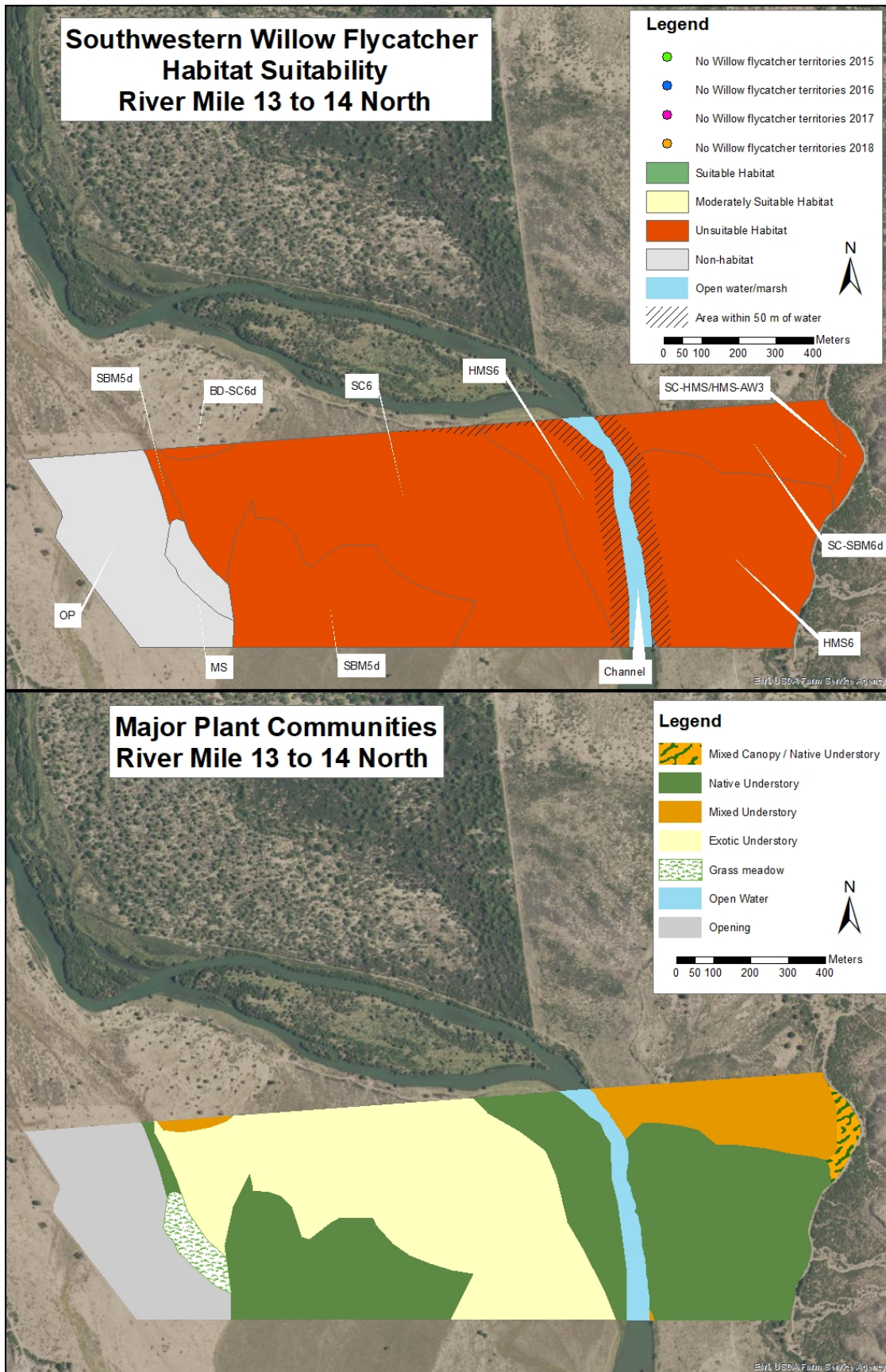
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	0	0	0	0
Unsuitable	244	83	18	7
Total Habitat Area	244	83	18	7
Non-habitat	41	14	-	-
Channel/Reservoir	22	3	-	-
Total Area	293	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	SC-HMS/HMS-AW3	3	1
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	HMS6, SBM5d	116	48
Mixed Understory	BD-SC6d, SC-SBM6d	26	11
Exotic Understory	SC6	99	40

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 13 – 14 South

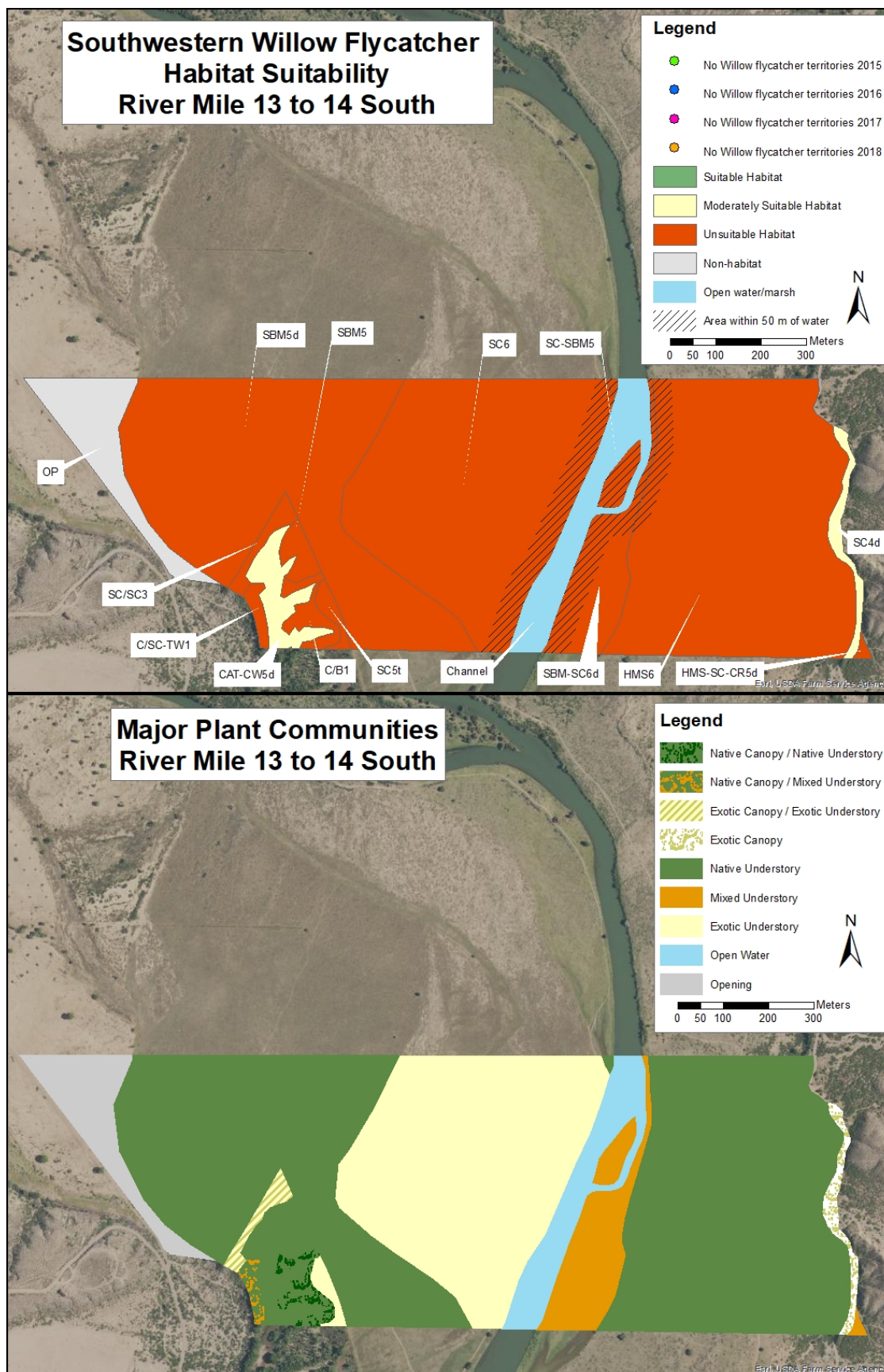
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	7	3	0	0
Unsuitable	204	88	18	9
Total Habitat Area	211	91	18	9
Non-habitat	10	4	-	-
Channel/Reservoir	12	5	-	-
Total Area	233	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C/B1	2	1
Native Canopy/Mixed Understory	C/SC-TW1	1	0
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	SC/SC3	2	1
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	2	1
Native Understory	CAT-CW5d, HMS6, SBM5, SBM5d	133	63
Mixed Understory	HMS-SC-CR5d, SBM-SC6d, SC-SBM5	12	6
Exotic Understory	SC5t, SC6	59	28

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 12 – 13 North

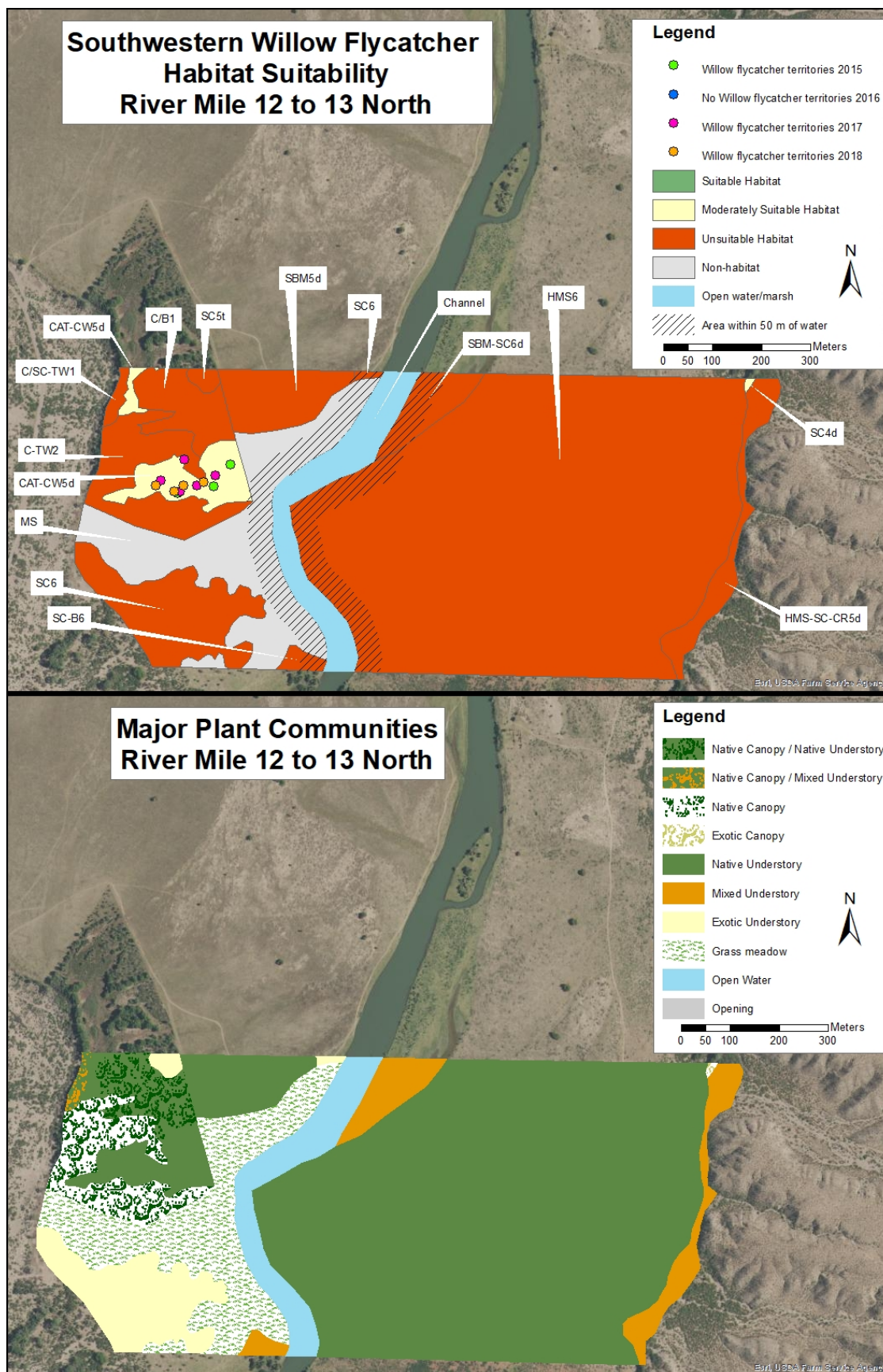
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	6	3	0	0
Unsuitable	158	79	10	6
Total Habitat Area	164	82	10	6
Non-habitat	24	12	-	-
Channel/Reservoir	11	6	-	-
Total Area	199	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C/B1	5	3
Native Canopy/Mixed Understory	C/SC-TW1	1	0
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	C-TW2	9	6
Mixed Canopy	-		
Exotic Canopy	SC4d	<1	0
Native Understory	CAT-CW5d, HMS6, SBM5d	126	77
Mixed Understory	HMS-SC-CR5d, SBM-SC6d, SC-B6	10	6
Exotic Understory	SC5t, SC6	13	8

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	3	0	3
2016	0	0	0
2017	1	4	5
2018	0	4	4



River Mile 12 – 13 South

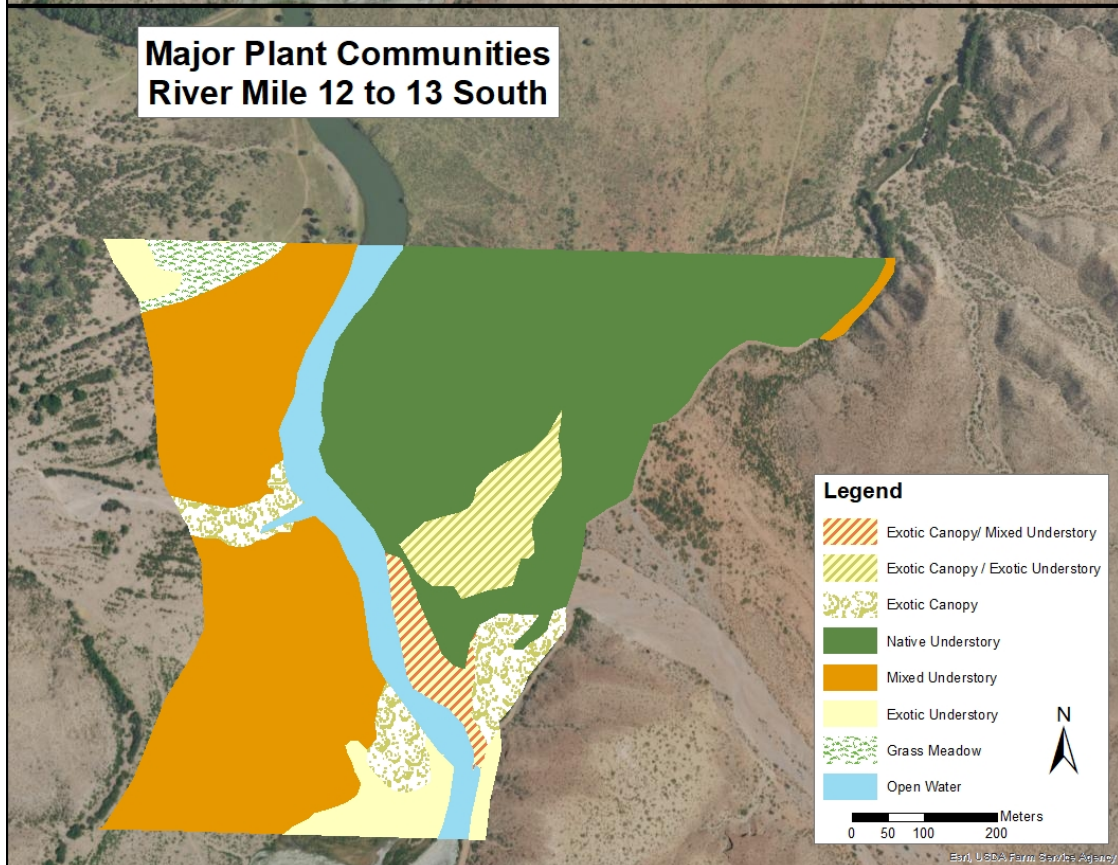
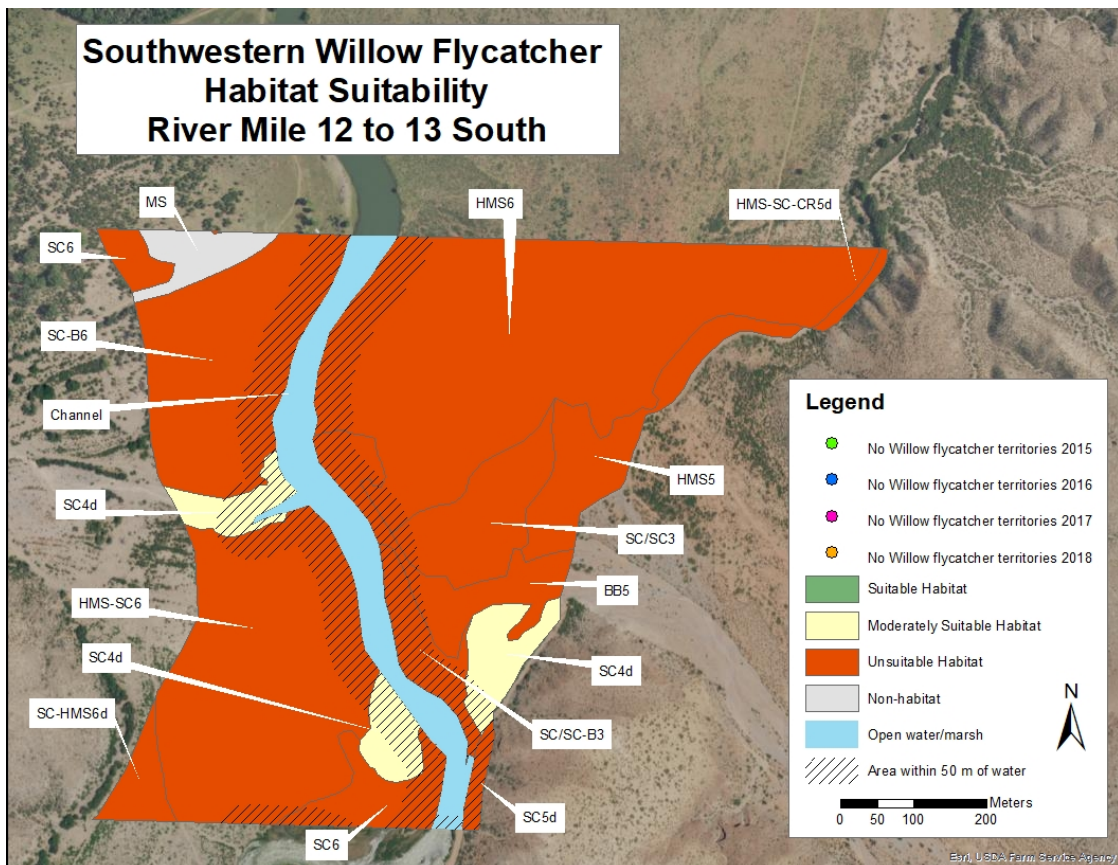
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	7	5	3	3
Unsuitable	109	85	21	18
Total Habitat Area	116	90	24	21
Non-habitat	2	2	-	-
Channel/Reservoir	10	8	-	-
Total Area	128	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	SC/SC-B3	3	3
Exotic Canopy/Exotic Understory	SC/SC3	6	5
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	7	6
Native Understory	BB5, HMS5, HMS6	51	44
Mixed Understory	HMS-SC6, HMS-SC-CR5d, SC-B6, SC-HMS6d	43	37
Exotic Understory	SC5d, SC6	6	5

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



Middle Section

River Miles 12 to 6

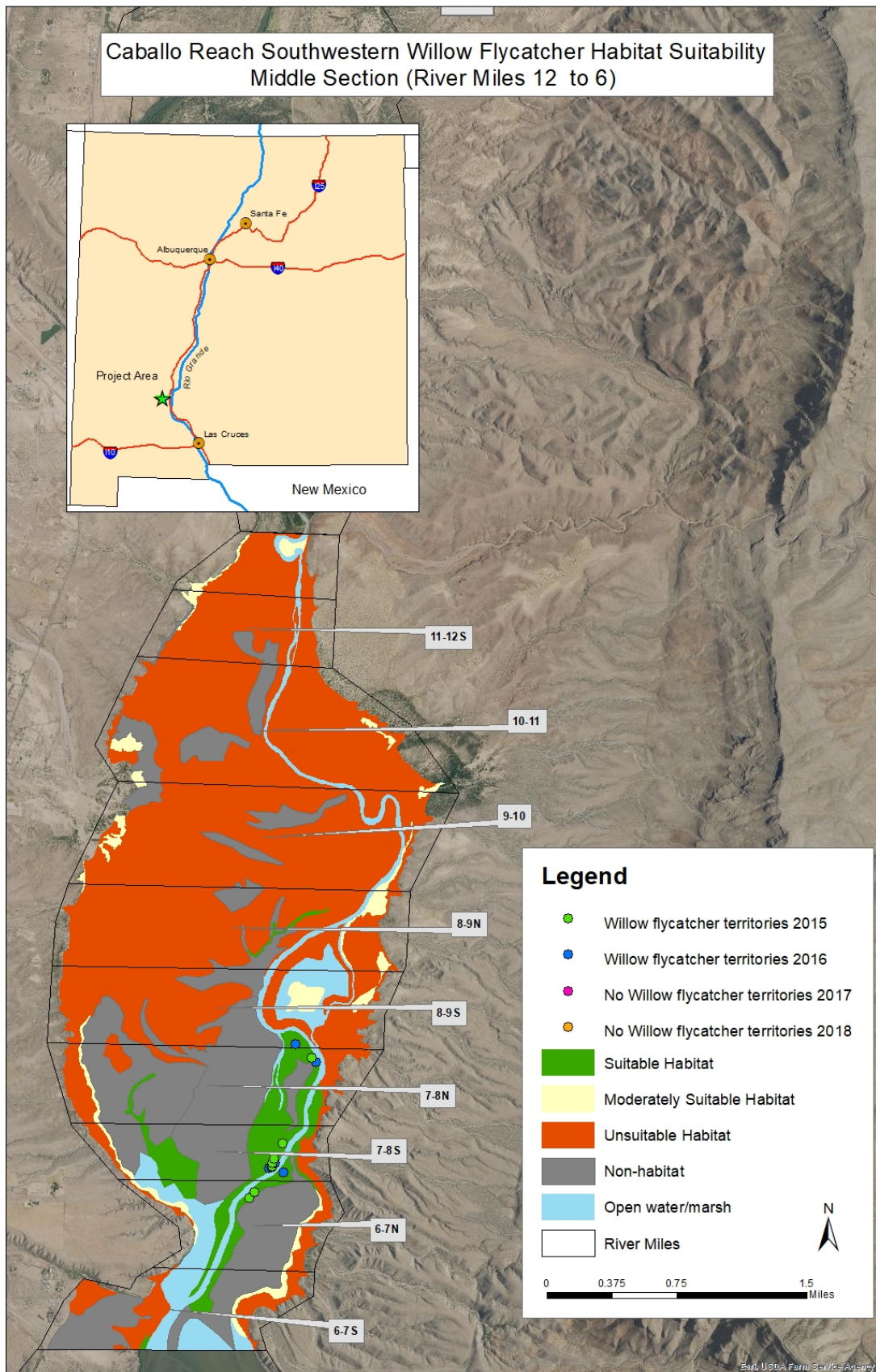
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	220	6	95	4
Moderately Suitable	132	3	40	2
Unsuitable	2316	58	200	7
Total Habitat Area	2668	67	335	13
Non-habitat	981	25	-	-
Channel/Reservoir	307	8		
Total Area	3956	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C-TW/HMS3d	1	0
Native Canopy/Mixed Understory	C/TW-SC-SBM1, SBM/SBM-SC-HMS3, TW/SBM-SC5d, TW/SC-TW3, TW/TW-SC3d	49	2
Native Canopy/Exotic Understory	C/SC1, C/SC3d, TW/SC3d	167	6
Mixed Canopy/Native Understory	TW-SC-SBM/SBM-TW3d	12	0
Mixed Canopy/Mixed Understory	C-TW-SC/TW-SC3d	20	1
Mixed Canopy/Exotic Understory	C-TW-SC/SC3d	4	0
Exotic Canopy/Native Understory	SC/HMS3	4	0
Exotic Canopy/Mixed Understory	SC/SC-B3d	7	0
Exotic Canopy/Exotic Understory	SC/SC3d	13	0
Native Canopy	C2, TW2d, TW4, TW4d	74	3
Mixed Canopy	-		
Exotic Canopy	SC4d	30	1
Native Understory	B5d, B6, B6d, HMS5d, HMS6, HMS6d, HMS-CR5d, HMS-CR-ATX6, HMS-RB6, SBM5d, SBM6, SBM-B5, SBM-B5d, SC6, SC-B6, TW5	654	24
Mixed Understory	HMS-SC5, HMS-SC5d, HMS-SC6, HMS-SC6d, HMS-SC-B6d, SBM-SC5, SBM-SC5d, SBM-SC-B5, SC-AW6d, SC-B5d, SC-B6, SC-B6d, SC-B-HMS6d, SC-HMS5, SC-HMS5d, SC-HMS6, SC-HMS6d, SC-HMS-B6, SC-HMS-SBM-TW5d, SC-SBM5, SC-SBM6, TW-SC5	1057	39
Exotic Understory	SC5, SC5d, SC5dt, SC6, SC6d	624	23

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	2	5	7
2016	3	3	6
2017	0	0	0
2018	0	0	0



River Mile 11 – 12 North

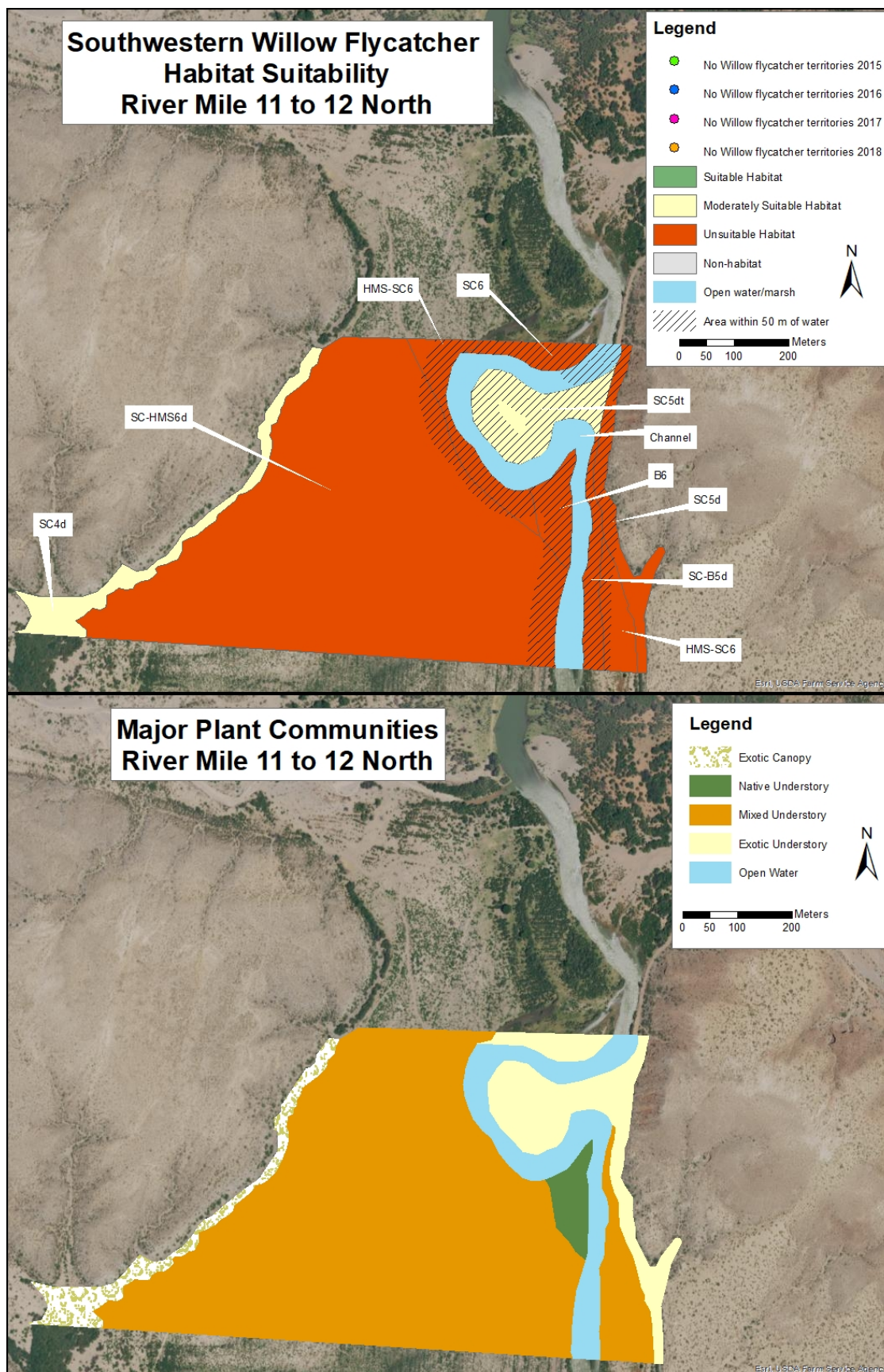
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	12	11	6	6
Unsuitable	89	79	18	18
Total Habitat Area	101	90	24	24
Non-habitat	0	0	-	-
Channel/Reservoir	11	10	-	-
Total Area	112	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	5	5
Native Understory	B6	3	3
Mixed Understory	HMS-SC6, HMS-SC6, SC-B5d, SC-HMS6d	81	80
Exotic Understory	SC5d, SC5dt, SC6	12	12

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 11 – 12 South

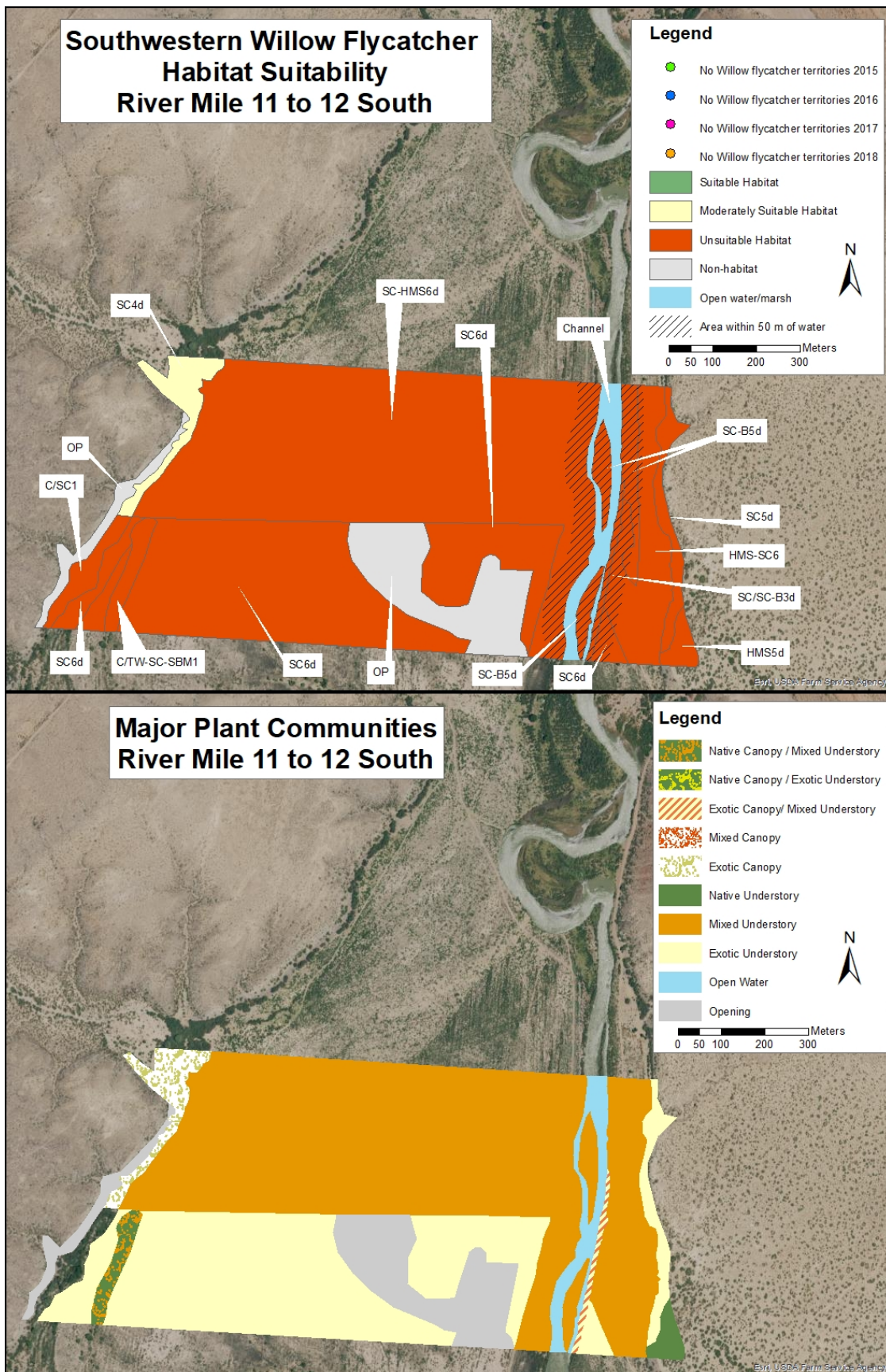
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	5	2	0	0
Unsuitable	176	86	19	11
Total Habitat Area	181	88	19	11
Non-habitat	19	9	-	-
Channel/Reservoir	6	3	-	-
Total Area	206	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	C/TW-SC-SBM1	2	1
Native Canopy/Exotic Understory	C/SC1	3	2
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	SC/SC-B3d	1	1
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	5	3
Native Understory	HMS5d	2	1
Mixed Understory	HMS-SC6, SC-B5d, SC-B5d, SC-B5d, SC-HMS6d	107	59
Exotic Understory	SC5d, SC6d	60	33

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 10 - 11

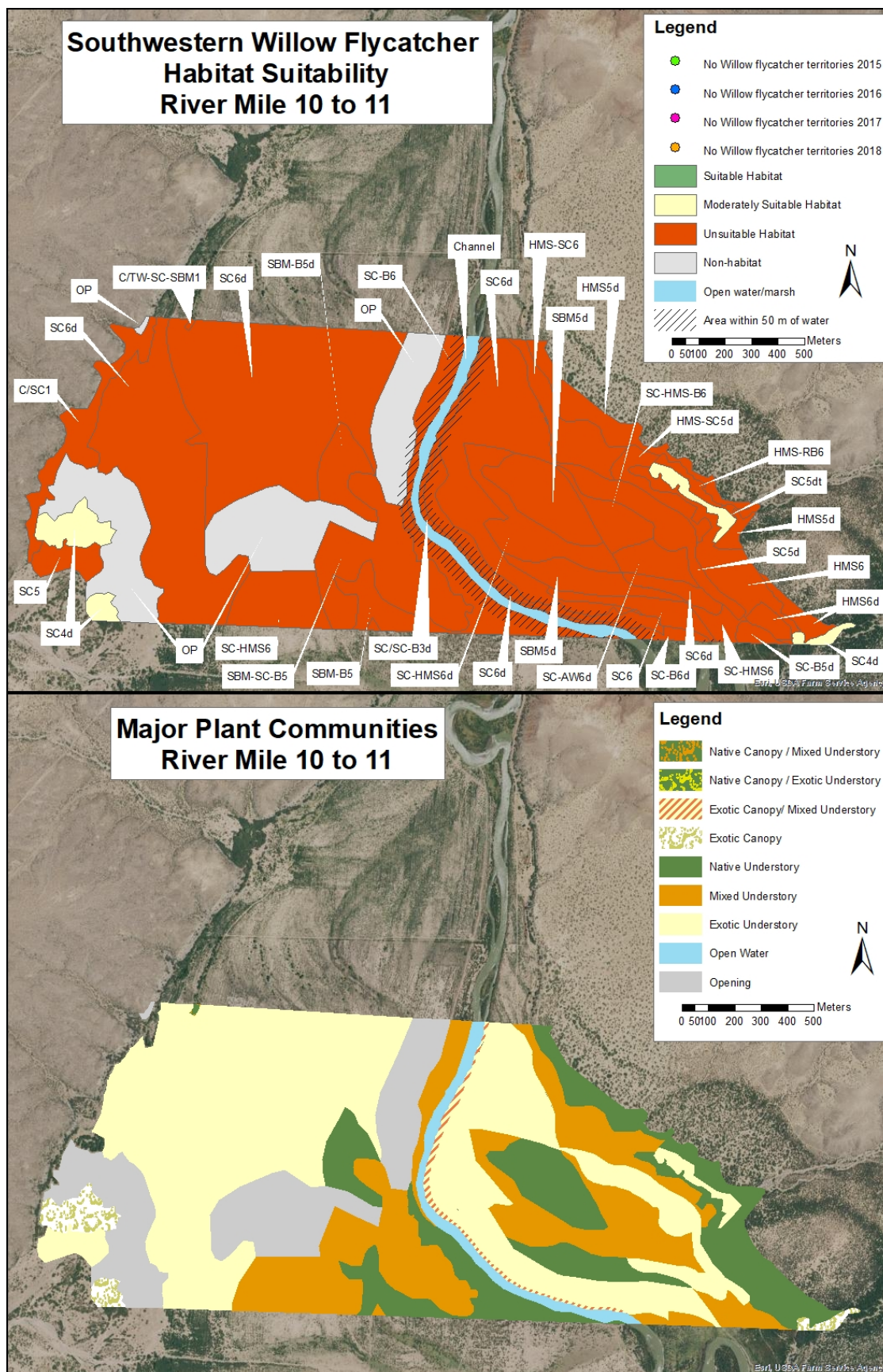
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	18	3	0	0
Unsuitable	548	82	39	7
Total Habitat Area	566	85	39	7
Non-habitat	87	13	-	-
Channel/Reservoir	15	2	-	-
Total Area	668	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	C/TW-SC-SBM1	<1	0
Native Canopy/Exotic Understory	C/SC1	17	3
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	SC/SC-B3d	6	1
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	13	2
Native Understory	HMS5d, HMS6, HMS6d, HMS-RB6, SBM5d, SBM-B5, SBM-B5d	110	20
Mixed Understory	HMS-SC5d, HMS-SC6, SBM-SC-B5, SC-AW6d, SC-B6, SC-B6d, SC-B-HMS6d, SC-HMS6, SC-HMS6d, SC-HMS-B6	132	23
Exotic Understory	SC5, SC5d, SC5dt, SC6, SC6d	286	51

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 9 - 10

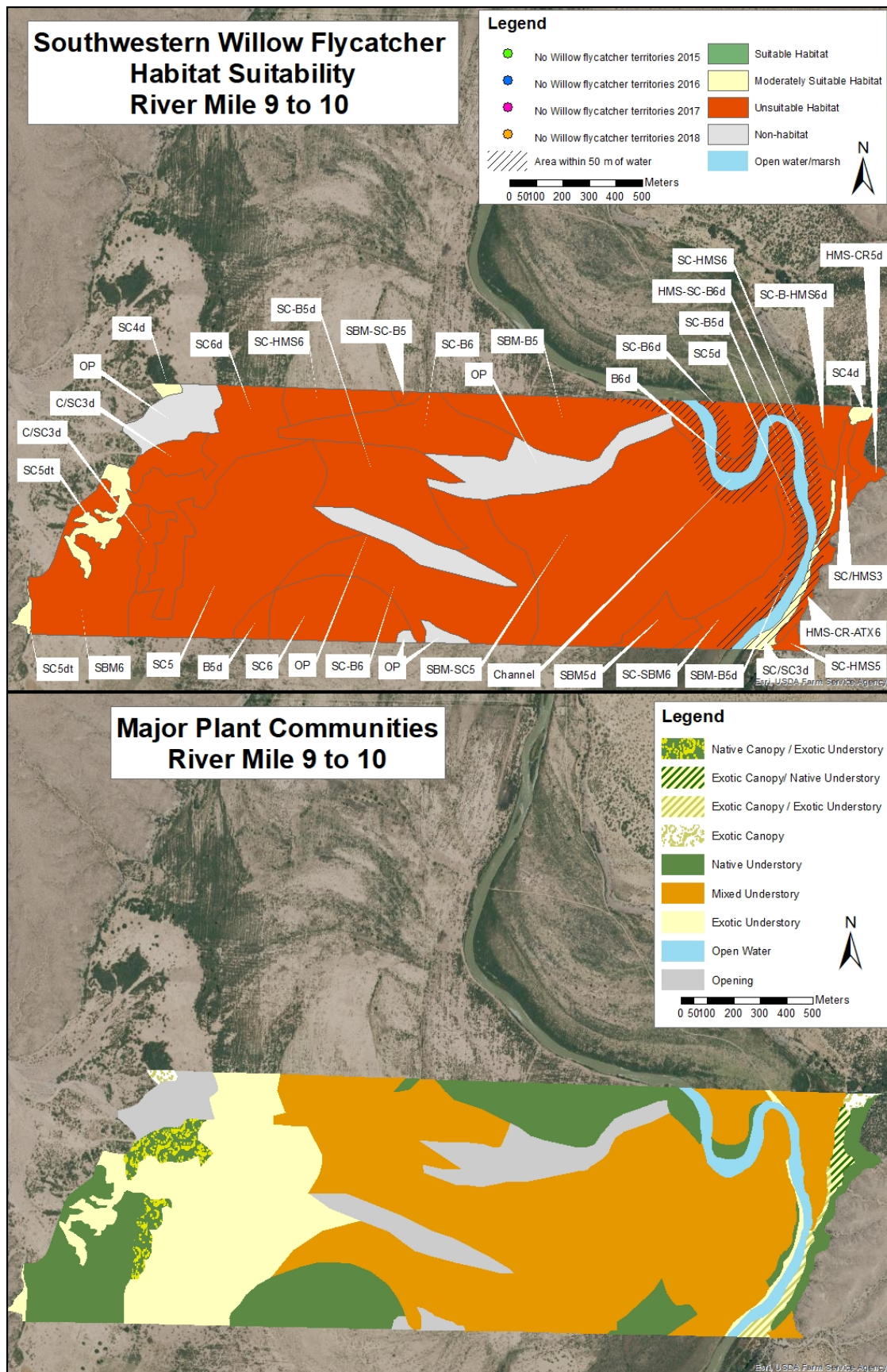
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	17	3	4	1
Unsuitable	578	86	40	7
Total Habitat Area	595	89	44	8
Non-habitat	57	9	-	-
Channel/Reservoir	17	3	-	-
Total Area	669	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	C/SC3d	14	2
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	SC/HMS3	4	1
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	SC/SC3d	5	1
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	2	0
Native Understory	B5d, B6d, HMS6, HMS-CR5d, HMS-CR-ATX6, SBM5d, SBM6, SBM-B5, SBM-B5d	100	17
Mixed Understory	HMS-SC-B6d, SBM-SC5, SBM-SC-B5, SC-B5d, SC-B6, SC-B6d, SC-B-HMS6d, SC-HMS5, SC-HMS6, SC-SBM6	317	53
Exotic Understory	SC5, SC5d, SC5dt, SC6, SC6d	153	26

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 8 – 9 North

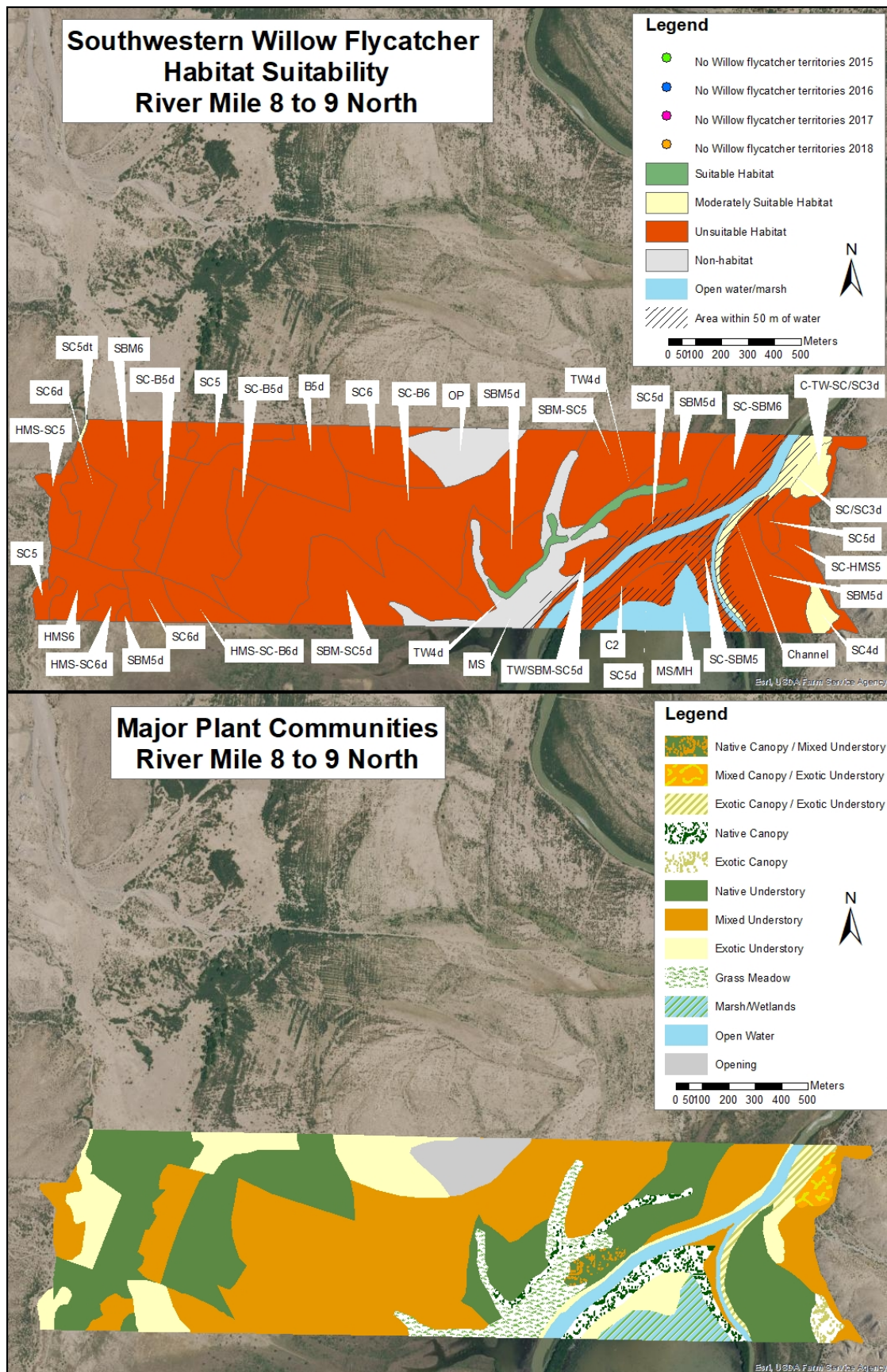
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	6	1	0	0
Moderately Suitable	16	3	6	1
Unsuitable	457	83	39	8
Total Habitat Area	479	87	45	9
Non-habitat	53	10	-	-
Channel/Reservoir	15	3	-	-
Total Area	547	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	TW/SBM-SC5d	4	1
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	C-TW-SC/SC3d	4	1
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory			
Exotic Canopy/Exotic Understory	SC/SC3d	8	2
Native Canopy	C2, TW4d	20	4
Mixed Canopy	-		
Exotic Canopy	SC4d	4	1
Native Understory	B5d, HMS6, SBM5d, SBM6	155	32
Mixed Understory	HMS-SC5, HMS-SC6d, HMS-SC-B6d, SBM-SC5, SBM-SC5d, SC-B5d, SC-B6, SC-HMS5, SC-SBM5, SC-SBM6	220	46
Exotic Understory	SC5, SC5d, SC5dt, SC6, SC6d	64	13

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 8 – 9 South

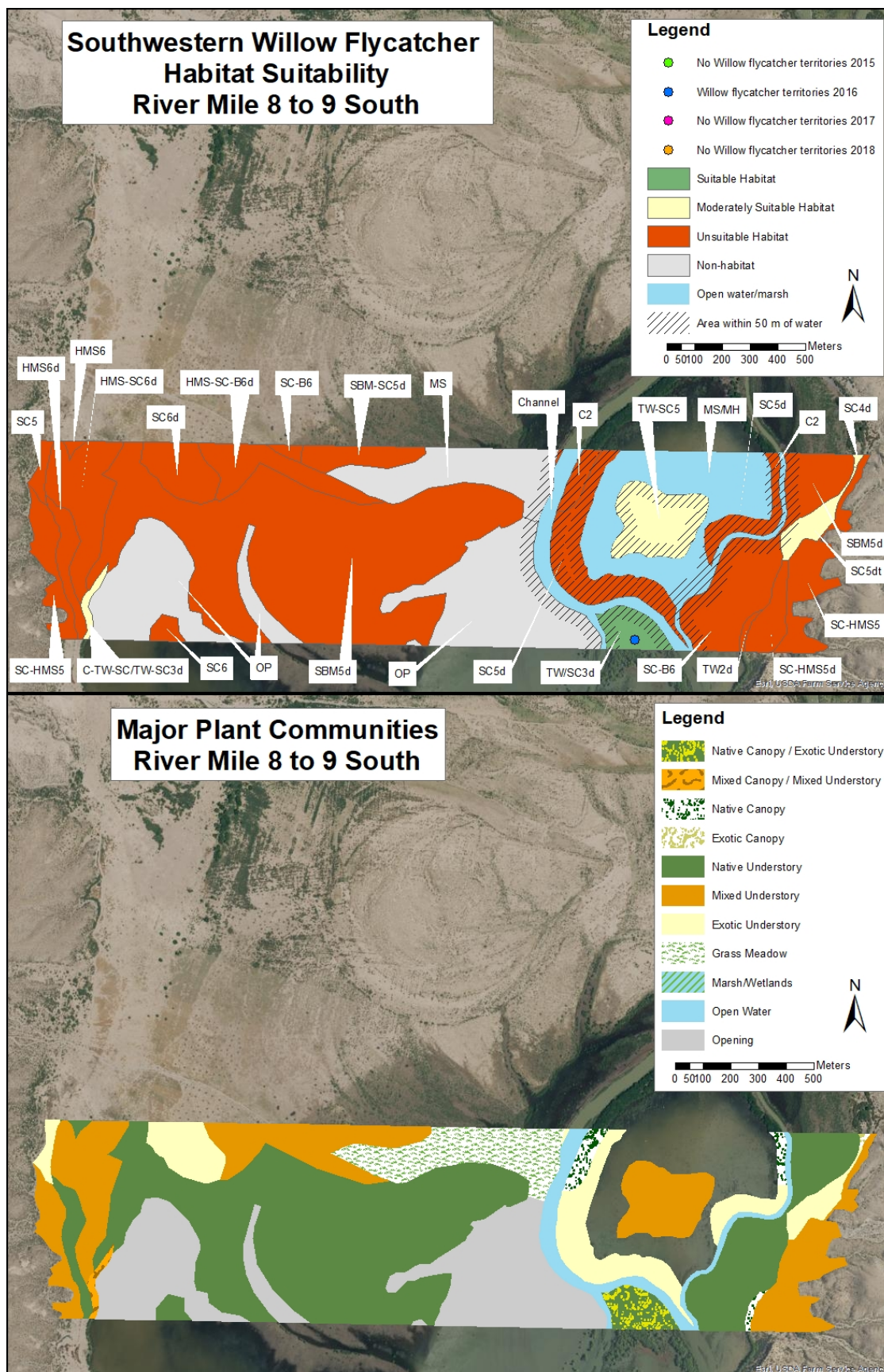
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	8	2	5	1
Moderately Suitable	25	5	13	4
Unsuitable	305	60	40	12
Total Habitat Area	338	67	58	17
Non-habitat	156	30	-	-
Channel/Reservoir	17	3	-	-
Total Area	511	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	TW/SC3d	8	2
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	C-TW-SC/TW-SC3d	2	0
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory			
Exotic Canopy/Exotic Understory			
Native Canopy	C2, TW2d	6	2
Mixed Canopy	-		
Exotic Canopy	SC4d	<1	0
Native Understory	HMS6, HMS6d, SBM5d	186	55
Mixed Understory	HMS-SC6d, HMS-SC-B6d, SBM-SC5d, SC-B6, SC-HMS5, SC-HMS5d, TW-SC5	91	27
Exotic Understory	SC5, SC5dt, SC5d, SC6, SC6d	45	13

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	1	0	1
2017	0	0	0
2018	0	0	0



River Mile 7 – 8 North

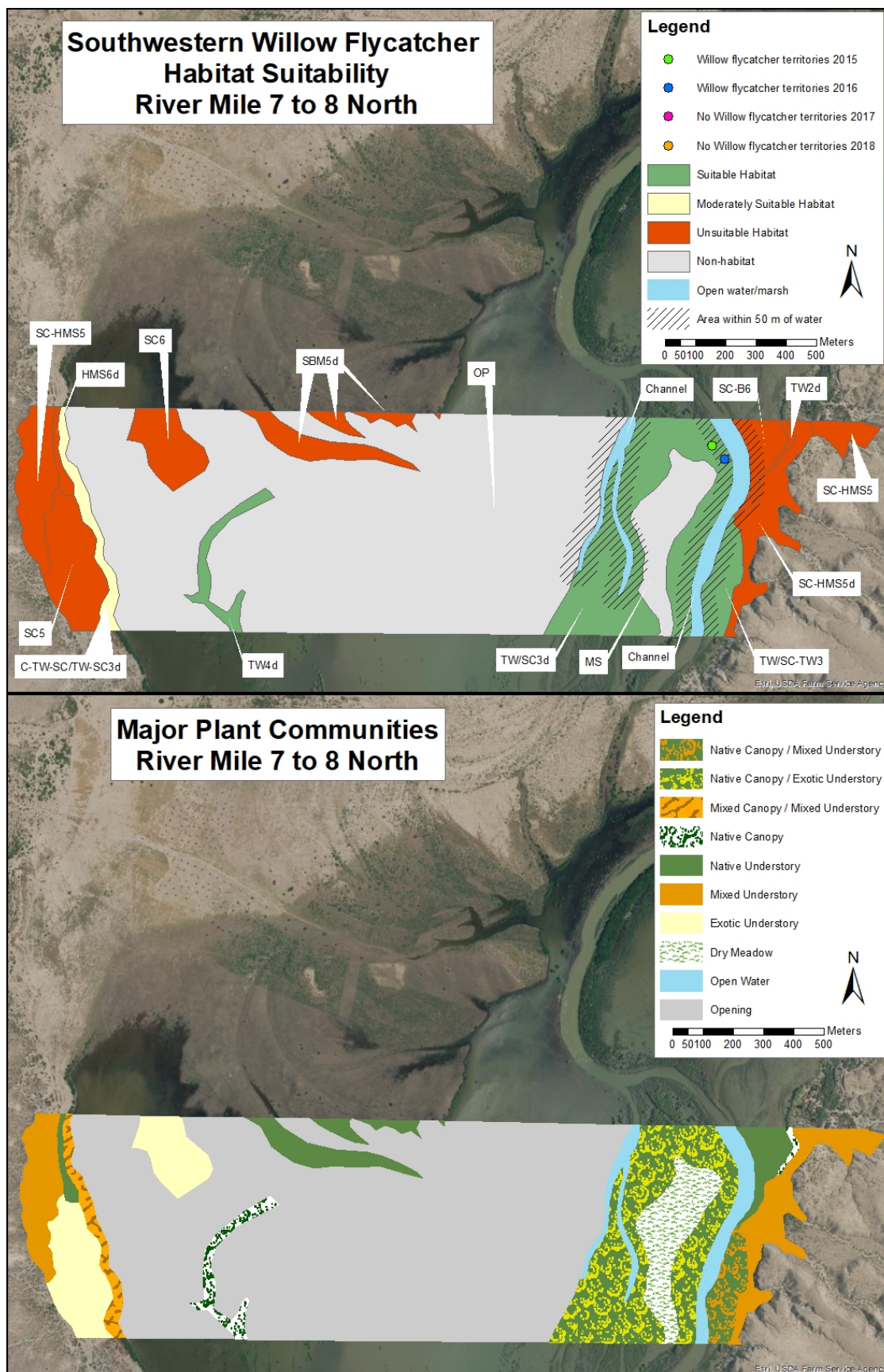
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	63	21	29	20
Moderately Suitable	7	2	0	0
Unsuitable	78	25	5	3
Total Habitat Area	148	48	34	23
Non-habitat	145	47	-	-
Channel/Reservoir	15	5	-	-
Total Area	308	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	TW/SC-TW3	8	6
Native Canopy/Exotic Understory	TW/SC3d	49	33
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	C-TW-SC/TW-SC3d	6	4
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory			
Exotic Canopy/Exotic Understory			
Native Canopy	TW2d, TW4d	6	4
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	HMS6d, SBM5d	13	9
Mixed Understory	SC-HMS5, SC-HMS5d, SC-B6	37	25
Exotic Understory	SC5, SC6	27	18

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	1	1
2016	1	0	1
2017	0	0	0
2018	0	0	0



River Mile 7 – 8 South

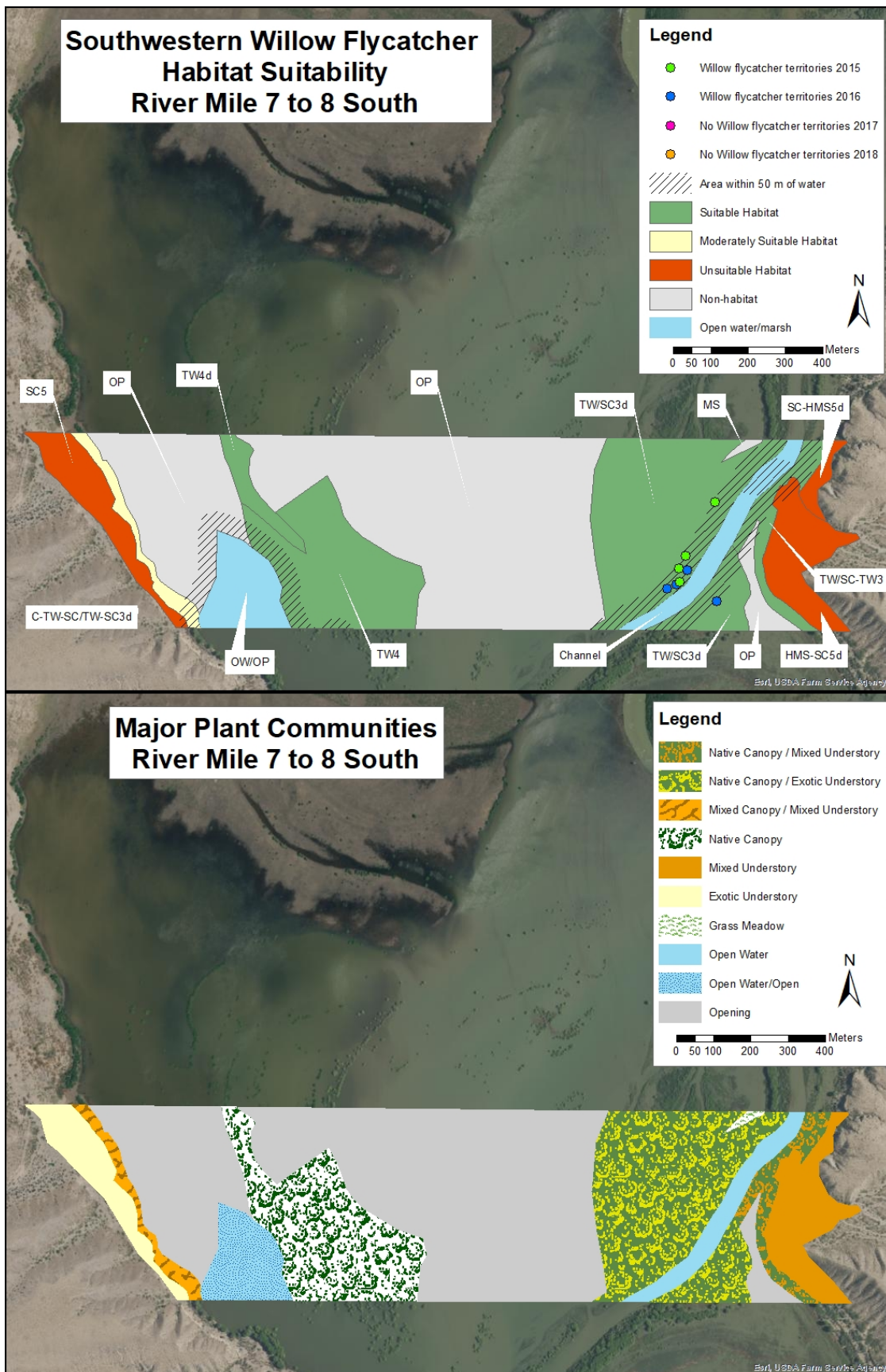
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	84	34	17	15
Moderately Suitable	4	2	1	1
Unsuitable	24	10	1	1
Total Habitat Area	112	46	19	
Non-habitat	128	51	-	-
Channel/Reservoir	8	3	-	-
Total Area	248	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	TW/TW-SC3	7	6
Native Canopy/Exotic Understory	TW/SC3d	46	41
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	C-TW-SC/TW-SC3d	4	4
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	TW4, TW4d	32	28
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	-		
Mixed Understory	HMS-SC5d, SC-HMS5d	14	13
Exotic Understory	SC5	10	9

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	2	2	4
2016	1	3	4
2017	0	0	0
2018	0	0	0



River Mile 6 – 7 North

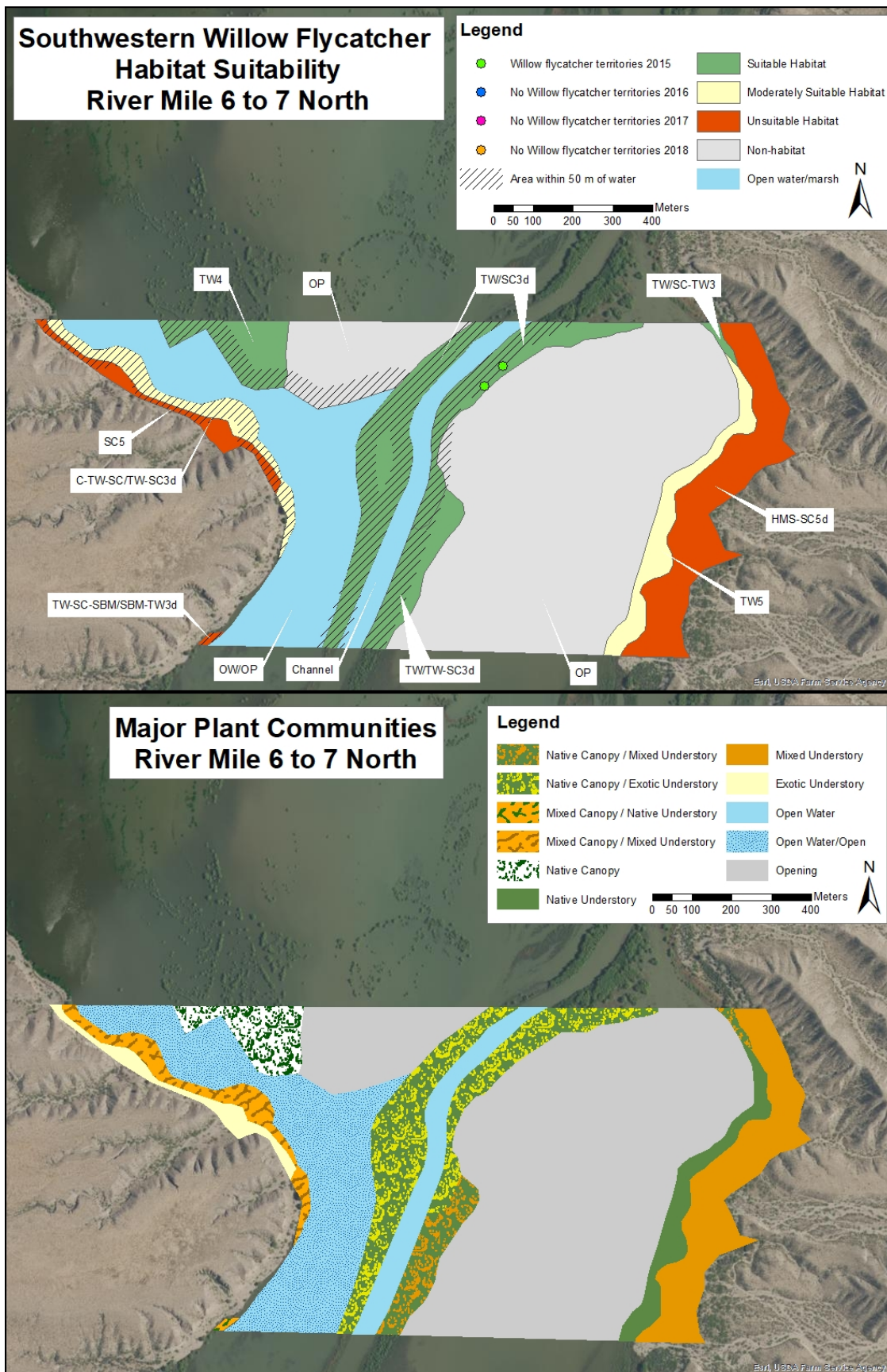
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	44	16	32	36
Moderately Suitable	16	6	7	8
Unsuitable	28	10	3	3
Total Habitat Area	88	32	42	48
Non-habitat	175	64	-	-
Channel/Reservoir	12	4	-	-
Total Area	275	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	TW/SC-TW3, TW/TW-SC3d	8	9
Native Canopy/Exotic Understory	TW/SC3d	27	31
Mixed Canopy/Native Understory	TW-SC-SBM/SBM-TW3d	<1	0
Mixed Canopy/Mixed Understory	C-TW-SC/TW-SC3d	8	9
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	TW4	8	9
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	TW5	9	10
Mixed Understory	HMS-SC5d	23	27
Exotic Understory	SC5	5	5

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	2	2
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 6 – 7 South

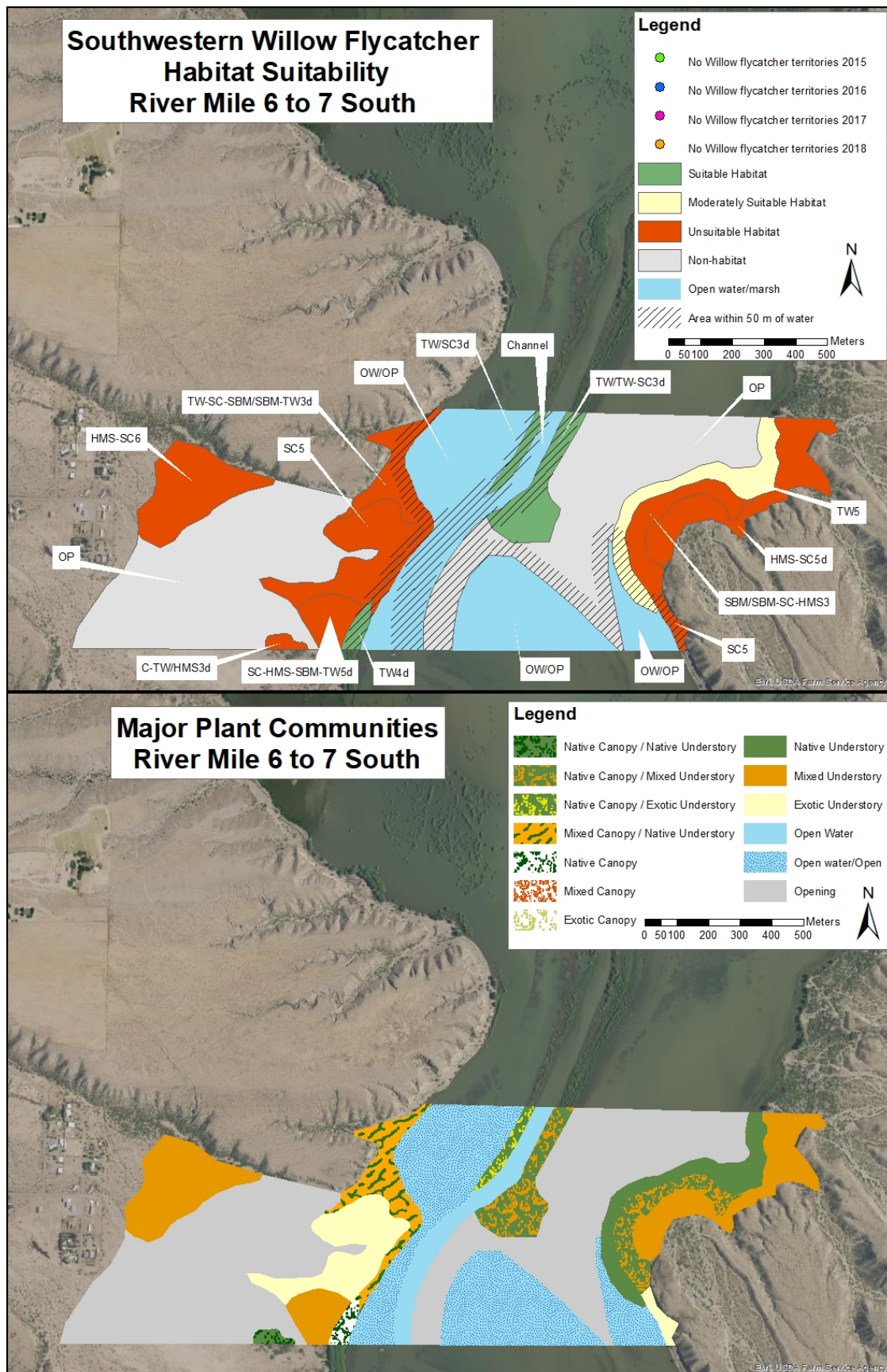
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	15	5	10	9
Moderately Suitable	13	4	3	3
Unsuitable	80	25	11	10
Total Habitat Area	108	34	24	22
Non-habitat	198	62	-	-
Channel/Reservoir	12	4	-	-
Total Area	318	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C-TW/HMS3d	1	1
Native Canopy/Mixed Understory	SBM/SBM-SC-HMS3, TW/TW-SC3d	19	18
Native Canopy/Exotic Understory	TW/SC3d	2	2
Mixed Canopy/Native Understory	TW-SC-SBM/SBM-TW3d	11	11
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	TW4d	2	2
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	TW5	13	12
Mixed Understory	HMS-SC5d, HMS-SC6, SC-HMS-SBM-TW5d	40	37
Exotic Understory	SC5	18	17

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



Lower Section

River Miles 6 to 0

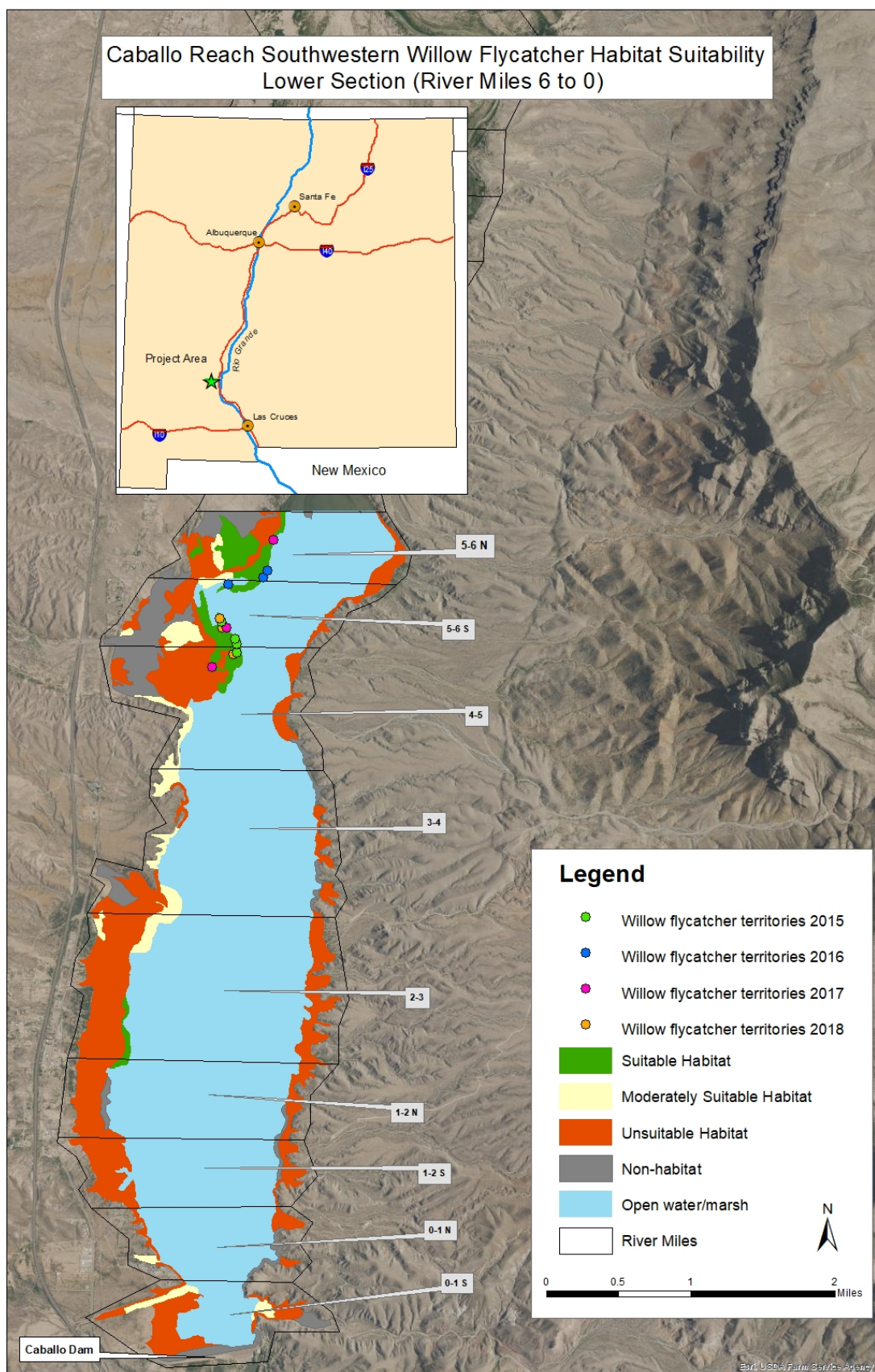
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	136	3	53	4
Moderately Suitable	151	3	42	3
Unsuitable	973	20	171	14
Total Habitat Area	1260	26	266	21
Non-habitat	264	6	-	-
Channel/Reservoir	3272	68	-	-
Total Area	4796	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C-TW/HMS3d	1	0
Native Canopy/Mixed Understory	C/SC-B1d, C/SC-HMS3d, C-SBM/SC-SBM-B3d TW/SC-TW3, TW/TW-SC3d	71	6
Native Canopy/Exotic Understory	C/SC1, C-TW/SC3d, TW/SC3d, TW-C/SC1, TW-C/SC3d	100	8
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	C-SC/SBM-SC3, TW-SC/HMS-SC3d	22	2
Mixed Canopy/Exotic Understory	C-SC/SC3d	6	0
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	SC/SC3d	8	1
Native Canopy	C4d, C-TW4, TW2d, TW4d	57	5
Mixed Canopy	C-SC4	6	0
Exotic Canopy	SC4, SC4d	26	2
Native Understory	ATX6, ATX-HMS6, B5d, BB6, B-SBM5, CR-HMS6d, HMS5, HMS5d, HMS6, HMS6d, HMS-CR6d	188	15
Mixed Understory	C-SC5d, HMS-SC5, SC-B5d, SC-BB5d, SC-HMS5, SC-HMS5d, SC-HMS-SBM-TW5d, SC-SBM5d, TW-SC5d	463	37
Exotic Understory	SC5, SC5d, SC5dt, SC5t	311	25

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	1	3	4
2016	3	0	3
2017	3	0	3
2018	1	2	3



River Mile 5 – 6 North

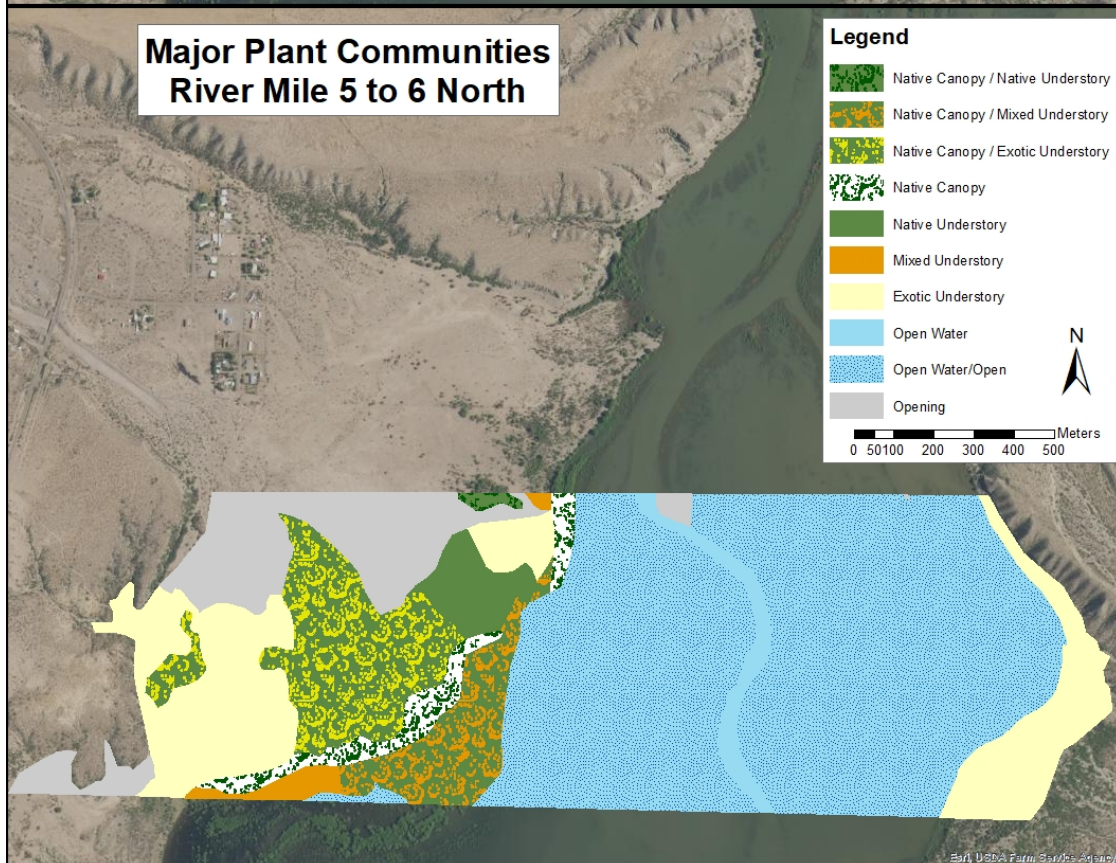
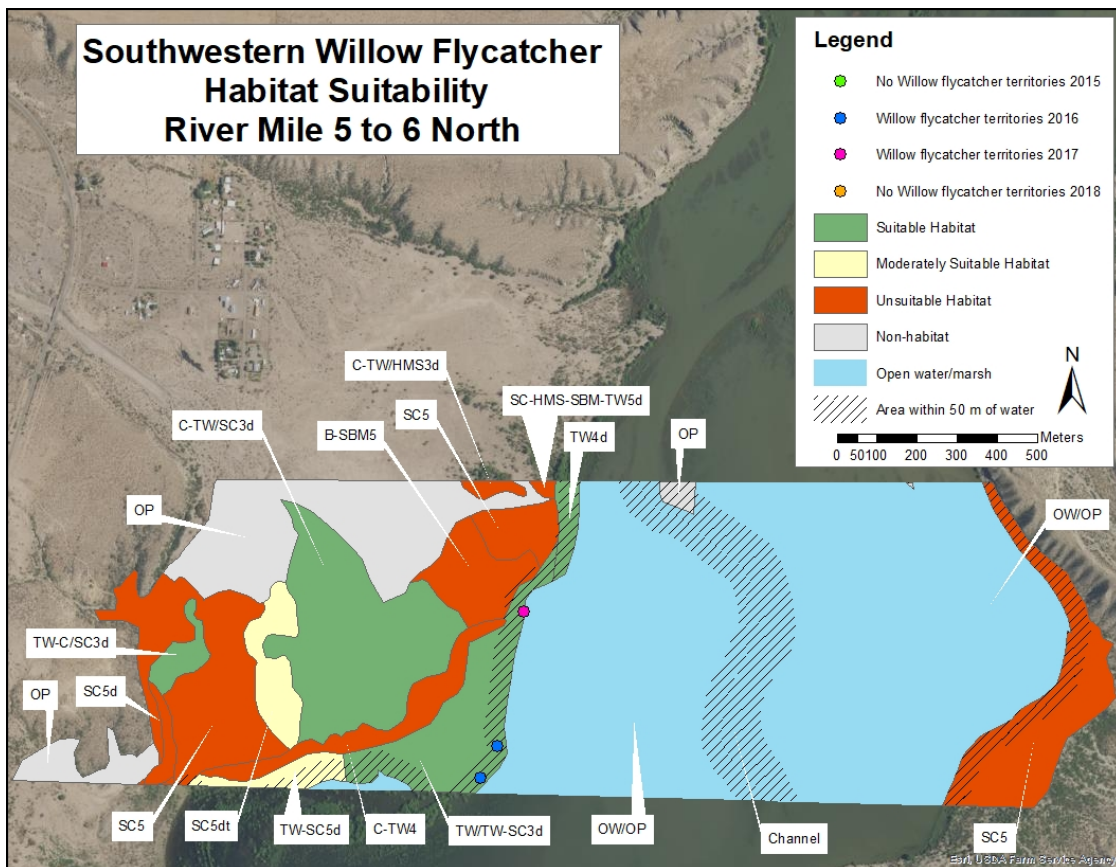
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	67	15	13	8
Moderately Suitable	13	3	2	1
Unsuitable	84	18	8	5
Total Habitat Area	164	36	23	14
Non-habitat	276	62	-	-
Channel/Reservoir	9	2	-	-
Total Area	449	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	C-TW/HMS3d	1	1
Native Canopy/Mixed Understory	TW/TW-SC3d	22	14
Native Canopy/Exotic Understory	C-TW/SC3d, TW-C/SC3d	42	26
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	C-TW4, TW4d	13	8
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	B-SBM5	10	6
Mixed Understory	SC-HMS-SBM-TW5d, TW-SC5d	7	3
Exotic Understory	SC5, SC5d, SC5dt	71	43

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	2	0	2
2017	1	0	1
2018	0	0	0



River Mile 5 – 6 South

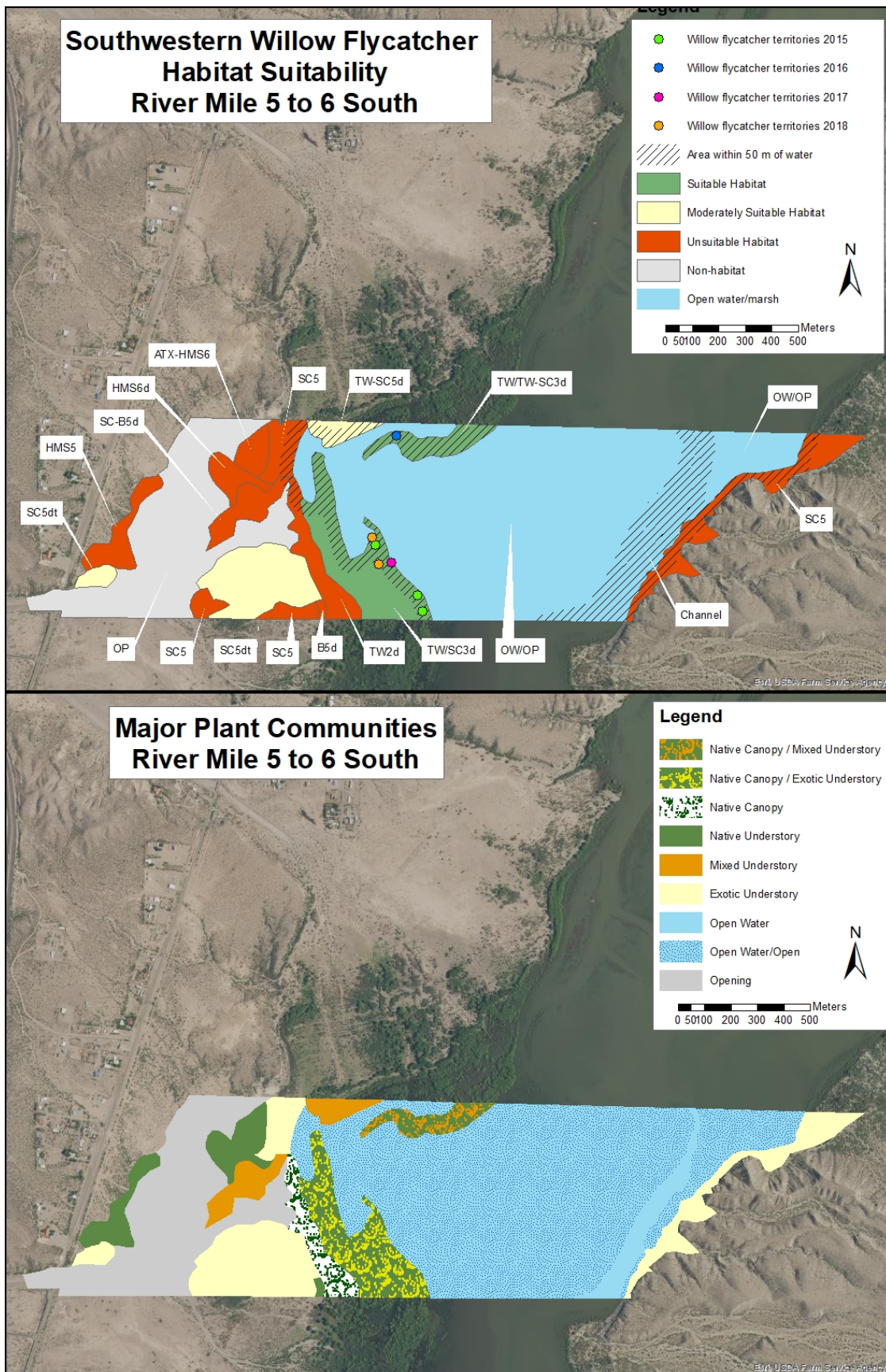
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	35	8	22	17
Moderately Suitable	29	7	4	3
Unsuitable	64	15	15	12
Total Habitat Area	128	30	41	32
Non-habitat	282	67	-	-
Channel/Reservoir	12	3	-	-
Total Area	422	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	TW/TW-SC3d	8	7
Native Canopy/Exotic Understory	TW/SC3d	26	21
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	TW2d	10	8
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	ATX-HMS6, B5d, HMS5, HMS6d	18	14
Mixed Understory	SC-B5d, TW-SC5d	12	9
Exotic Understory	SC5, SC5dt	54	42

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	3	3
2016	1	0	1
2017	1	0	1
2018	1	1	2



River Mile 4 - 5

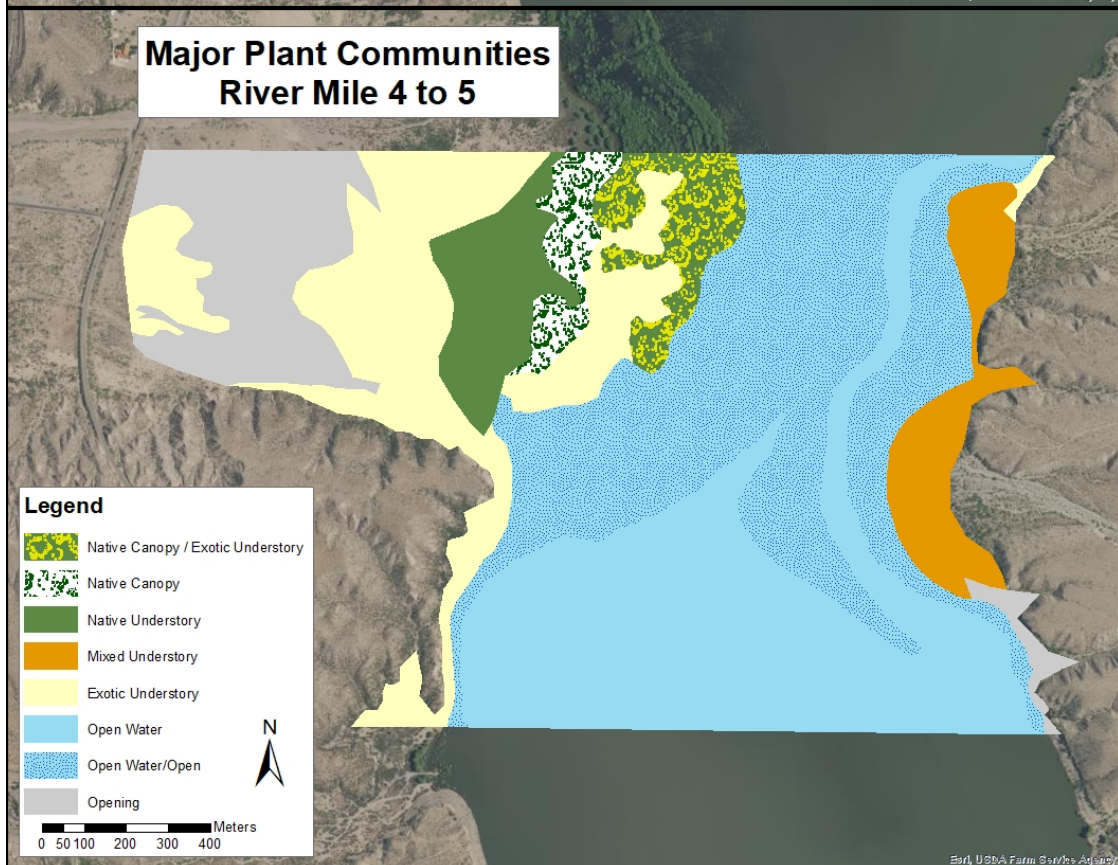
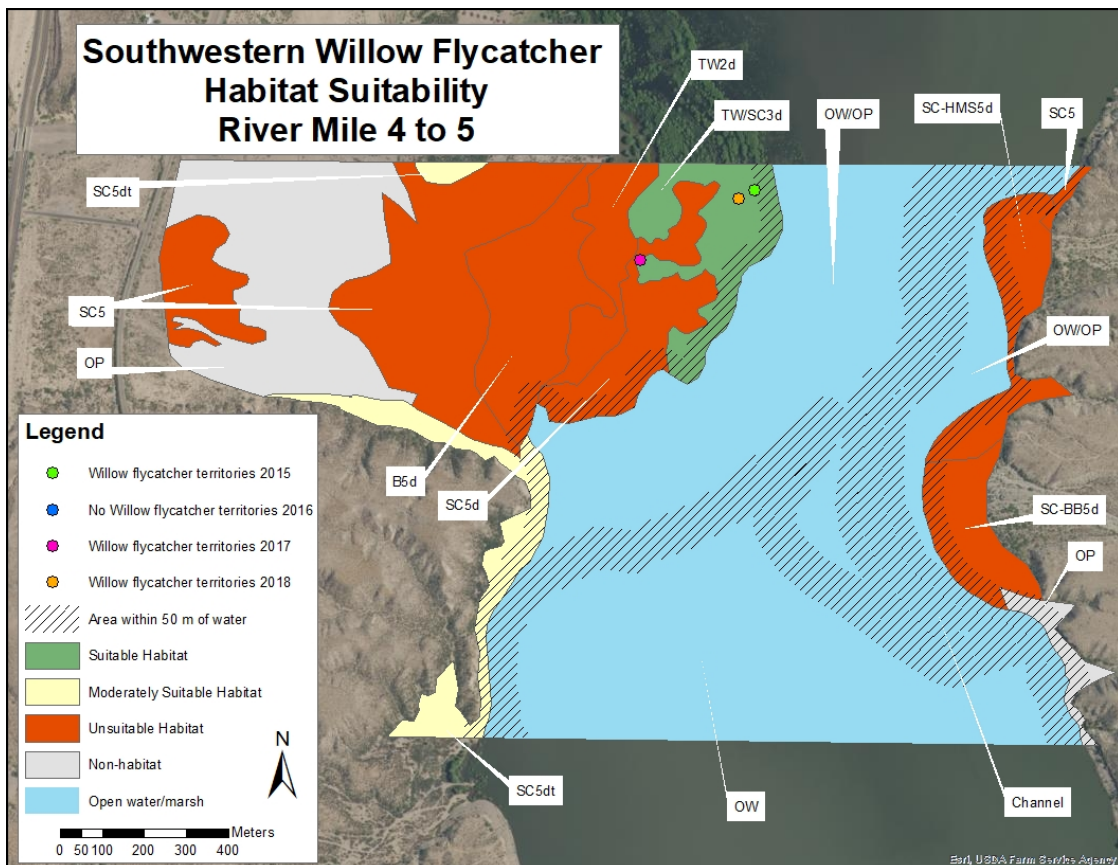
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	21	4	8	4
Moderately Suitable	20	4	7	4
Unsuitable	148	27	22	12
Total Habitat Area	189	34	37	20
Non-habitat	221	40	-	-
Channel/Reservoir	148	27	-	-
Total Area	558	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	TW/SC3d	21	11
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	TW2d	14	7
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	B5d	27	14
Mixed Understory	SC-BB5d, SC-HMS5d	30	16
Exotic Understory	SC5, SC5d, SC5dt	97	51

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	1	0	1
2016	0	0	0
2017	1	0	1
2018	0	1	1



River Mile 3 - 4

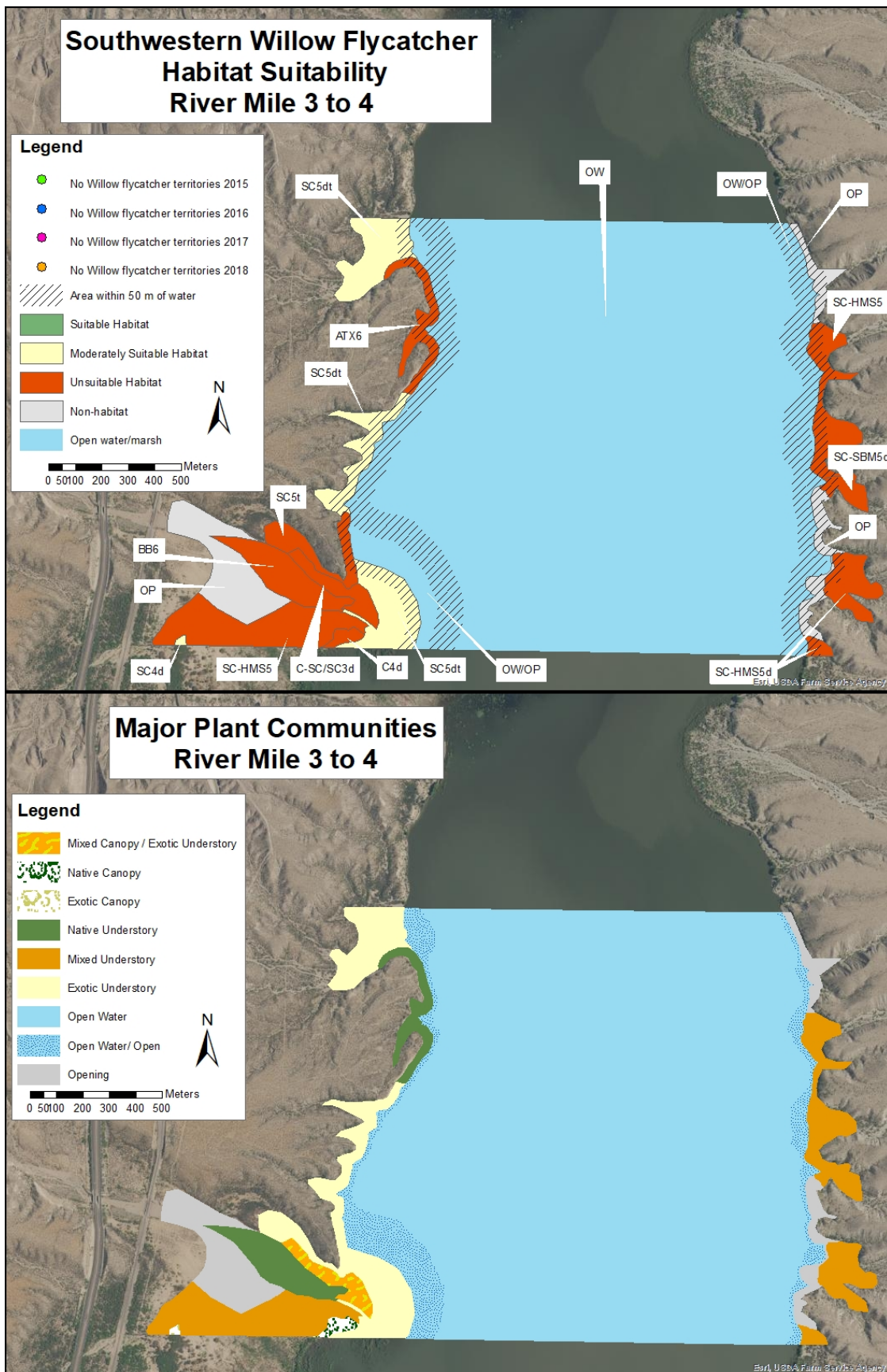
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	37	5	14	11
Unsuitable	85	11	18	15
Total Habitat Area	122	16	32	26
Non-habitat	75	9	-	-
Channel/Reservoir	584	75	-	-
Total Area	781	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	C-SC/SC3d	6	5
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	C4d	2	1
Mixed Canopy	-		
Exotic Canopy	SC4d	<1	0
Native Understory	ATX6, BB6	20	17
Mixed Understory	SC-HMS5, SC-HMS5d, SC-SBM5d	50	41
Exotic Understory	SC5t, SC5dt	45	37

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 2 - 3

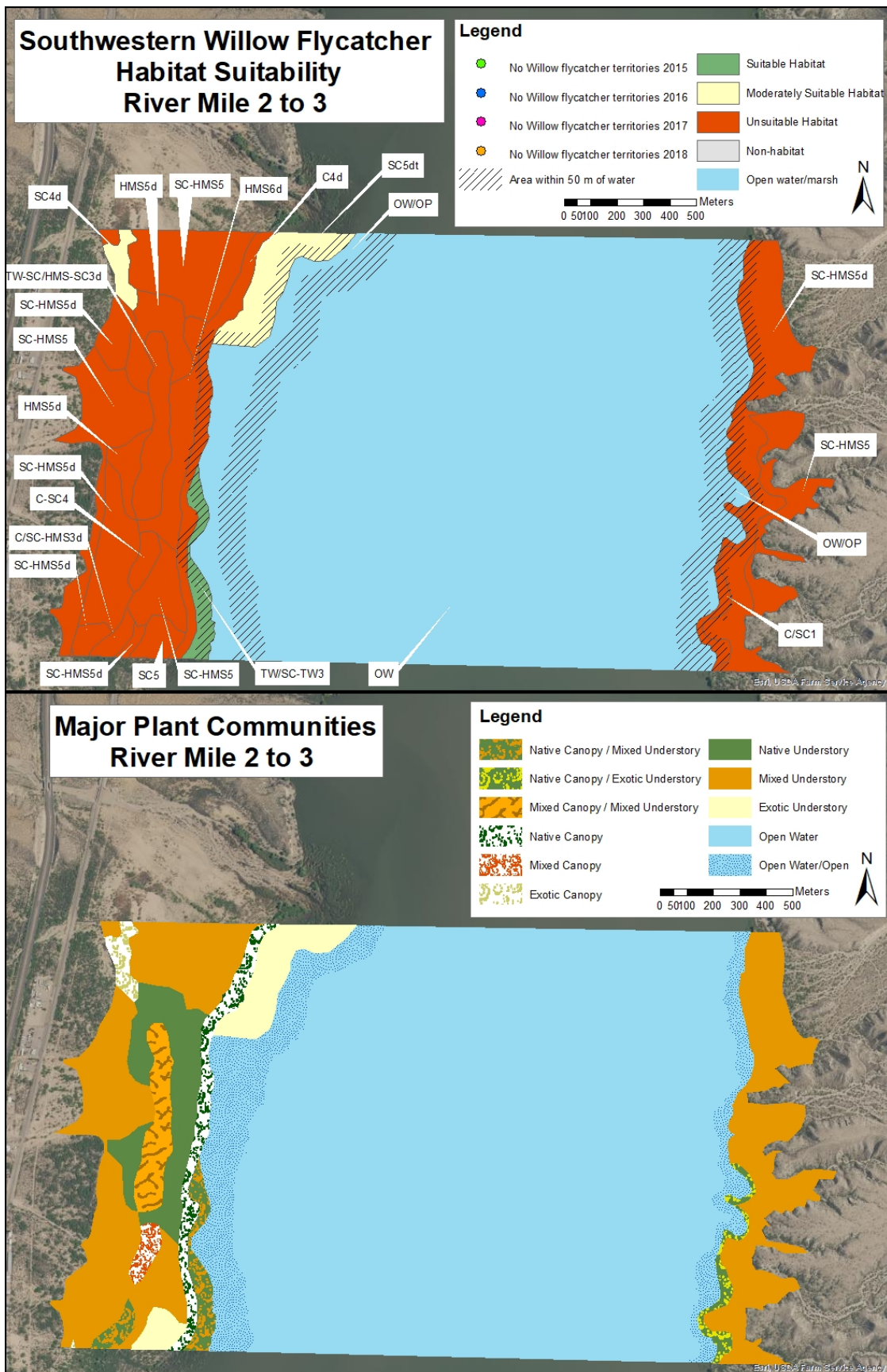
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	9	1	8	3
Moderately Suitable	25	3	10	4
Unsuitable	256	24	33	11
Total Habitat Area	290	28	51	18
Non-habitat	85	8	-	-
Channel/Reservoir	678	64	-	-
Total Area	1053	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	C/SC-HMS3d, TW/SC-TW3	13	4
Native Canopy/Exotic Understory	C/SC1	7	2
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	TW-SC/HMS-SC3d	15	5
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	C4d	18	6
Mixed Canopy	C-SC4	4	1
Exotic Canopy	SC4, SC4d	5	2
Native Understory	HMS5d, HMS6d	37	13
Mixed Understory	SC-HMS5, SC-HMS5d	167	57
Exotic Understory	SC5, SC5dt	25	9

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 1 – 2 North

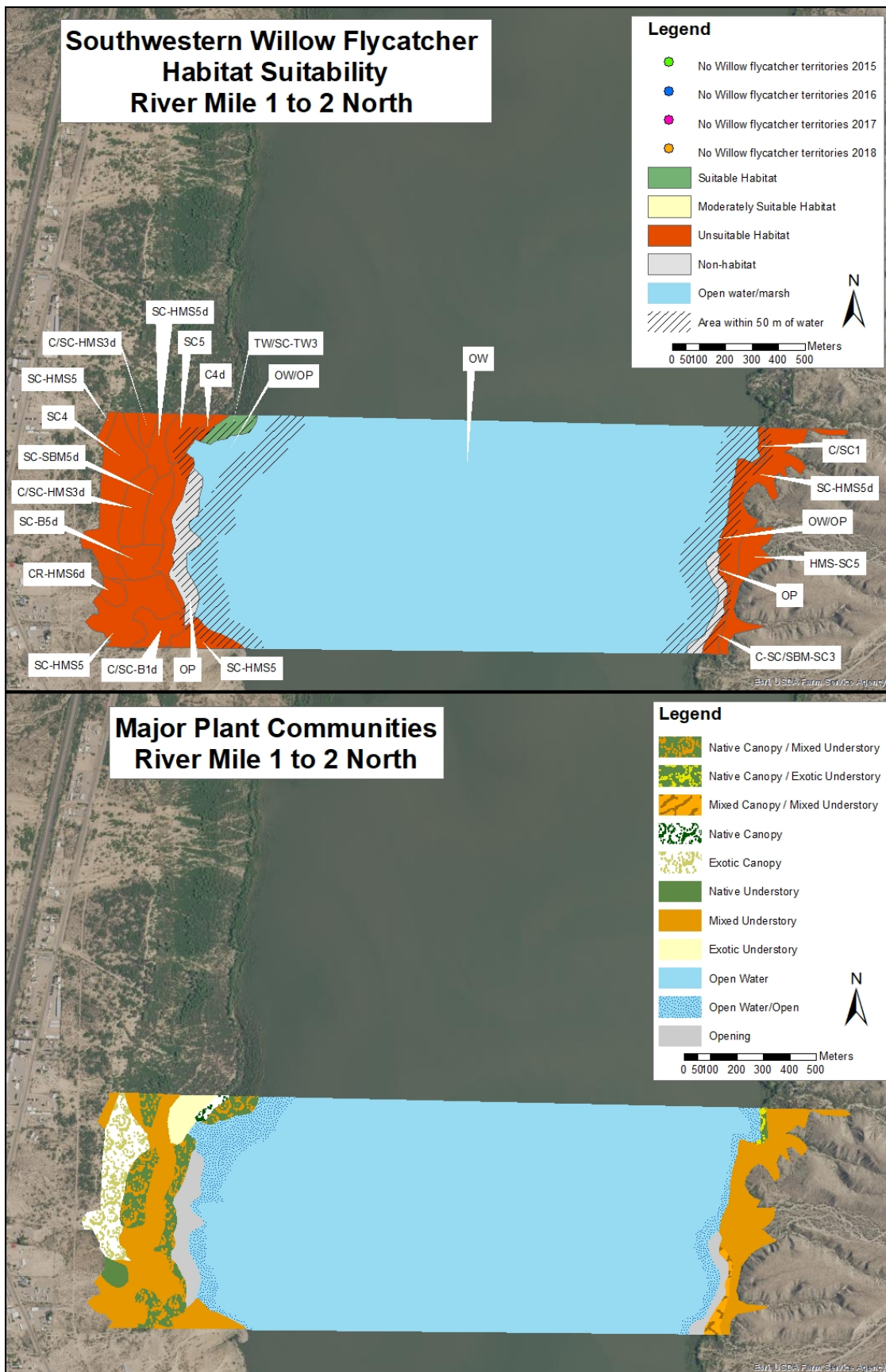
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	3	1	3	3
Moderately Suitable	0	0	0	0
Unsuitable	103	20	15	14
Total Habitat Area	106	20	18	17
Non-habitat	23	4	-	-
Channel/Reservoir	393	75	-	-
Total Area	522	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	C/SC-B1d, C/SC-HMS3d, TW/SC-TW3	22	21
Native Canopy/Exotic Understory	C/SC1	1	1
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	C-SC/SBM-SC3	2	2
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	C4d	1	1
Mixed Canopy	-		
Exotic Canopy	SC4	16	15
Native Understory	CR-HMS6d	2	2
Mixed Understory	HMS-SC5, SC-B5d, SC-HMS5, SC-HMS5d, SC-SBM5d	57	54
Exotic Understory	SC5	5	4

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 1 – 2 South

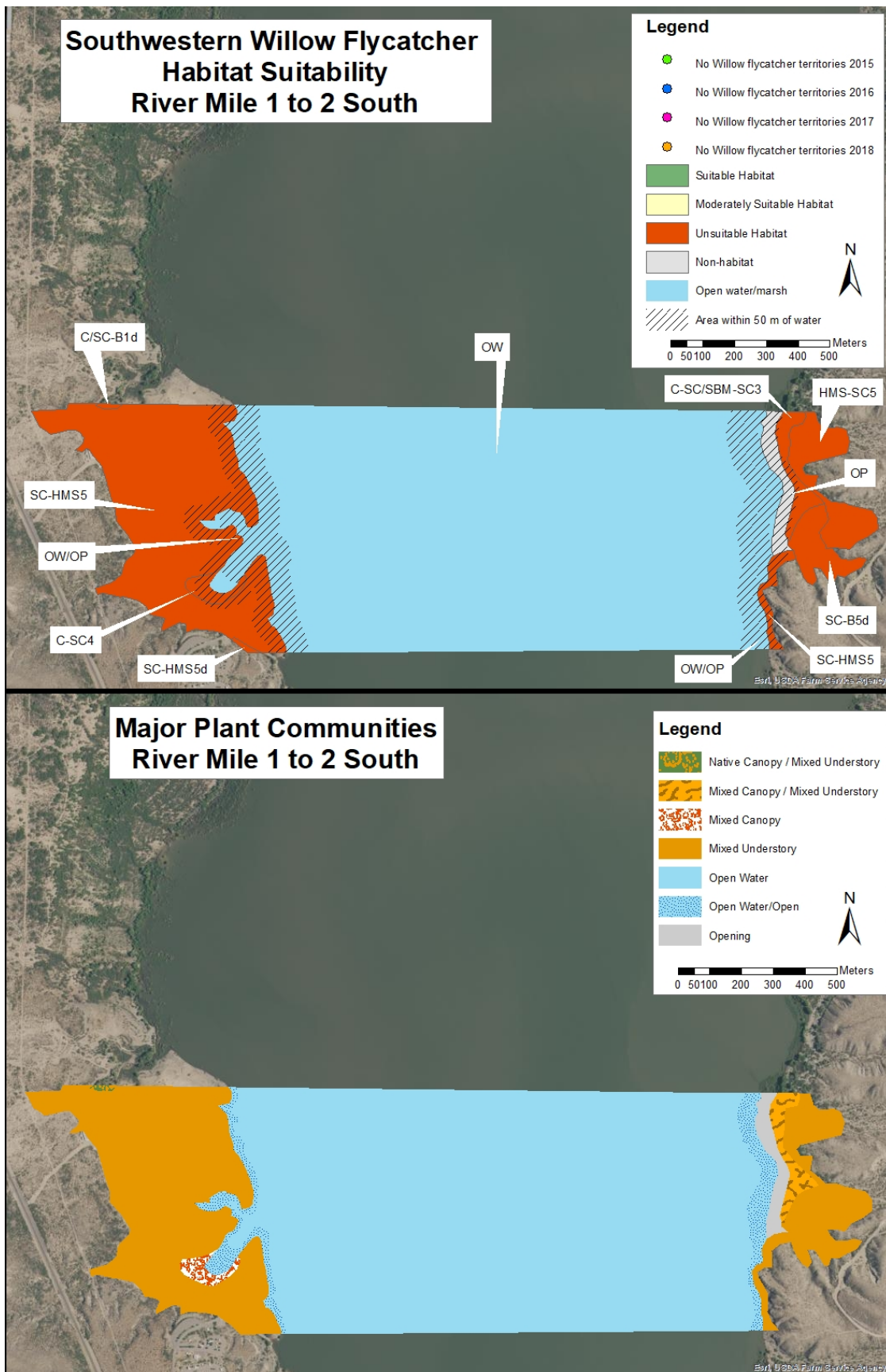
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	0	0	0	0
Unsuitable	104	25	22	21
Total Habitat Area	104	25	22	21
Non-habitat	21	5	-	-
Channel/Reservoir	293	70	-	-
Total Area	418	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	C/SC-B1d	<1	0
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	C-SC/SBM-SC3	4	4
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	C-SC4	2	2
Exotic Canopy	-		
Native Understory	-		
Mixed Understory	HMS-SC5, SC-B5d, SC-HMS5, SC-HMS5d	97	93
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 0 - 1 North

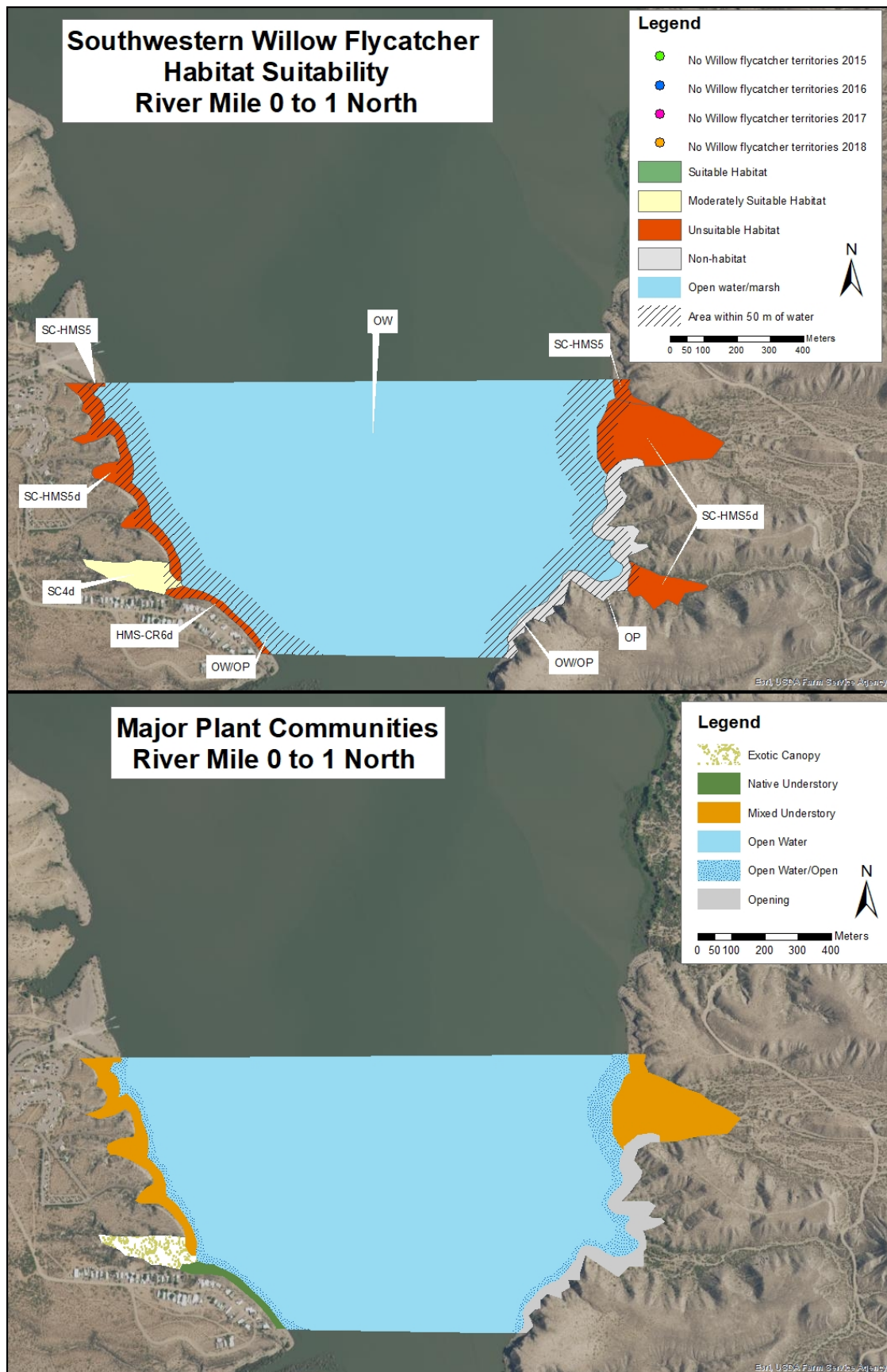
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	4	1	1	3
Unsuitable	29	10	13	39
Total Habitat Area	33	11	14	42
Non-habitat	26	9	-	-
Channel/Reservoir	238	80	-	-
Total Area	297	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	-		
Native Canopy/Exotic Understory	-		
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	-		
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	SC4d	4	13
Native Understory	HMS-CR6d	2	7
Mixed Understory	SC-HMS5, SC-HMS5d	27	80
Exotic Understory	-		

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



River Mile 0 – 1 South

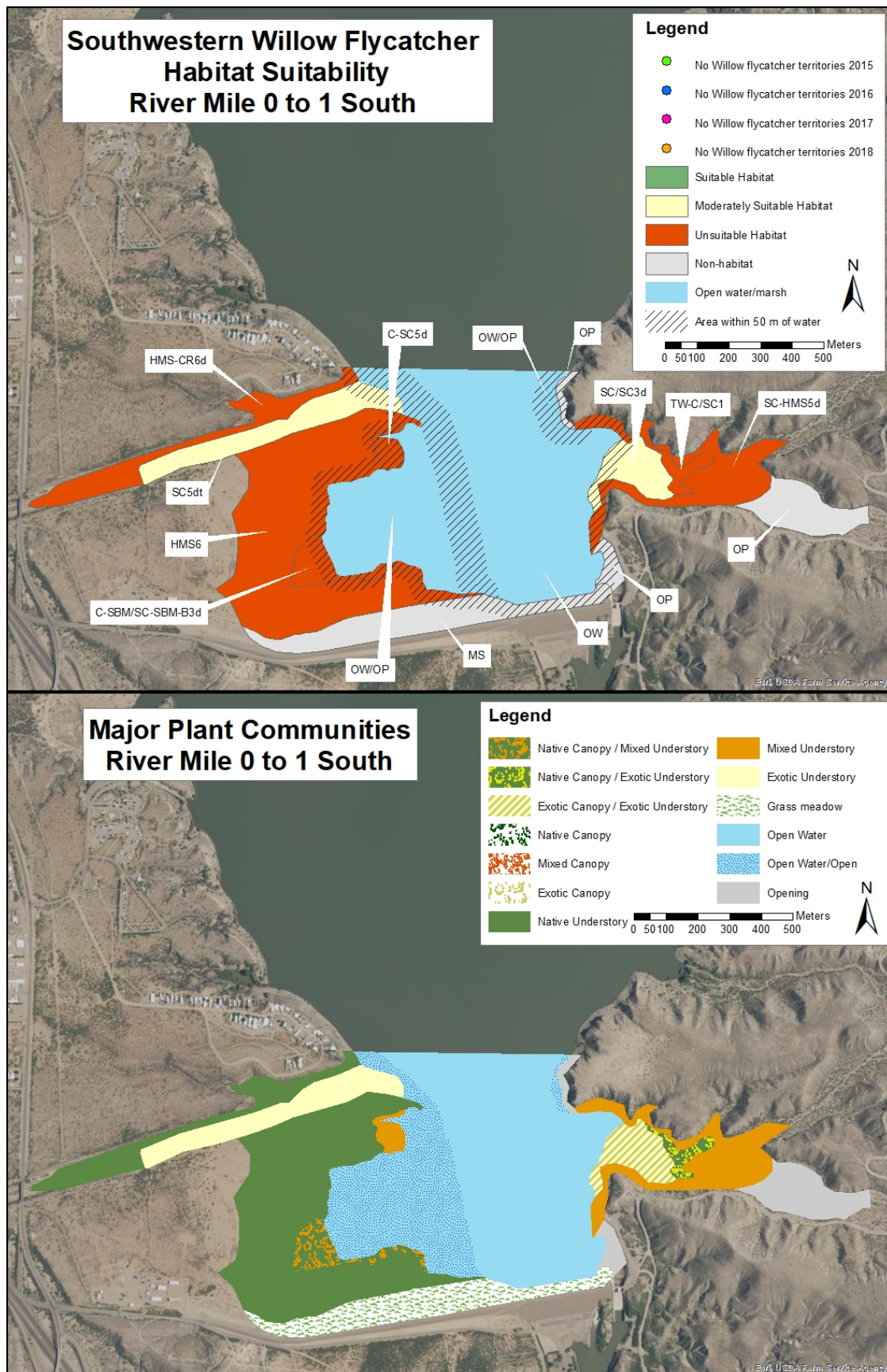
Suitability Class	Acreage		Acreage within 50m of water	
	No. of Acres	Percentage of Total	No. of Acres	Percentage of Habitat
Suitable	0	0	0	0
Moderately Suitable	22	8	5	4
Unsuitable	100	36	20	16
Total Habitat Area	122	44	25	20
Non-habitat	76	28	-	-
Channel/Reservoir	78	28	-	-
Total Area	276	100	-	-

Dominant Plant Communities within Reach

Community Type	Species Composition Hink & Ohmart Classification	Acres	Percentage of Habitat
Native Canopy/Native Understory	-		
Native Canopy/Mixed Understory	C-SBM/SC-SBM-B3d	6	5
Native Canopy/Exotic Understory	TW-C/SC1	3	2
Mixed Canopy/Native Understory	-		
Mixed Canopy/Mixed Understory	-		
Mixed Canopy/Exotic Understory	-		
Exotic Canopy/Native Understory	-		
Exotic Canopy/Mixed Understory	-		
Exotic Canopy/Exotic Understory	SC/SC3d	8	6
Native Canopy	-		
Mixed Canopy	-		
Exotic Canopy	-		
Native Understory	HMS6, HMS-CR6d	72	59
Mixed Understory	C-SC5d, SC-HMS5d	20	16
Exotic Understory	SC5dt	15	12

Southwestern Willow Flycatcher Territories

Year	Number of Unpaired/Undetermined	Number of Pairs	Total Number of Territories
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0



PEER REVIEW DOCUMENTATION

PROJECT AND DOCUMENT INFORMATION

Project Name Caballo Vegetation Mapping and SWFL Suitability Modelling
WOID FA727

Document Southwestern Willow Flycatcher Habitat Suitability 2018 – Caballo Reach
Document Date July 2019
Team Leader Dave Moore

Document Author(s)/Preparer(s) Rebecca Siegle, Darrell Ahlers

Peer Reviewer Dave Moore

REVIEW REQUIREMENT

Part A: Document Does Not Require Peer Review

Explain _____

Part B: Document Requires Peer Review: SCOPE OF PEER REVIEW

Peer Review restricted to the following Items/Section(s): Reviewer:

Entire document subject to review _____

REVIEW CERTIFICATION

Peer Reviewer - I have reviewed the assigned Items/Section(s) noted for the above document and believe them to be in accordance with the project requirements, standards of the profession, and Reclamation policy.

Reviewer: Dave Moore Review Date: November 2018

Signature: 

I have discussed the above document and review requirements with the Peer Reviewer and believe that this review is completed, and that the document will meet the requirements of the project.

Team Leader: Dave Moore Date: July 3, 2019 Signature: 