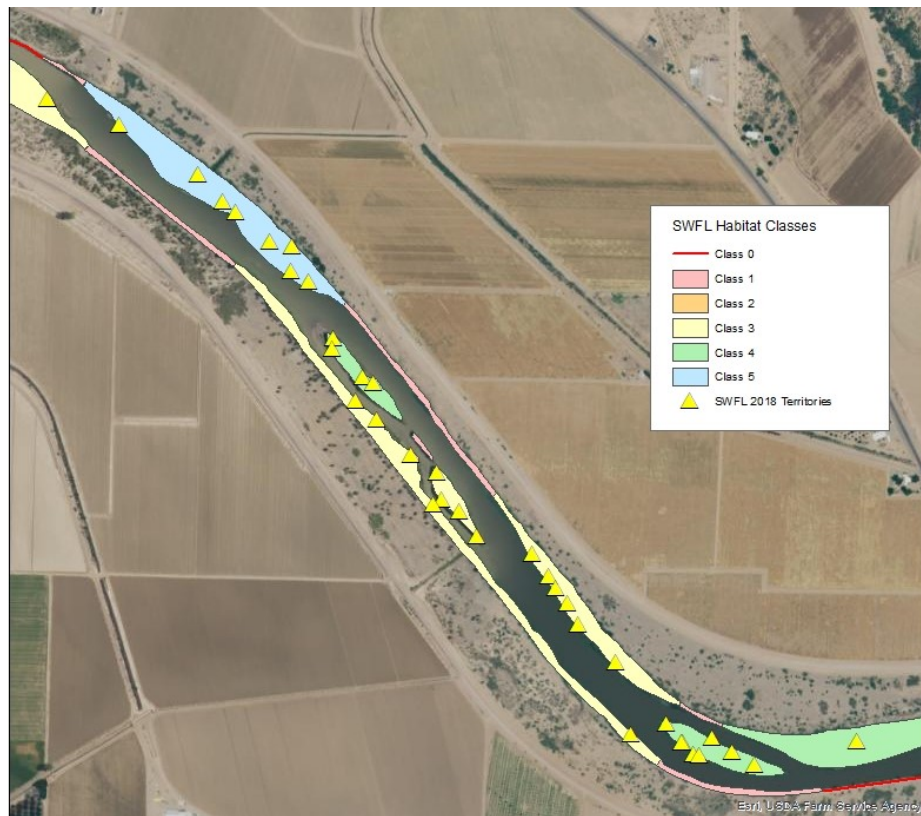


RECLAMATION

Managing Water in the West

Southwestern Willow Flycatcher Habitat Classification 2018

Lower Rio Grande from Elephant Butte Dam, NM to El Paso,
TX



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

July 2019

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Southwestern Willow Flycatcher Habitat Classification 2018

**Lower Rio Grande from Elephant Butte Dam, NM to El Paso,
TX**

Report No. ENV-2019-062

prepared for

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Executive Summary

Bureau of Reclamation personnel classified the suitability of riparian habitat for breeding Southwestern Willow Flycatchers within the active floodplain of the Rio Grande between Elephant Butte Dam, New Mexico and El Paso, Texas during the spring of 2018. Seven different study reaches were delineated based on geographic landmarks, habitat characteristics and ongoing surveys for the endangered Southwestern Willow Flycatcher. All ground within the active floodplain (i.e. not separated from the river channel by roads, levees, etc.) was visually classified based on its suitability as breeding habitat. Classification was performed either via kayak or on foot by biologists intimately familiar with habitat requirements of the species. Habitat classes ranged from zero (non-habitat) to five (highly suitable) and took into consideration patch width, vegetation height, structural diversity and hydrology; classes 2 and below were considered unsuitable and classes 3 through 5 were considered at least moderately suitable.

Within the study area's 216 kilometers of riparian corridor, approximately 44 percent of the linear distance of riverbank was classified as zero, or non-habitat. The Caballo Reach (between Elephant Butte Dam and Caballo Dam) and Mesilla Reach had the highest percentages of non-habitat due to ongoing and historic land use and management activities. Overall, approximately 160 hectares of suitable habitat were mapped within the study area, with the majority of it located within the Caballo Reservoir delta and Hatch Reach. Not surprisingly, these reaches were also home to the majority of resident flycatchers detected during the 2018 surveys. Data generated during 2018 documented an increase in habitat quality and quantity when compared to 2012 data, presumably due to recent continual flows in the river.

Introduction

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

The SWFL was listed as endangered under the Endangered Species Act in 1995 (USFWS 1995). Bureau of Reclamation biologists began formal surveys for the species along the Rio Grande soon thereafter using protocol issued by the U.S. Fish and Wildlife Service (Sogge, et.al. 2010). During the following 10 years, a sizeable population of SWFLs developed in the delta of Elephant Butte Reservoir as reservoir levels receded and bare mineral soil was colonized by vast expanses of primarily native vegetation. A flycatcher habitat mapping and modeling effort conducted in 2008 documented 4200 acres [1700 hectares (ha)] of suitable habitat within the San Marcial reach (which encompasses Elephant Butte Reservoir) of the Middle Rio Grande (Ahlers et al. 2010). The San Marcial population is currently the largest known breeding population within the range of the subspecies. The most recent update to the Middle Rio Grande mapping effort was conducted over a larger study area in 2016 and documented more than 13,000 acres (5,260 ha) of suitable habitat between the Isleta Pueblo and Elephant Butte Dam (Siegle and Ahlers 2017).

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

conducted during 2012 documented 28 SWFL territories, which eclipsed the recovery goal of 25 for the Lower Rio Grande Management Unit (USFWS 2002). Annual SWFL surveys within the Lower Rio Grande since 2012 have documented a growing population. During the spring of 2016, habitat mapping of the Lower Rio Grande was again conducted in order to update the 2012 study. The study area was expanded north to Elephant Butte Dam in order to encompass the developing habitat within the Caballo Reservoir delta. Habitat mapping was again conducted within this same area in 2018; the following sections present details of the 2018 habitat classification.

Methods

Study Area

During the 2018 study, riparian habitat classification was conducted within the Lower Rio Grande from Elephant Butte Dam, New Mexico to the international boundary (River mile 0) adjacent to El Paso, Texas (Figure 1). This stretch of river is highly managed and regulated by flow releases from Elephant Butte and Caballo Dams. The river channel is often dry or experiences low flows in the winter and carries water during the irrigation season (generally March to October but may be shorter when water availability is limited). If water is available, releases are sufficient to provide irrigation water but rarely reach magnitudes that lead to inundation of the surrounding floodplain. Thus, much of the floodplain within this stretch of river is more xeric than upstream reaches and typically dominated by exotic saltcedar or upland species. All habitats within the active floodplain of the Rio Grande (i.e. not separated hydrologically from the active river channel by a major impediment such as a road or levee) were classified based on a system initially developed for use in the Upper Rio Grande (Ahlers 2009). This system consisted of habitat classes ranging from zero to five and was modified to account for the differences in habitat characteristics at the lower elevations of southern New Mexico.

Habitat Classification

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

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

Class 1 (Unsuitable) = Vegetation height is greater than 3 m and patch width is less than 10 m (i.e. patch width is limiting factor). Habitat of this class generally consists of narrow bands of coyote willow or saltcedar within the river channel prism.

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

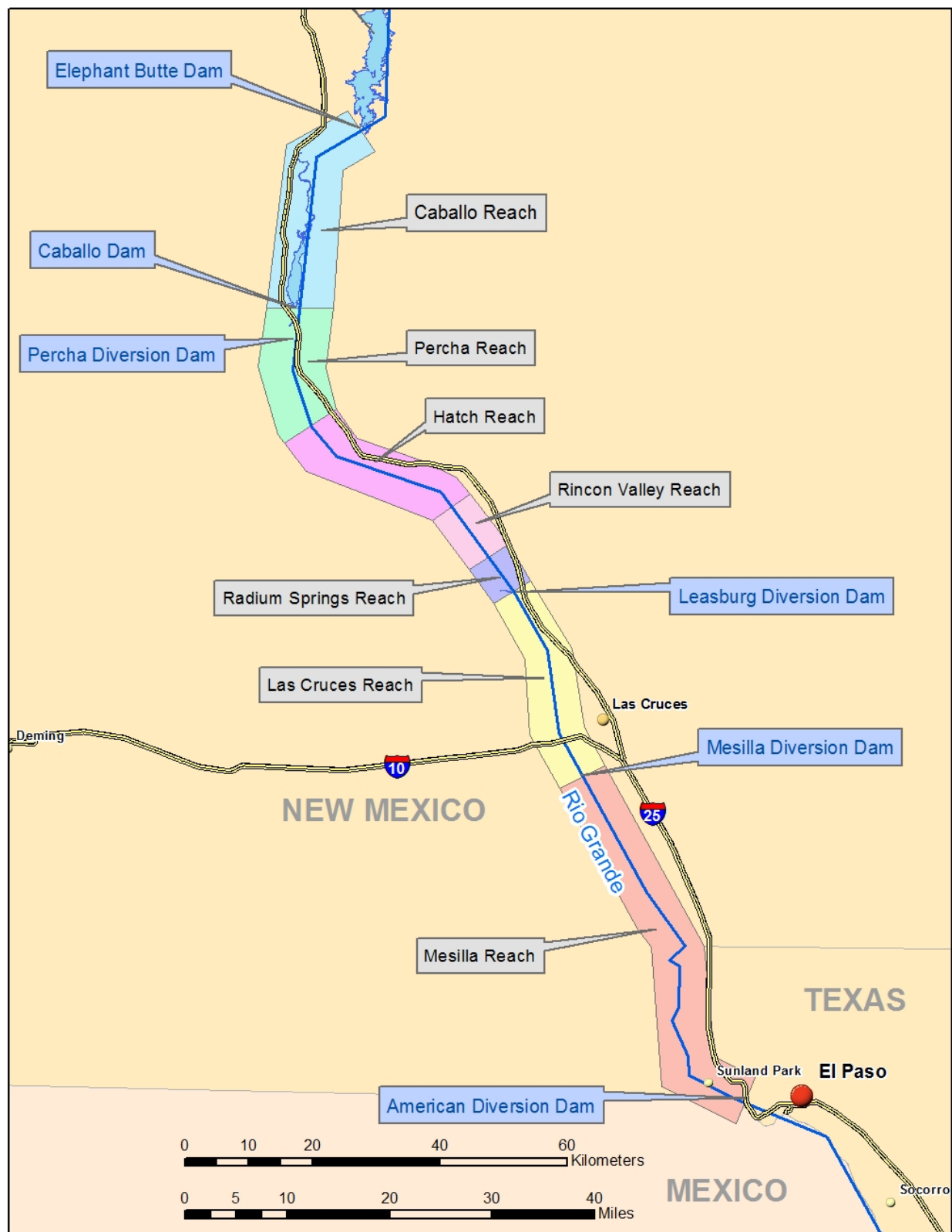


Figure 1. 2018 Lower Rio Grande SWFL habitat classification study reaches.

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

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

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

Habitat classifications 1 – 5 also included a species designation denoting the dominant woody vegetation. A species was considered dominant if it composed more than 90 percent of the woody vegetation within a given habitat class (i.e. CW-3 denotes a coyote willow dominant Class 3). If no species constituted greater than 90 percent of the woody vegetation, a mixed (MX) designation was given (i.e. MX-3). Species that were included in habitat classification types are listed in Table 1.

Table 1. Species included in habitat classification types.

Common name	Scientific name	Code
Velvet ash	<i>Fraxinus velutina</i>	ASH
Rio Grande cottonwood	<i>Populus deltoides</i>	C
Coyote willow	<i>Salix exigua</i>	CW
Russian olive	<i>Eleagnus angustifolia</i>	RO
Saltcedar	<i>Tamarix ramosissima</i>	SC
Tree (Goodding's)willow	<i>Salix gooddingii</i>	TW

When classifying habitats in the field, both sides of the active floodplain and any islands were assessed visually and accessed either via vehicle, kayak or on foot. Habitat polygons of Class 1 or above were delineated on 2016 aerial photography encompassing the entire study area. Large, complex habitat polygons were entered on foot in order to fully assess habitat characteristics. Any habitat within the active floodplain not assigned a Class 1 or above was considered a zero or non-habitat. Data recorded on aerial photos in the field were subsequently double-checked for accuracy and digitized into Geographic Information Systems (GIS) files overlain on the 2016 aerial photos. The size of all polygons in hectares (ha) was calculated and summed by reach and structure class. Non-habitat was mapped as linear distance (in kilometers) along each bank not occupied by a habitat polygon (Figure 2) and tallied by reach.

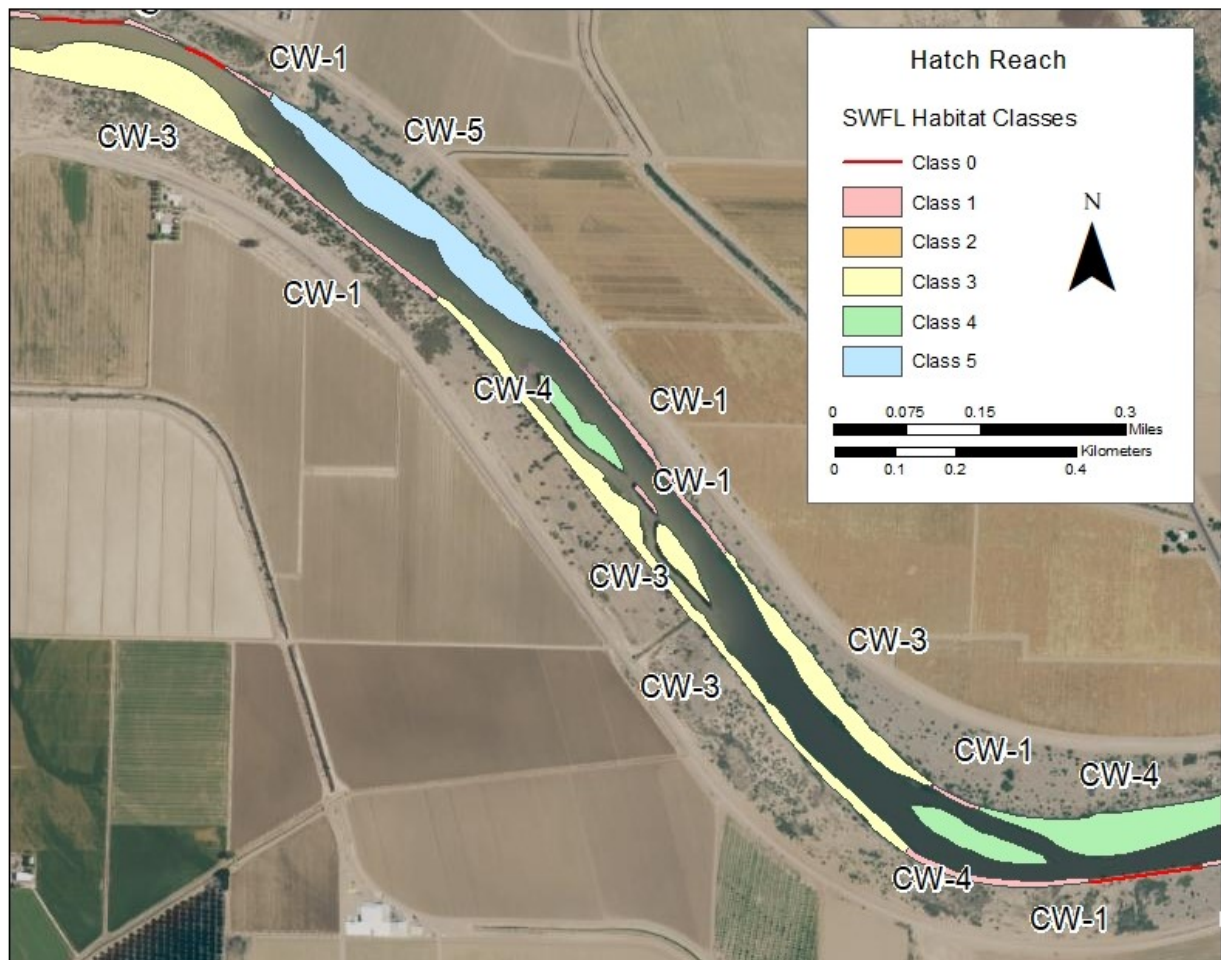


Figure 2. Example of SWFL habitat classification system used in Lower Rio Grande 2018.

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

Results

In total, 215.8 kilometers (km) of the Lower Rio Grande was classified during 2018. Of this, 44.2 percent of the linear distance of the active floodplain was devoid of significant woody vegetation and classified as non-habitat (Class 0). The Caballo and Mesilla reaches (Figure 1) contained the highest percentages of non-habitat, with 77 and 42 percent, respectively (Table 1). Of the non-zero habitat classes, classes 1 and 2 were most abundant throughout the study area (Table 2). Classes 3 and 4 were present in much lower abundance and only 7 ha of Class 5 habitat was identified. In total, approximately 160 ha of suitable habitat (i.e. Classes 3-5) was documented within the study area during 2018 and the majority was located within the Caballo and Hatch reaches.

Table 2. Extent of Class 0 (non-habitat) within the active floodplain of Lower Rio Grande study reaches.

Reach	Reach length (km)	Both Banks length (km)	Total linear length of Class 0 (km)	Percentage of Class 0
Caballo	42.6	85.2	65.8	77.3
Percha	24	48	18.5	38.6
Hatch	29.6	59.2	14.5	24.5
Rincon Valley	11.3	22.6	7.7	34.1
Radium Springs	8.4	16.8	3.8	22.4
Las Cruces	31.7	63.4	22.8	35.9
Mesilla	68.2	136.4	56.9	41.7
Total	215.8	431.6	190.6	44.2

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

Table 3. Hectares of habitat within the active floodplain of Lower Rio Grande study reaches.

Reach	Class 1 (Unsuitable)	Class 2 (Unsuitable)	Class 3 (Moderately Suitable)	Class 4 (Suitable)	Class 5 (Highly Suitable)
Caballo	13.3	167.2	15.8	54.1	0
Percha	24.6	21.8	5.0	1.3	0
Hatch	26.4	15.5	33.9	15.6	7.0
Rincon Valley	11.8	13.8	0.3	0.0	0
Radium Springs	6.1	20.8	8.7	6.8	0
Las Cruces	33.1	10.8	3.6	1.7	0
Mesilla	58.4	21.1	4.7	1.5	0
Total	173.7	271.1	72.0	80.9	7.0

The percentage of total habitat that was determined to be suitable for SWFL breeding within each reach is listed in Table 4. The reaches with the highest proportions of suitable habitat were Hatch, Radium Springs, and Caballo. The reaches with the smallest percentage of suitable habitat were Rincon Valley and Mesilla. Out of 605 ha of total habitat, 160 ha were classified as suitable (sum of Classes 3, 4, and 5); suitable SWFL habitat accounted for 26 percent of the woody riparian vegetation along the entire LRG.

Table 4. Percentage of suitable SWFL habitat (ha) by reach.

Reach	Suitable Habitat - Classes 3,4,5 (ha)	Total Habitat (ha)	Percent Suitable Habitat
Caballo	69.9	250.4	27.9%
Percha	6.3	52.7	11.9%
Hatch	56.5	98.4	57.5%
Rincon Valley	0.3	25.9	1.1%
Radium Springs	15.5	42.5	36.6%
Las Cruces	5.2	49.2	10.6%
Mesilla	6.1	85.7	7.2%
Total LRG	159.9	604.7	26.4

Detailed maps of the habitat classification are included as an Attachment to this report and the following is a summary of habitat documented within each study reach.

The **Caballo Reach** (43 km) was the second longest reach in the study area and contained the highest degree of habitat diversity. This reach consisted of two sections: (1) upstream of Caballo Reservoir between Elephant Butte Dam and the Caballo Reservoir pool and (2) the conservation pool of Caballo Reservoir. Floodplain habitat within these two sections was markedly different. The floodplain within the Caballo Reach upstream of Caballo Reservoir was constricted by human development and consisted primarily of bare riverbank or narrow stringers of woody vegetation. The floodplain was perched above a river heavily regulated by releases from Elephant Butte Dam, resulting in a relatively deep water table and nearly nonexistent overbank flooding events. Thus, non-native saltcedar or lower stature coyote willow composed most of the woody vegetation and were typically found on lower river banks. Within the Caballo Reservoir pool, the active floodplain was less constrained and up to three km wide. River flows were regulated by Elephant Butte Dam releases, but rising and falling reservoir levels, in addition to occasional localized inflows from the adjacent uplands, provided for a shallower water table and occasional flooded conditions. These conditions have promoted the growth of native willows in many areas and large patches of highly suitable SWFL breeding habitat have developed. SWFLs have been detected within this reach since Reclamation began surveys in 2012. However, nearly 78 percent of the linear length of this reach was classified as a non-habitat. Most of this occurred in the upper end of the reach or along unvegetated banks of Caballo Reservoir. Conversely, the Caballo Reach also contained the largest amount of suitable SWFL habitat within the study area; 15.8 ha of Class 3 and 54.1 ha of Class 4 habitat were mapped in 2018.

The **Percha Reach** (24 km), lying immediately downstream of Caballo Dam, was largely characterized by an elevated floodplain that was relatively disconnected from the river channel due to flow regulation and a lower groundwater table. A large percentage (38.6) of the linear distance of the floodplain within the reach was devoid of significant woody vegetation and classified as non-habitat. Due to the hydrological characteristics of the reach, the majority of the non-zero habitat occurred in the form of narrow bands of vegetation along the riverbank (Class 1) or larger, relatively dry patches of saltcedar farther from the river channel (Class 2). Suitable habitat occurred sporadically within this reach and was generally located near Percha Diversion Dam or the mouths of arroyos where flows were slowed and a higher water table existed.

The **Hatch Reach** (29.6 km), contained the second highest abundance of suitable SWFL habitat within the study area. This reach included the Hatch SWFL survey site and has consistently had the greatest number of SWFL detections in the Lower Rio Grande since Reclamation surveys began. Several isolated patches within the current HA-01 and HA-04 sites were surveyed by United States International Boundary and Water Commission (USIBWC) contractors in 2010 and 2011. One of these patches, the Crow Canyon B patch (within the current HA-01 site) supported four SWFL territories during each of those years (TRC Environmental Corporation 2011). Suitable habitat in this reach was found on islands and lower riverside terraces adjacent to either the main river channel or high flow channels. This habitat consisted of either dense stands of large (8 to 10 cm diameter) coyote willow or a coyote willow/saltcedar mix. These areas were often either flooded due to a high water table and/or beaver activity, or were adjacent to or interspersed with marsh habitat. In total, 56.5 ha of Class 3 or better SWFL habitat was located in this reach, which represented 35 percent of the suitable habitat within the Lower Rio Grande study area. This was the only reach in which Class 5 habitat (highly suitable) was mapped.

The **Rincon Valley Reach** (11.3 km) was another reach dominated by an elevated floodplain that was disconnected from the active river channel. Woody riparian vegetation, when present, consisted almost entirely of narrow bands along the riverbanks (Class 1) or larger patches of dry, decadent saltcedar (Class 2) and 34.1 percent of the reach was classified as a zero. Only 0.3 ha of suitable habitat was mapped within this reach in 2018.

The **Radium Springs Reach** (8.4 km) was immediately upstream of Leasburg Diversion Dam and encompassed the Radium Springs and Selden Canyon SWFL survey sites. Floodplain habitat in this reach was less constrained by anthropomorphic activities and had a higher degree of connectivity to the river channel. Portions of this reach have been surveyed for SWFLs sporadically during the past 24 years and occupancy by resident SWFLs has been confirmed on a regular basis. These flycatchers have been located in patches of moderately suitable or suitable habitat consisting of a mix of coyote willow and saltcedar. Due to a higher water table and reduced human activity, this reach had the lowest percentage of non-habitat within the study area (22.4). There was a total of 13.7 ha of suitable habitat within this reach, which was typically located on lower terraces or river bars with a higher water table. There was also a relatively prominent saltcedar component.

The **Las Cruces Reach** (31.7 km) was a relatively long reach that extended from Leasburg Diversion Dam to Mesilla Diversion Dam and includes the city of Las Cruces. Flycatcher habitat within this reach was very limited due to hydrological conditions (i.e. regulated flows,

perched floodplain) and floodplain management activities. The active floodplain was restricted in many areas by levees. Periodic mowing of the riparian area reduced woody vegetation growth along most of the length of this reach. Nearly 36 percent of the linear distance of the floodplain in this reach was devoid of significant woody riparian vegetation and was classified as zero. Only 5.2 ha of suitable SWFL habitat was mapped in this reach in 2018.

The **Mesilla Reach** (68.2 km) was immediately downstream of the Las Cruces Reach and was by far the longest of the six study reaches. It was very similar to the Las Cruces Reach in terms of river and floodplain management and flycatcher habitat characteristics. Forty-two percent of the linear distance of the floodplain was devoid of significant woody riparian vegetation and was classified as Class 0. The majority of non-zero habitat documented in this reach consisted of narrow, linear bands of riparian vegetation along the river banks (Class 1). Several small patches of suitable flycatcher habitat classified as Class 3 or 4 were located during 2018 but only totaled 6.1 ha. Flycatcher surveys have been conducted in these patches periodically during the past seven years but no flycatchers have been documented.

Discussion

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

During the two years following the 2012 mapping effort, a severe drought greatly reduced the duration of releases from Caballo Dam. During 2013, water only flowed in the Lower Rio Grande from June 1st to July 17th. Groundwater levels dropped out of the root zone for native vegetation within many portions of the Lower Rio Grande. Native willows began to suffer and many of them either exhibited signs of water stress or had died by the summer of 2014. Flows in the Rio Grande were more regular during the 2014 and 2015 growing seasons and many of the willow patches showed signs of recovery. However, as shown in Table 5 and Figure 3, a reduction in suitable SWFL habitat was documented in nearly all of the study reaches during the 2016 mapping effort.

Table 5. Hectares of suitable SWFL habitat in the Lower Rio Grande – 2012 to 2018.

Reach	2012 Suitable Habitat	2016 Suitable Habitat	2018 Suitable Habitat	Percent Gain or Loss since 2012
Caballo	N/A	62.9	69.9	11%*
Percha	5.1	4.9	6.3	24%
Hatch	52.4	45.4	56.5	8%
Rincon Valley	0.2	0.2	0.3	50%
Radium Springs	14.6	13.7	15.5	6%
Las Cruces	1.2	0	5.2	333%
Mesilla	8.1	2.2	6.1	– 25%
Total	81.6	129.3	159.9	96%

* Percent gain since 2016

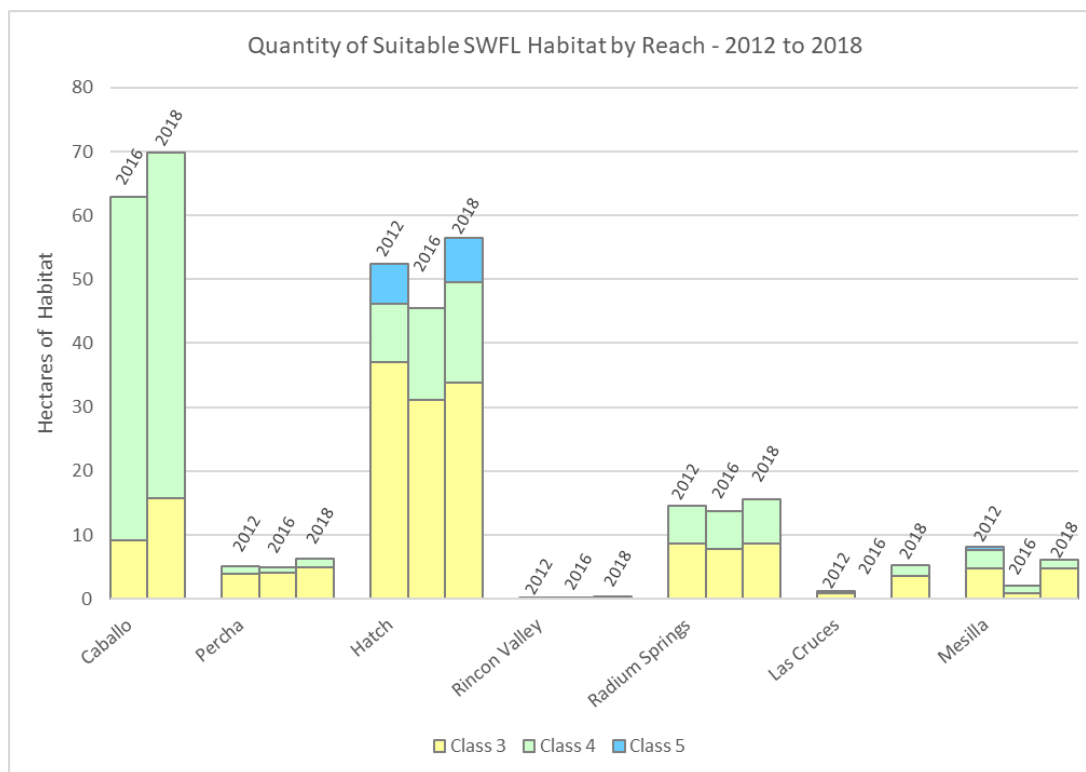


Figure 3. Quantity of suitable SWFL habitat mapped within the Lower Rio Grande by class and reach during the 2012 and 2016 mapping efforts. The Caballo Reach was not mapped in 2012.

In 2017, relatively high flows (i.e. typically between 700 and 3,000 cfs) were measured below Elephant Butte Dam from March through September, which appeared to improve vegetative conditions along the Lower Rio Grande. From the 2016 to 2018 study periods, suitable SWFL habitat increased in all reaches (Table 5). There was a 96 percent overall increase in suitable habitat from 2012 to 2018 with only the Mesilla Reach exhibiting a decrease.

Mapping studies conducted in 2012, 2016, and 2018 emphasized two important aspects concerning SWFL habitat development within the Lower Rio Grande. First, while the SWFL recovery goal for the Lower Rio Grande Management Unit of 25 territories has been met annually since 2012 and the population has continued to grow, suitable SWFL habitat within the Lower Rio Grande is in short supply. Within nearly 216 km of river corridor, 160 ha of suitable SWFL habitat was mapped in 2018, and 44 percent of the riverbank length was classified as Class 0, or “non-habitat”. Secondly, presumably due to severe drought conditions between 2012 and 2016 the abundance of suitable habitat decreased during that period (Table 3 and Figure 3). Despite these decreases, vegetation was apparently resilient enough to rejuvenate and increase in habitat quality given favorable hydrologic conditions. Regardless, even though there was a large percentage increase in suitable habitat along the Lower Rio Grande over time, the actual amount of this type of habitat was fairly low. For example, suitable habitat within the Las Cruces Reach increased from 1.2 to 5.2 ha, which was a 333 percent increase from 2012, however the amount of suitable habitat was still minimal at 5.2 ha along 32 km of the river channel (Tables 4 and 5).

Habitat within the Lower Rio Grande is limited by a highly regulated river and, in recent years, drought conditions. Additionally, floodplain management plays a large role in habitat suitability and abundance. The active floodplain of the Lower Rio Grande is often narrowed by levees and/or roads and is, for much of its length, kept devoid of woody vegetation by regular mowing. This stretch of river is also likely more susceptible to drought as a lack of winter releases from Caballo Dam, in combination with reduced tributary inputs and a lowered water table, could have negative consequence for the relatively small patches of native vegetation as was demonstrated in the 2016 study. On the other hand, as was demonstrated in the 2018 study, habitat appears to have the capacity to recover if flows are sufficient and/or if water is managed to meet the needs of riparian vegetation. Floodplain management via restoration is currently being conducted at various sites within this reach. Efforts to achieve efficient water delivery while promoting the establishment of native woody vegetation are being considered as part of a joint multi-agency restoration effort within the Lower Rio Grande.

Conclusions

The habitat classification conducted in 2018 documented suitable SWFL habitat within the Lower Rio Grande. The quality of several of these habitat patches was confirmed by documentation of territorial flycatchers during presence/absence surveys that have been conducted since 2012. Conversely, the quantity of suitable habitat was very low in comparison to that available upstream in the Middle Rio Grande above Elephant Butte Dam. As was observed when comparing the 2016 mapping study to the 2012 mapping data, habitat can be quickly lost if unfavorable hydrologic conditions persist for an extended period and additional habitat would buffer this impact. Increased river flows appeared to improve habitat quality in 2018. However, riparian restoration activities incorporating changes to river and floodplain management within the Lower Rio Grande would be needed in order to maintain and increase this population of breeding SWFLs. Ongoing drought conditions can affect this population's ability to remain active. Continued monitoring of this population, including surveys and nest monitoring, will provide insight into its sustainability, limiting factors to growth, and the effectiveness of restoration activities. Additionally, this mapping effort should be periodically repeated in order to monitor changes in abundance and quality of SWFL breeding habitat, particularly in light of potential changes due to defoliation of saltcedar by *Diorhabda* (tamarisk beetle) species along the Rio Grande.

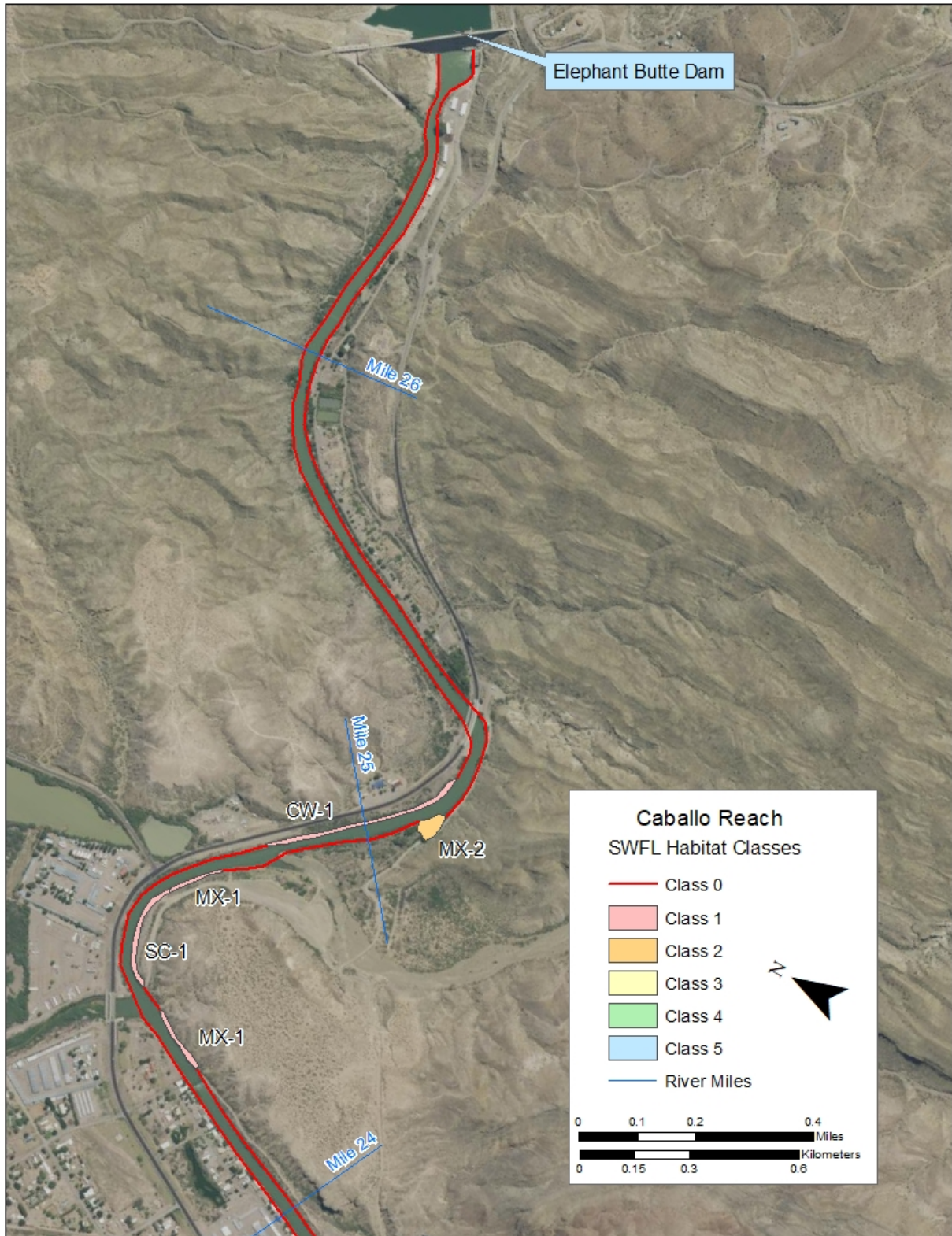
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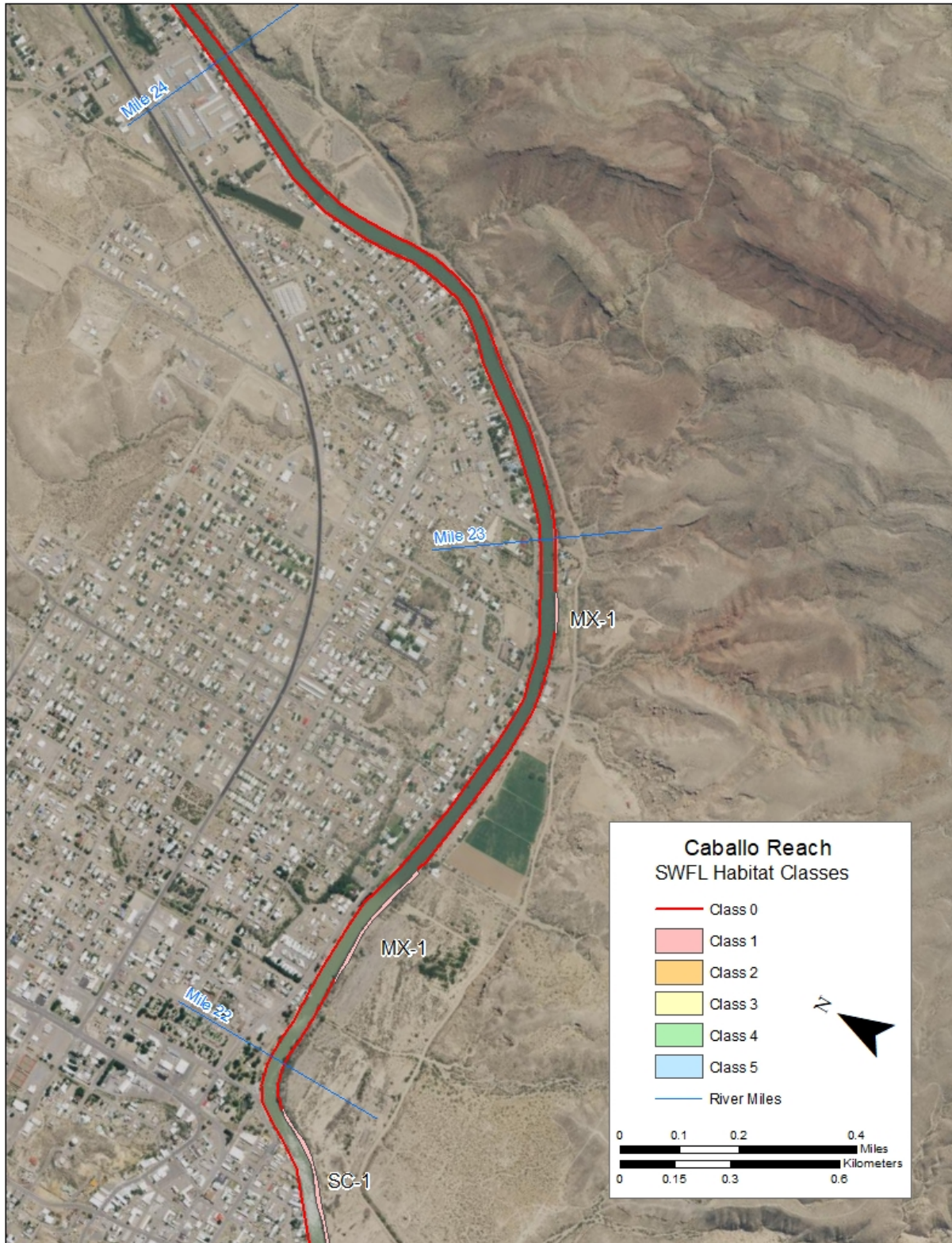
- Ahlers, D. 2009. Southwestern Willow Flycatcher Habitat Reconnaissance: Upper Rio Grande from the Colorado State Line to Cochiti Reservoir, New Mexico. Bureau of Reclamation, Denver, CO.
- Ahlers, D., V. Johanson, S. Ryan, and R. Siegle. 2010. Southwestern Willow Flycatcher Habitat Suitability 2008: Highway 60 Downstream to Elephant Butte Reservoir, NM. Bureau of Reclamation, Denver, CO.
- Ahlers, D. and S.D. Moore. 2013. 2012 Southwestern Willow Flycatcher Survey Results: Selected Sites within the Rio Grande Basin from Caballo Reservoir, NM to El Paso, TX. Bureau of Reclamation, Denver, CO.
- Blackburn, D. 2010. Summary of Findings — 2010 Southwestern Willow Flycatcher and Yellow-billed Cuckoo Surveys. TRC under contract with USIBWC.
- Siegle, R., D. Ahlers, and V. Ryan. 2013. Southwestern Willow Flycatcher Habitat Suitability 2012 – Middle Rio Grande, New Mexico. Bureau of Reclamation, Denver, CO.
- Siegle, R. and D. Ahlers. 2015. Southwestern Willow Flycatcher Habitat Suitability 2014 – Elephant Butte Dam to Caballo Dam, Lower Rio Grande, New Mexico. Bureau of Reclamation, Denver, CO.
- Sogge, M.K., D. Ahlers, and S.J. Sferra. 2010. A natural history summary and survey protocol for the Southwestern Willow Flycatcher: U.S. Geological Survey Techniques and Methods 2A-10. 38 pgs.
- TRC Environmental Corporation. 2011. Southwestern Willow Flycatcher and Yellow-billed Cuckoo Surveys for 2010 and 2011 – Rio Grande Canalization Project River Restoration Implementation Plan. Prepared for International Boundary and Water Commission.
- U.S. Fish and Wildlife Service (USFWS). 1995. Final rule determining endangered status for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*). Federal Register 60:10694 (February 27, 1995).
- _____. 2002. Southwestern Willow Flycatcher Recovery Plan. Albuquerque, New Mexico. i-ix + 210 pp., Appendices A-O.

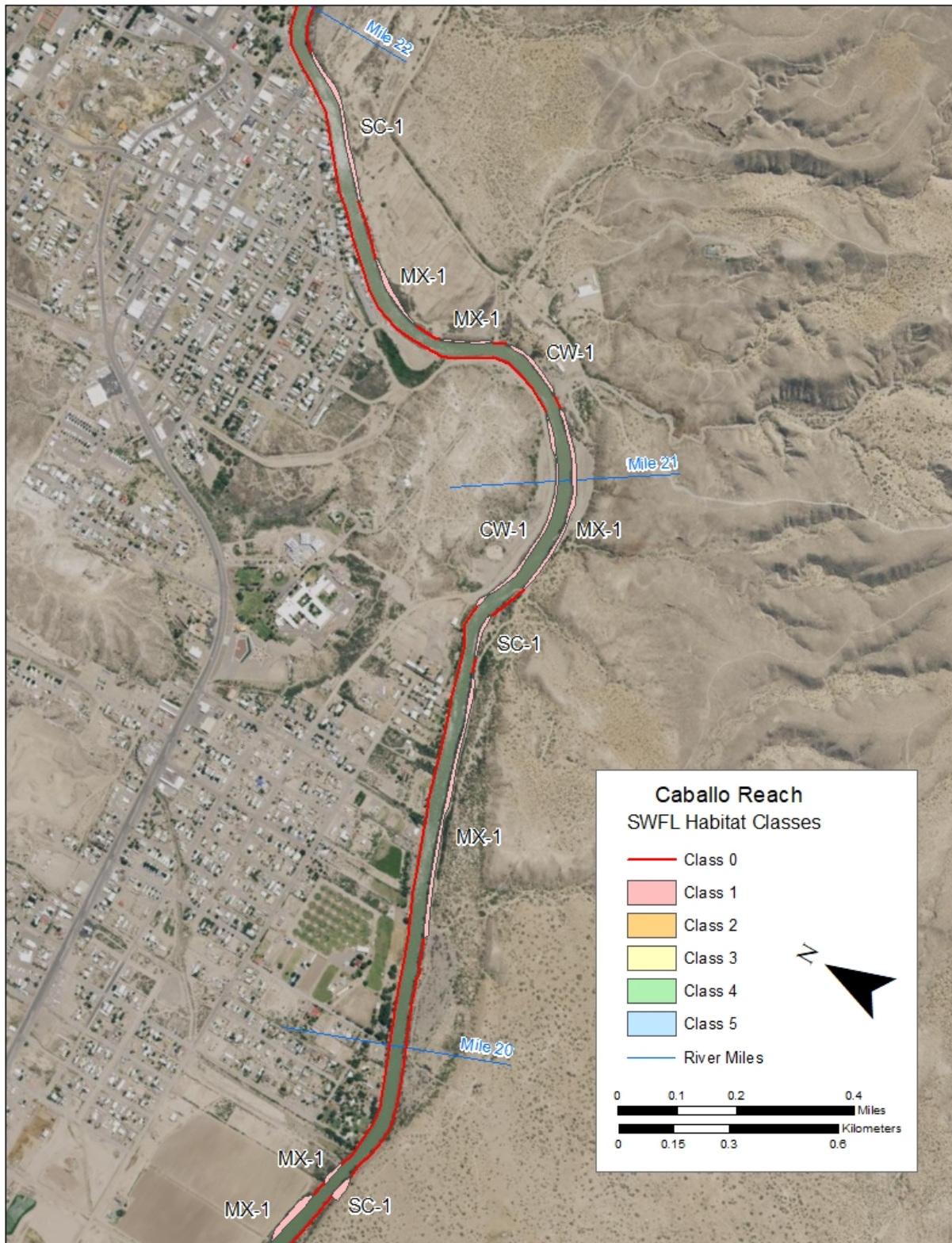
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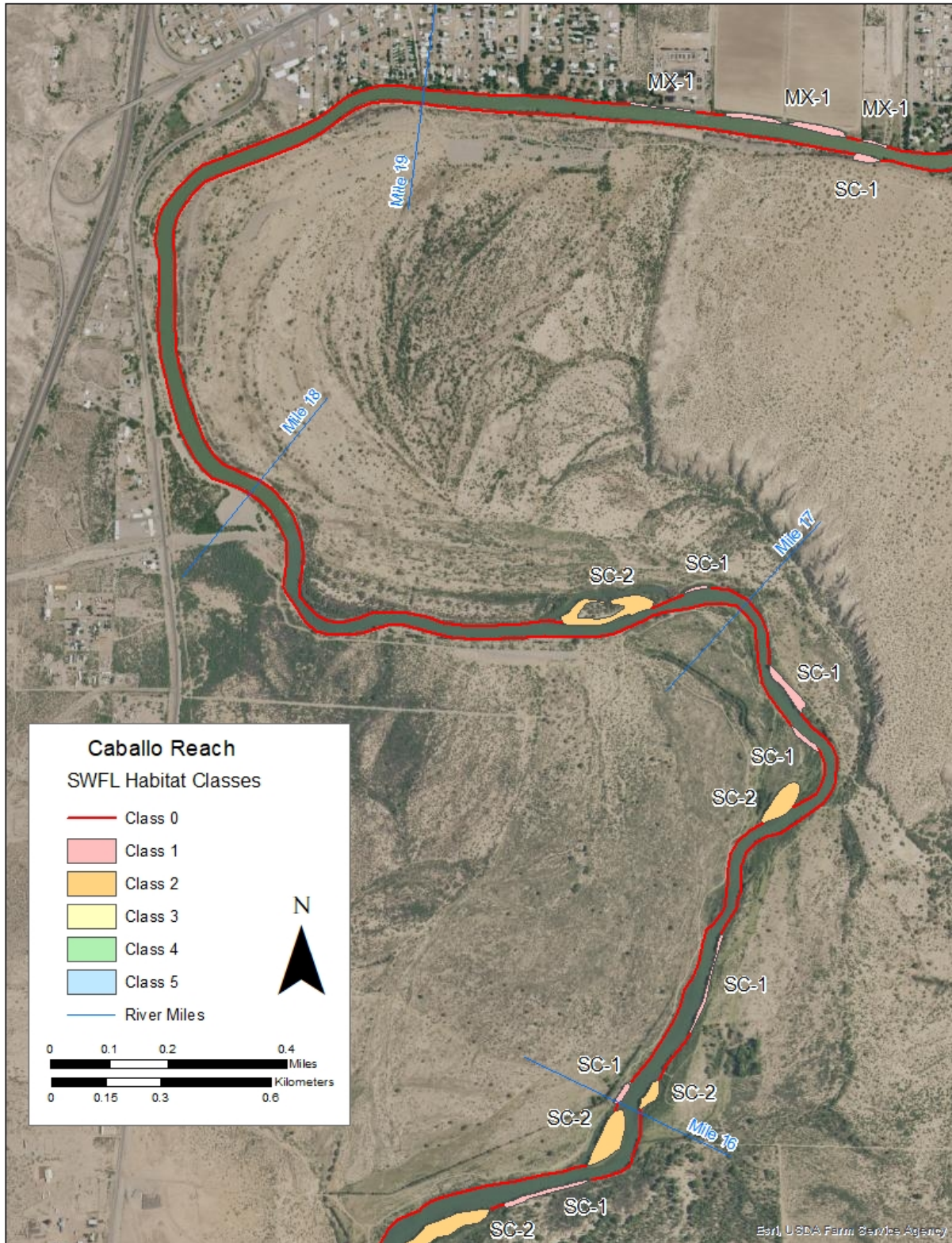
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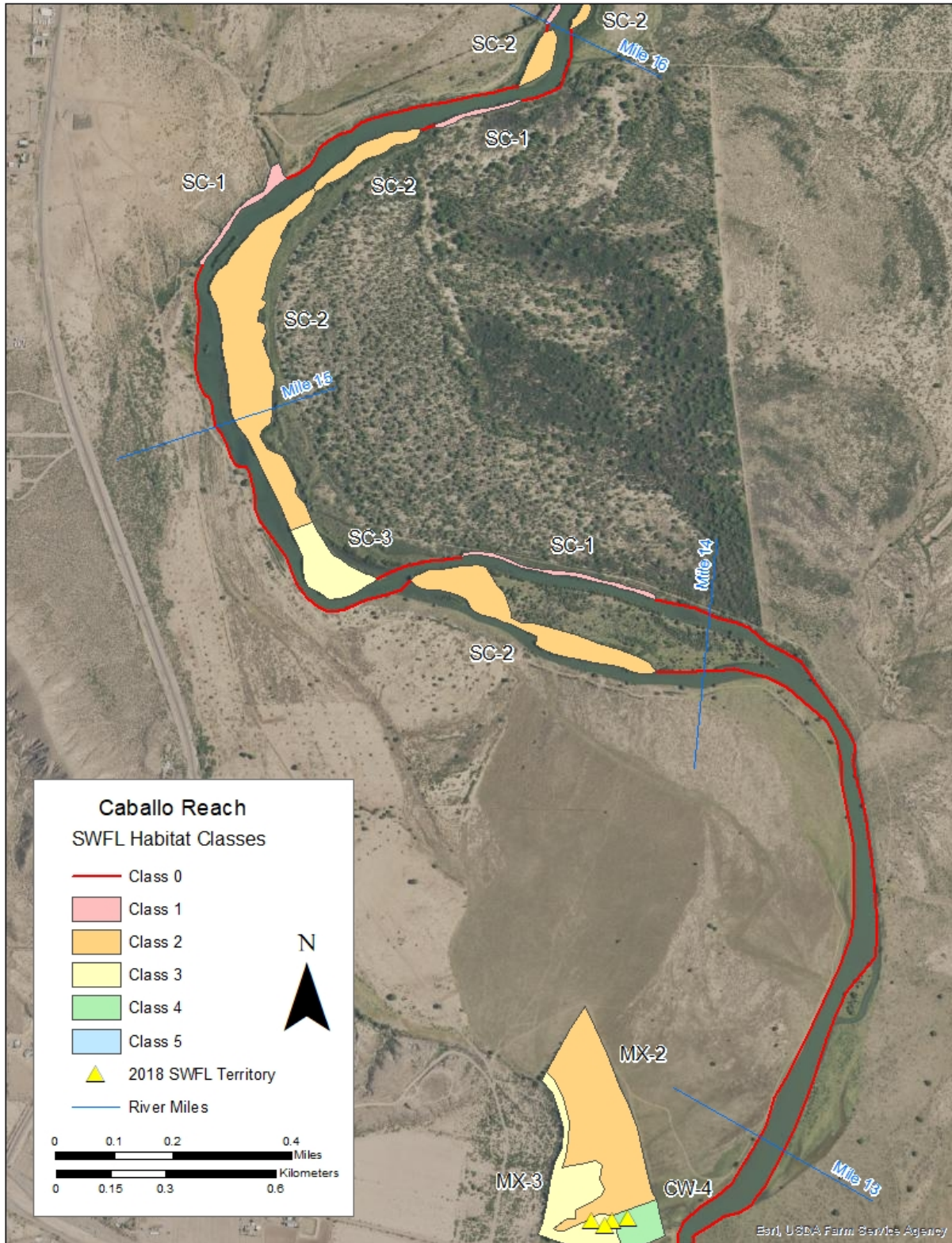
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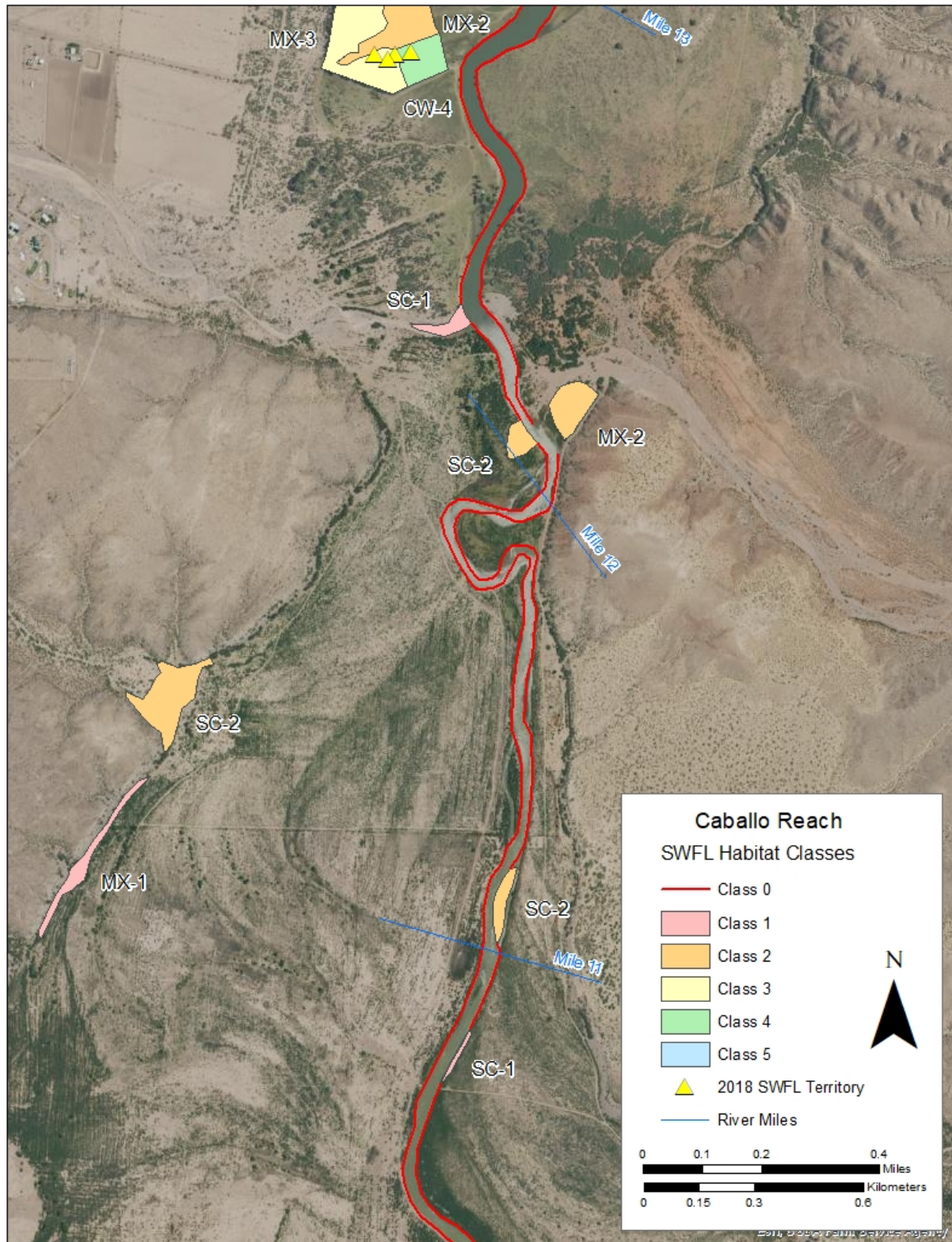


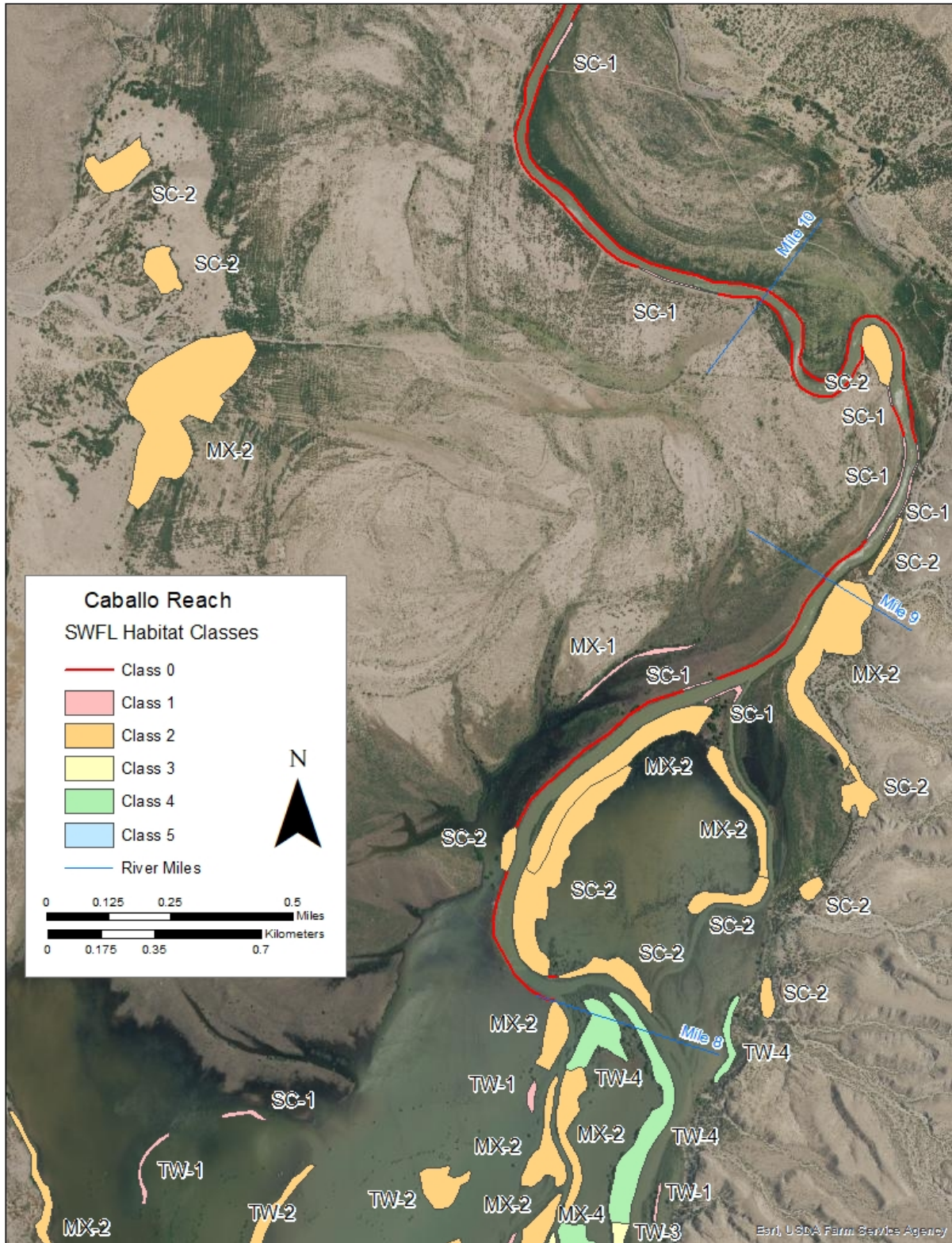


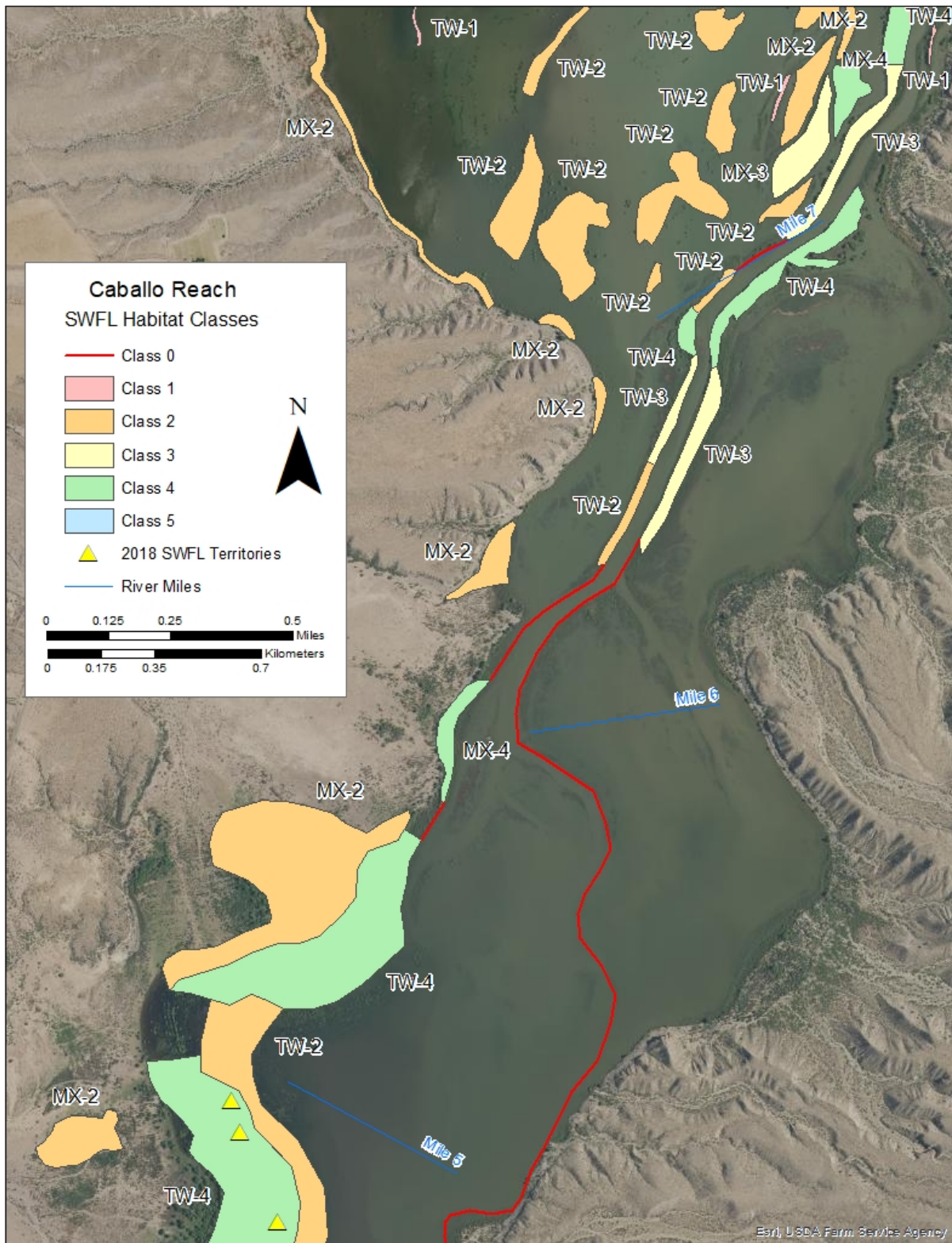


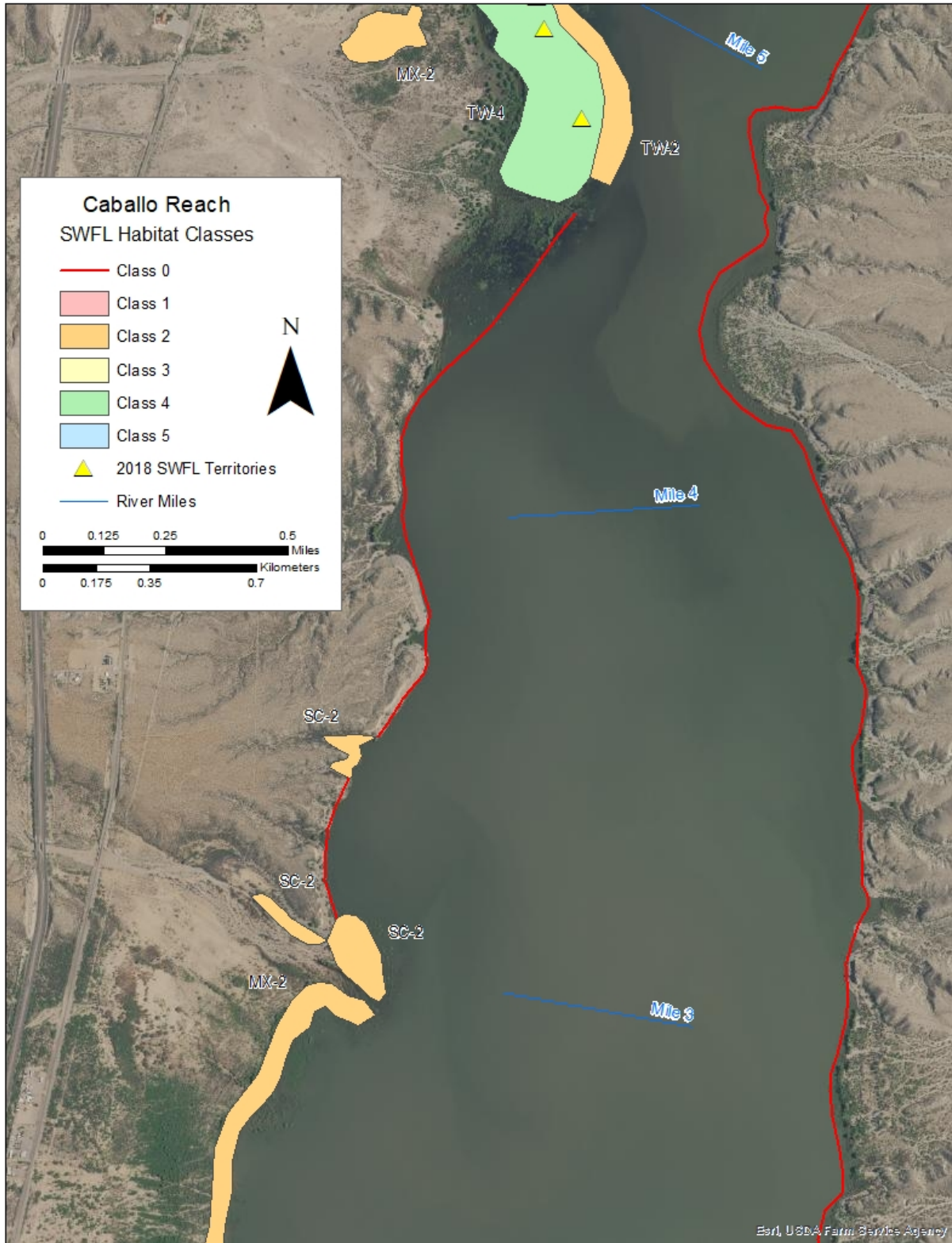


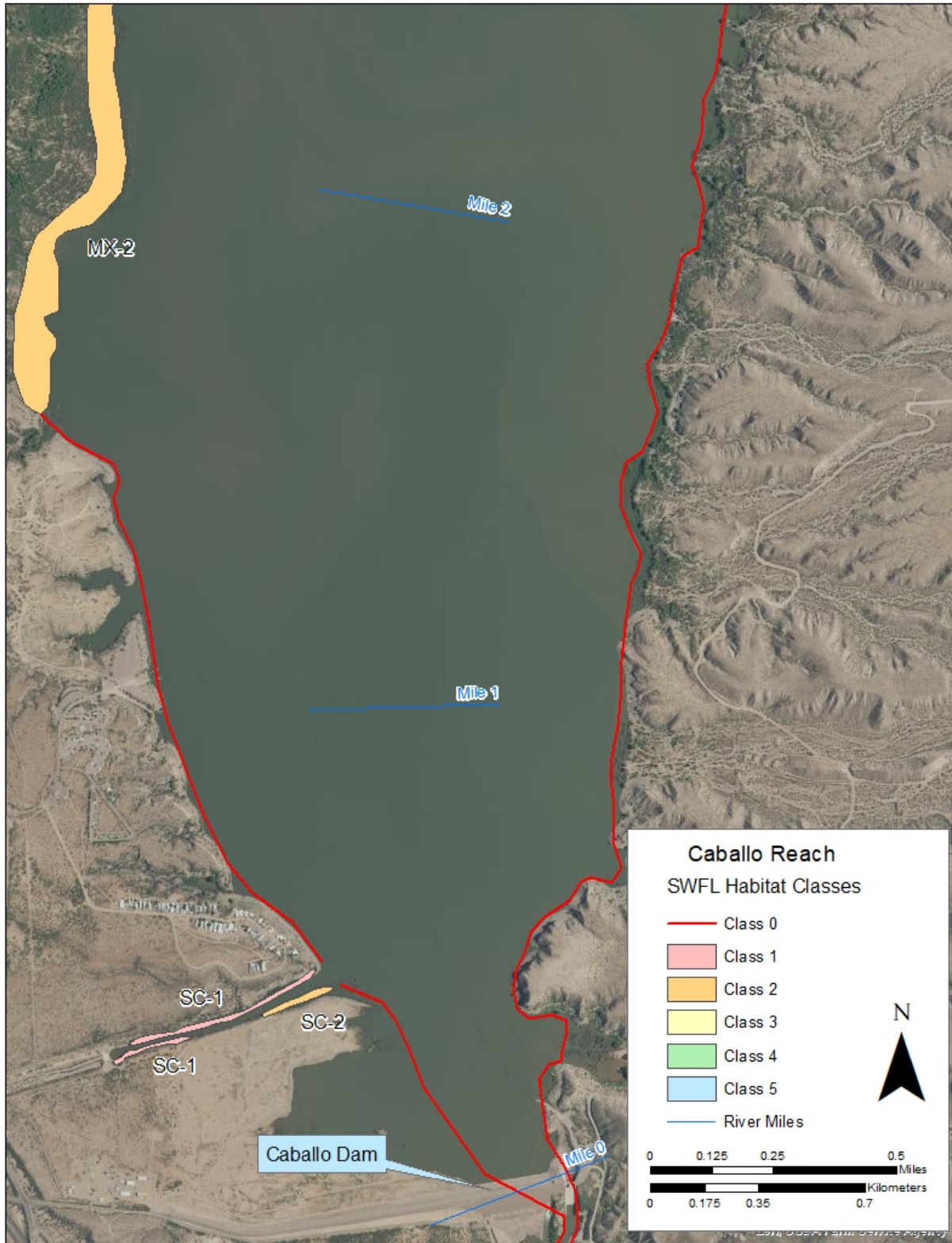


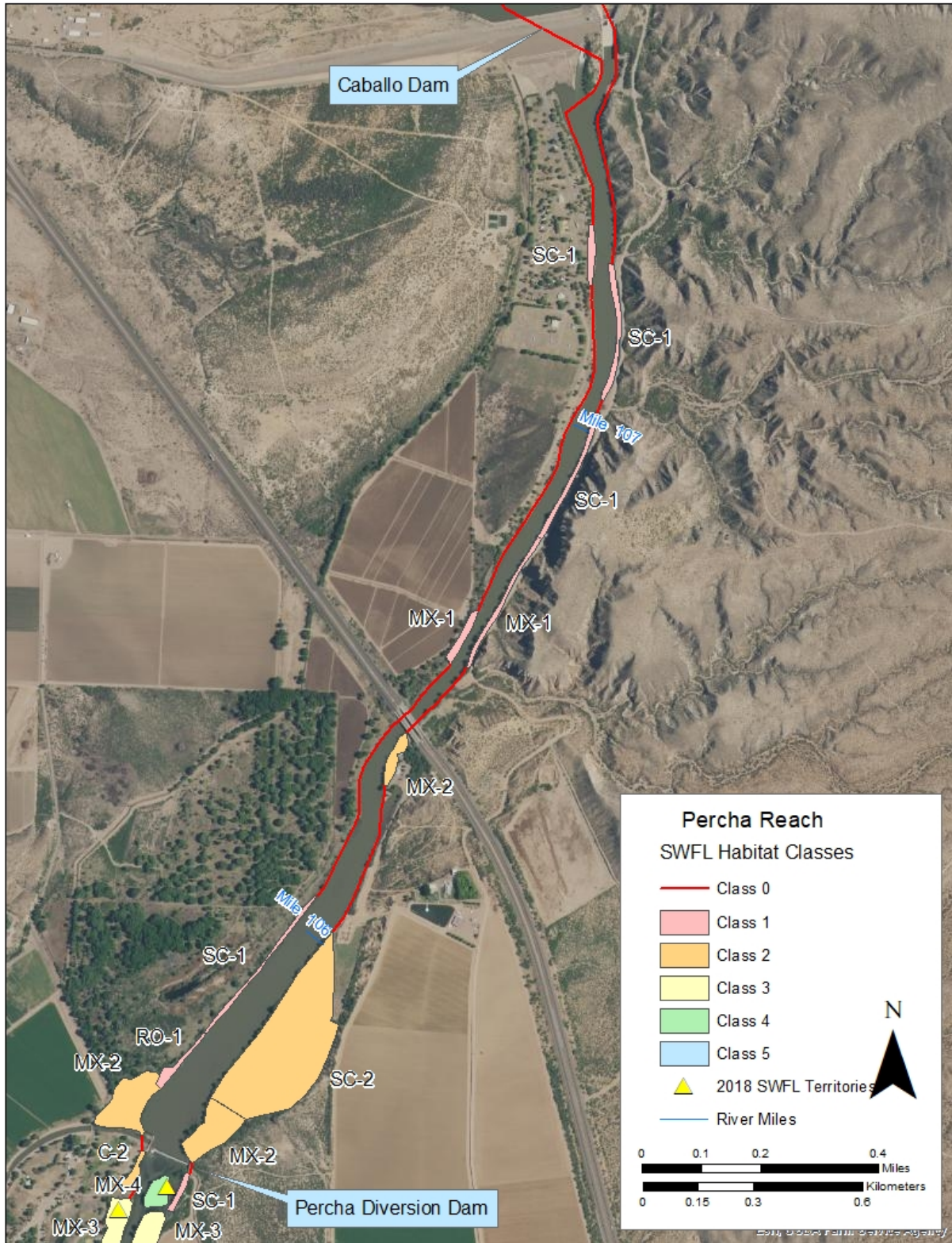


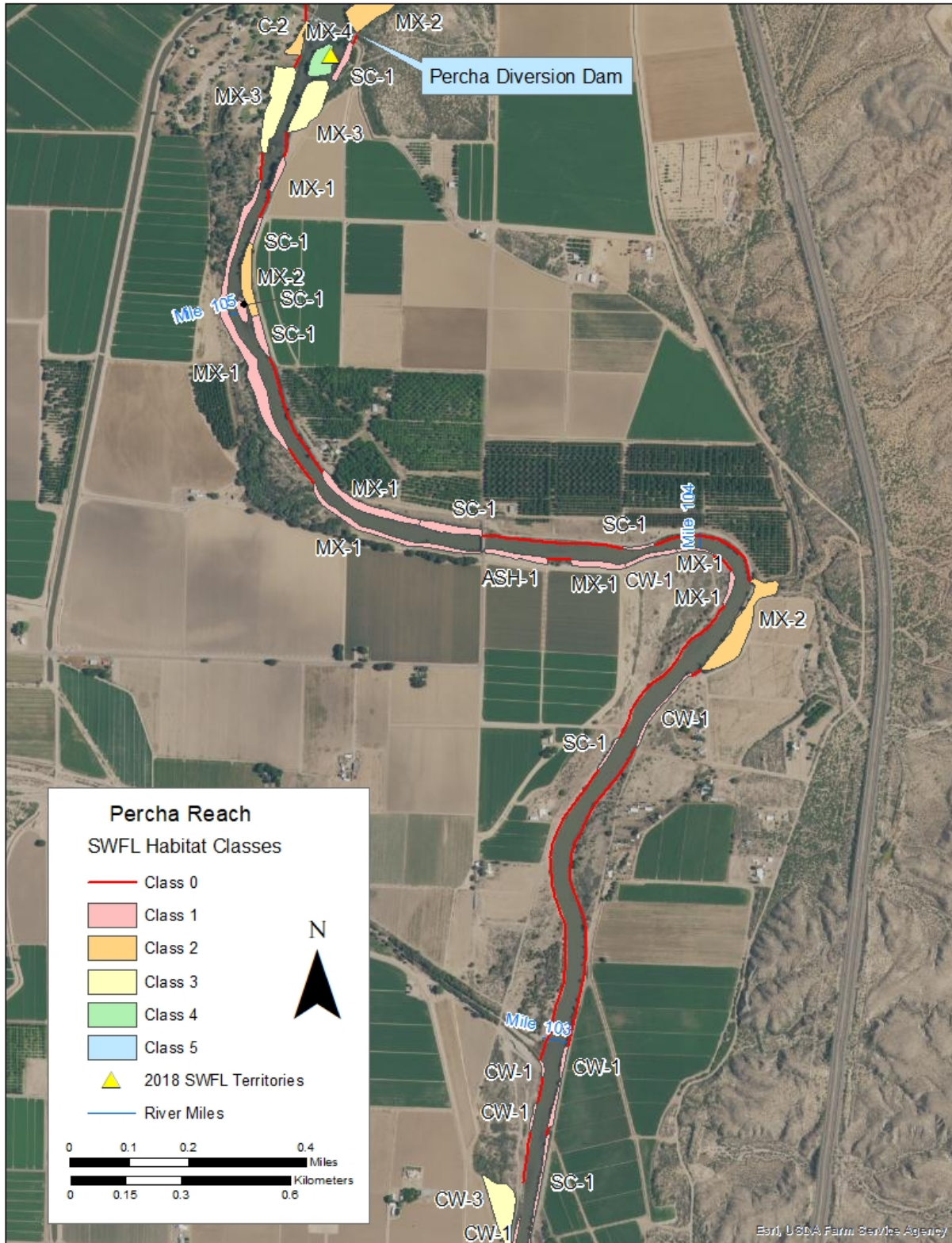


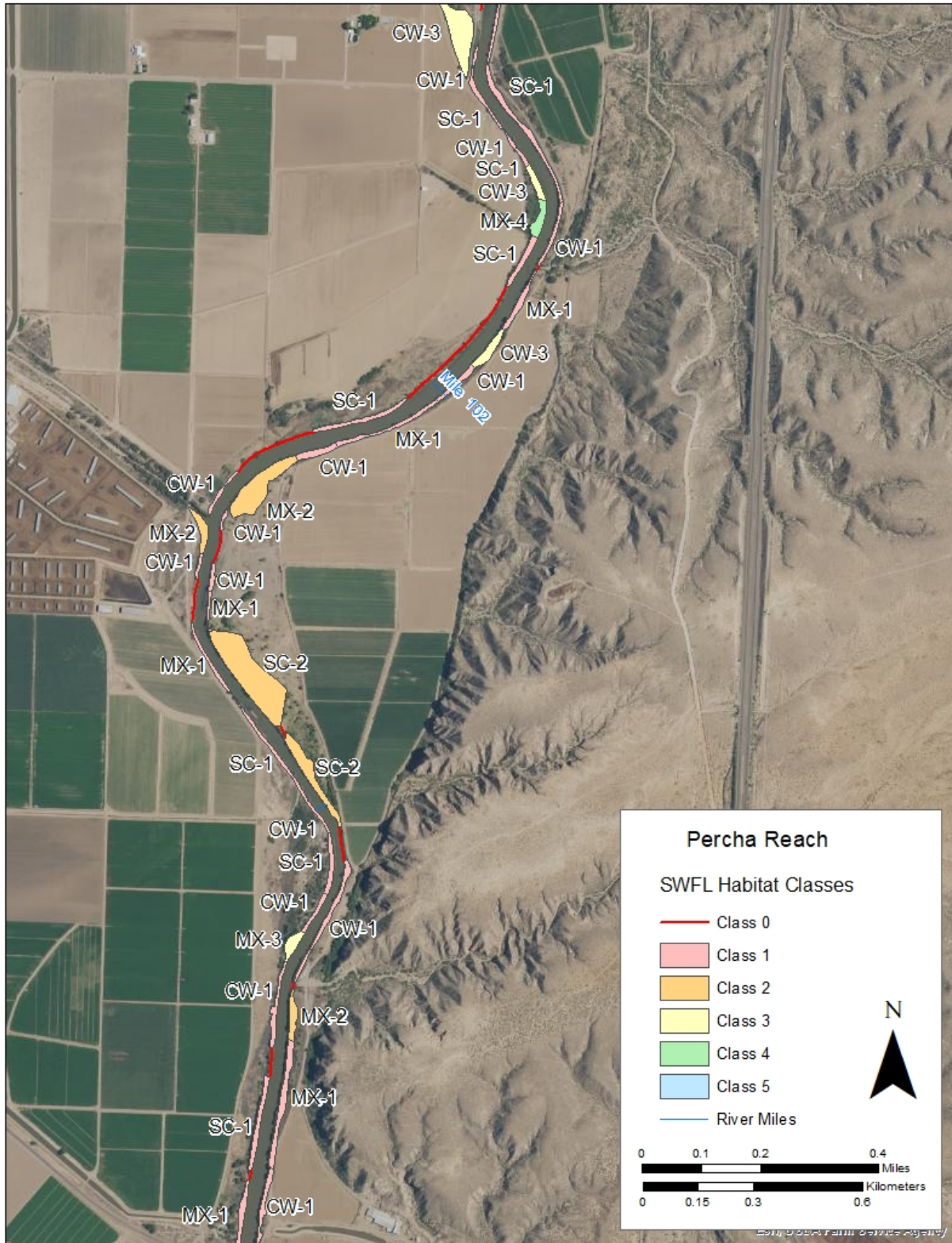


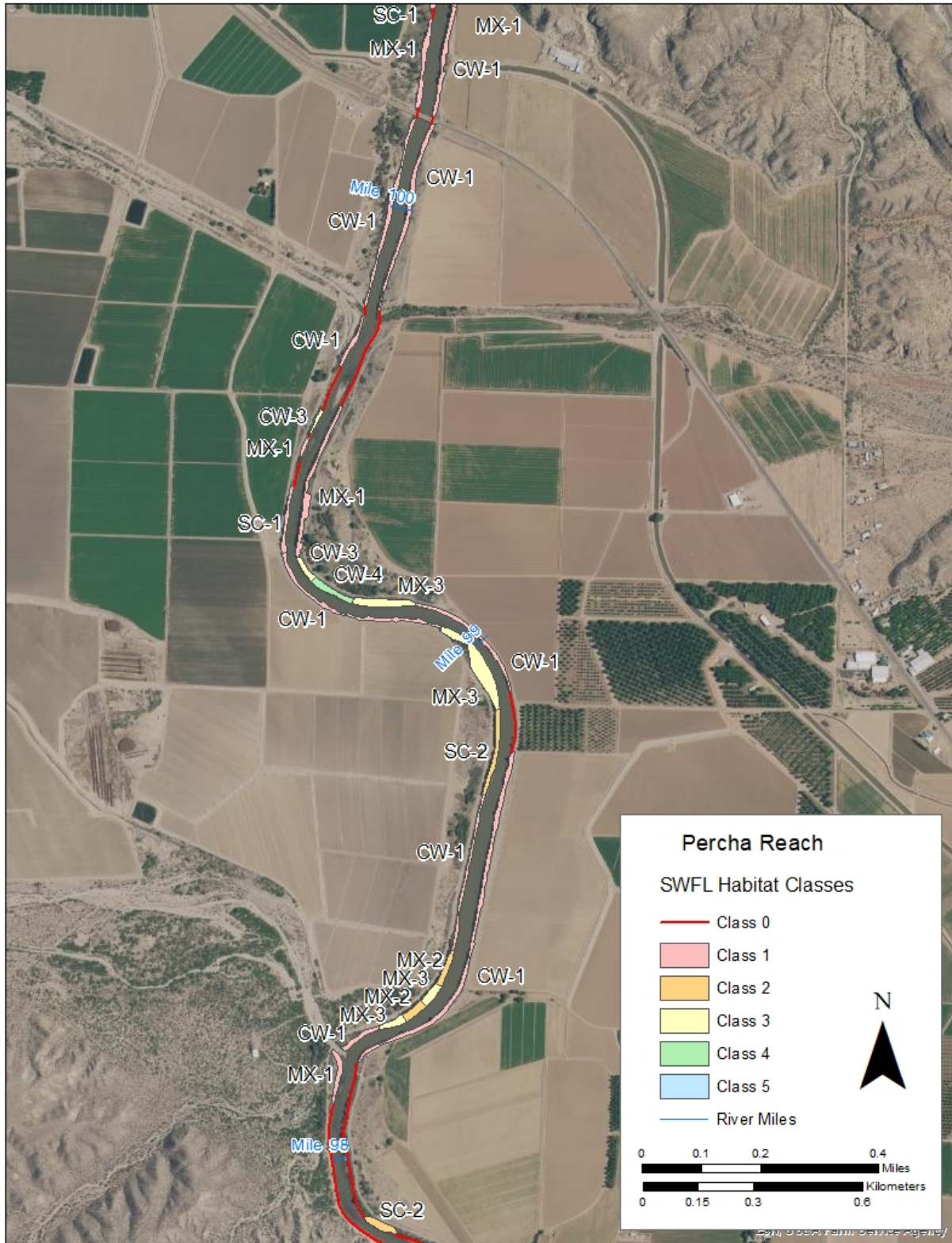


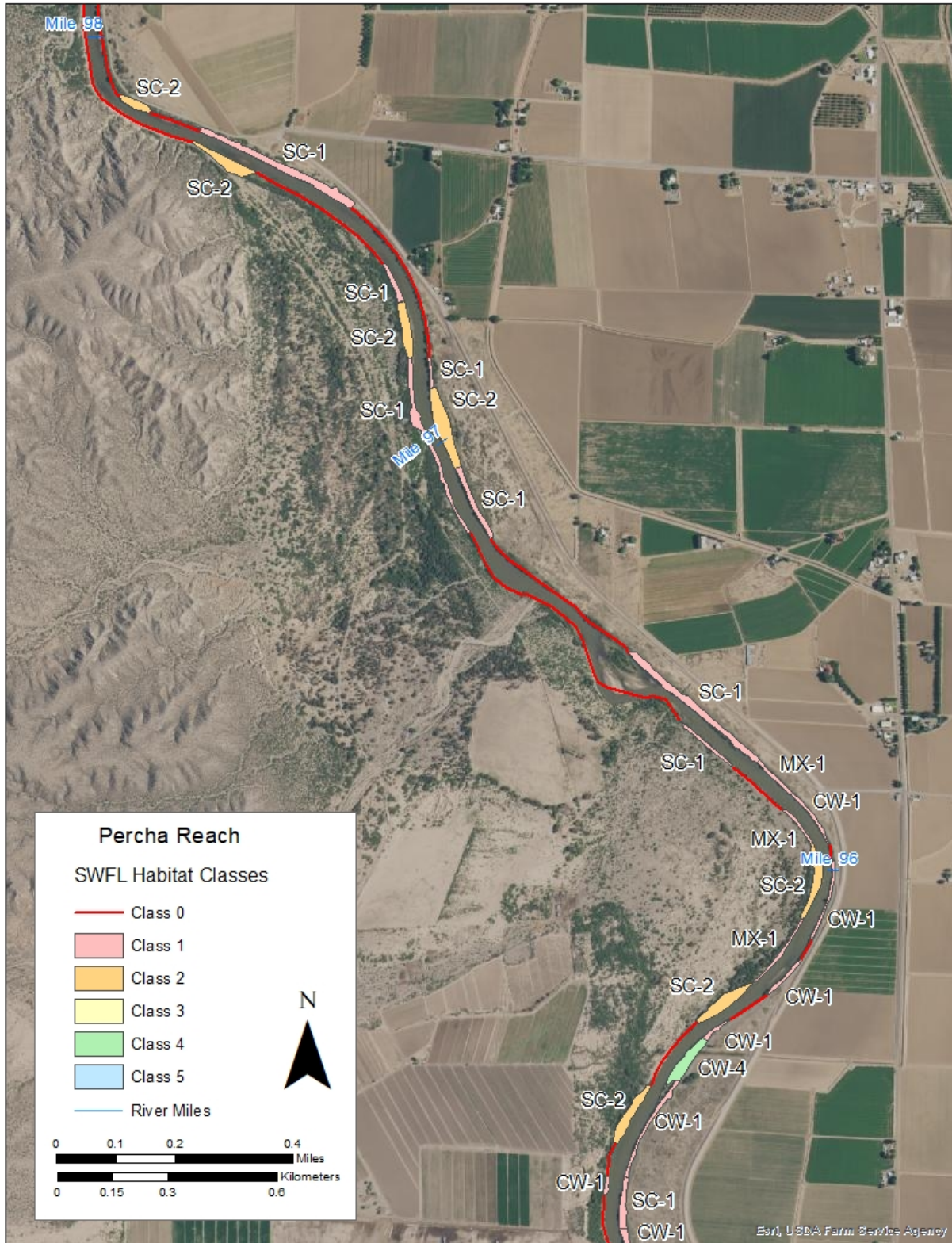


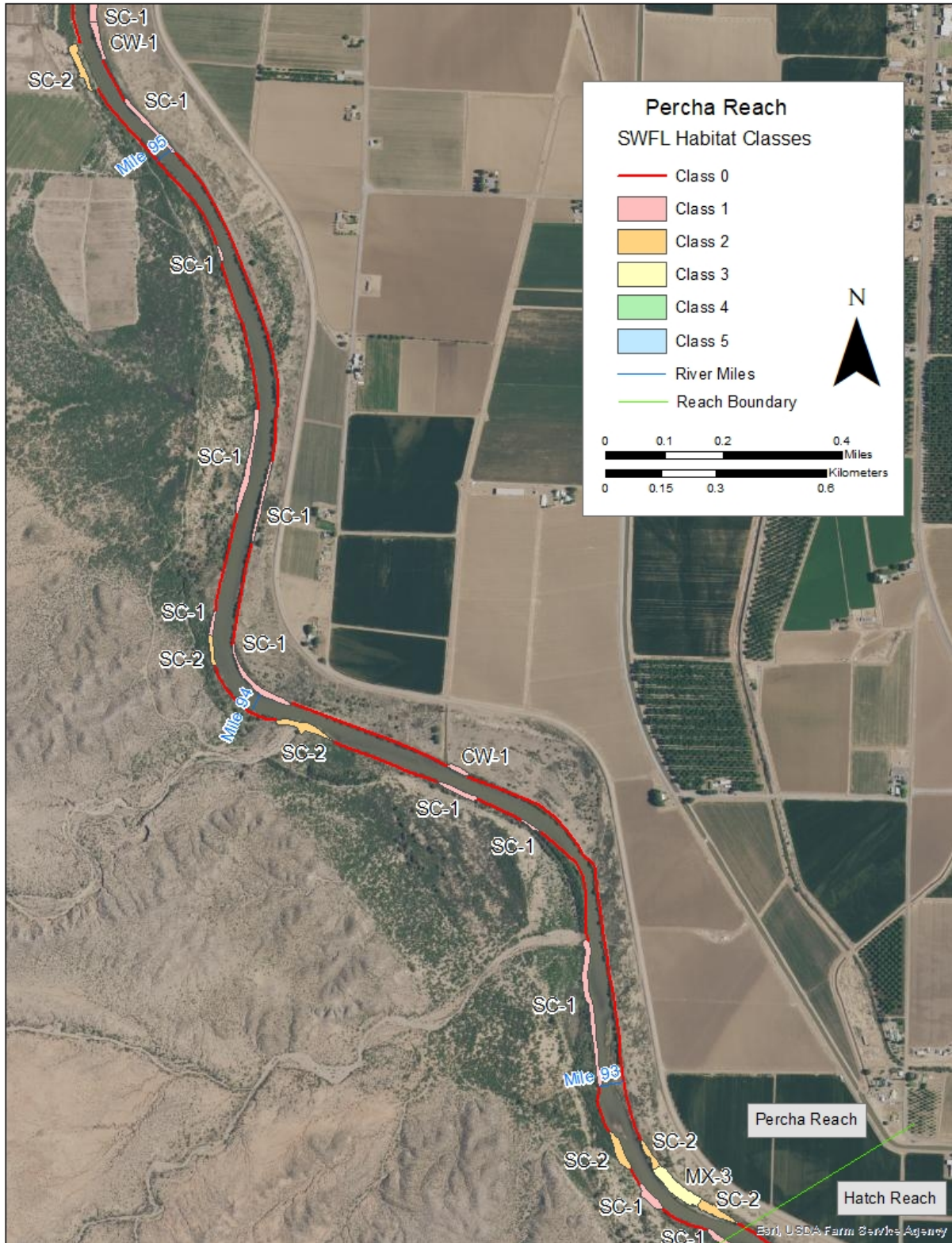


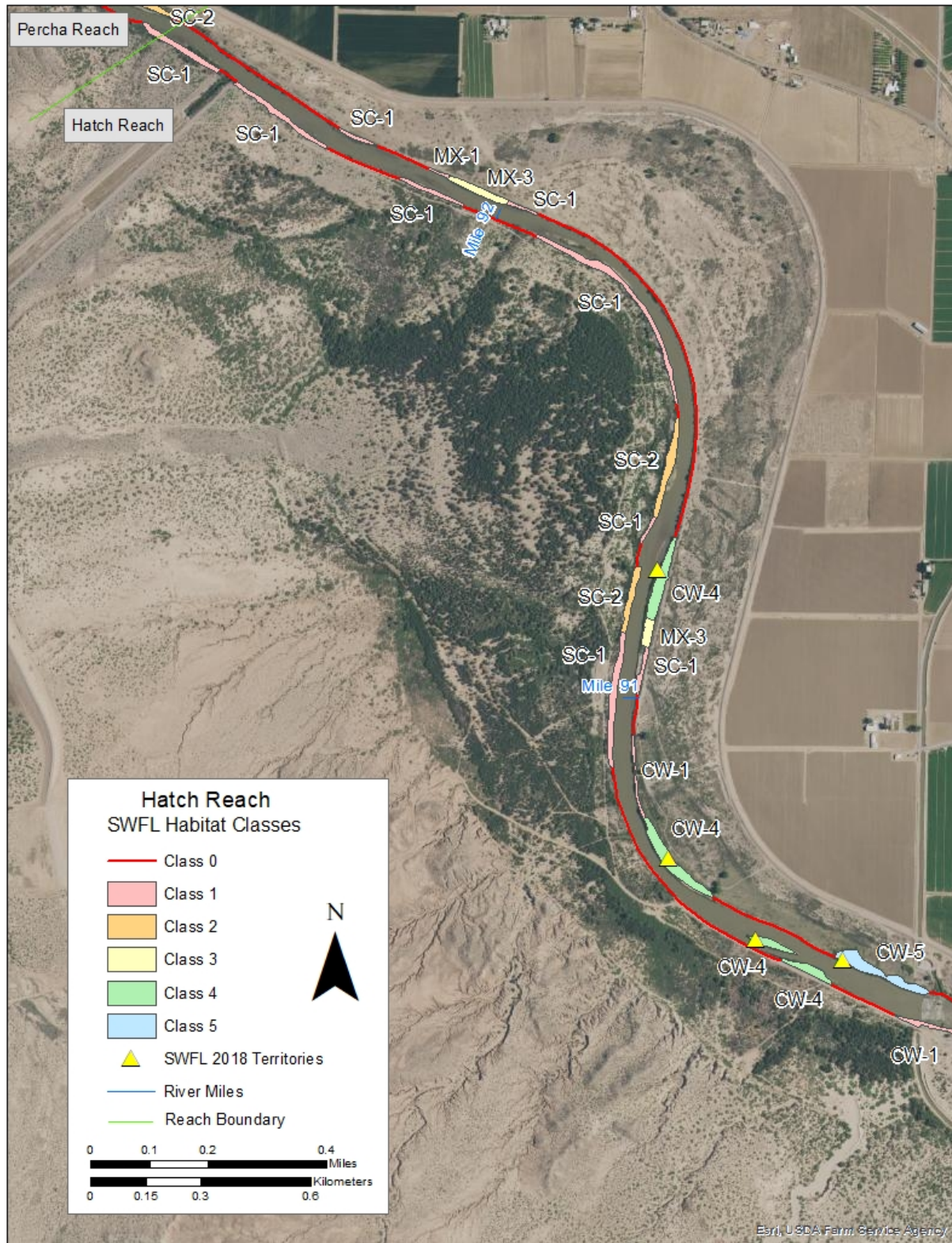


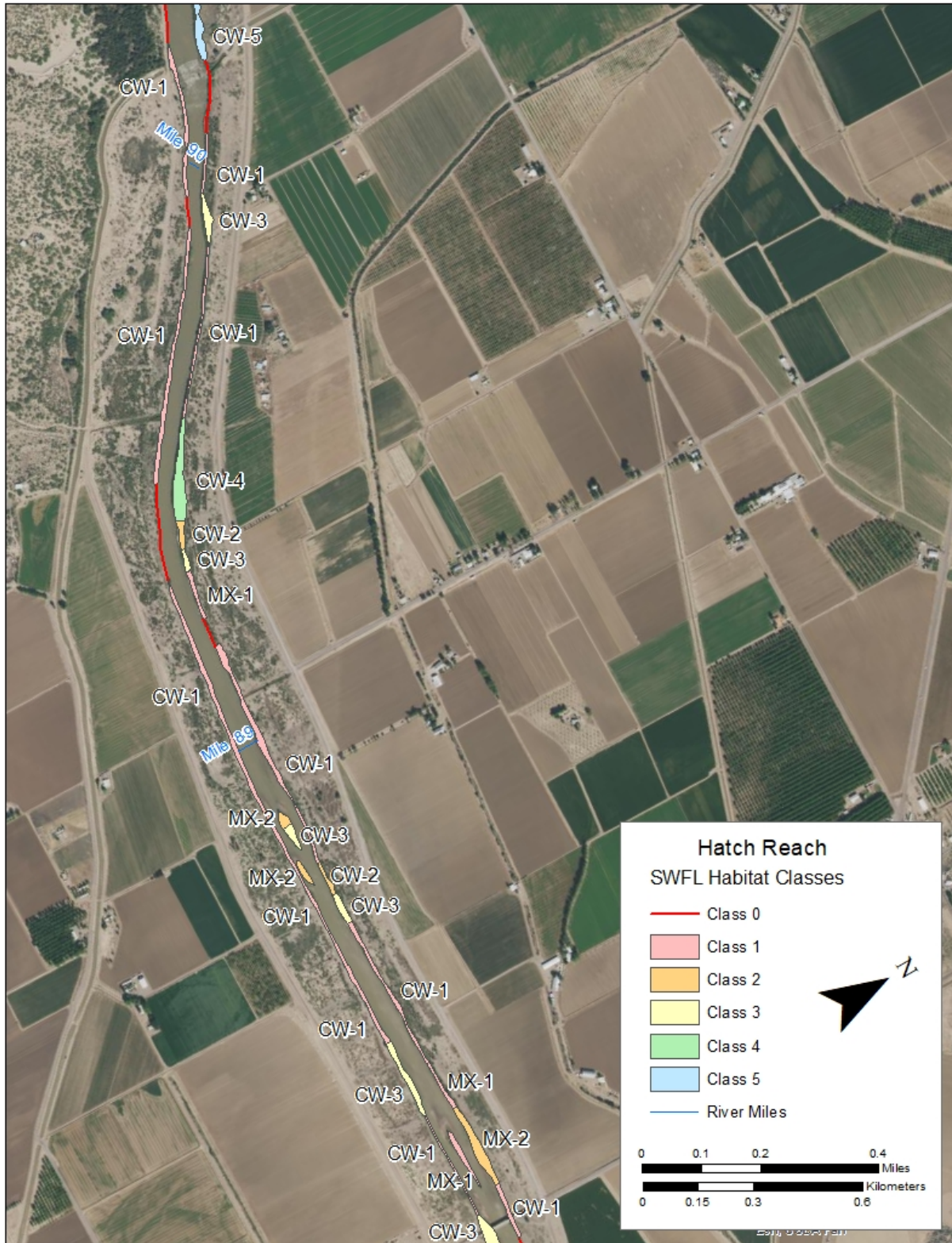


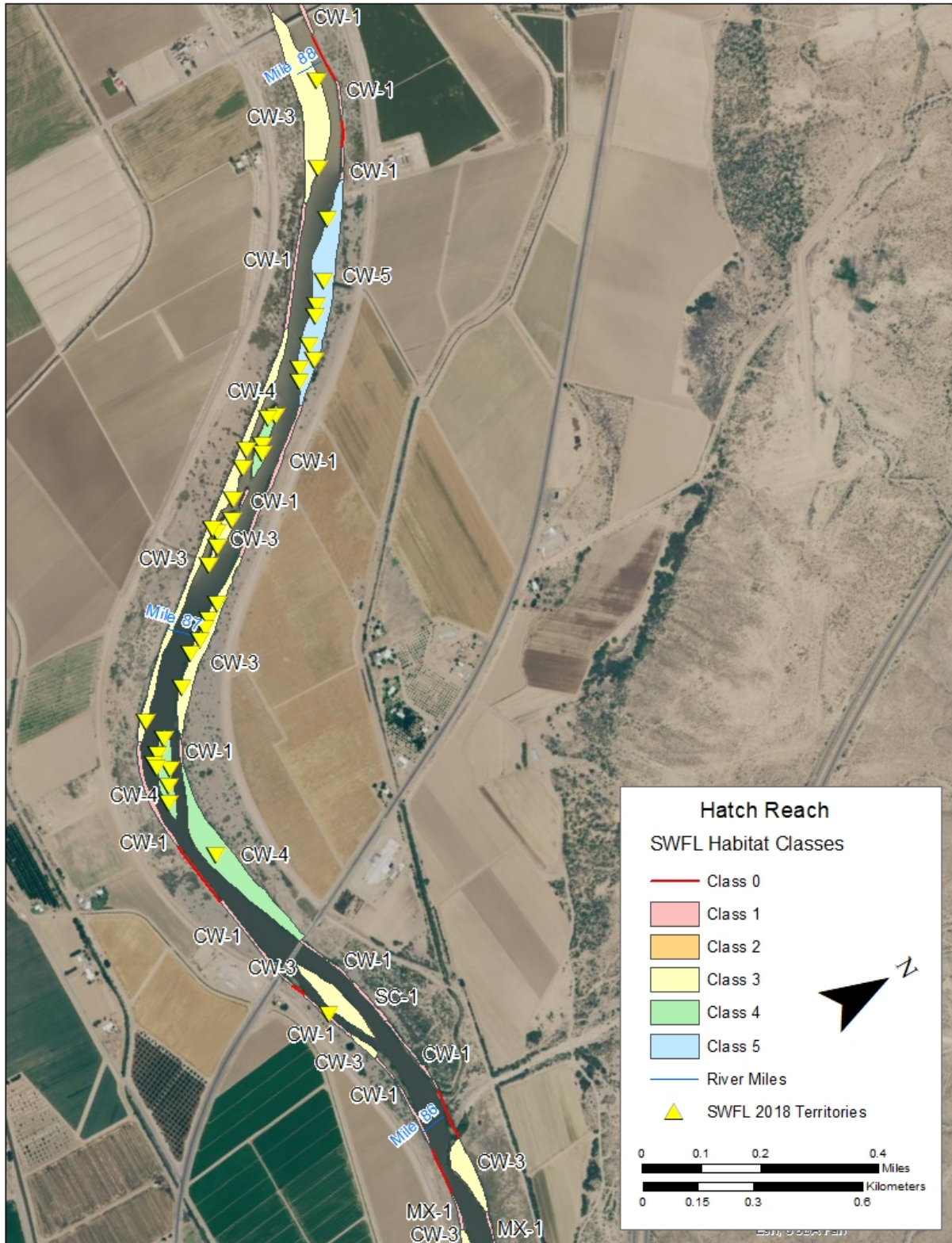


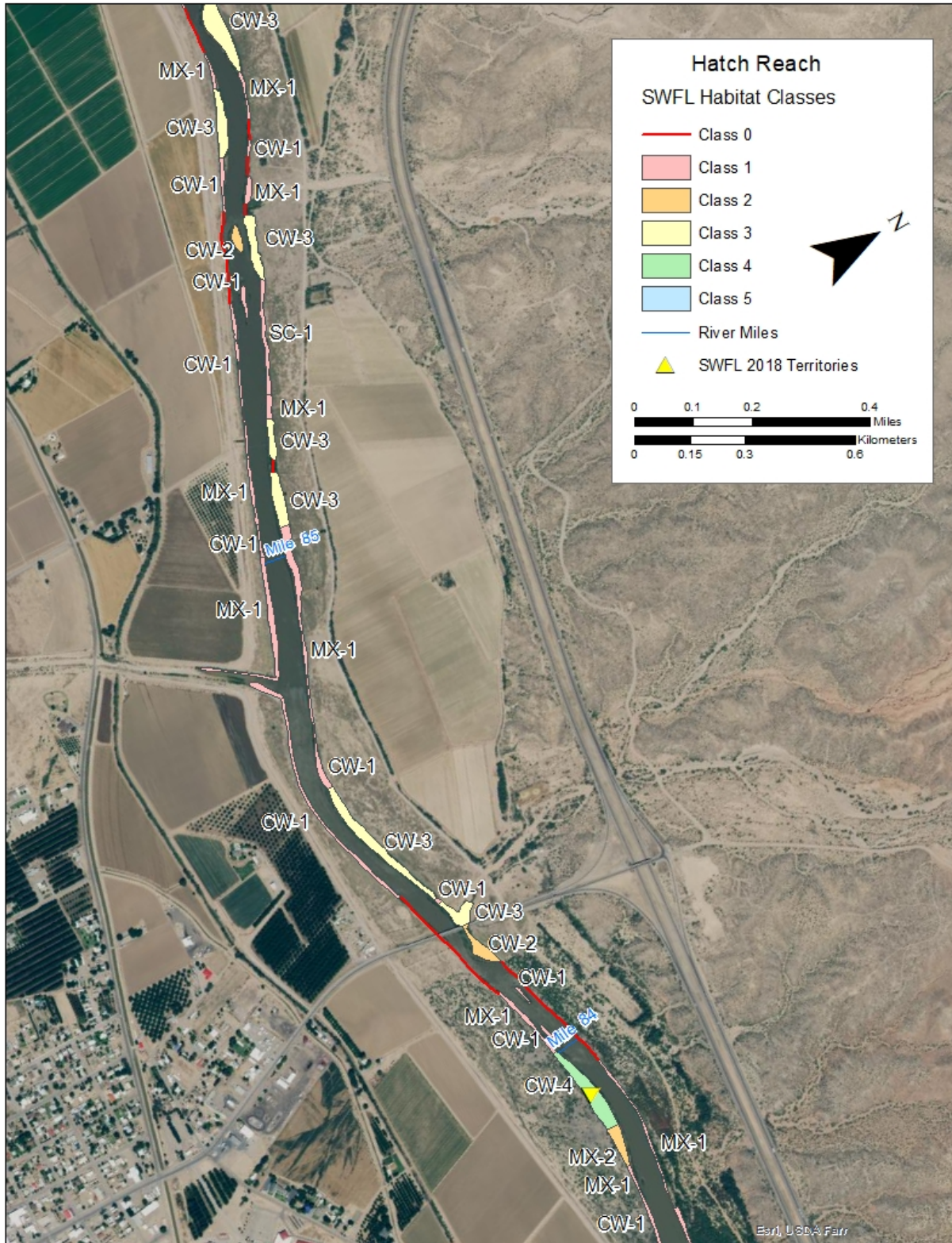


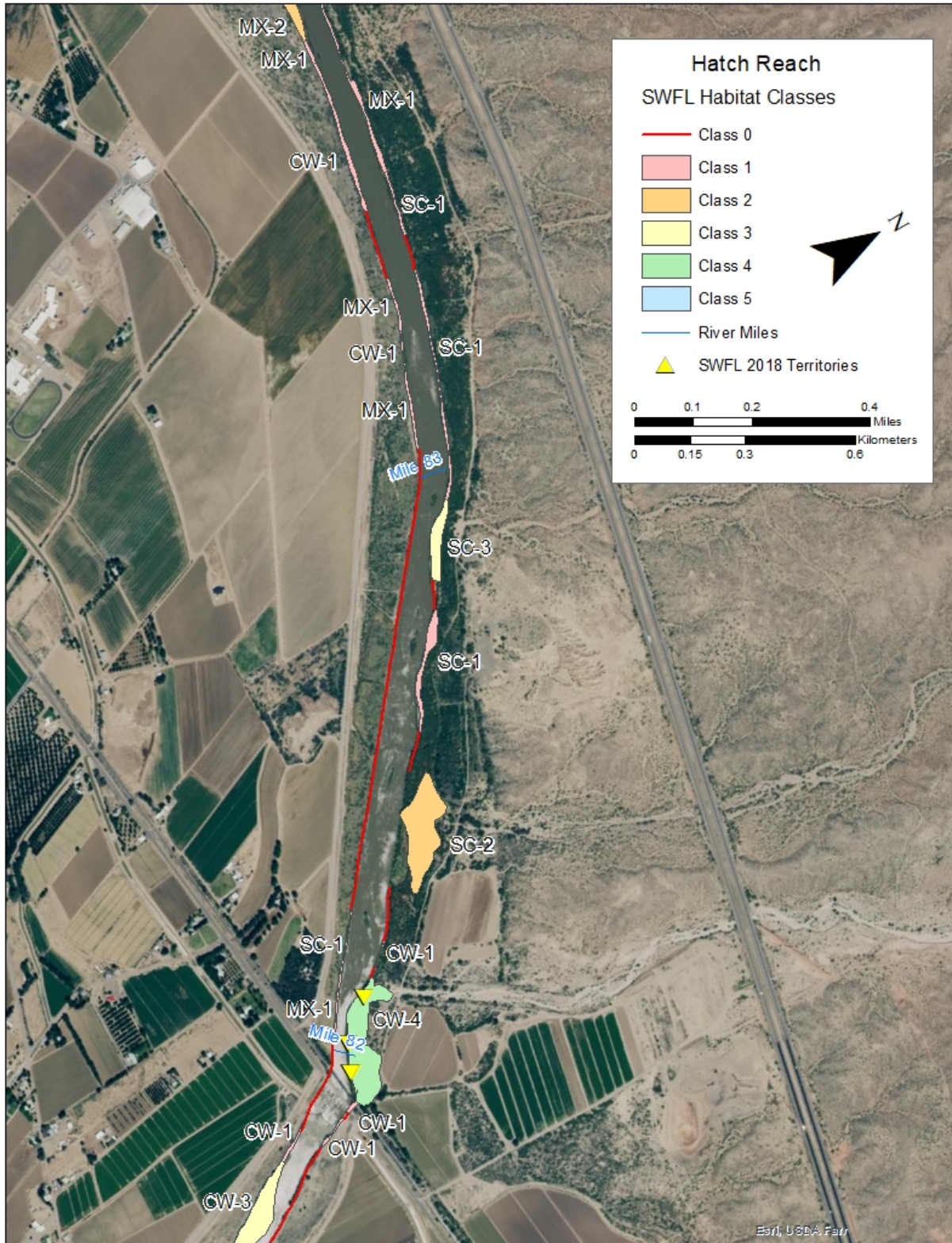


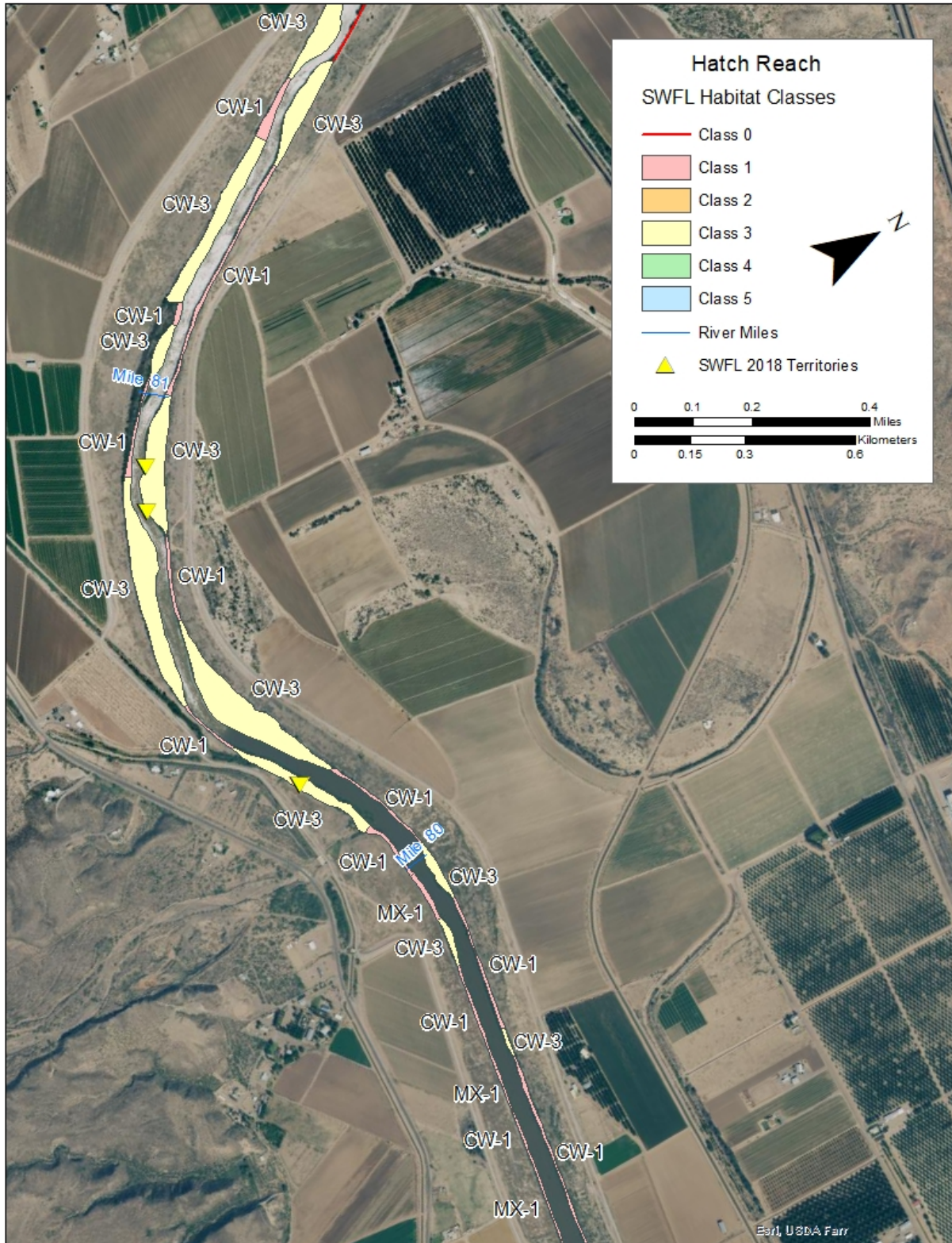


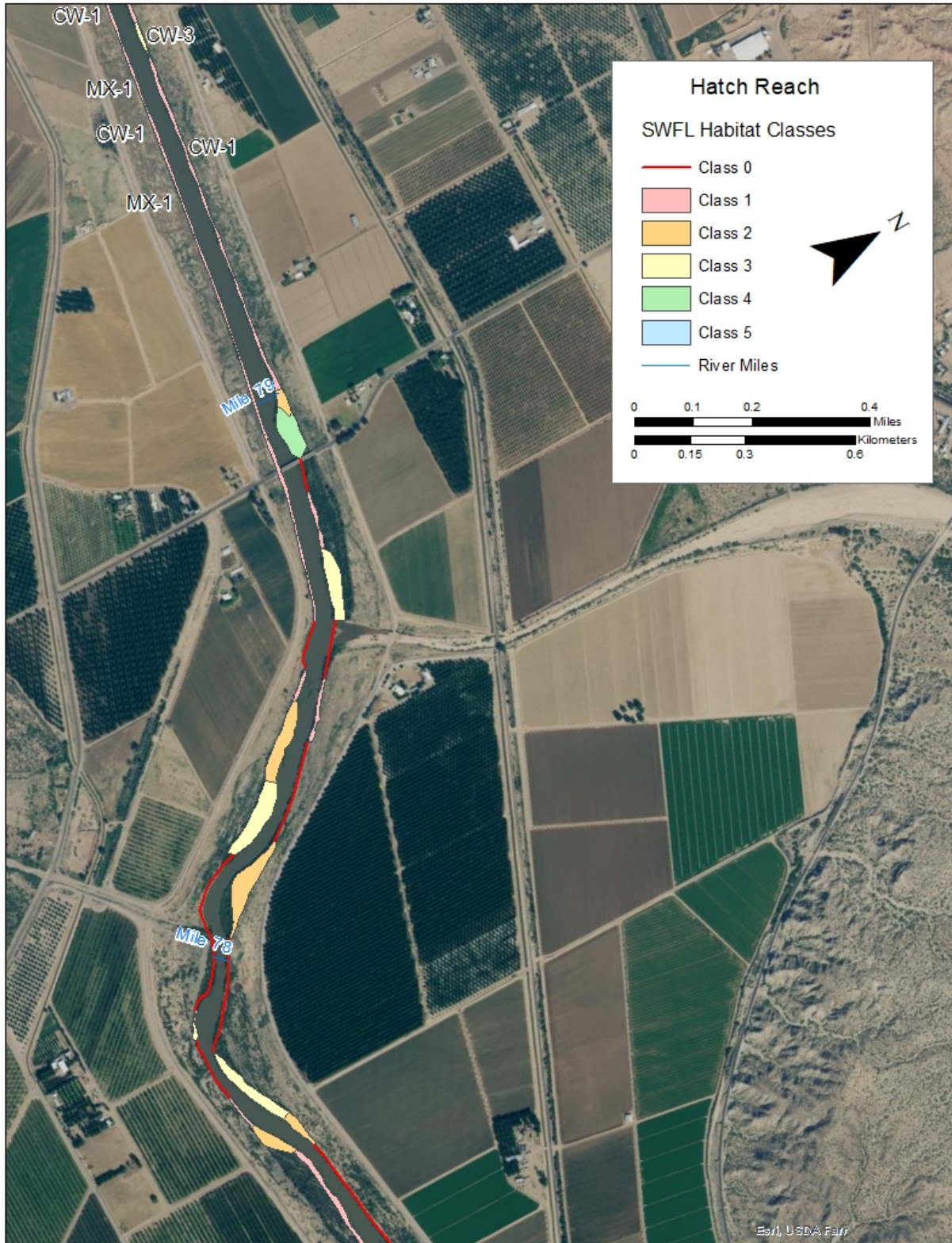


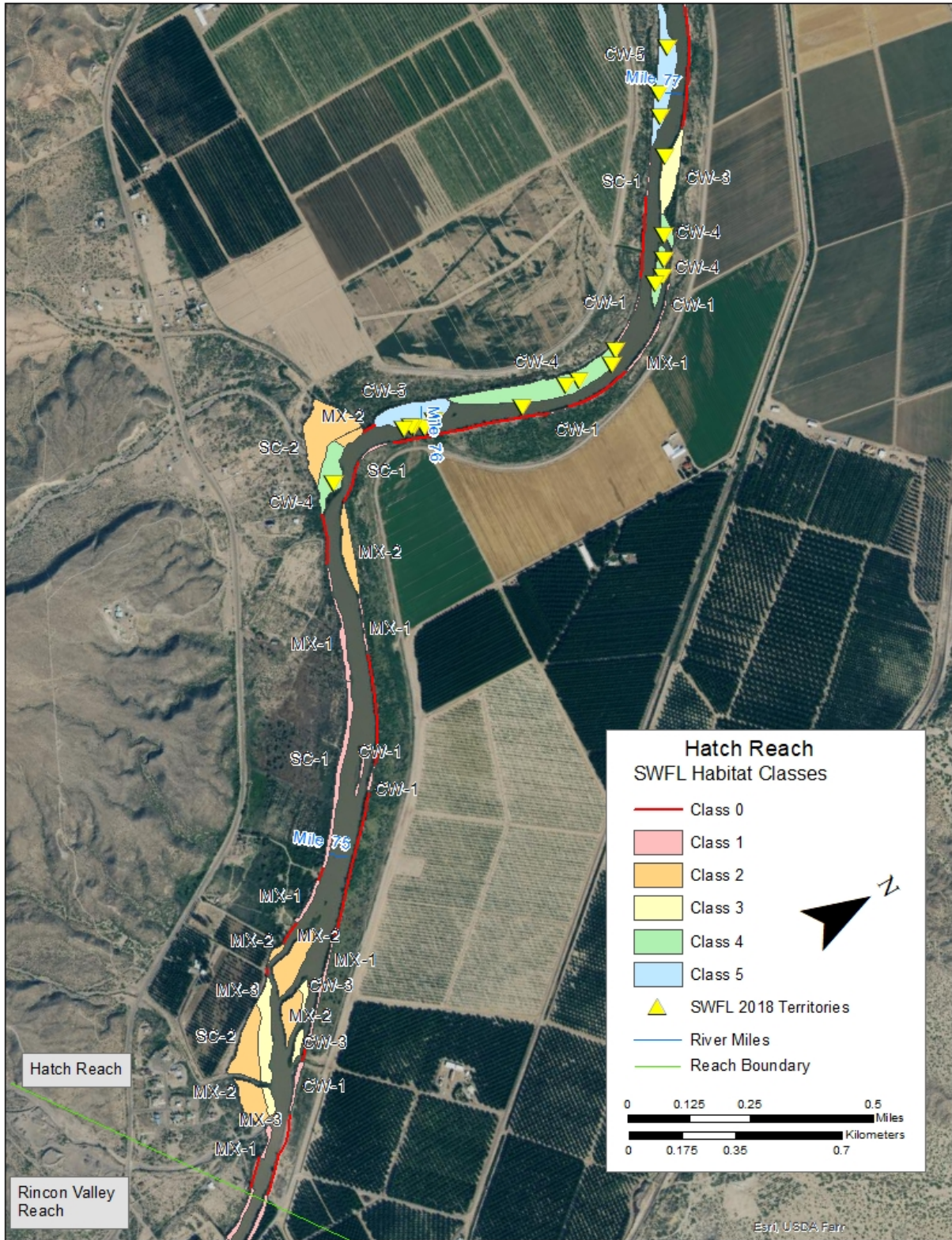


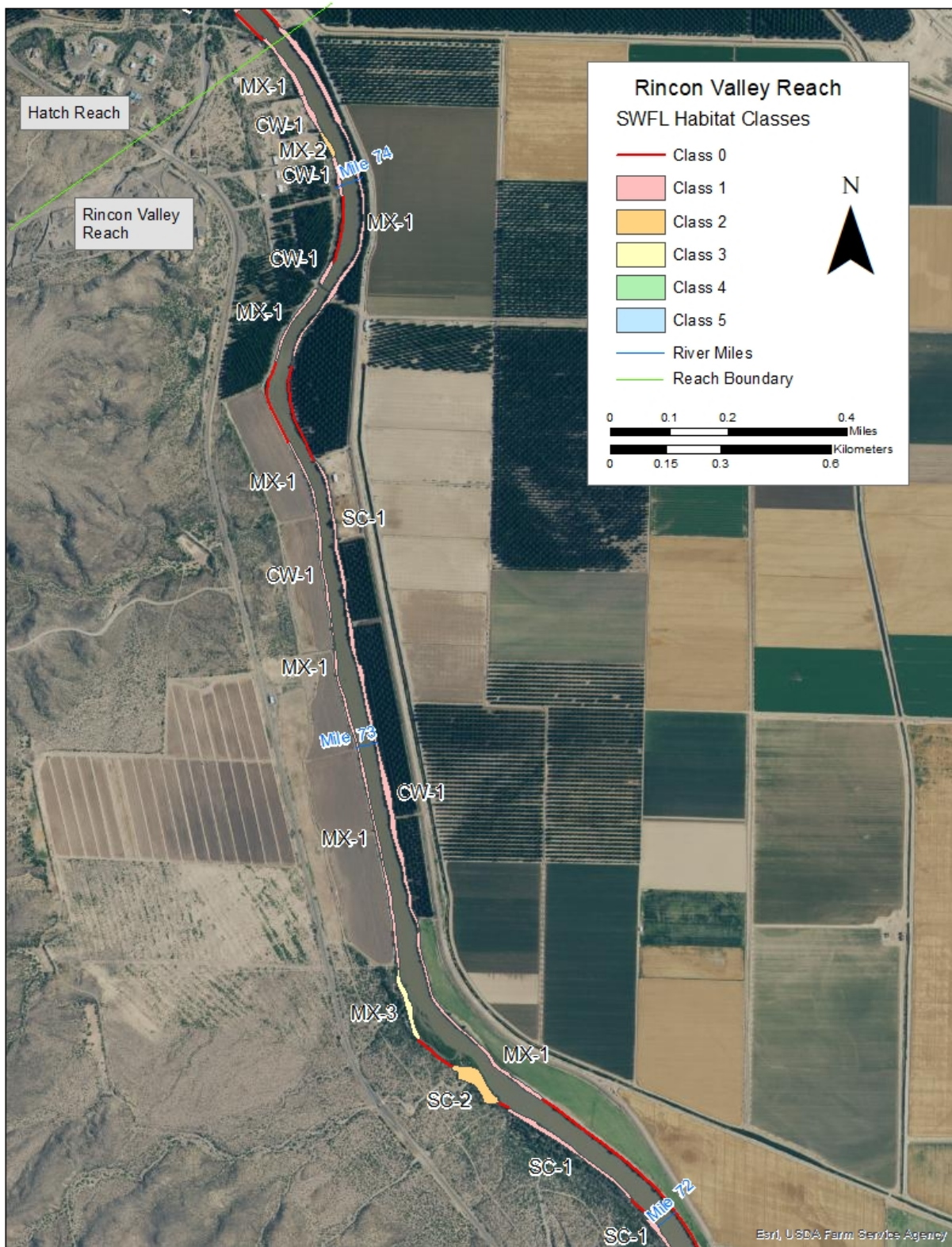


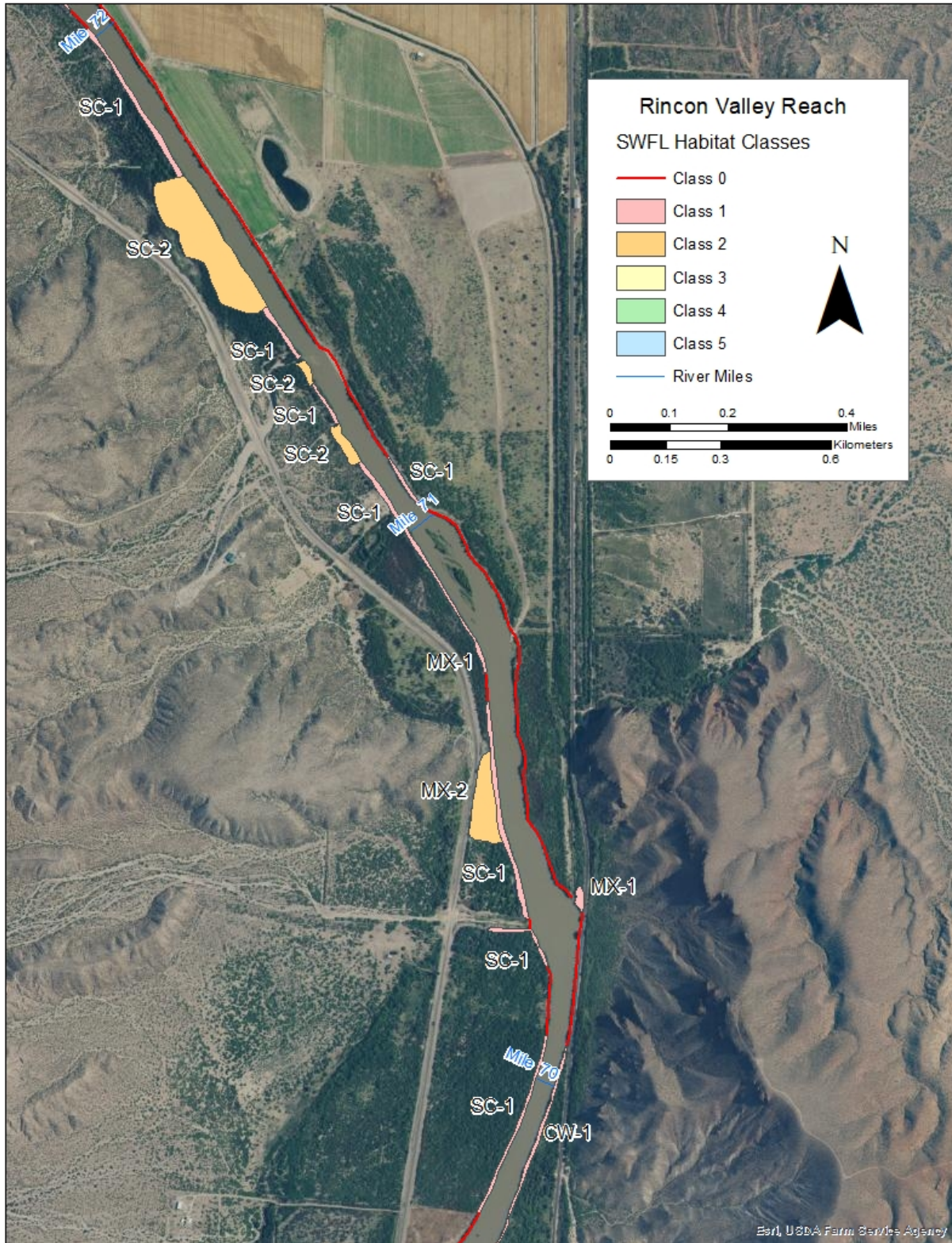


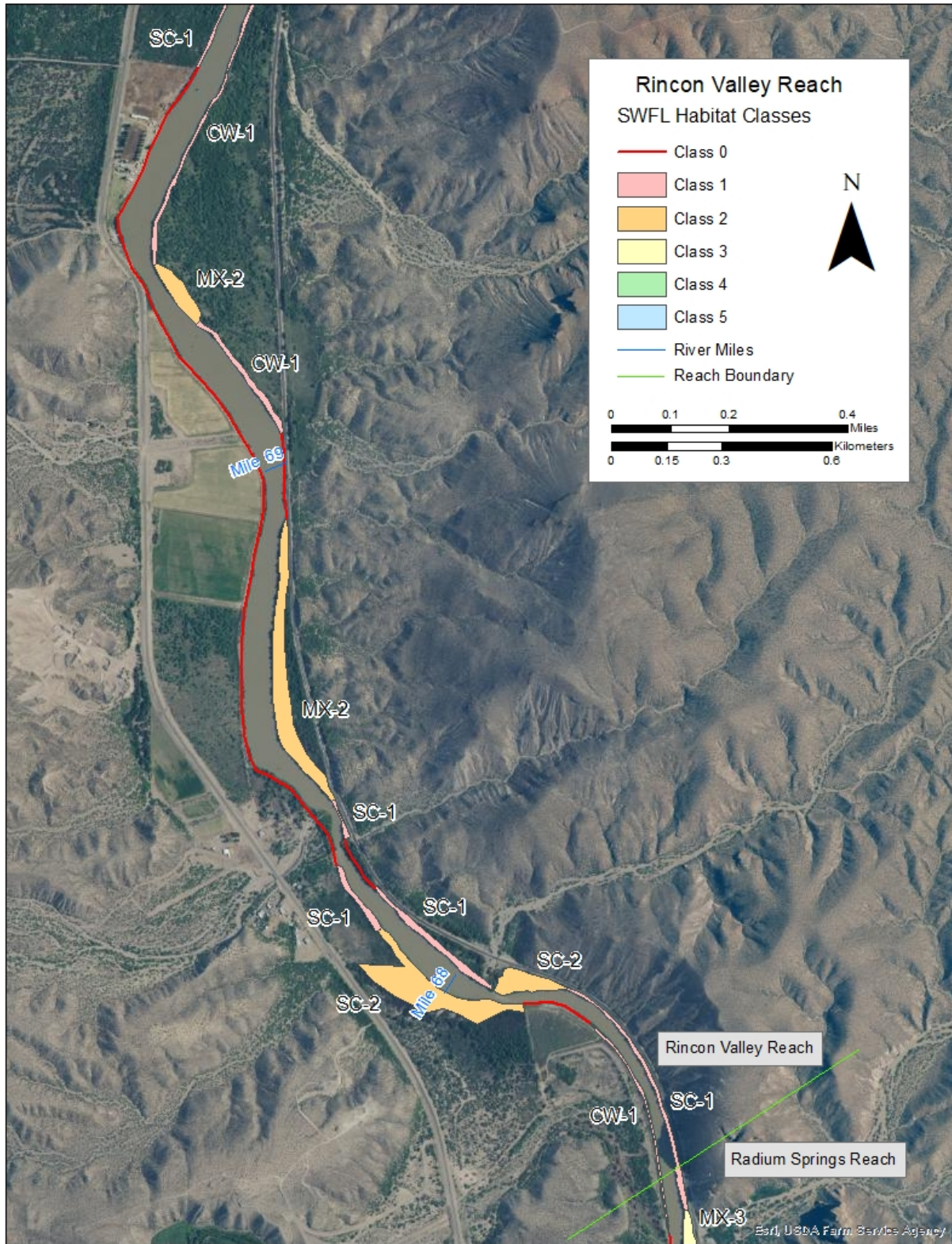


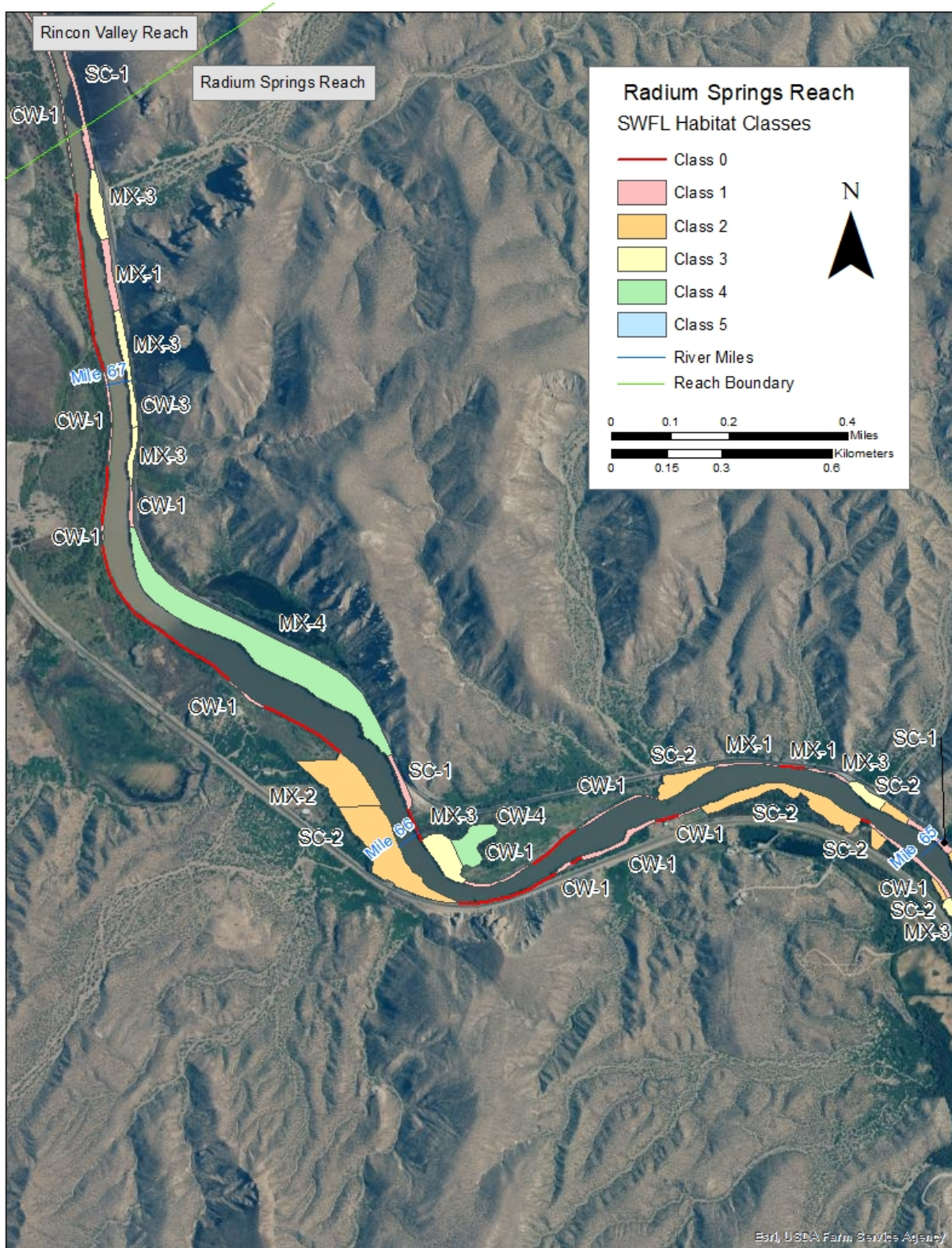


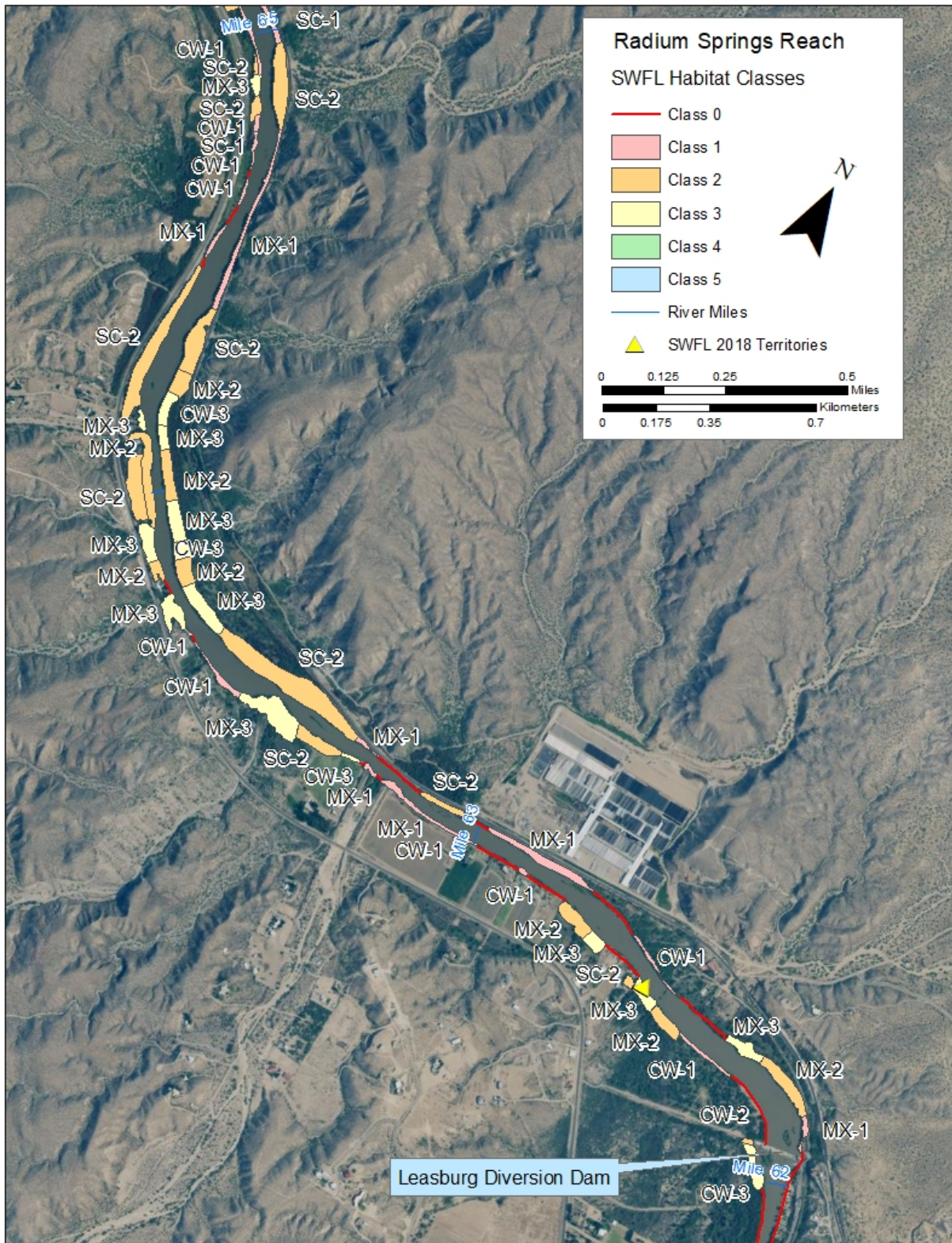


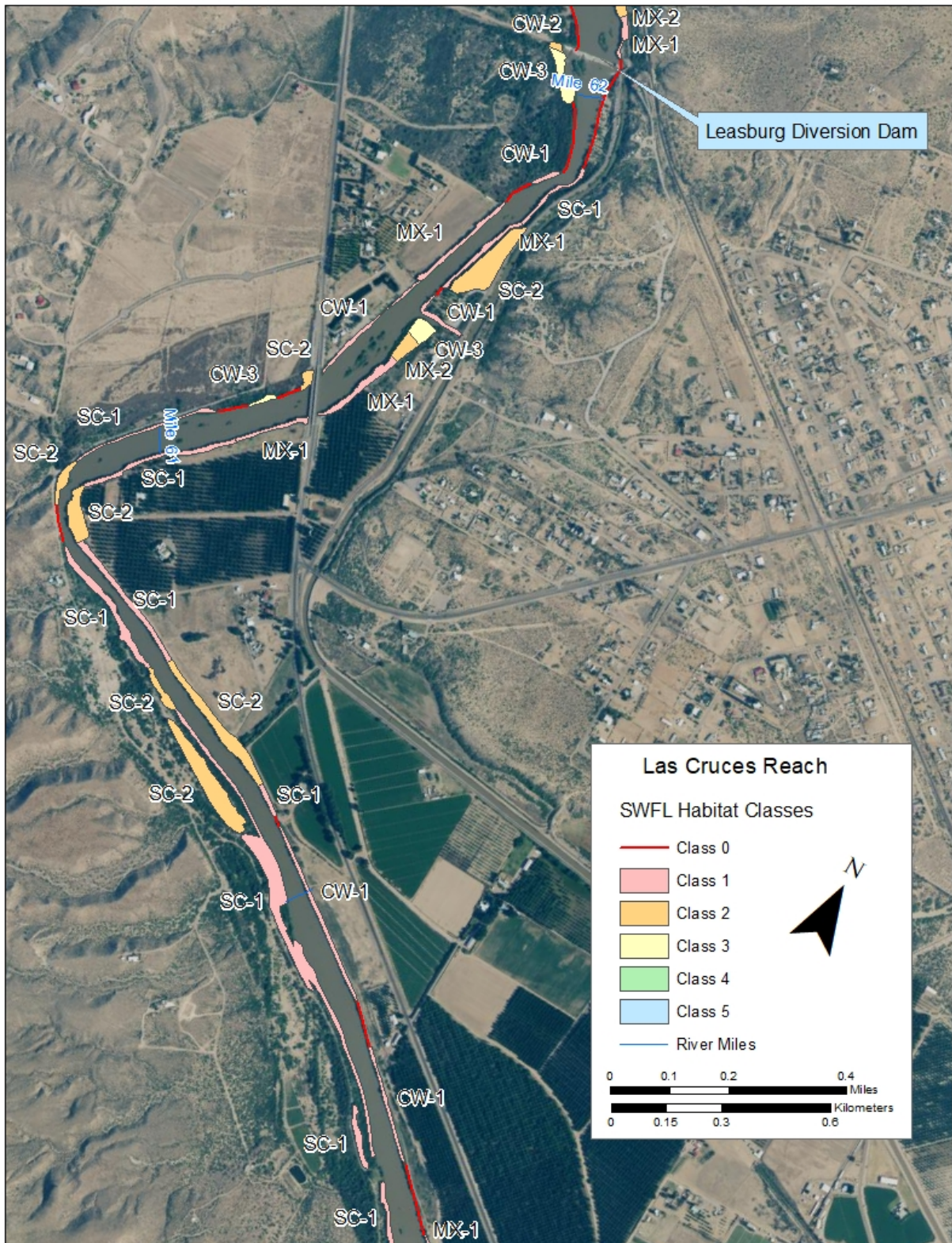


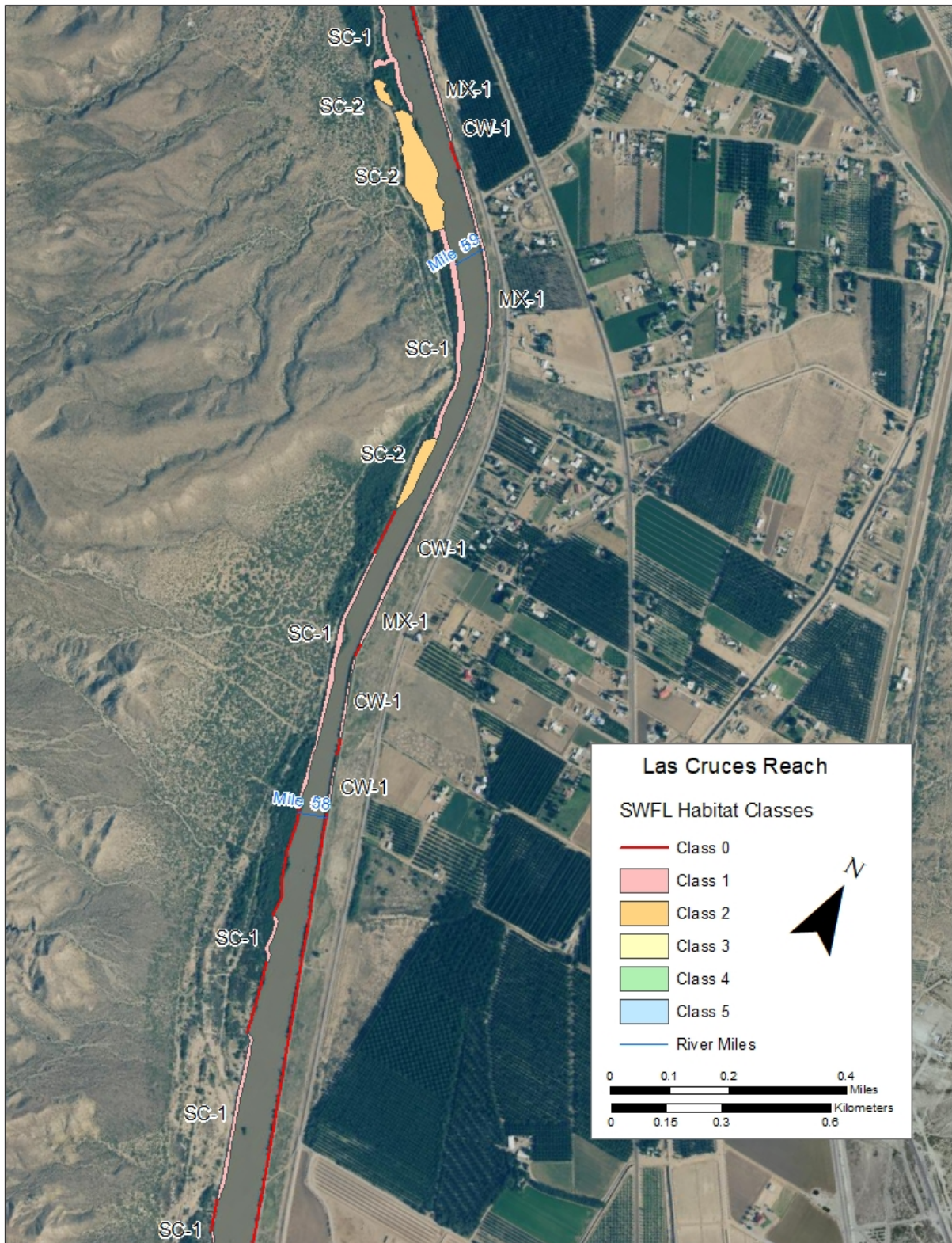


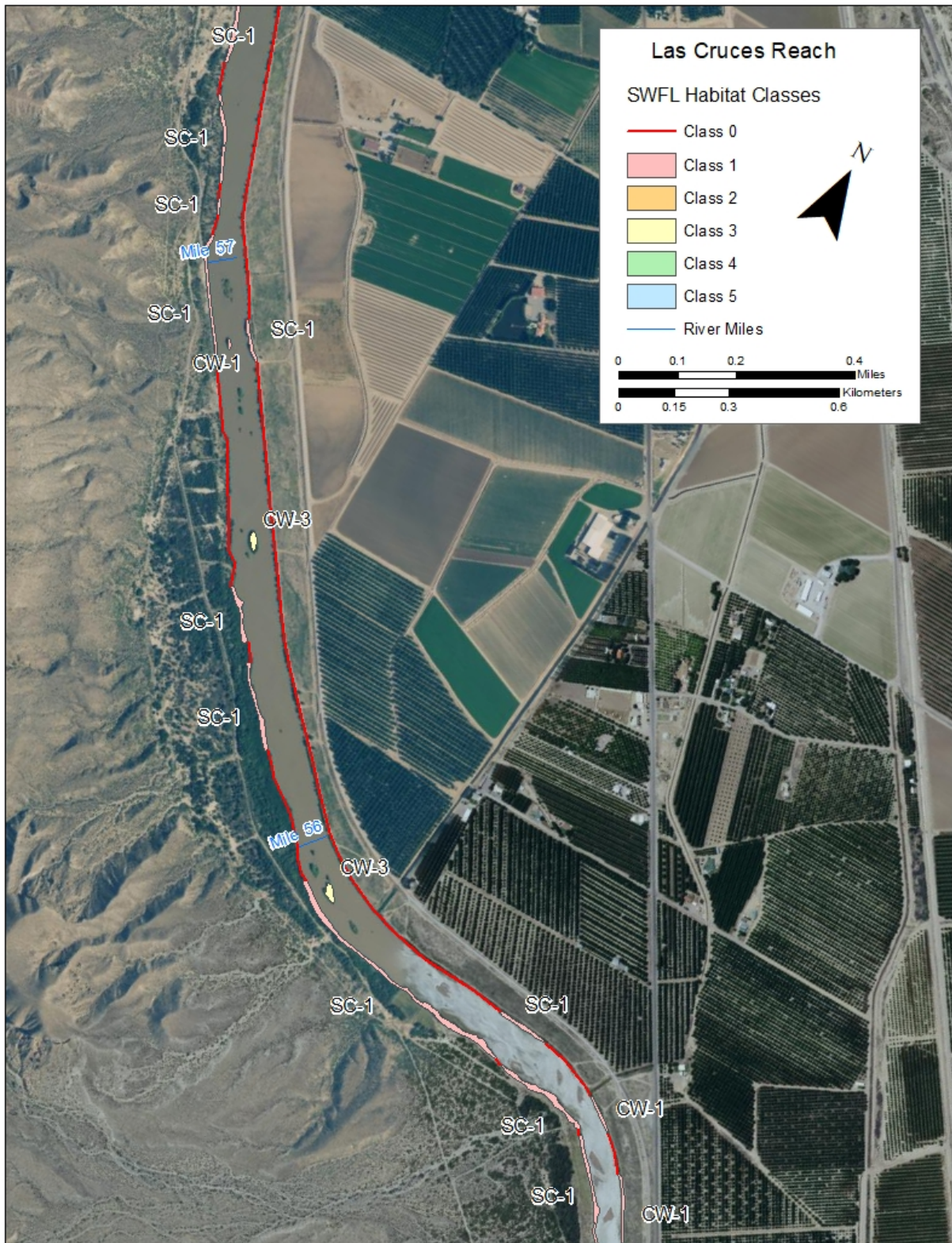


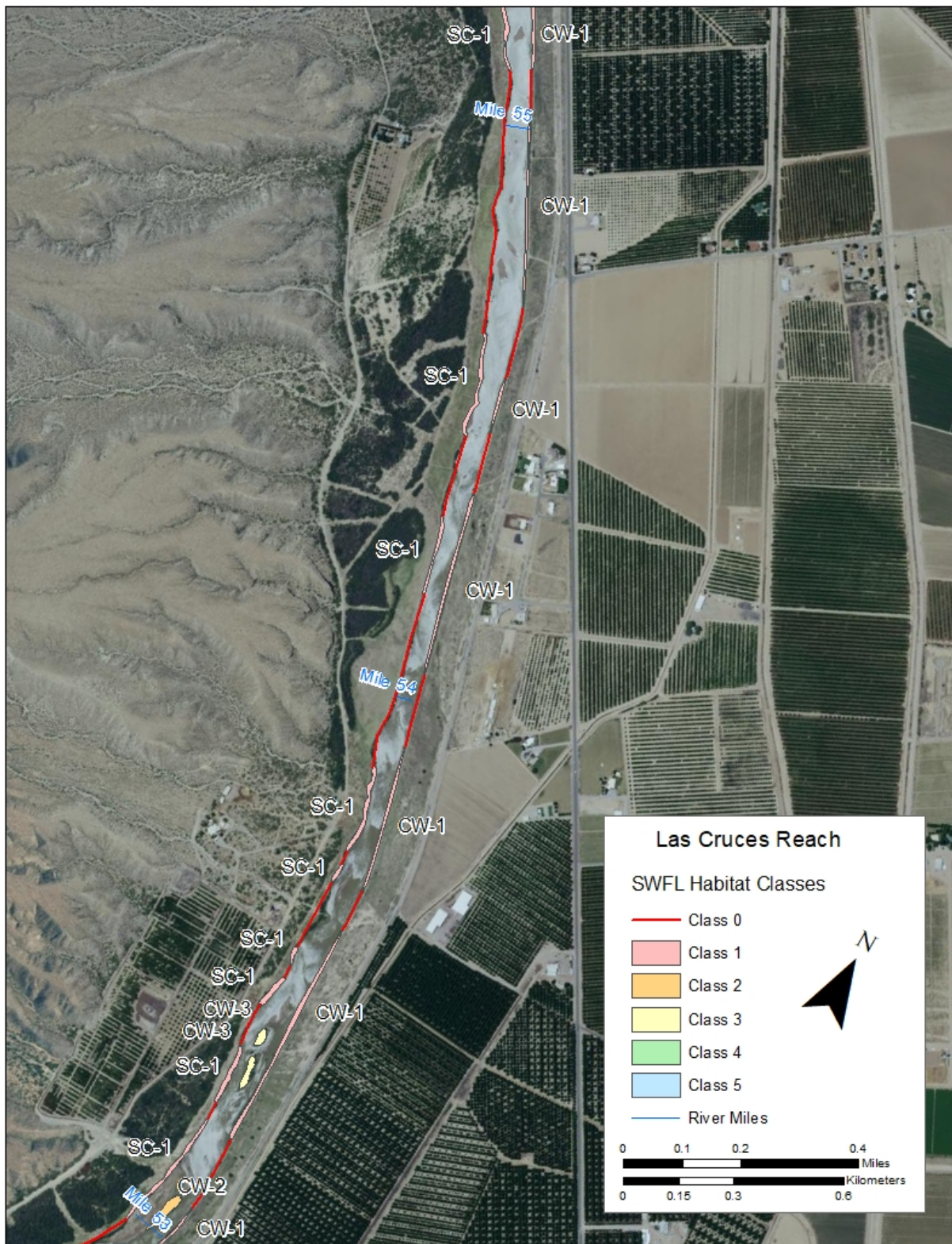


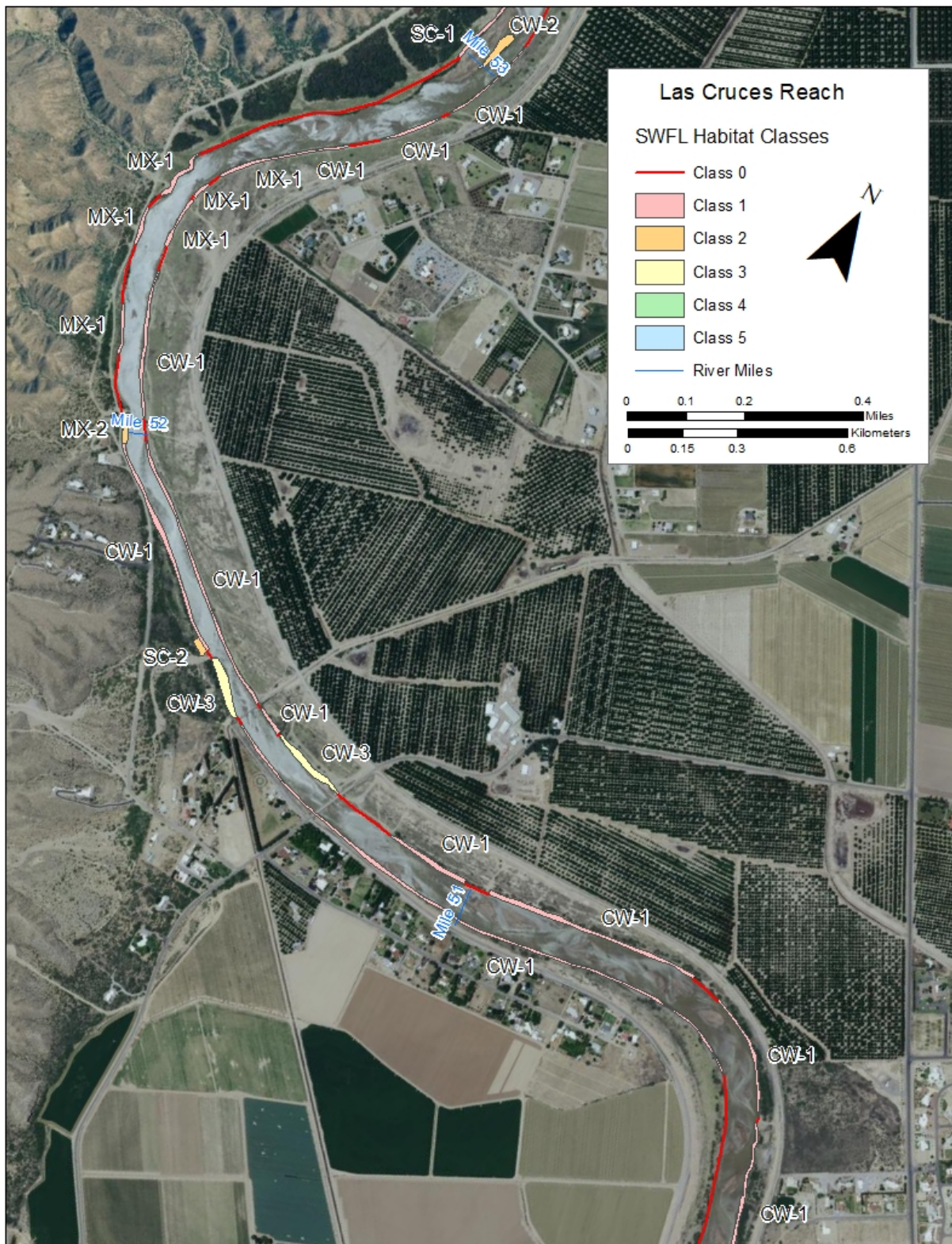


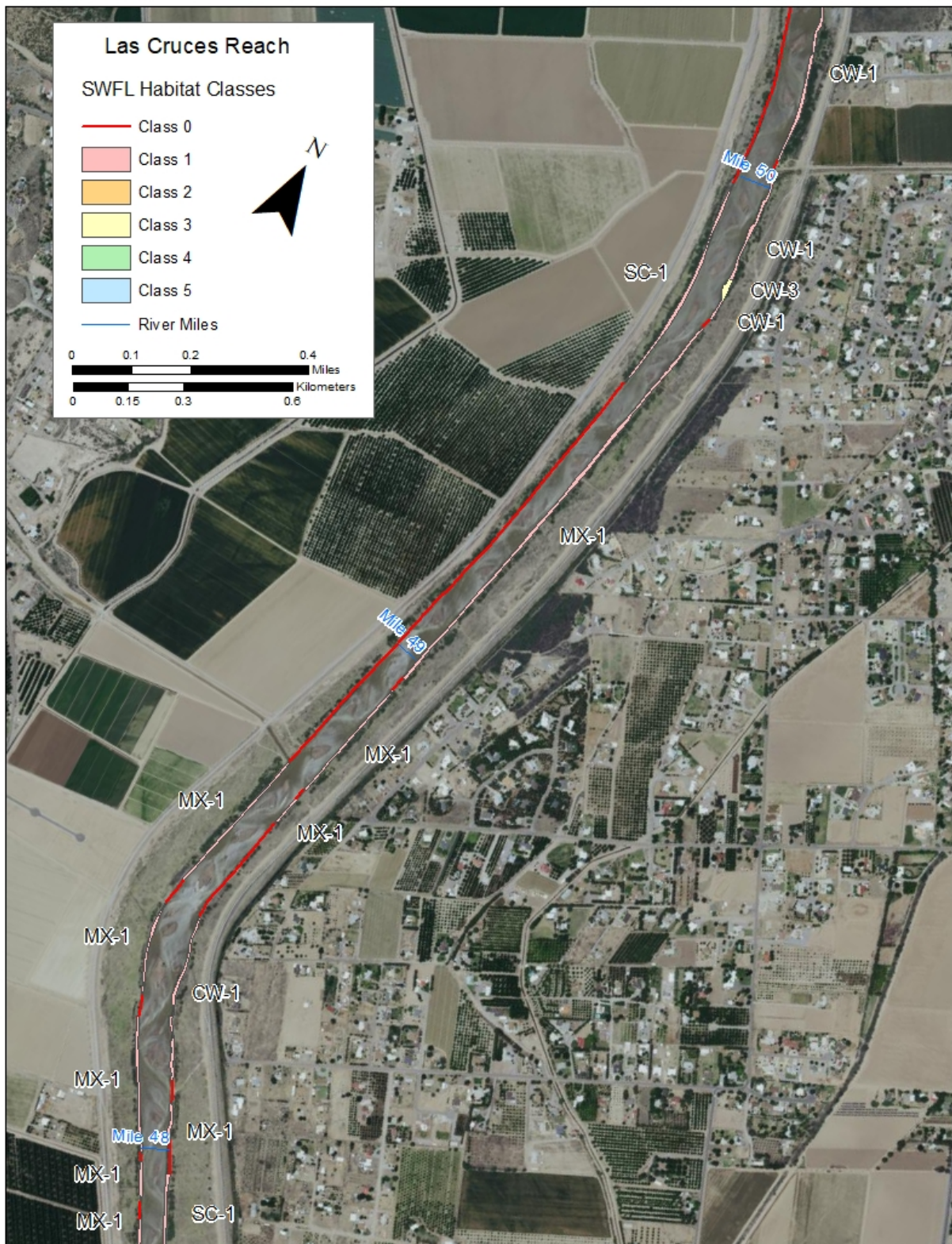


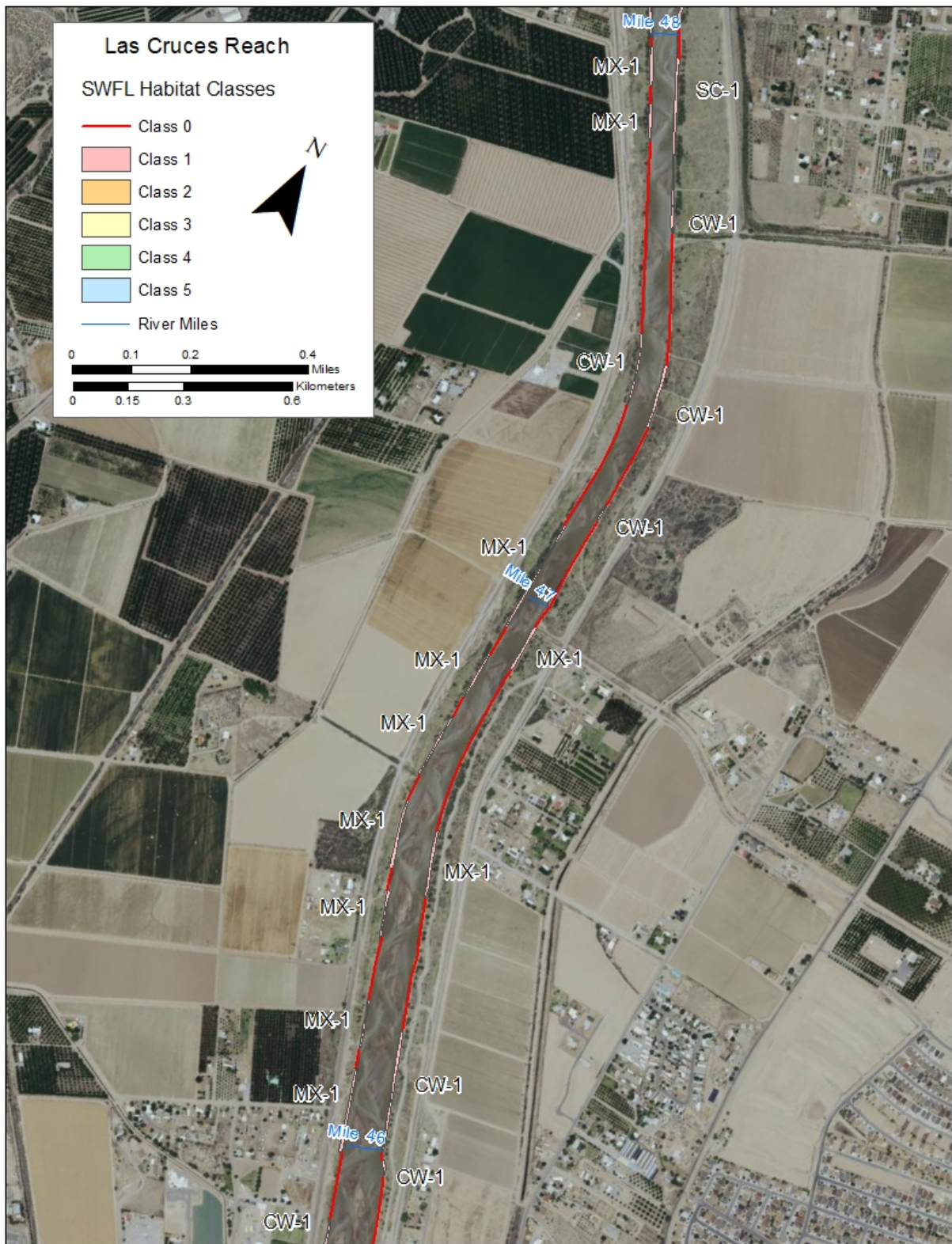


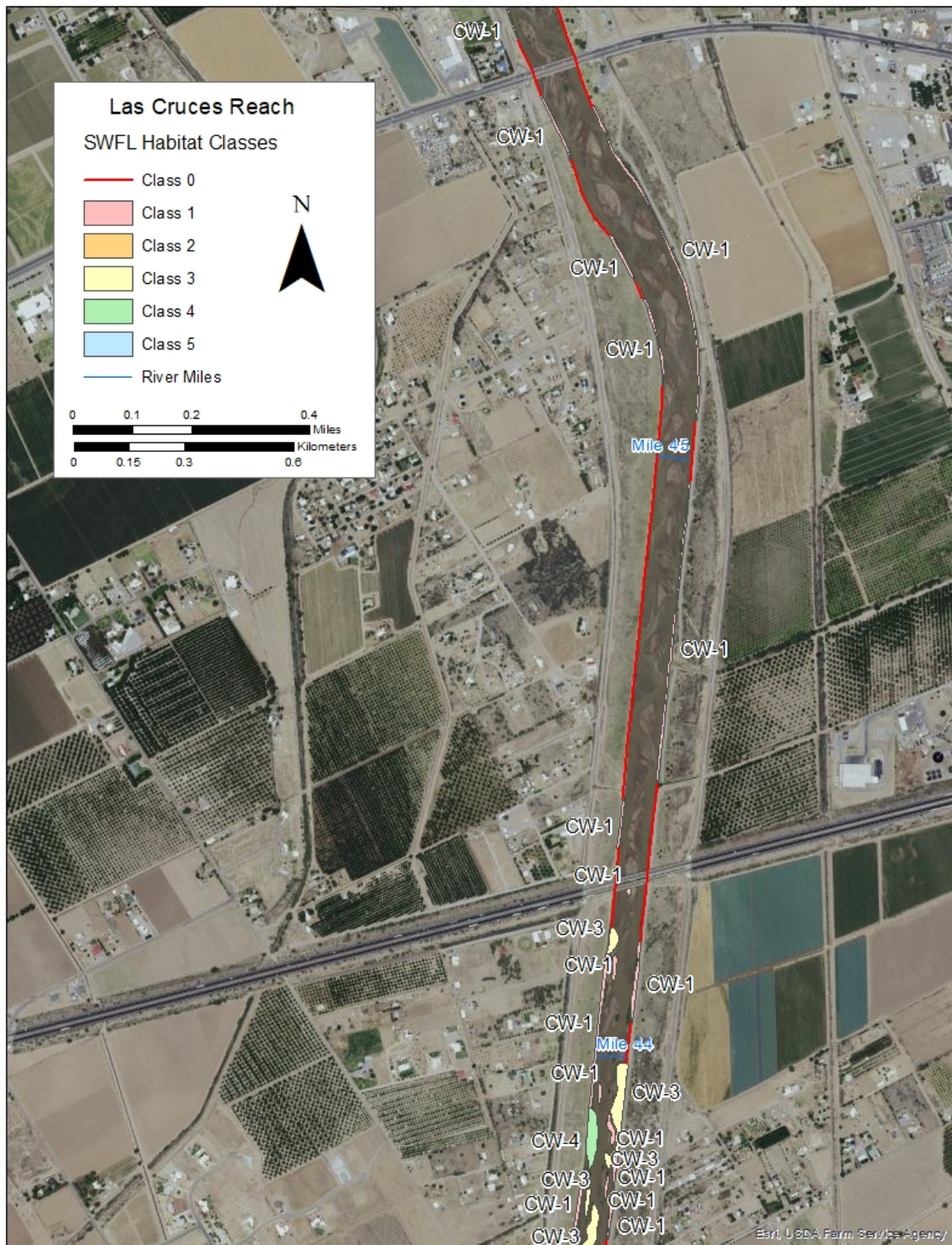


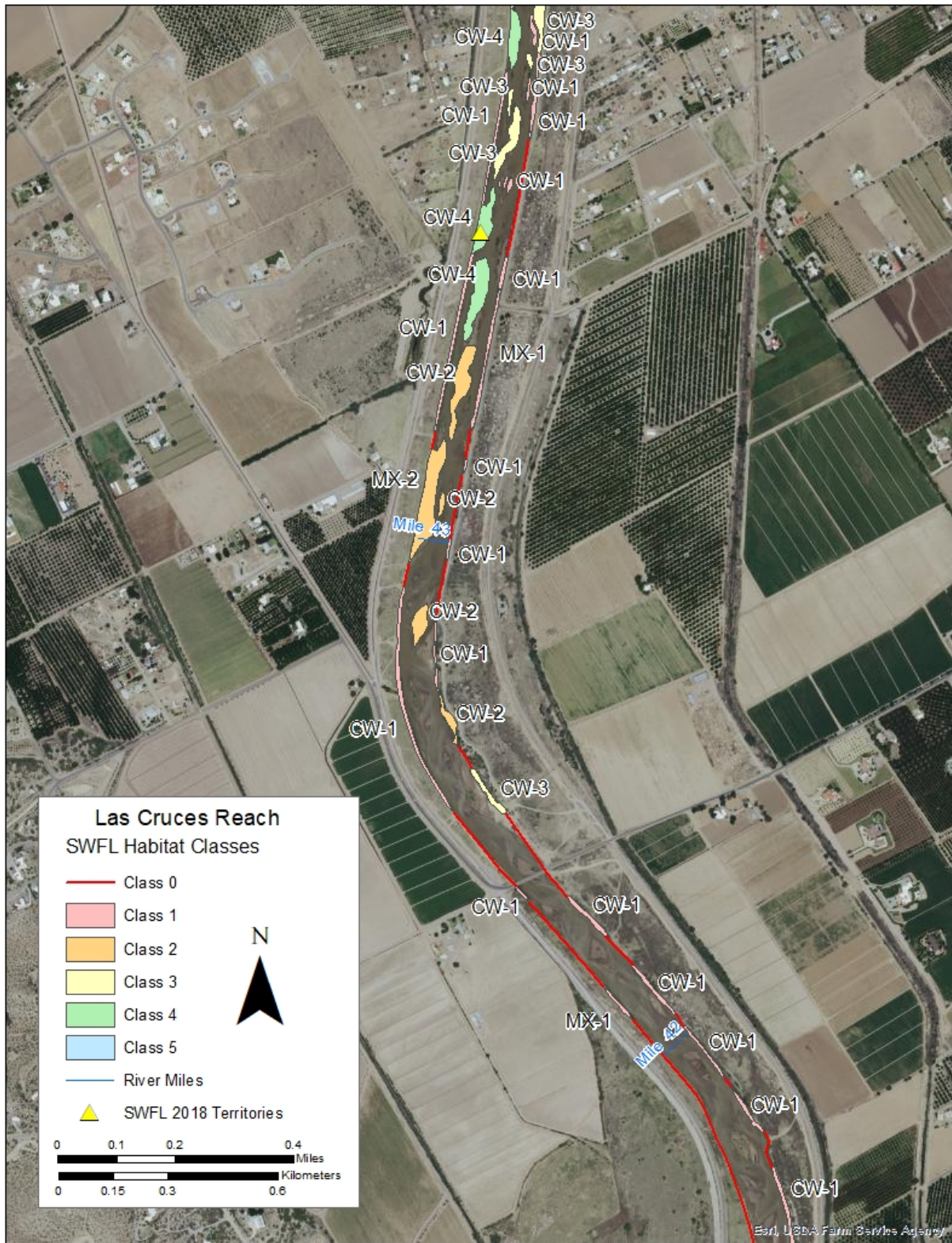


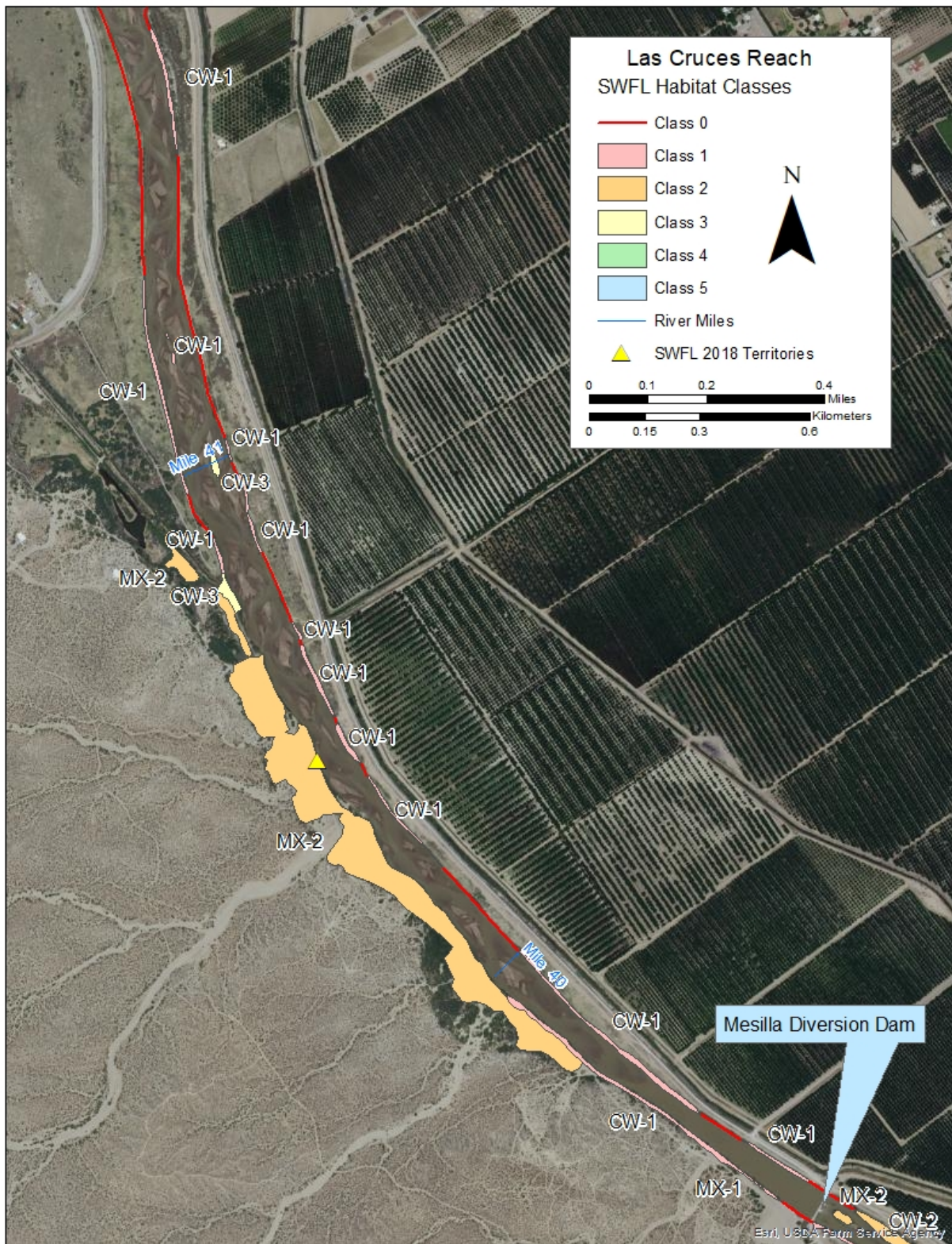


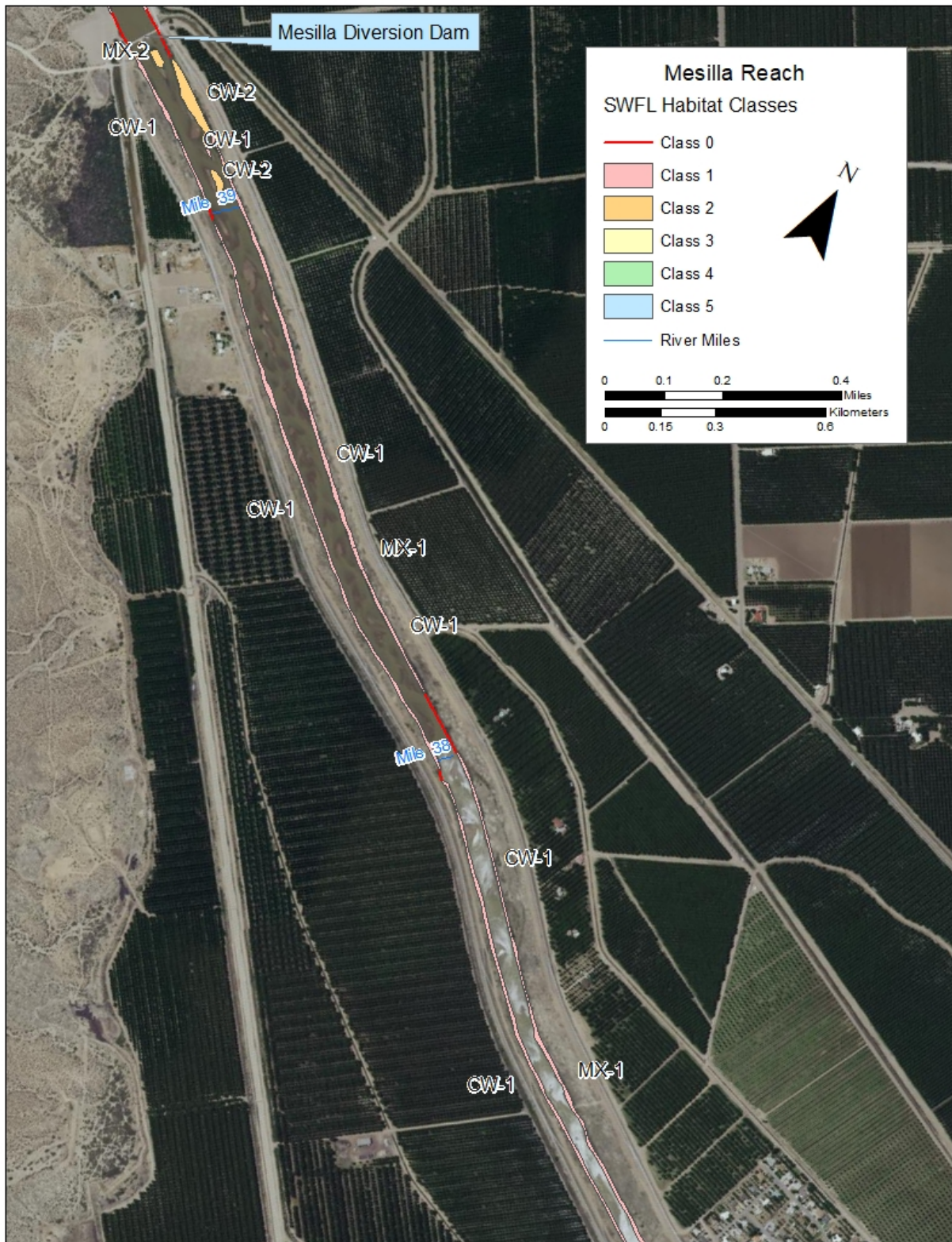


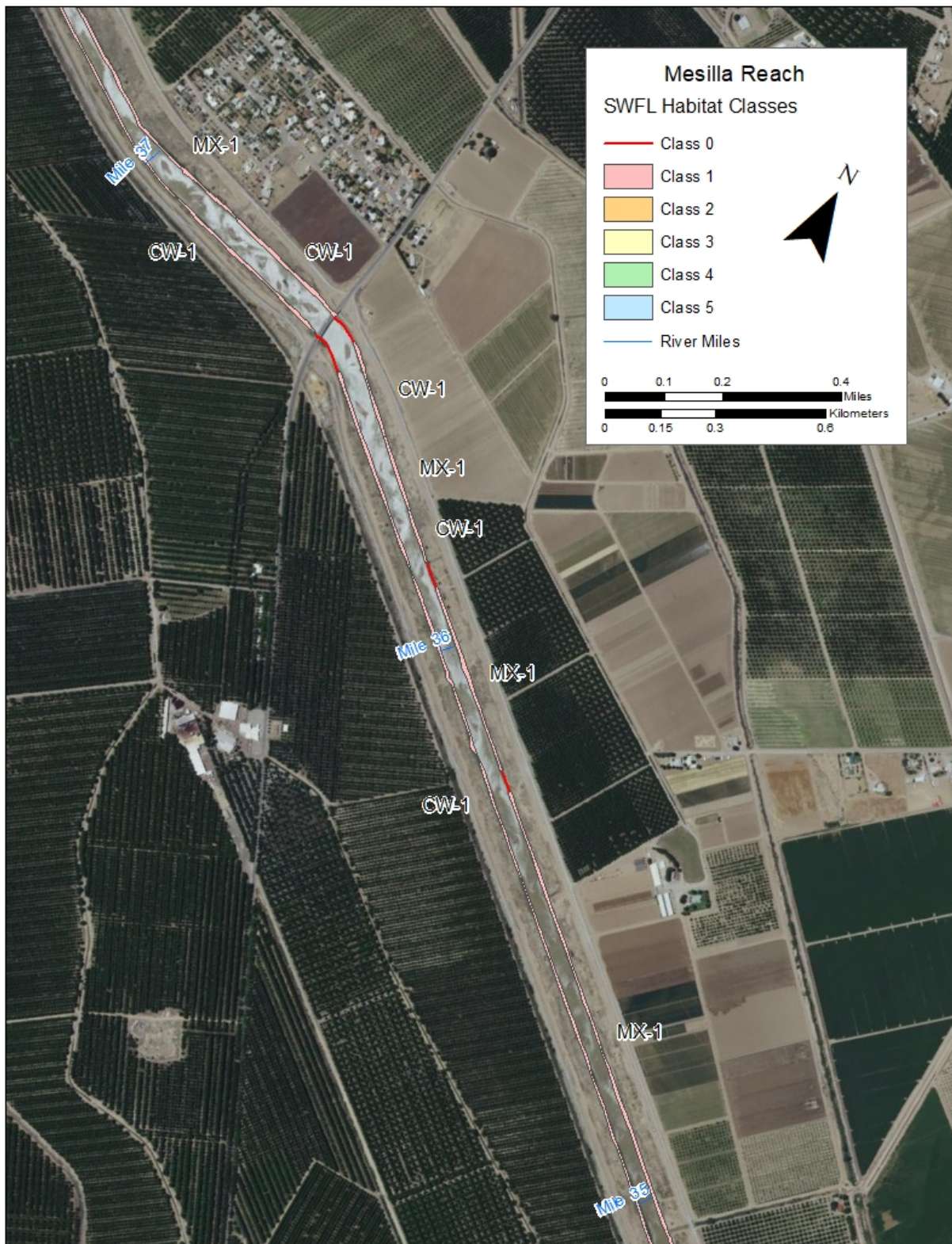


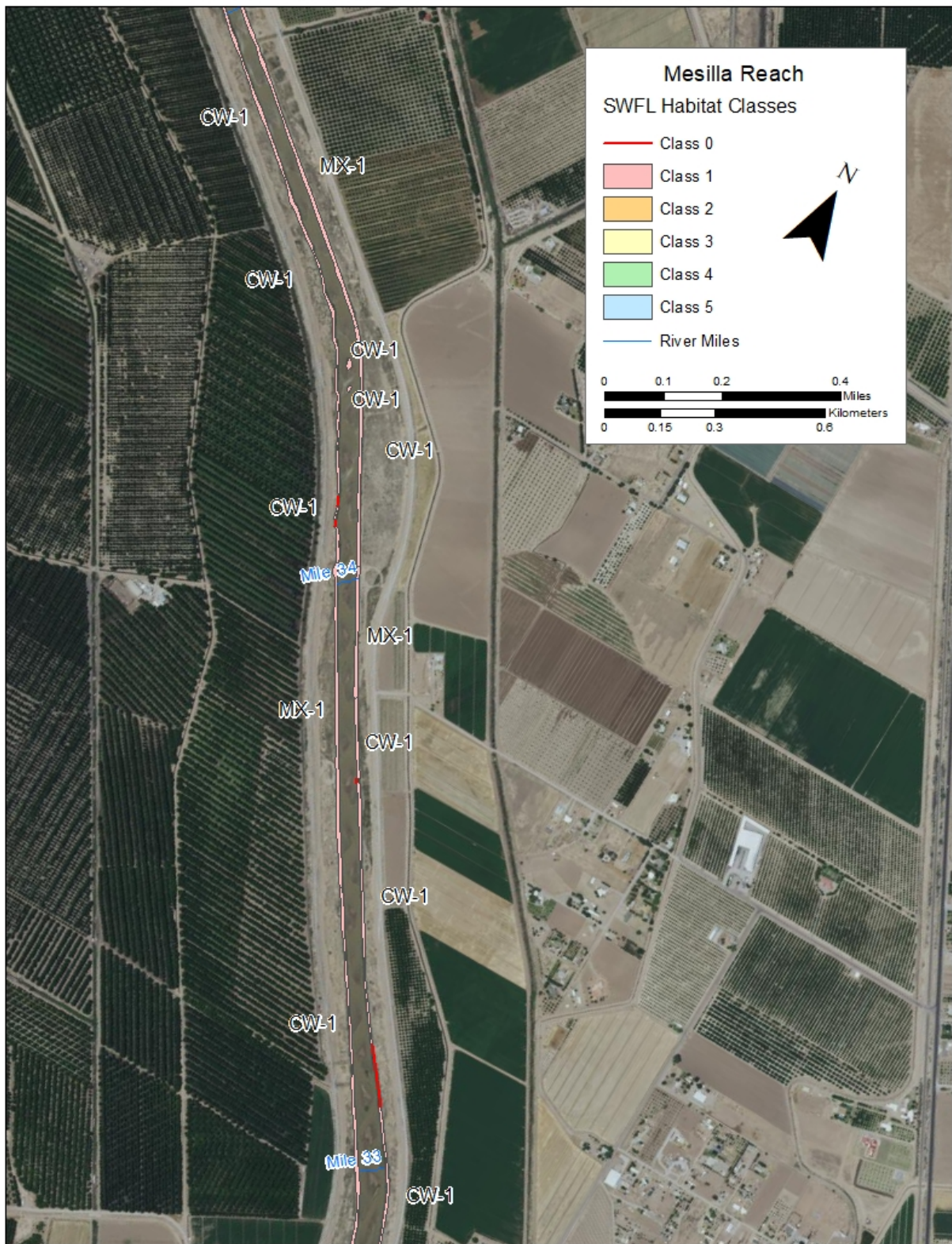


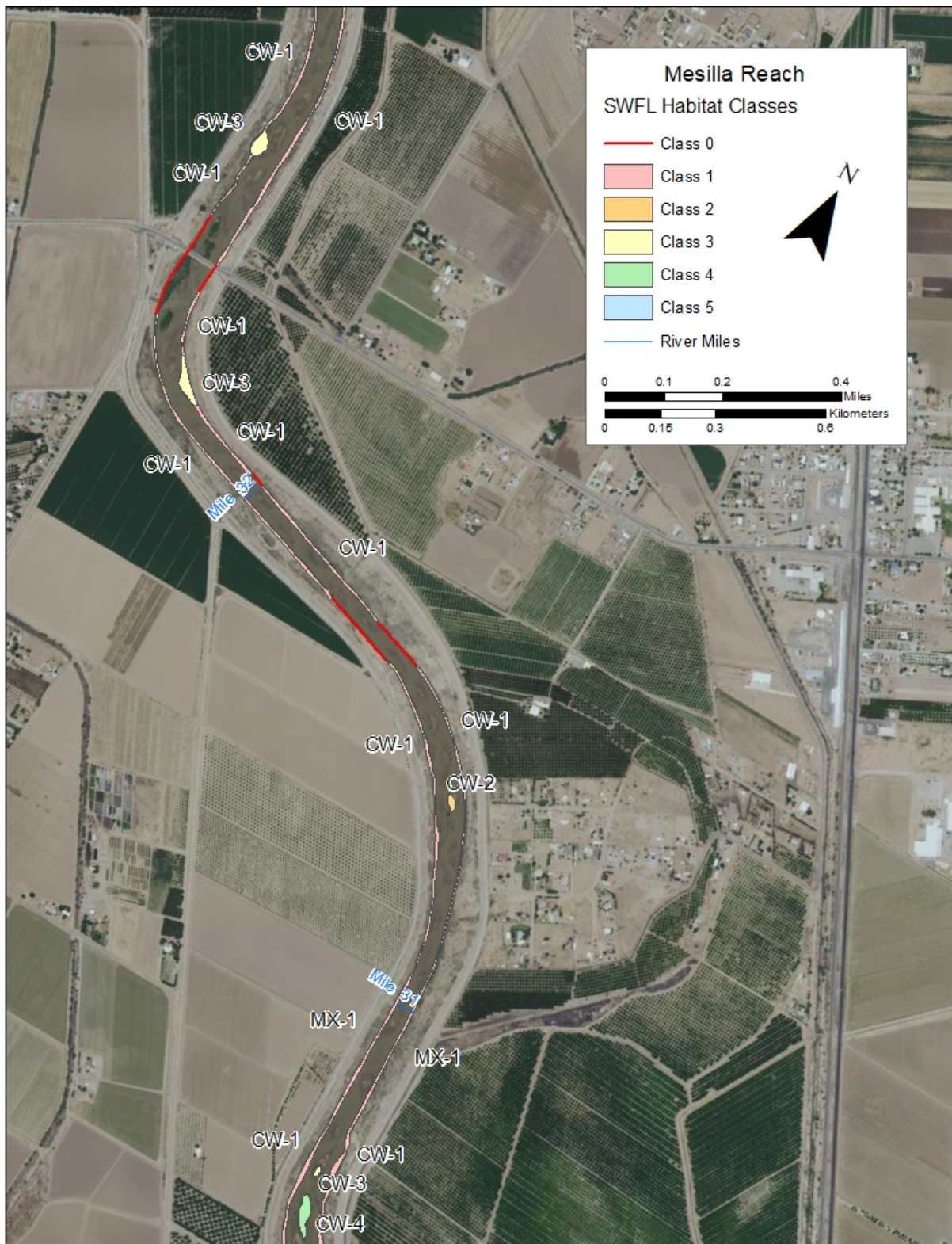


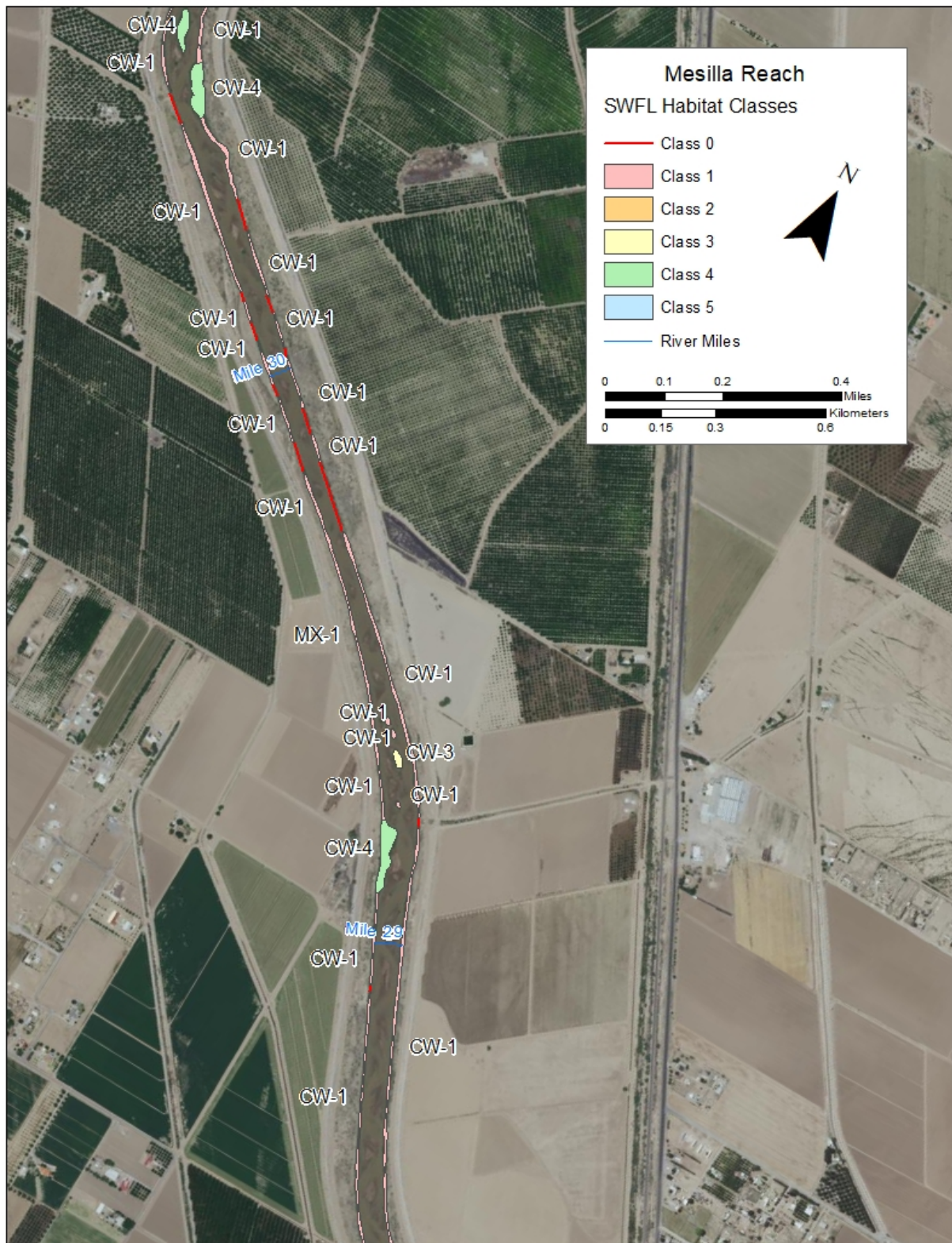


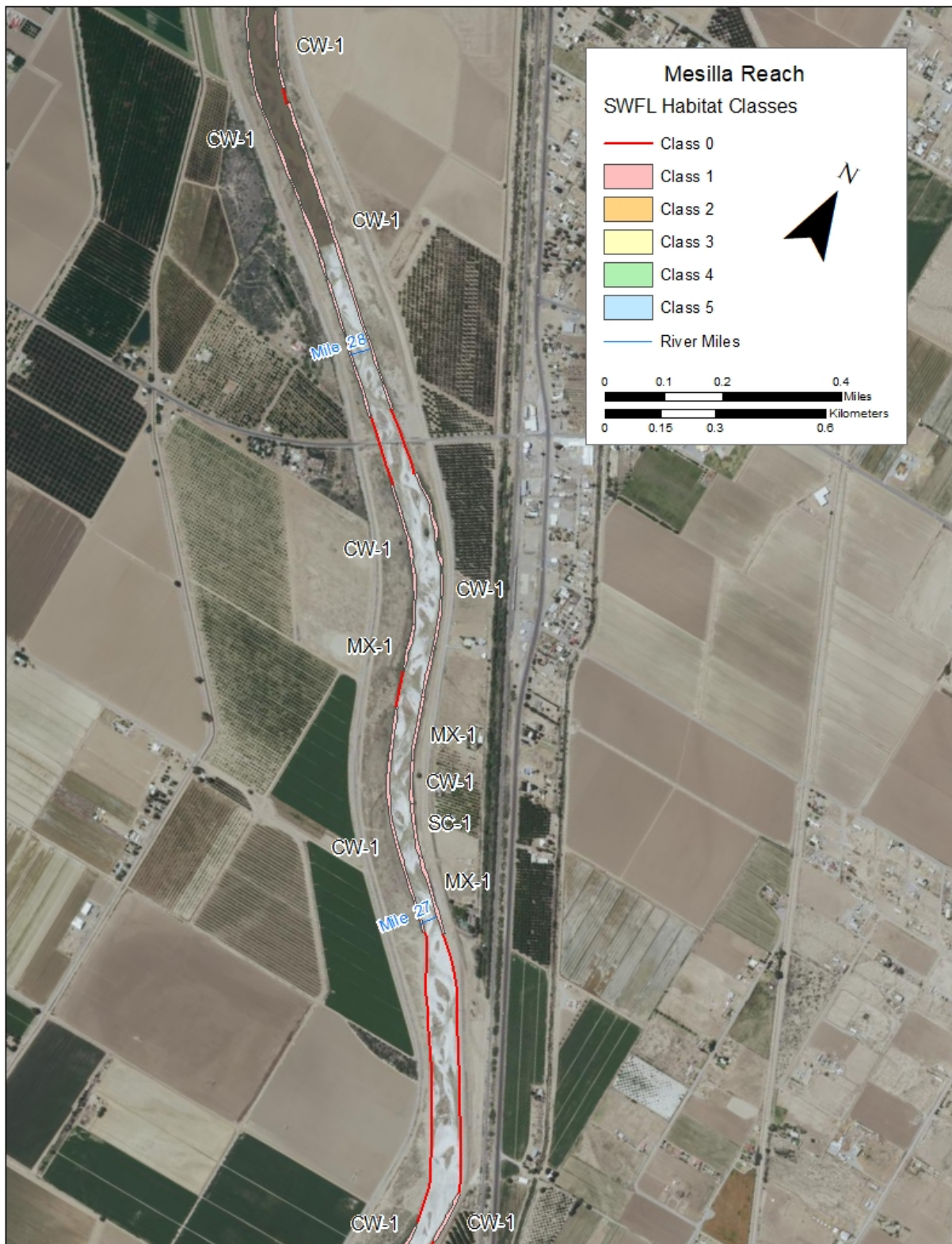


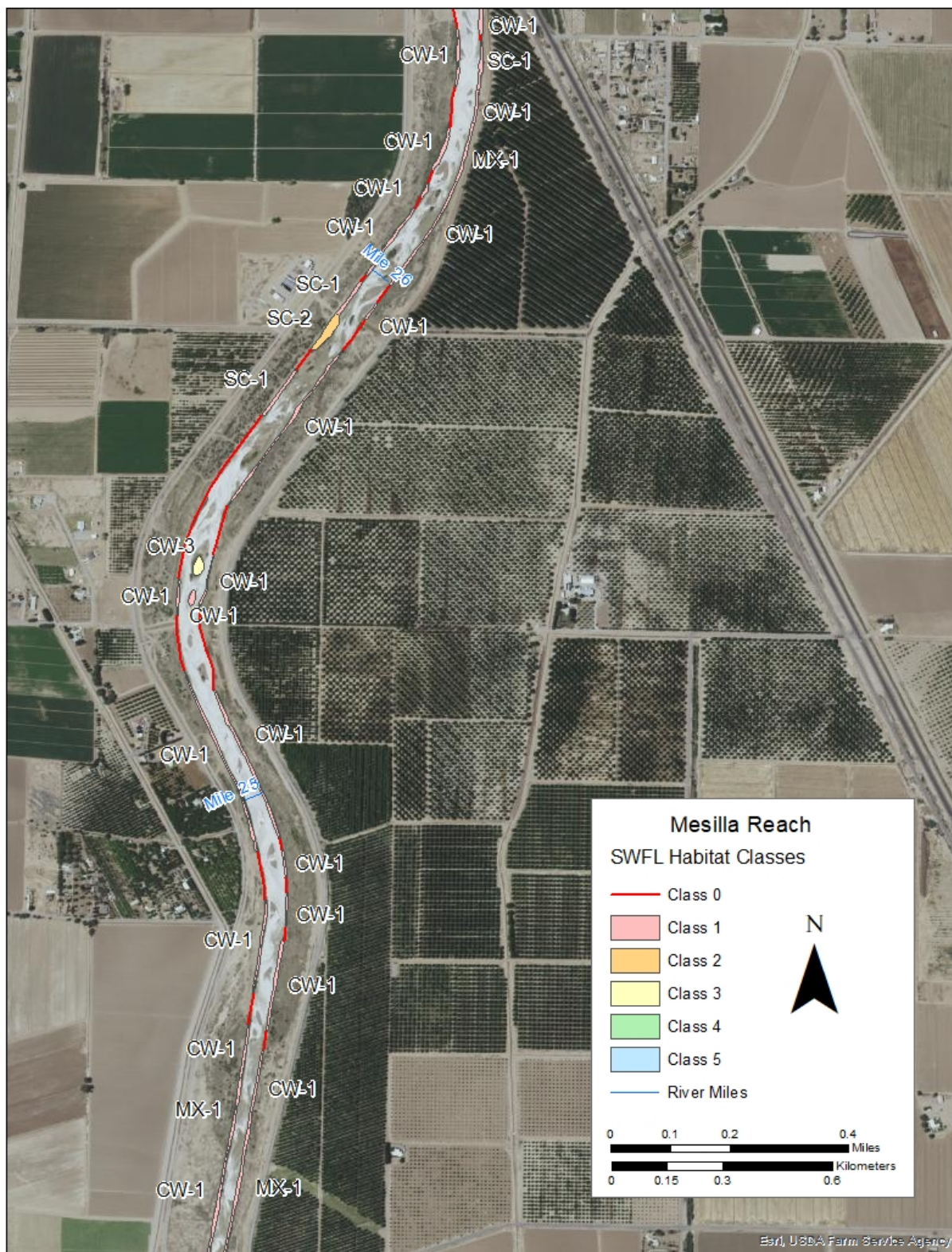


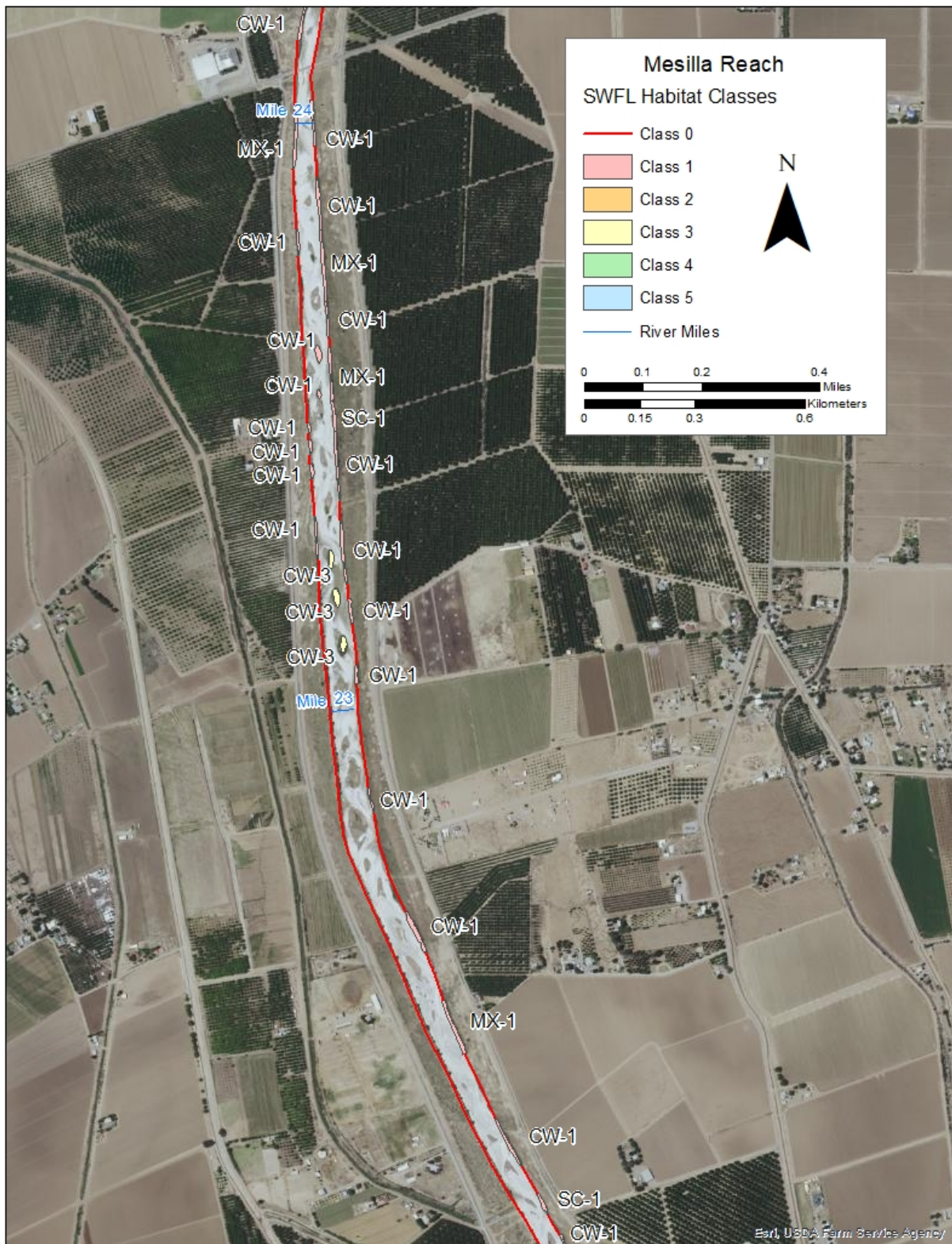


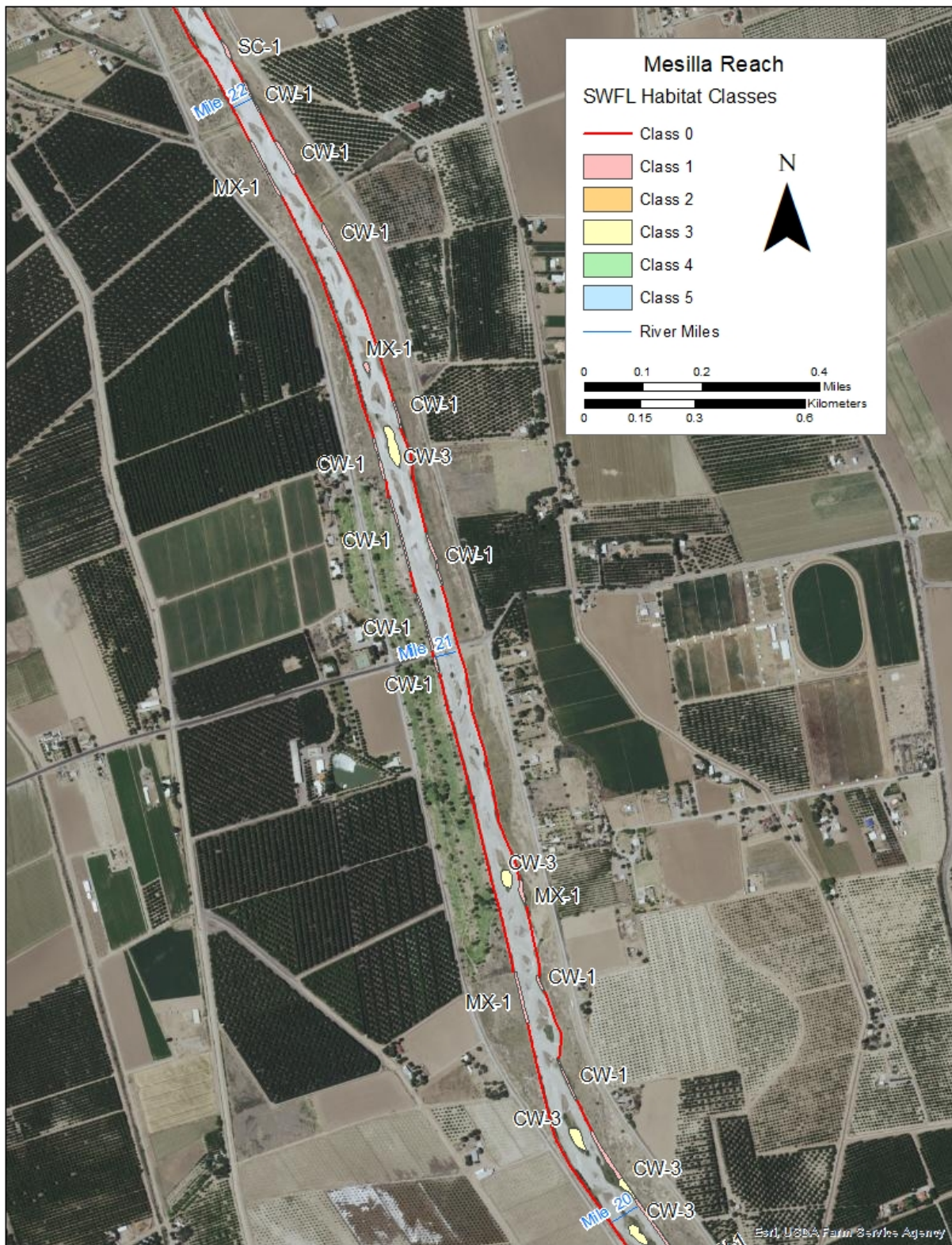


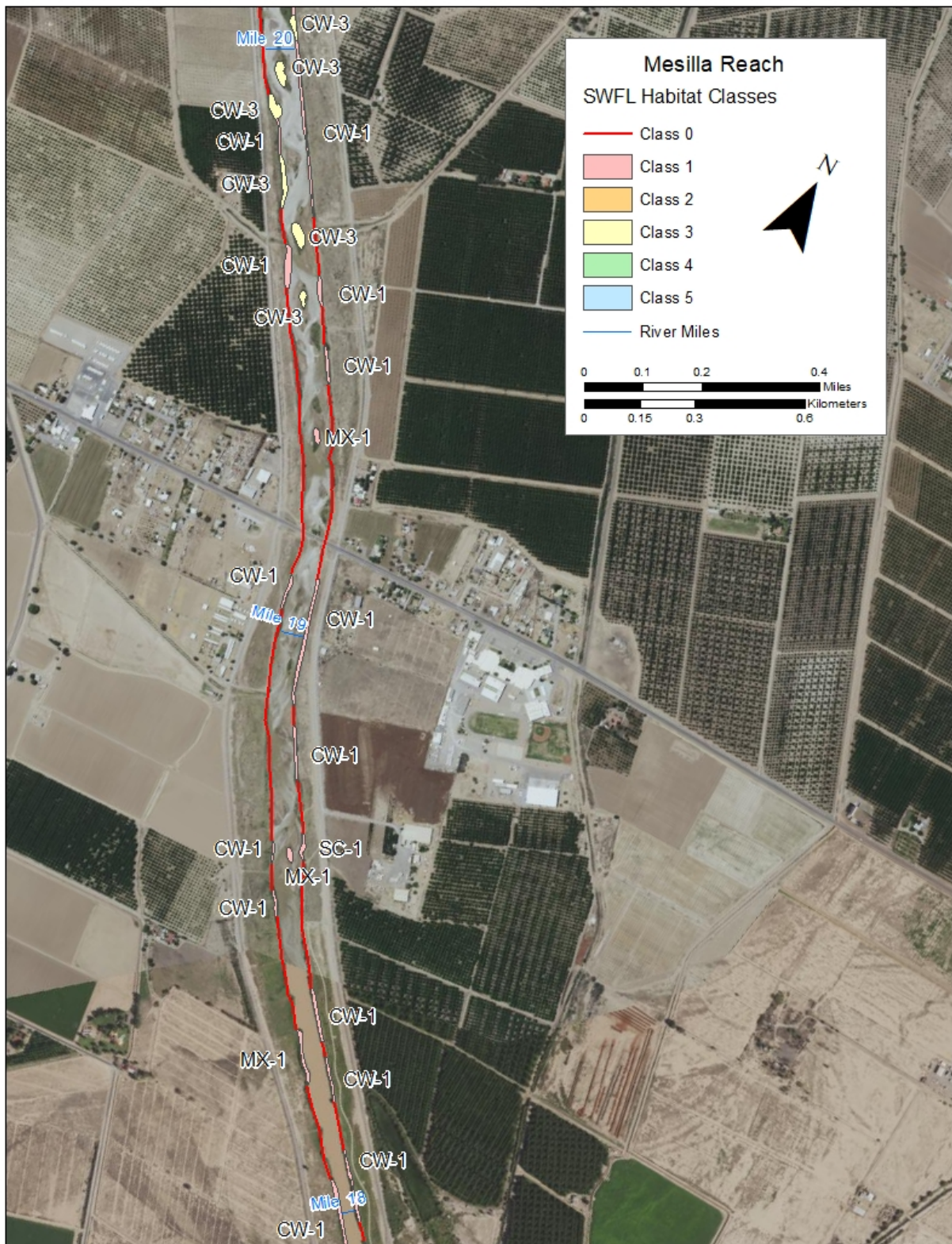


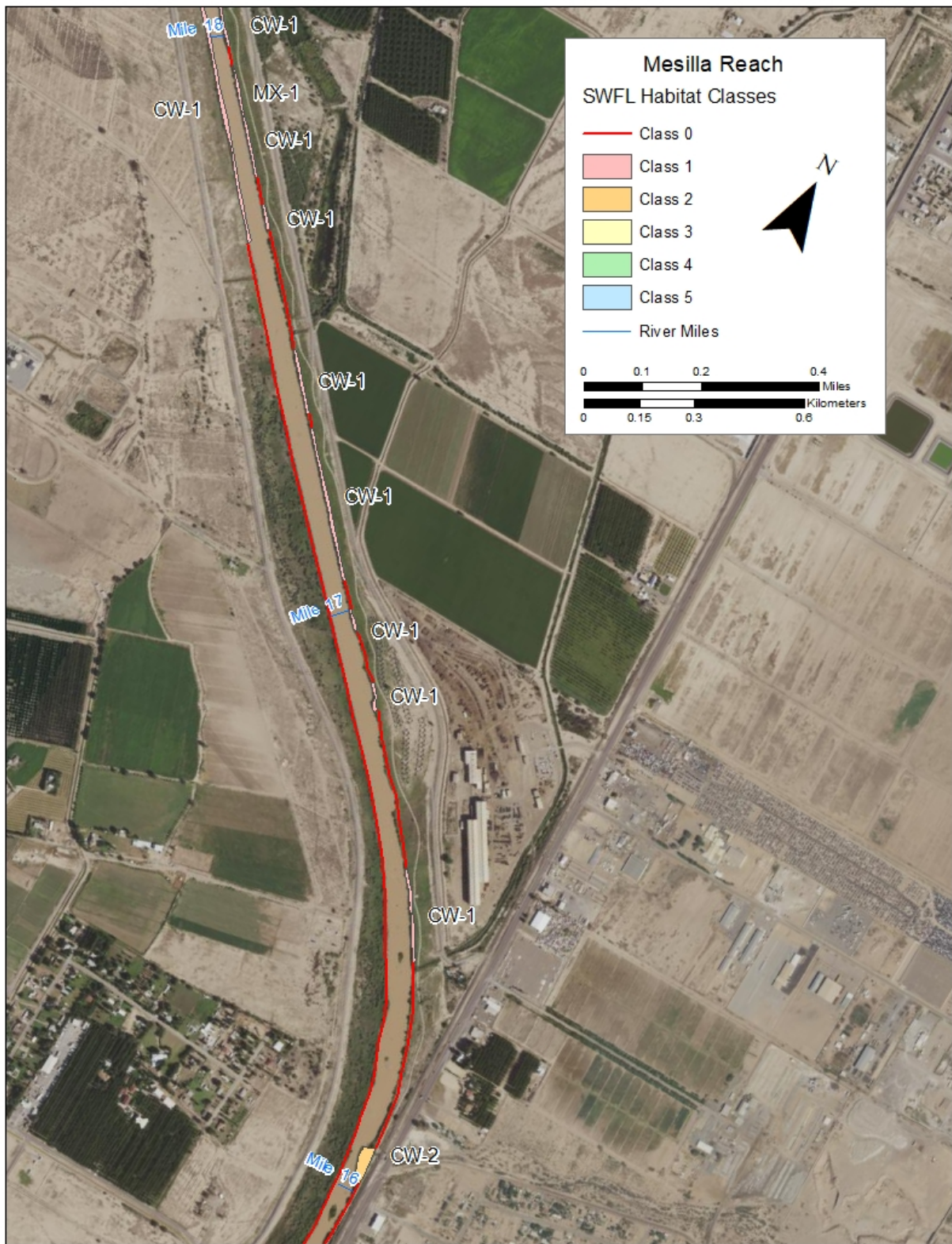


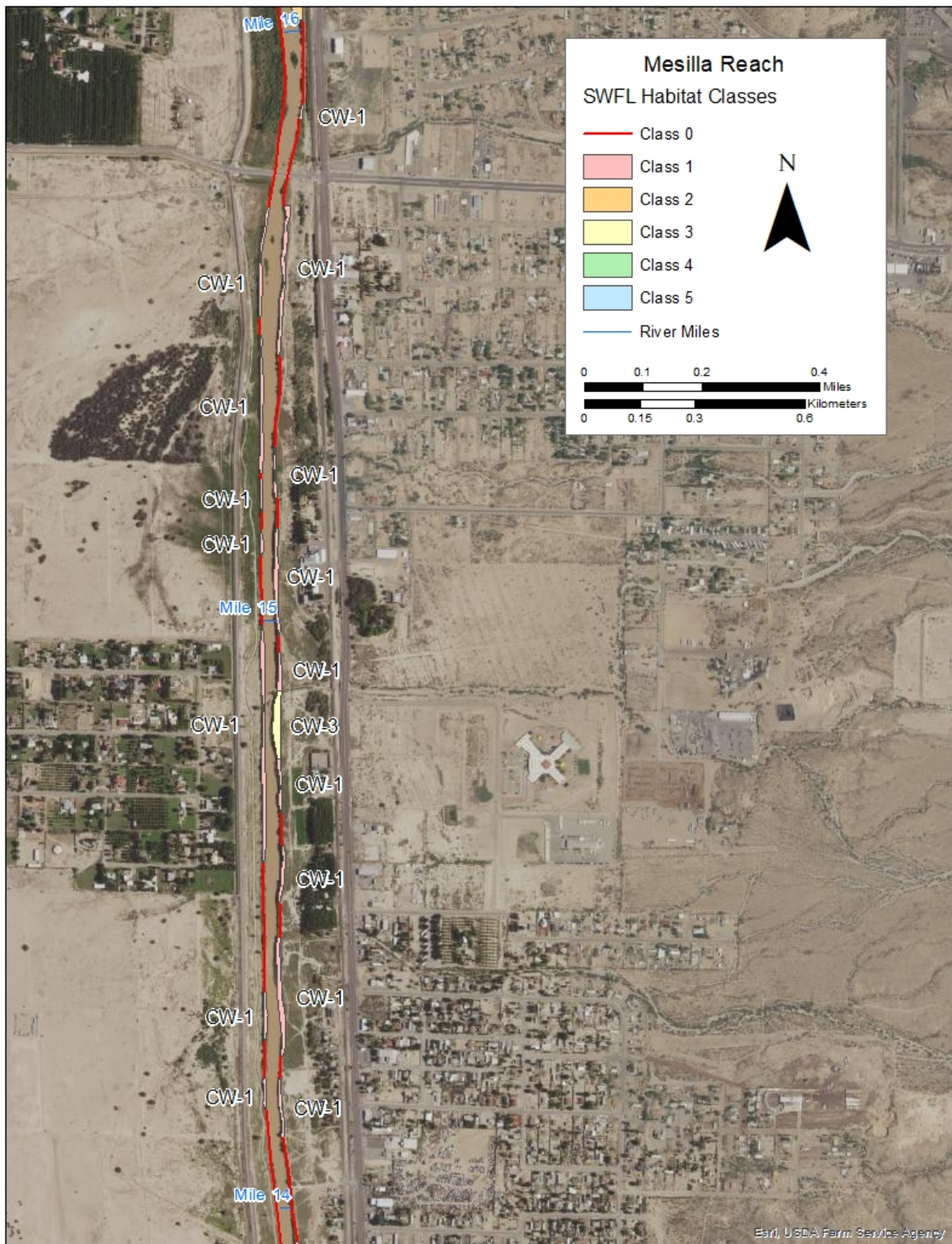


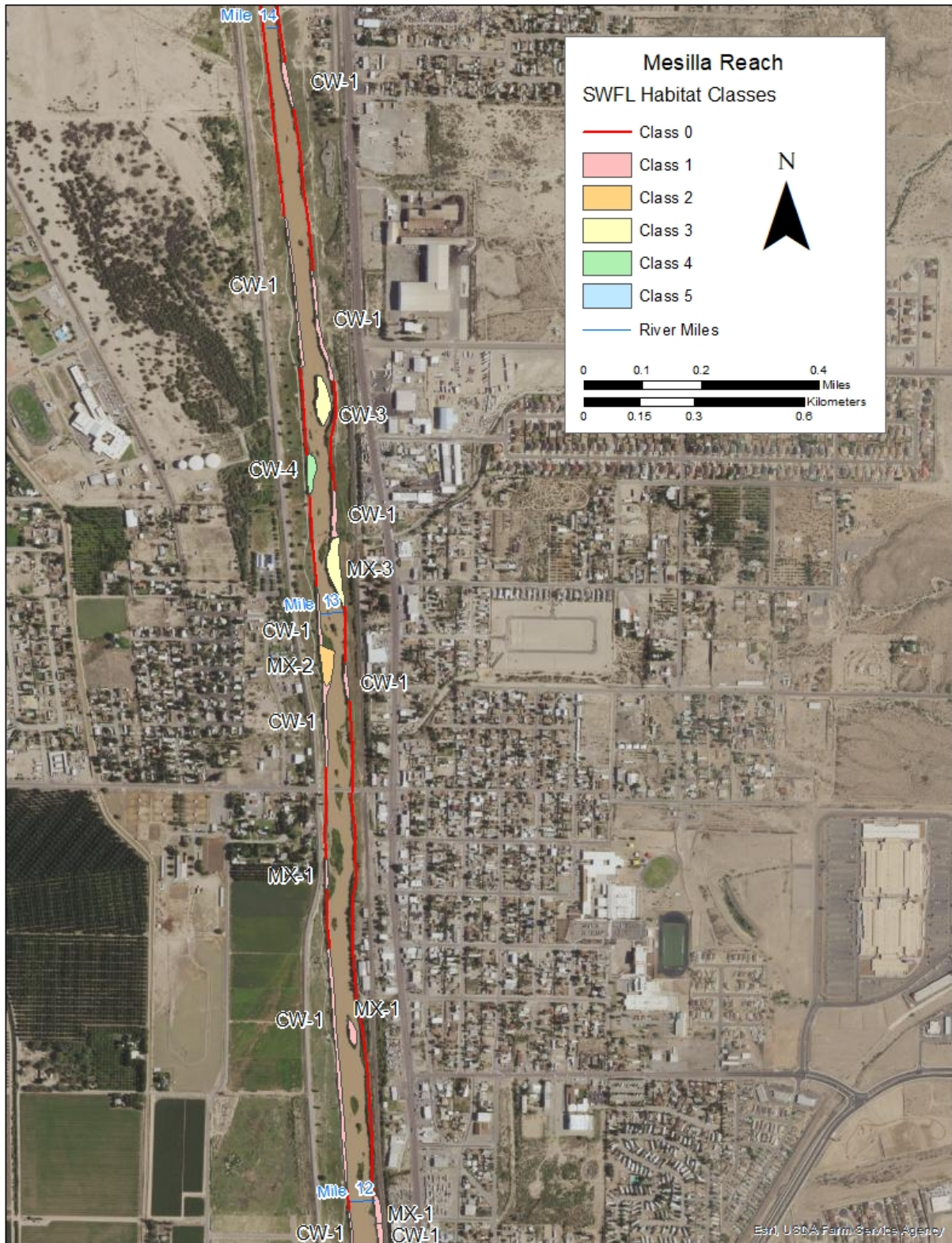


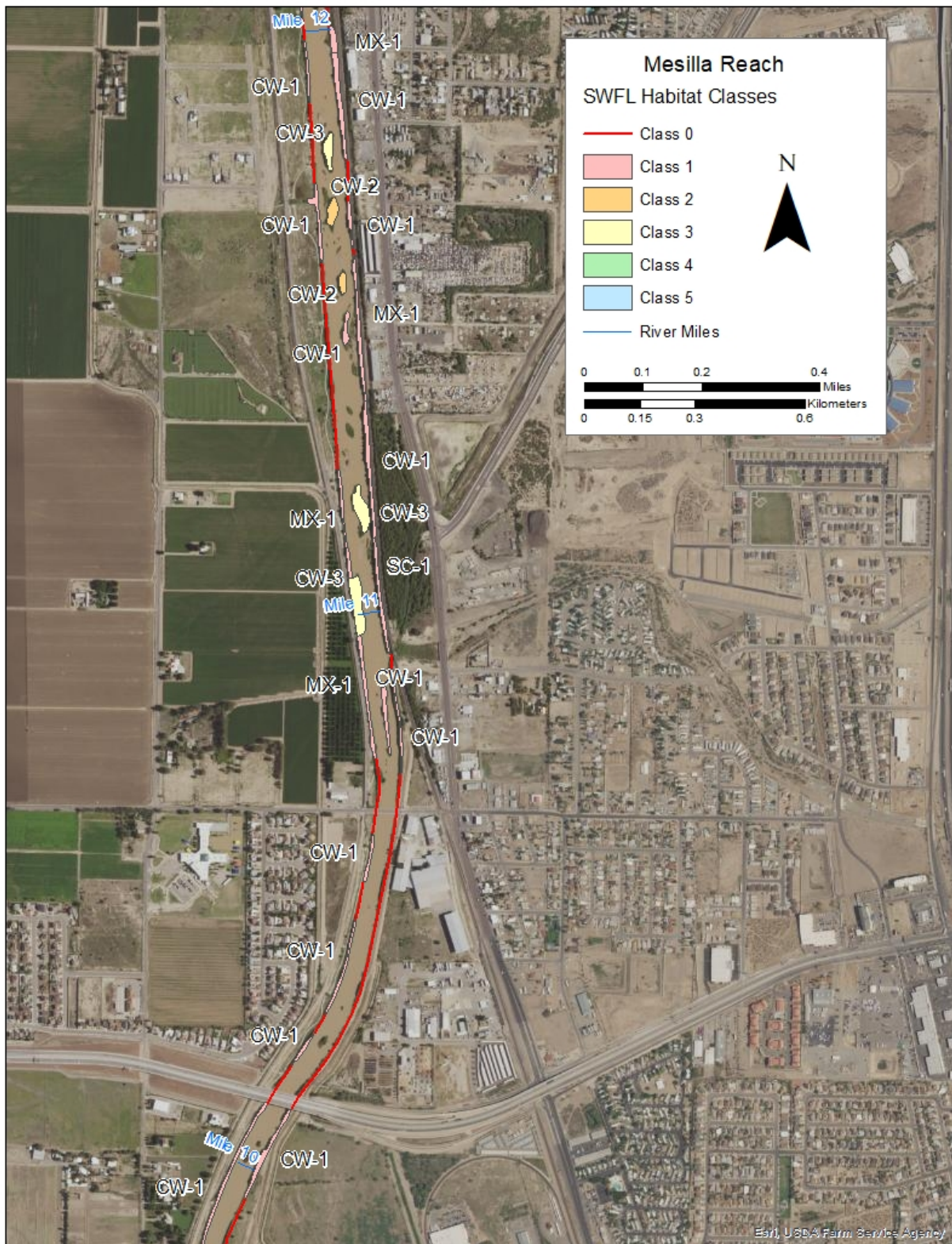


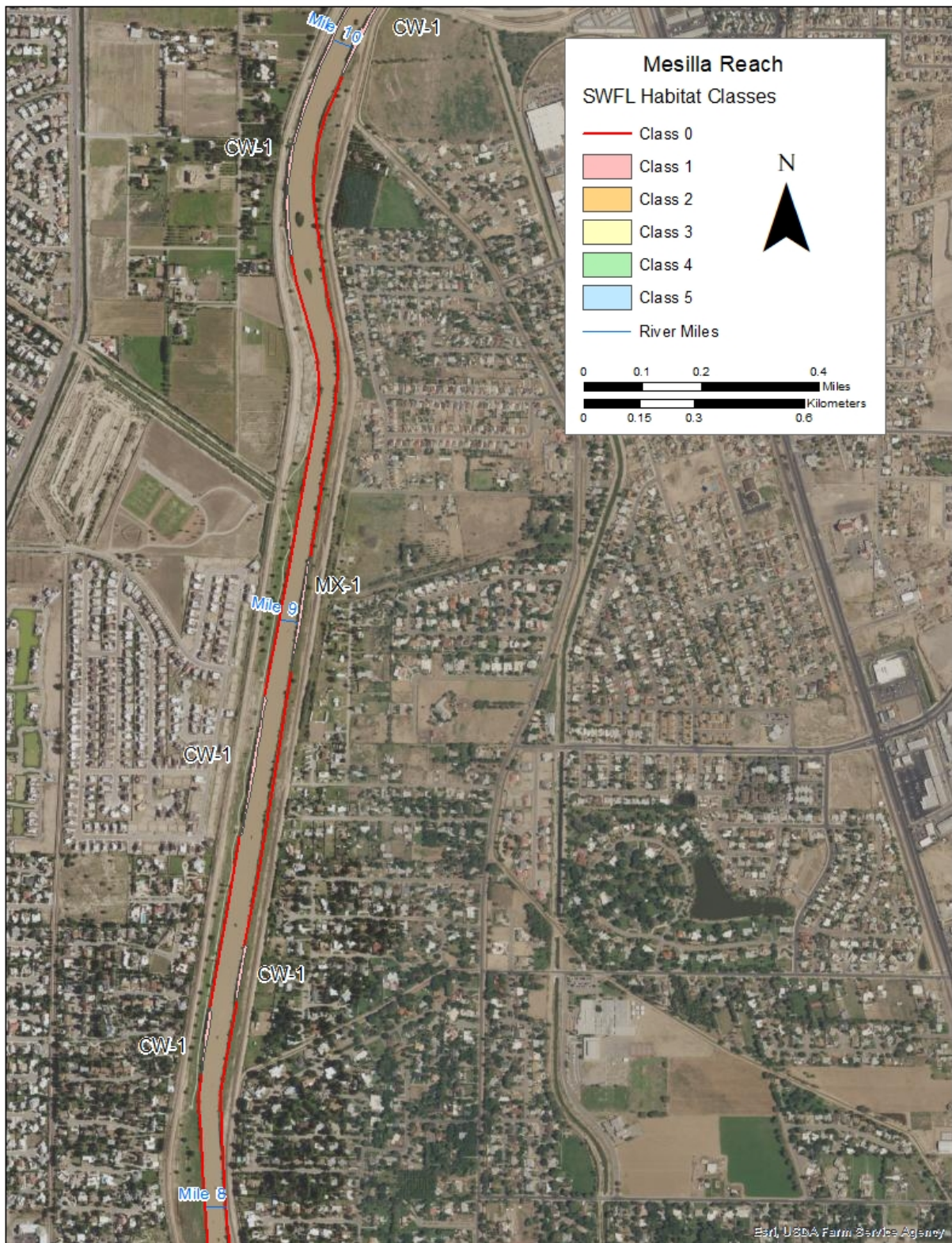


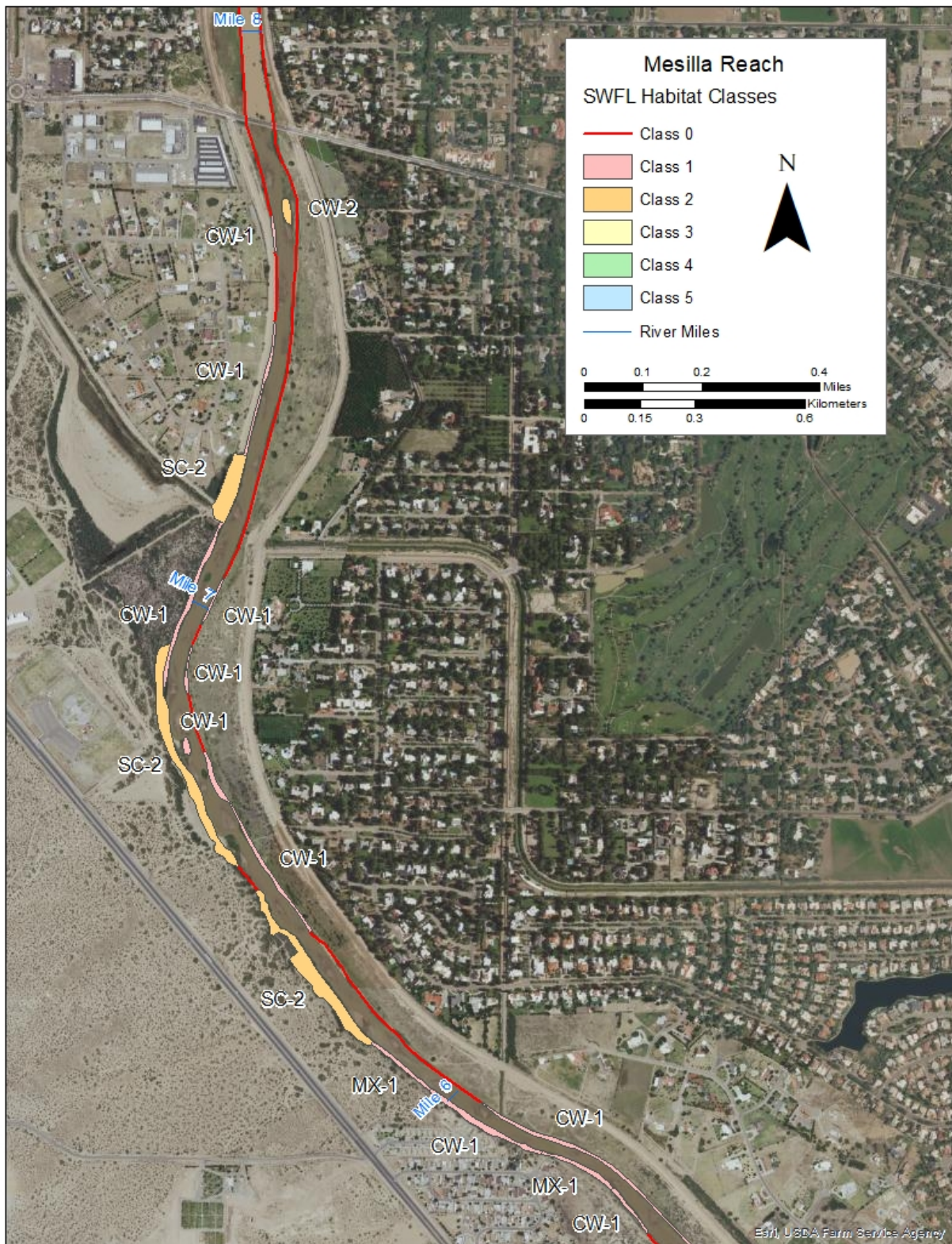


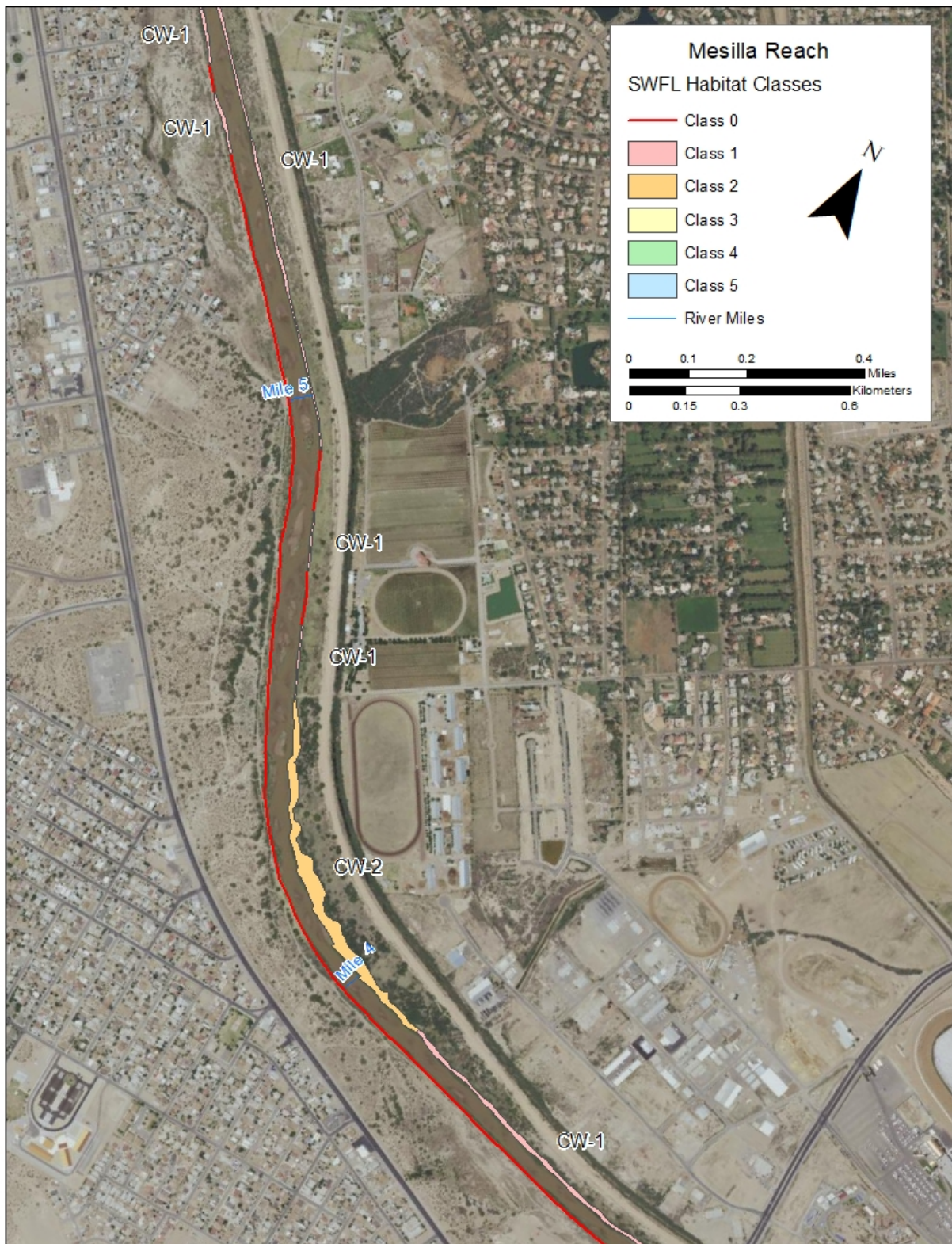














PEER REVIEW DOCUMENTATION

PROJECT AND DOCUMENT INFORMATION

Project Name LRG Southwestern Willow Flycatcher Habitat Classification WOID FA727

Document Southwestern Willow Flycatcher Habitat Classification 2018: Lower Rio Grande

Document Date April 2019

Team Leader Dave Moore

Document Author(s)/Preparer(s) Dave Moore, Rebecca Siegle

Peer Reviewer Mike Horn

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: _____

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: Mike Horn Review Date: February 2019 Signature: MICHAEL HORN Digitally signed by MICHAEL HORN
Date: 2019.04.09 12:53:57 -06'00'

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: 4/9/2019 Signature: STANTON MOORE Digitally signed by STANTON MOORE
Date: 2019.04.09 12:59:04 -06'00'