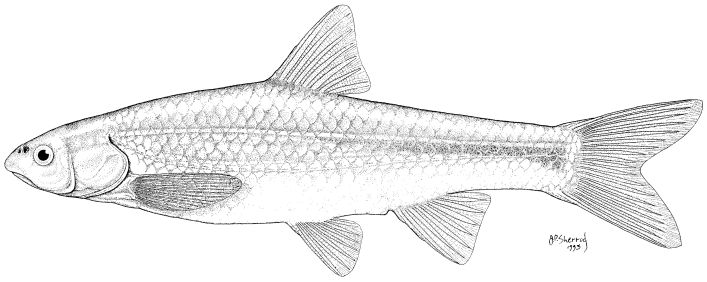
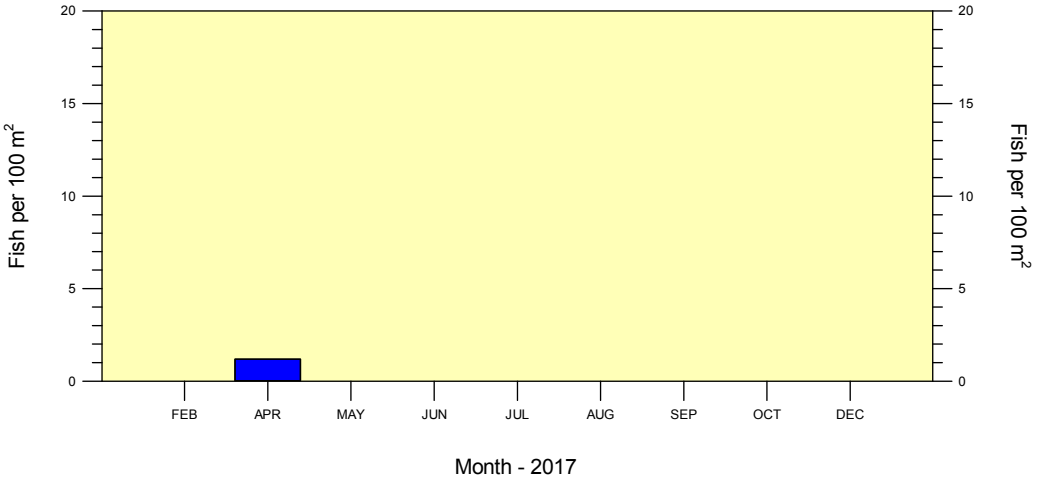
Rio Grande Silvery Minnow Population Monitoring Results from April 2017

A Middle Rio Grande Endangered Species Collaborative Program Funded Research Project





Robert K. Dudley[1,2], Steven P. Platania[1,2], and Gary C. White[1,3]

[1] American SW Ichthyological Researchers; 800 Encino Place NE, Albuquerque, NM, 87102-2606
&
[2] Div. of Fishes, Museum of SW Biology, UNM; MSC03-2020, Albuquerque, NM, 87131-0001
&
[3] Dept. of Fish, Wildlife, and Conservation Biology, CSU; 10 Wagar, Fort Collins, CO, 80523-1474

26 May 2017

Rio Grande Silvery Minnow Population Monitoring Results from April 2017

A Middle Rio Grande Endangered Species Collaborative Program Funded Research Project

Contract R17PC00028:

Requisition 0040306655
U.S. Bureau of Reclamation
Albuquerque Area Office
555 Broadway NE, Suite 100
Albuquerque, NM 87102-2352

submitted to:

U.S. Bureau of Reclamation
Albuquerque Area Office
555 Broadway NE, Suite 100
Albuquerque, NM 87102-2352

Robert K. Dudley[1,2], Steven P. Platania[1,2], and Gary C. White[1,3]

[1] American SW Ichthyological Researchers; 800 Encino Place NE, Albuquerque, NM, 87102-2606
&
[2] Div. of Fishes, Museum of SW Biology, UNM; MSC03-2020, Albuquerque, NM, 87131-0001
&
[3] Dept. of Fish, Wildlife, and Conservation Biology, CSU; 10 Wagar, Fort Collins, CO, 80523-1474

26 May 2017

SUMMARY OF APRIL 2017 POPULATION MONITORING

The April population monitoring efforts were conducted at 20 sites throughout the Middle Rio Grande. Five sites were located in the Angostura Reach, six sites in the Isleta Reach, and nine sites in the San Acacia Reach. A list of collection localities is appended (Table A). Adult and juvenile fish were obtained by rapidly drawing a 3.1 m x 1.8 m small mesh (3/16th inch) seine through discrete mesohabitats. Larval fish were also collected with a 1.0 m x 1.0 m fine mesh (1/16th inch) seine in all seasons except winter. All fishes were identified to species and enumerated. We used length-age relationships to assign ages (i.e., age-0, age-1, and age-2+) to all Rio Grande Silvery Minnow collected. Age-0 individuals are, however, only present after annual spring spawning occurs (ca. April–June). Figures illustrating fish densities (i.e., fish per 100 m^2) were prepared for the ten focal species to facilitate comparisons across reaches.

During April, sampling covered 9,348.7 m^2 (surface area) of water and yielded 500 fish. Cumulative fish density during April was 5.3 individuals/100 m^2 sampled. The three most common species were Red Shiner (n = 159), Rio Grande Silvery Minnow (n = 111), and Channel Catfish (n = 86). The 20 sampling sites yielded a total of 11 fish species. Rio Grande Silvery Minnow was present in 49 of the 155 seine hauls that yielded fish. We collected Rio Grande Silvery Minnow at 10 of the 20 sampling sites, and its overall density was 1.19 (n = 111) individuals/100 m^2 sampled. Densities of unmarked and marked individuals were 1.18 (n = 110) and 0.01 (n = 1) individuals/100 m^2 sampled, respectively. Densities of age-0, age-1, and age-2+ individuals were 0.00 (n = 0), 1.11 (n = 104), and 0.07 (n = 7) individuals/100 m^2 sampled, respectively.

Rio Grande Silvery Minnow that were stocked during autumn 2016 (ca. 66,000; Thomas P. Archdeacon, New Mexico Fish and Wildlife Conservation Office, pers. comm.) were present at low densities during the spring of 2017. The overwinter mortality of Rio Grande Silvery Minnow resulted in substantial losses of individuals (both unmarked and marked) from December 2016 to April 2017. However, the abundance of Rio Grande Silvery Minnow in April 2017 was higher than it was in April 2016. Ensuring elevated and extended spring flows will be crucial for the successful survival of Rio Grande Silvery Minnow during 2017.

APRIL 2017 POPULATION MONITORING BY RIVER REACH

Angostura Reach

Mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gage 8330000) averaged 2,920.6 and ranged from 1,380 to 3,980 cfs from 16 March to 15 April. Water temperatures ranged from 10.1 to 11.8 ^{o}C during the Angostura Reach sampling efforts (ca. 0830–1530 h). Secchi disk measurements of water clarity ranged from 10 to 19 cm.

Sampling for fishes in the Angostura Reach during April yielded 134 individuals with a cumulative fish density of 6.2 individuals/100 m^2 sampled. The overall sampling effort in the Angostura Reach covered 2,157.6 m^2 (surface area) of water. Densities of all fish species combined ranged from 3.7 to 11.7 individuals per 100 m^2 at the five sampling sites. In April, there were 8 fish species collected in the Angostura Reach. Flathead Chub was the most abundant taxon (n = 38), followed by Rio Grande Silvery Minnow (n = 35), and Longnose Dace (n = 28). Densities of Rio Grande Silvery Minnow ranged from 0.0 to 4.8 individuals per 100 m^2. Rio Grande Silvery Minnow (n = 35) was present in 17 of the 49 seine hauls that yielded fish during April.

Isleta Reach

In the Isleta Reach, mean daily discharge (Rio Grande at Isleta Lakes near Isleta, NM; USGS Gage 08354900) averaged 2,742.9 and ranged from 1,040 to 3,410 cfs from 16 March to 15 April. Water temperatures ranged from 11.5 to 13.8 ^{o}C throughout the sampling localities during the day (ca. 0930–1600 h). Secchi disk measurements ranged from 7 to 14 cm during sampling.

Isleta Reach population monitoring efforts produced 65 individuals in April with a cumulative fish density of 2.4 individuals/100 m^2 sampled. The total sampling effort in the Isleta Reach during April covered 2,669.7 m^2 (surface area) of water. Fish densities (all species combined) at the six sites ranged from 0.0 to 4.5 individuals per 100 m^2 sampled. There were 8 fish species collected in the Isleta Reach during April. Red Shiner was the most abundant taxon (n = 32), followed by Flathead Chub (n = 17), and Channel Catfish (n = 8). Densities of Rio Grande Silvery Minnow ranged from 0.0 to 0.5 individuals per 100 m^2. Rio Grande Silvery Minnow (n = 2) was present in 2 of the 31 seine hauls that yielded fish during April.

San Acacia Reach

Mean daily discharge at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gage 08354900) from 16 March to 15 April was generally higher (average = 2,080.4; range = 790–2,630 cfs) as compared to San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gage 08358400) during the same period (average = 1,872.3; range = 499–2,930 cfs). Water temperatures in April for the San Acacia Reach ranged from 11.8 to 16.1 ^{o}C (ca. 0930–1600 h). Water clarity was generally lower in this reach (Secchi disk range = 5–9 cm) compared to the two upstream reaches.

Population monitoring efforts in the San Acacia Reach during April yielded 301 individuals with a cumulative fish density of 6.7 individuals per 100 m^2 sampled. Sampling in the San Acacia Reach covered an area of 4,521.4 m^2 of water. Fish densities (all species combined) ranged from 0.0 to 14.2 individuals per 100 m^2 at the nine sites sampled in the San Acacia Reach. In April, there were 8 fish species collected in the San Acacia Reach. Red Shiner was the most abundant taxon (n = 120), followed by Rio Grande Silvery Minnow (n = 74), and Channel Catfish (n = 73). Densities of Rio Grande Silvery Minnow ranged from 0.0 to 7.1 individuals per 100 m^2. Rio Grande Silvery Minnow (n = 74) was present in 30 of the 75 seine hauls that yielded fish during April.

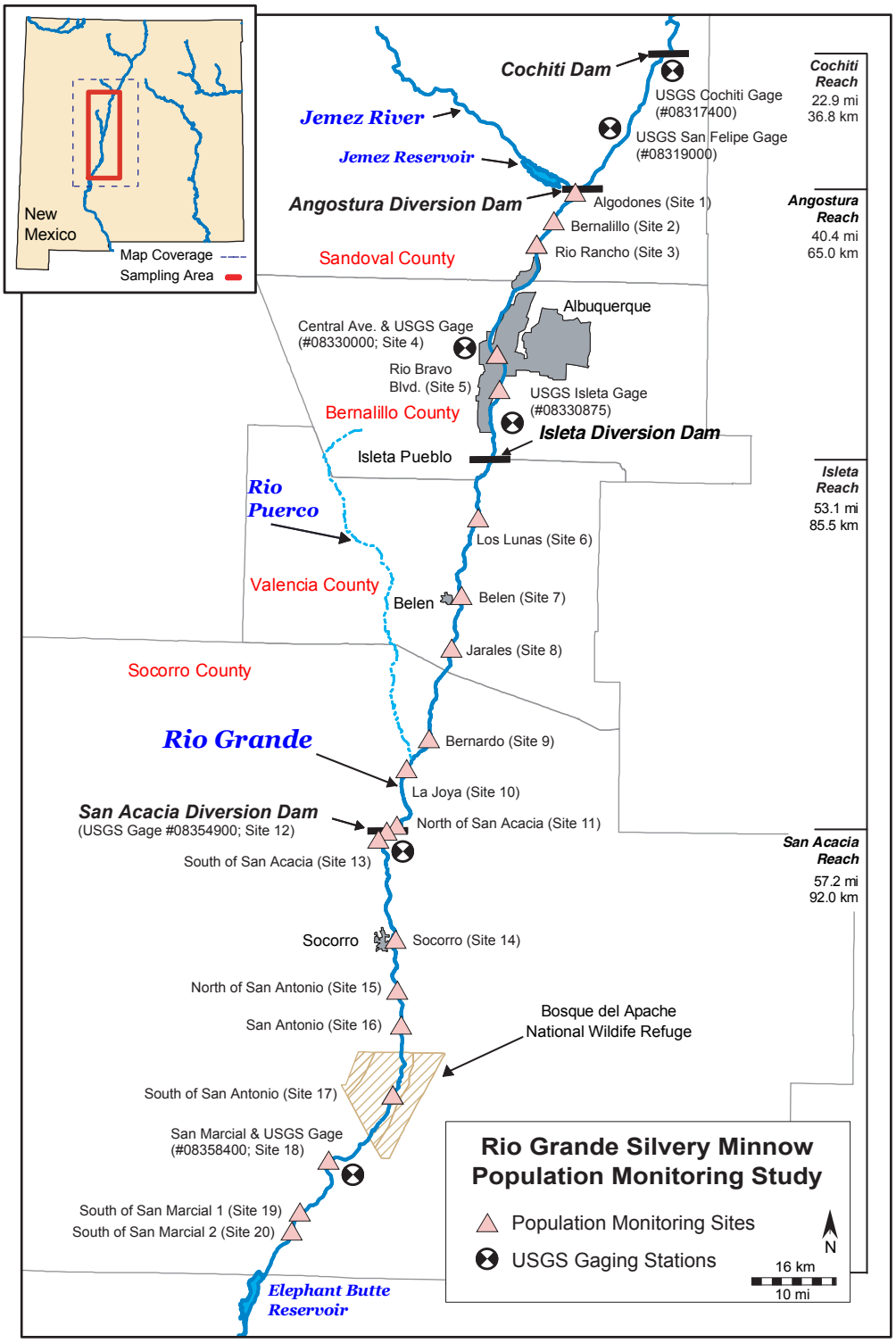


Figure 1. Map of the study area and sampling sites (numbered) for the Rio Grande Silvery Minnow population monitoring study. Sampling site descriptions are located in Appendix A.

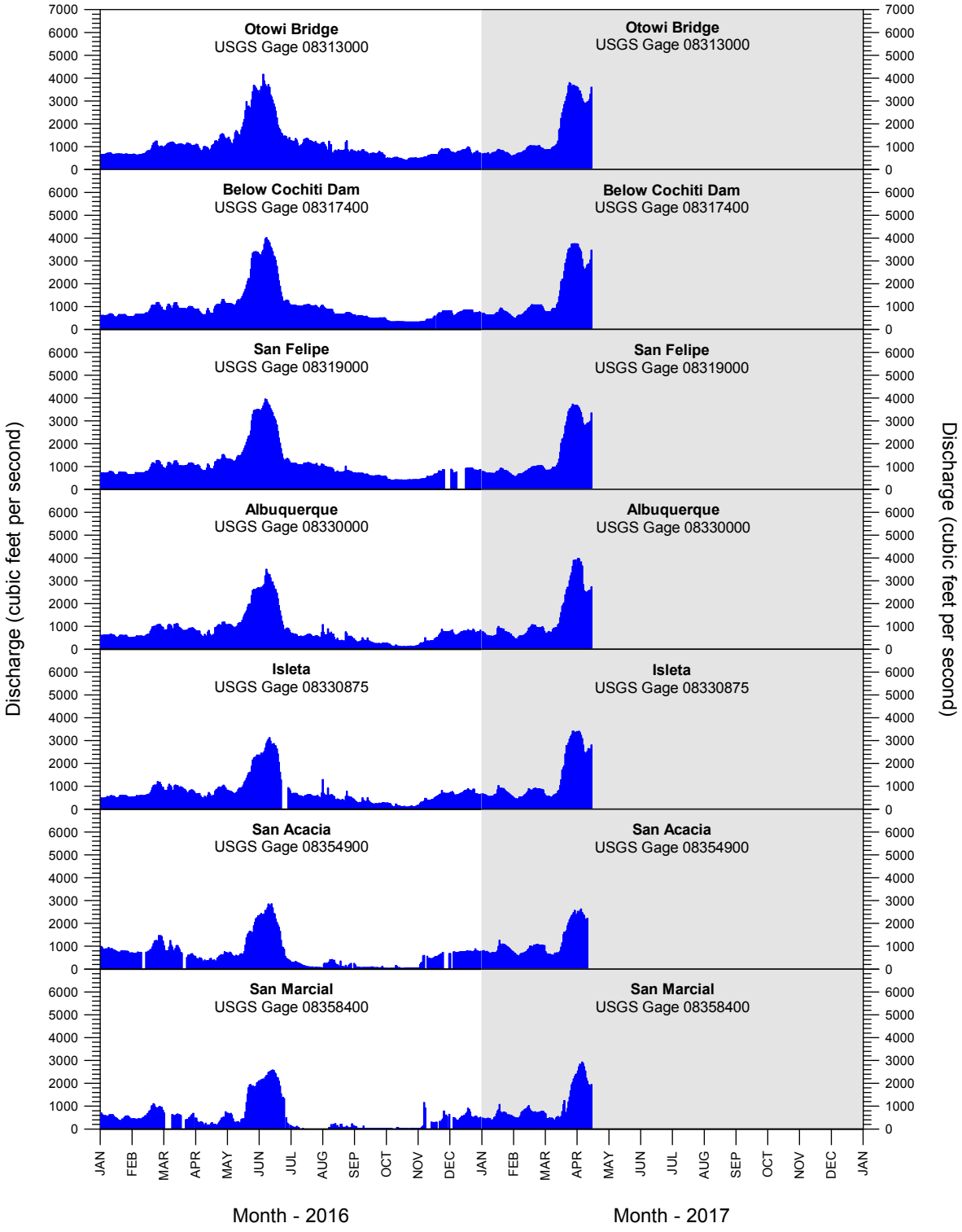


Figure 2. Rio Grande discharge from 1 January 2016 to 15 April 2017 at U.S. Geological Survey (USGS) gaging stations. Discharge data are provisional and subject to change.

Table 1. Scientific names, common names, and species codes of fish collected in the Middle Rio Grande since 1993.

Scientific Name	Common Name	Species Code
Order Clupeiformes		
Family Clupeidae	**herrings**	
Dorosoma cepedianum	Gizzard Shad	(DORCEP)
Dorosoma petenense	Threadfin Shad	(DORPET)
Order Cypriniformes		
Family Cyprinidae	**carps and minnows**	
Campostoma anomalum	Central Stoneroller	(CAMANO)
Carassius auratus	Goldfish	(CARAUR)
Cyprinella lutrensis	Red Shiner[1]	(CYPLUT)
Cyprinus carpio	Common Carp[1]	(CYPCAR)
Gila pandora	Rio Grande Chub	(GILPAN)
Hybognathus amarus	Rio Grande Silvery Minnow[1]	(HYBAMA)
Notemigonus crysoleucas	Golden Shiner	(NOTCRY)
Pimephales promelas	Fathead Minnow[1]	(PIMPRO)
Pimephales vigilax	Bullhead Minnow	(PIMVIG)
Platygobio gracilis	Flathead Chub[1]	(PLAGRA)
Rhinichthys cataractae	Longnose Dace[1]	(RHICAT)
Family Catostomidae	**suckers**	
Carpiodes carpio	River Carpsucker[1]	(CARCAR)
Catostomus commersonii	White Sucker[1]	(CATCOM)
Ictiobus bubalus	Smallmouth Buffalo	(ICTBUB)
Order Siluriformes		
Family Ictaluridae	**North American catfishes**	
Ameiurus melas	Black Bullhead	(AMEMEL)
Ameiurus natalis	Yellow Bullhead	(AMENAT)
Ictalurus furcatus	Blue Catfish	(ICTFUR)
Ictalurus punctatus	Channel Catfish[1]	(ICTPUN)
Pylodictis olivaris	Flathead Catfish	(PYLOLI)
Order Salmoniformes		
Family Salmonidae	**trouts and salmons**	
Oncorhynchus mykiss	Rainbow Trout	(ONCMYK)
Salmo trutta	Brown Trout	(SALTRU)
Order Cyprinodontiformes		
Family Poeciliidae	**livebearers**	
Gambusia affinis	Western Mosquitofish[1]	(GAMAFF)

Table 1. Scientific names, common names, and species codes of fish collected in the Middle Rio Grande since 1993 (continued).

Scientific Name	Common Name	Species Code
Order Perciformes		
Family Moronidae	**temperate basses**	
Morone chrysops	White Bass	(MORCHR)
Morone saxatilis	Striped Bass	(MORSAX)
Family Centrarchidae	**sunfishes**	
Lepomis cyanellus	Green Sunfish	(LEPCYA)
Lepomis macrochirus	Bluegill	(LEPMAC)
Lepomis megalotis	Longear Sunfish	(LEPMEG)
Micropterus dolomieu	Smallmouth Bass	(MICDOL)
Micropterus salmoides	Largemouth Bass	(MICSAL)
Pomoxis annularis	White Crappie	(POMANN)
Pomoxis nigromaculatus	Black Crappie	(POMNIG)
Family Percidae	**perches**	
Perca flavescens	Yellow Perch	(PERFLA)
Percina macrolepida	Bigscale Logperch	(PERMAC)
Sander vitreus	Walleye	(SANVIT)

[1] = Focal taxa were the most abundant species from recent Middle Rio Grande collections.

Table 2. Summary of the April 2017 Rio Grande Silvery Minnow population monitoring results (species list is based on fish collected since 1993).

Family	Common Name	Residence Status[1]	Total Number of Individuals	Percent (%) of Total	Frequency of Occurrence[2]	% Frequency of Occurrence[2]
Clupeidae	Gizzard Shad	N	-	-	-	-
Clupeidae	Threadfin Shad	I	-	-	-	-
Cyprinidae	Central Stoneroller	I	-	-	-	-
Cyprinidae	Goldfish	I	-	-	-	-
Cyprinidae	Red Shiner	N	159	31.80	16	80
Cyprinidae	Common Carp	I	12	2.40	4	20
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	111	22.20	10	50
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	4	0.80	3	15
Cyprinidae	Bullhead Minnow	I	-	-	-	-
Cyprinidae	Flathead Chub	N	84	16.80	11	55
Cyprinidae	Longnose Dace	N	28	5.60	3	15
Catostomidae	River Carpsucker	N	2	0.40	2	10
Catostomidae	White Sucker	I	9	1.80	3	15
Catostomidae	Smallmouth Buffalo	N	-	-	-	-
Ictaluridae	Black Bullhead	I	-	-	-	-
Ictaluridae	Yellow Bullhead	I	-	-	-	-
Ictaluridae	Blue Catfish	N	-	-	-	-
Ictaluridae	Channel Catfish	I	86	17.20	11	55
Ictaluridae	Flathead Catfish	N	-	-	-	-
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	4	0.80	3	15
Moronidae	White Bass	I	-	-	-	-
Moronidae	Striped Bass	I	-	-	-	-
Centrarchidae	Green Sunfish	I	-	-	-	-
Centrarchidae	Bluegill	N	-	-	-	-
Centrarchidae	Longear Sunfish	I	-	-	-	-
Centrarchidae	Smallmouth Bass	I	-	-	-	-
Centrarchidae	Largemouth Bass	I	1	0.20	1	5
Centrarchidae	White Crappie	I	-	-	-	-
Centrarchidae	Black Crappie	I	-	-	-	-
Percidae	Yellow Perch	I	-	-	-	-
Percidae	Bigscale Logperch	I	-	-	-	-
Percidae	Walleye	I	-	-	-	-
Monthly Total			**500**	**100.00**		

[1] = N (native); I (introduced)
[2] = Frequency and % frequency of occurrence were based on 20 site samples.

Table 3. Summary of the Rio Grande Silvery Minnow population monitoring results by month.

Family	Common Name	Feb	Apr	May	Jun	Jul	Aug	Sep	Oct	Dec	Total
Clupeidae	Gizzard Shad	-	-	-	-	-	-	-	-	-	0
Clupeidae	Threadfin Shad	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Central Stoneroller	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Goldfish	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Red Shiner	-	159	-	-	-	-	-	-	-	159
Cyprinidae	Common Carp	-	12	-	-	-	-	-	-	-	12
Cyprinidae	Rio Grande Chub	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Rio Grande Silvery Minnow	-	111	-	-	-	-	-	-	-	111
Cyprinidae	Golden Shiner	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Fathead Minnow	-	4	-	-	-	-	-	-	-	4
Cyprinidae	Bullhead Minnow	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Flathead Chub	-	84	-	-	-	-	-	-	-	84
Cyprinidae	Longnose Dace	-	28	-	-	-	-	-	-	-	28
Catostomidae	River Carpsucker	-	2	-	-	-	-	-	-	-	2
Catostomidae	White Sucker	-	9	-	-	-	-	-	-	-	9
Catostomidae	Smallmouth Buffalo	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Black Bullhead	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Yellow Bullhead	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Blue Catfish	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Channel Catfish	-	86	-	-	-	-	-	-	-	86
Ictaluridae	Flathead Catfish	-	-	-	-	-	-	-	-	-	0
Salmonidae	Rainbow Trout	-	-	-	-	-	-	-	-	-	0
Salmonidae	Brown Trout	-	-	-	-	-	-	-	-	-	0
Poeciliidae	Western Mosquitofish	-	4	-	-	-	-	-	-	-	4
Moronidae	White Bass	-	-	-	-	-	-	-	-	-	0
Moronidae	Striped Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Green Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Bluegill	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Longear Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Smallmouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Largemouth Bass	-	1	-	-	-	-	-	-	-	1
Centrarchidae	White Crappie	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Black Crappie	-	-	-	-	-	-	-	-	-	0
Percidae	Yellow Perch	-	-	-	-	-	-	-	-	-	0
Percidae	Bigscale Logperch	-	-	-	-	-	-	-	-	-	0
Percidae	Walleye	-	-	-	-	-	-	-	-	-	0
Monthly Totals		**-**	**500**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**500**

Table 4. Summary of the abundance of Rio Grande Silvery Minnow, by reach, site, and month, during 2017. Marked individuals at sites are shown in parentheses.

Reach	Site	Locality	Feb	Apr	May	Jun	Jul	Aug	Sep	Oct	Dec	Total
Angostura	1	Angostura Dam	-	-	-	-	-	-	-	-	-	0
Angostura	2	Bernalillo	-	8(0)	-	-	-	-	-	-	-	8
Angostura	3	Rio Rancho	-	-	-	-	-	-	-	-	-	0
Angostura	4	Central Ave.	-	9(0)	-	-	-	-	-	-	-	9
Angostura	5	Rio Bravo Blvd.	-	18(0)	-	-	-	-	-	-	-	18
Angostura Totals			-	*35*	-	-	-	-	-	-	-	*35*
Isleta	6	Los Lunas	-	-	-	-	-	-	-	-	-	0
Isleta	7	Belen	-	-	-	-	-	-	-	-	-	0
Isleta	8	Jarales	-	2(0)	-	-	-	-	-	-	-	2
Isleta	9	Bernardo	-	-	-	-	-	-	-	-	-	0
Isleta	10	La Joya	-	-	-	-	-	-	-	-	-	0
Isleta	11	North of San Acacia	-	-	-	-	-	-	-	-	-	0
Isleta Totals			-	*2*	-	-	-	-	-	-	-	*2*
San Acacia	12	San Acacia Dam	-	15(0)	-	-	-	-	-	-	-	15
San Acacia	13	South of San Acacia	-	37(0)	-	-	-	-	-	-	-	37
San Acacia	14	Socorro	-	1(0)	-	-	-	-	-	-	-	1
San Acacia	15	North of San Antonio	-	18(0)	-	-	-	-	-	-	-	18
San Acacia	16	San Antonio	-	-	-	-	-	-	-	-	-	0
San Acacia	17	South of San Antonio	-	-	-	-	-	-	-	-	-	0
San Acacia	18	San Marcial	-	2(0)	-	-	-	-	-	-	-	2
San Acacia	19	South of San Marcial 1	-	1(1)	-	-	-	-	-	-	-	1
San Acacia	20	South of San Marcial 2	-	-	-	-	-	-	-	-	-	0
San Acacia Totals			-	*74*	-	-	-	-	-	-	-	*74*
Monthly Totals			**-**	**111**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**111**

Table 5. Summary of the abundance of Rio Grande Silvery Minnow, by reach, site and mesohabitat, during April 2017. Blank cells indicate mesohabitats that were unavailable for sampling at certain sites.

Reach	Site	Locality	BW	PO	RU	SHPO	SHRU	Total
Angostura	1	Angostura Dam	-		-	-	-	0
Angostura	2	Bernalillo			3	-	5	8
Angostura	3	Rio Rancho	-	-			-	0
Angostura	4	Central Ave.	-		-	9	-	9
Angostura	5	Rio Bravo Blvd.	-	12	2	1	3	18
Angostura Totals			*-*	*12*	*5*	*10*	*8*	*35*
Isleta	6	Los Lunas		-	-	-		0
Isleta	7	Belen	-	-	-		-	0
Isleta	8	Jarales	-	2	-	-	-	2
Isleta	9	Bernardo		-	-	-	-	0
Isleta	10	La Joya		-	-			0
Isleta	11	North of San Acacia		-	-	-	-	0
Isleta Totals			*-*	*2*	*-*	*-*	*-*	*2*
San Acacia	12	San Acacia Dam		-	3	9	3	15
San Acacia	13	South of San Acacia		7	5	8	17	37
San Acacia	14	Socorro			-	-	1	1
San Acacia	15	North of San Antonio	2	-	1	4	11	18
San Acacia	16	San Antonio			-	-	-	0
San Acacia	17	South of San Antonio		-	-	-	-	0
San Acacia	18	San Marcial		-	-	2	-	2
San Acacia	19	South of San Marcial 1		-	-	-	1	1
San Acacia	20	South of San Marcial 2		-	-	-	-	0
San Acacia Totals			*2*	*7*	*9*	*23*	*33*	*74*
Monthly Total			**2**	**21**	**14**	**33**	**41**	**111**

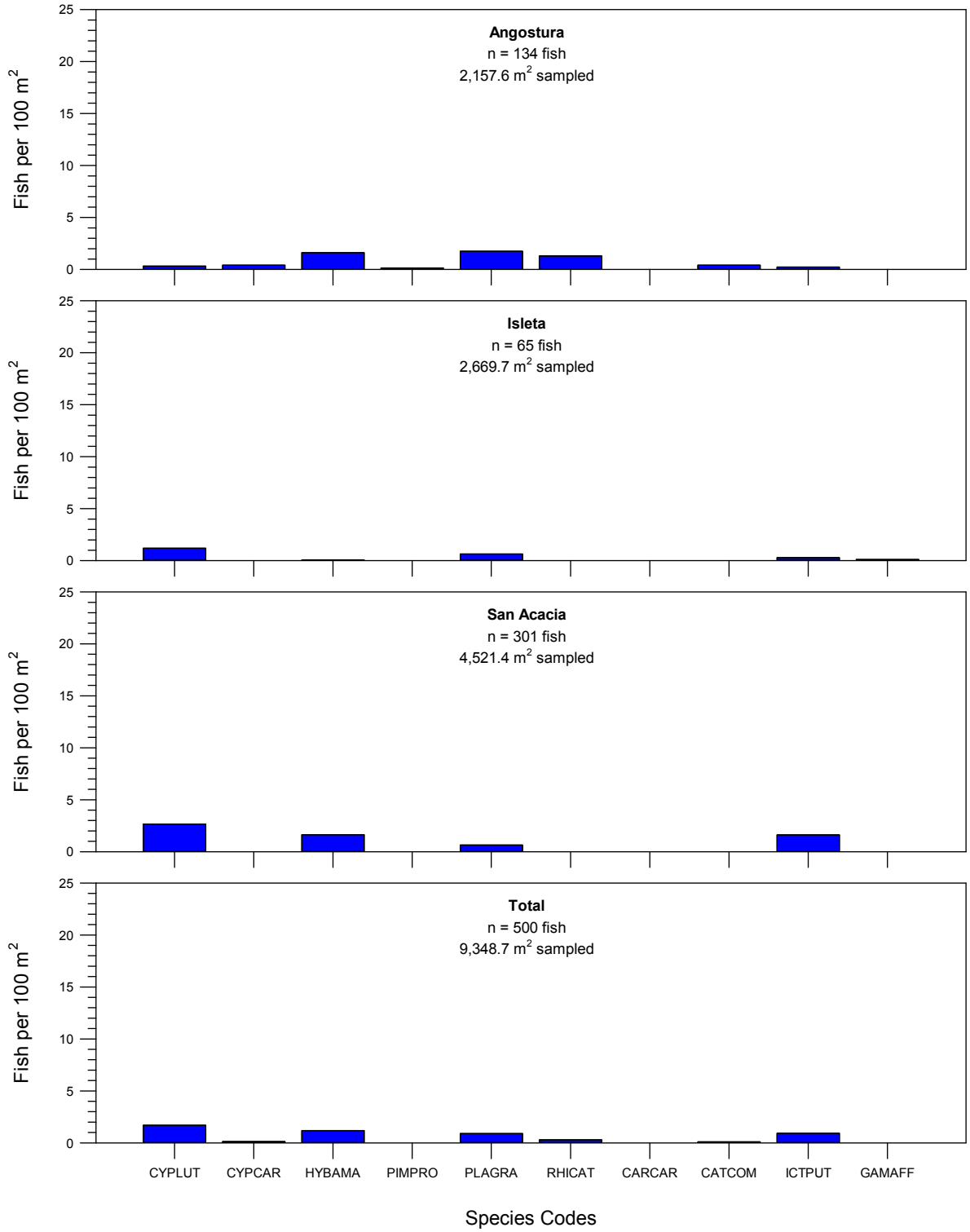


Figure 3. Fish densities during April 2017 for each focal species (see Table 1 for species codes), by sampling reach, in the Middle Rio Grande. Note: all marked and unmarked individuals are included.

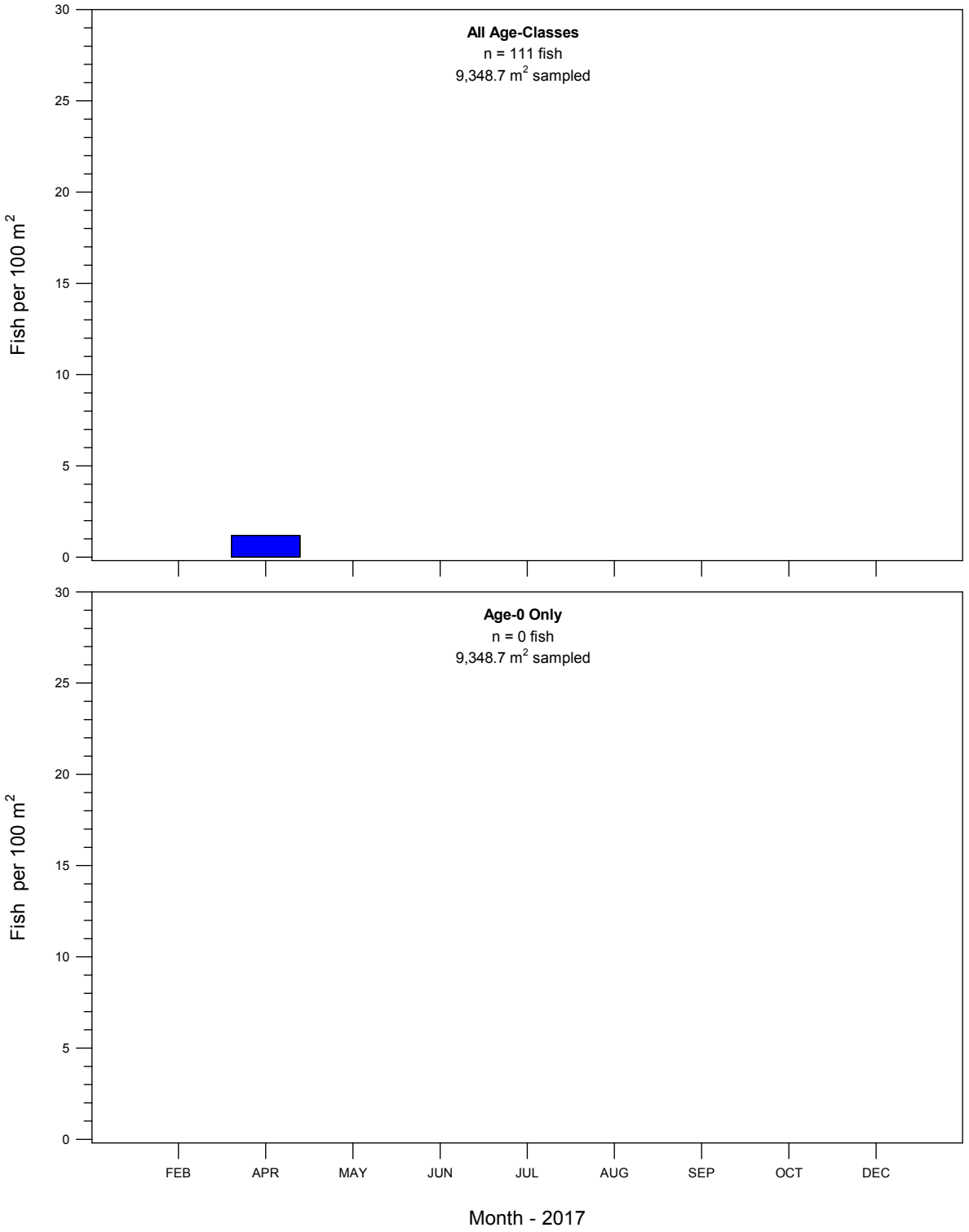


Figure 4. Rio Grande Silvery Minnow densities (all age-classes and age-0 only) during 2017, by sampling month, in the Middle Rio Grande. Note: all marked and unmarked individuals are included.

APPENDIX A (Sampling Sites)

Middle Rio Grande Fish Sampling Sites

Table A - 1. Sampling reaches and sites for population monitoring of Rio Grande Silvery Minnow in the Middle Rio Grande, NM.

Reach and Site	Locality
Angostura Reach	
1	New Mexico, Sandoval County, Rio Grande, downstream of Angostura Diversion Dam, Algodones. River Mile: 209.7; UTM Easting: 363811; UTM Northing: 3916006; Zone: 13S; Datum: NAD27
2	New Mexico, Sandoval County, Rio Grande, upstream of US Highway 550 bridge crossing, Bernalillo. River Mile: 203.8; UTM Easting: 358543; UTM Northing: 3909722; Zone: 13S; Datum: NAD27
3	New Mexico, Sandoval County, Rio Grande, ca. 4.0 miles downstream of US Highway 550 bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho. River Mile: 200.0; UTM Easting: 354772; UTM Northing: 3905355; Zone: 13S; Datum: NAD27
4	New Mexico, Bernalillo County, Rio Grande, upstream of Central Avenue (US Highway 66) bridge crossing, Albuquerque. River Mile: 183.4; UTM Easting: 346840; UTM Northing: 3884094; Zone: 13S; Datum: NAD27
5	New Mexico, Bernalillo County, Rio Grande, upstream of Rio Bravo Boulevard bridge crossing, Albuquerque. River Mile: 178.3; UTM Easting: 347554; UTM Northing: 3877163; Zone: 13S; Datum: NAD27
Isleta Reach	
6	New Mexico, Valencia County, Rio Grande, ca. 0.3 miles upstream of Los Lunas (NM State Highway 49) bridge crossing, Los Lunas. River Mile: 161.4; UTM Easting: 342898; UTM Northing: 3852531; Zone: 13S; Datum: NAD27
7	New Mexico, Valencia County, Rio Grande, ca. 1.0 miles upstream of NM State Highway 309/6 bridge crossing, Belen. River Mile: 151.5; UTM Easting: 339972; UTM Northing: 3837061; Zone: 13S; Datum: NAD27
8	New Mexico, Valencia County, Rio Grande, ca. 2.2 miles upstream of NM State Highway 346 bridge crossing, Jarales. River Mile: 143.2; UTM Easting: 338136; UTM Northing: 3827329; Zone: 13S; Datum: NAD27
9	New Mexico, Socorro County, Rio Grande, upstream of US Highway 60 bridge crossing, Bernardo. River Mile: 130.6; UTM Easting: 334604; UTM Northing: 3809726; Zone: 13S; Datum: NAD27
10	New Mexico, Socorro County, Rio Grande, ca. 3.5 miles downstream of US Highway 60 bridge crossing, La Joya. River Mile: 127.0; UTM Easting: 331094; UTM Northing: 3805229; Zone: 13S; Datum: NAD27
11	New Mexico, Socorro County, Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia. River Mile: 116.8; UTM Easting: 327902; UTM Northing: 3792603; Zone: 13S; Datum: NAD27

Table A - 1. Sampling reaches and sites for population monitoring of Rio Grande Silvery Minnow in the Middle Rio Grande, NM (continued).

Reach and Site	Locality
San Acacia Reach	
12	New Mexico, Socorro County, Rio Grande, downstream of San Acacia Diversion Dam, San Acacia. River Mile: 116.2; UTM Easting: 326162; UTM Northing: 3791977; Zone: 13S; Datum: NAD27
13	New Mexico, Socorro County, Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia. River Mile: 114.6; UTM Easting: 325263; UTM Northing: 3790442; Zone: 13S; Datum: NAD27
14	New Mexico, Socorro County, Rio Grande, ca. 0.5 miles upstream of the Low Flow Conveyance Channel bridge, east and upstream of Socorro Wastewater Treatment Plant, Socorro. River Mile: 99.5; UTM Easting: 327097; UTM Northing: 3771043; Zone: 13S; Datum: NAD27
15	New Mexico, Socorro County, Rio Grande, ca. 4.0 miles upstream of US Highway 380 bridge crossing, San Antonio. River Mile: 91.7; UTM Easting: 328140; UTM Northing: 3761283; Zone: 13S; Datum: NAD27
16	New Mexico, Socorro County, Rio Grande, upstream of US Highway 380 bridge crossing, San Antonio. River Mile: 87.1; UTM Easting: 328914; UTM Northing: 3754471; Zone: 13S; Datum: NAD27
17	New Mexico, Socorro County, Rio Grande, directly east of Bosque del Apache National Wildlife Refuge headquarters, San Antonio. River Mile: 79.1; UTM Easting: 327055; UTM Northing: 3740839; Zone: 13S; Datum: NAD27
18	New Mexico, Socorro County, Rio Grande, downstream of the San Marcial railroad crossing, San Marcial. River Mile: 68.6; UTM Easting: 315284; UTM Northing: 3728347; Zone: 13S; Datum: NAD27
19	New Mexico, Socorro County, Rio Grande, at its former confluence with the Low Flow Conveyance Channel and 16 miles downstream of the southern end of the Bosque del Apache National Wildlife Refuge, San Marcial. River Mile: 60.5; UTM Easting: 309487; UTM Northing: 3718178; Zone: 13S; Datum: NAD27
20	New Mexico, Socorro County, Rio Grande, ca. 10.0 miles downstream of the San Marcial Railroad Bridge crossing, San Marcial. River Mile: 58.8; UTM Easting: 307846; UTM Northing: 3716150; Zone: 13S; Datum: NAD27

APPENDIX B (Site-Specific Ichthyofaunal Composition)

Site-specific ichthyofaunal composition during the April 2017
Rio Grande Silvery Minnow population monitoring study

Monthly and annual reports, along with raw data, are available at:
http://mrgescp.dbstephens.com

** Data are provisional and should be verified by direct inspection of field data **

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD17-038**
Rio Grande, directly below Angostura Diversion Dam, Algodones.

Site Number: 1 River Mile: 209.7 06 April 2017
UTM Easting: 363811 UTM Northing: 3916006 Zone: 13 Quad: San Felipe Pueblo
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 405.0 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	1
76	*Pimephales promelas*	2
76	*Platygobio gracilis*	4
76	*Rhinichthys cataractae*	12

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD17-039**
Rio Grande, at US HWY 550 (formerly NM State HWY 44) bridge crossing, Bernalillo.

Site Number: 2 River Mile: 203.8 06 April 2017
UTM Easting: 358543 UTM Northing: 3909722 Zone: 13 Quad: Bernalillo
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 534.5 sq. m

FAMILY		N
76	*Hybognathus amarus**	8
76	*Platygobio gracilis*	10
76	*Rhinichthys cataractae*	7
81	*Catostomus commersonii*	4
93	*Ictalurus punctatus*	2

***Hybognathus amarus* (age-classes):**

age-0	
age-1	6
age-2+	2

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD17-040**
Rio Grande, ca. 4.0 miles downstream of US HWY 550 (formerly NM State HWY 44) bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho.

Site Number: 3 River Mile: 200.0 06 April 2017
UTM Easting: 354772 UTM Northing: 3905355 Zone: 13 Quad: Bernalillo
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 359.7 sq. m

FAMILY		N
76	*Platygobio gracilis*	10
76	*Rhinichthys cataractae*	9
81	*Catostomus commersonii*	3

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage **RKD17-037**
Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque.

Site Number: 4 River Mile: 183.4 06 April 2017
UTM Easting: 346840 UTM Northing: 3884094 Zone: 13 Quad: Albuquerque West
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 483.7 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	3
76	*Hybognathus amarus**	9
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	5

***Hybognathus amarus* (age-classes):**

age-0	
age-1	9
age-2+	

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage **RKD17-036**
Rio Grande, at Rio Bravo Blvd. Bridge crossing (NM State HWY 500) crossing, Albuquerque.

Site Number: 5 River Mile: 178.3 06 April 2017
UTM Easting: 347554 UTM Northing: 3877163 Zone: 13 Quad: Albuquerque West
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 374.8 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	3
76	*Cyprinus carpio*	9
76	*Hybognathus amarus**	18
76	*Platygobio gracilis*	9
81	*Catostomus commersonii*	2
93	*Ictalurus punctatus*	3

***Hybognathus amarus* (age-classes):**

age-0	
age-1	18
age-2+	

NEW MEXICO: VALENCIA Co., RIO GRANDE Drainage **RKD17-035**
Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas.

Site Number: 6 River Mile: 161.4 05 April 2017
UTM Easting: 342898 UTM Northing: 3852531 Zone: 13 Quad: Los Lunas
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 385.4 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	14
212	*Gambusia affinis*	2

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: VALENCIA Co., RIO GRANDE Drainage **RKD17-034**
Rio Grande, ca. 1.0 miles upstream of NM State HWY 309/6 bridge crossing, Belen.

Site Number: 7 River Mile: 151.5 05 April 2017
UTM Easting: 339972 UTM Northing: 3837061 Zone: 13 Quad: Tome
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 487.6 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	3

NEW MEXICO: VALENCIA Co., RIO GRANDE Drainage **RKD17-033**
Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales.

Site Number: 8 River Mile: 143.2 05 April 2017
UTM Easting: 338136 UTM Northing: 3827329 Zone: 13 Quad: Veguita
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 393.3 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	2
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	2
81	*Carpiodes carpio*	1
212	*Gambusia affinis*	1
294	*Micropterus salmoides*	1

***Hybognathus amarus* (age-classes):**

age-0	
age-1	2
age-2+	

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-032**
Rio Grande, at US HWY 60 bridge crossing, Bernardo.

Site Number: 9 River Mile: 130.6 05 April 2017
UTM Easting: 334604 UTM Northing: 3809726 Zone: 13 Quad: Abeytas
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 457.3 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	8
76	*Platygobio gracilis*	2
93	*Ictalurus punctatus*	2

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-031**
Rio Grande, ca. 3.5 miles downstream of the US HWY 60 bridge crossing, Bernardo.

Site Number: 10 River Mile: 127.0 05 April 2017
UTM Easting: 331094 UTM Northing: 3805229 Zone: 13 Quad: Abeytas
M.A. Farrington, J. L. Kennedy, S.L. Clark-Barkalow, C.A. Peralta Effort: 372.5 sq. m

FAMILY		N
	No Fish Collected	

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-030**
Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia

Site Number: 11 River Mile: 116.8 04 April 2017
UTM Easting: 327902 UTM Northing: 3792603 Zone: 13 Quad: La Joya
R.K. Dudley, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 573.7 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	5
76	*Platygobio gracilis*	15
93	*Ictalurus punctatus*	6

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-029**
Rio Grande, directly below San Acacia Diversion Dam, San Acacia.

Site Number: 12 River Mile: 116.2 04 April 2017
UTM Easting: 326162 UTM Northing: 3791977 Zone: 13 Quad: San Acacia
R.K. Dudley, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 449.6 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	38
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	15
76	*Pimephales promelas*	1
81	*Carpiodes carpio*	1
93	*Ictalurus punctatus*	7

***Hybognathus amarus* (age-classes):**

age-0	
age-1	11
age-2+	4

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-028**
Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia.

Site Number: 13 River Mile: 114.6 04 April 2017
UTM Easting: 325263 UTM Northing: 3790442 Zone: 13 Quad: Lemitar
R.K. Dudley, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 520.0 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	13
76	*Hybognathus amarus**	37
76	*Platygobio gracilis*	19
93	*Ictalurus punctatus*	5

***Hybognathus amarus* (age-classes):**

age-0	
age-1	37
age-2+	

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-027**
Rio Grande, east of Socorro, 0.5 miles upstream of Socorro Low Flow Conveyance Channel bridge and east just upstream of Socorro Wastewater Treatment Plant, Socorro.

Site Number: 14 River Mile: 99.5 04 April 2017
UTM Easting: 327097 UTM Northing: 3771043 Zone: 13 Quad: Loma de las Canas
R.K. Dudley, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 528.9 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	25
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	1
76	*Platygobio gracilis*	6
93	*Ictalurus punctatus*	30
212	*Gambusia affinis*	1

***Hybognathus amarus* (age-classes):**

age-0	
age-1	1
age-2+	

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-026**
Rio Grande, ca. 4.0 miles upstream of U.S. 380 bridge crossing.

Site Number: 15 River Mile: 91.7 04 April 2017
UTM Easting: 328140 UTM Northing: 3761283 Zone: 13 Quad: San Antonio
R.K. Dudley, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 457.1 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	5
76	*Hybognathus amarus**	18
76	*Platygobio gracilis*	3
93	*Ictalurus punctatus*	23

***Hybognathus amarus* (age-classes):**

age-0	
age-1	17
age-2+	1

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-025**
Rio Grande, at US HWY 380 bridge crossing, San Antonio.

Site Number: 16 River Mile: 87.1 03 April 2017
UTM Easting: 328914 UTM Northing: 3754471 Zone: 13 Quad: San Antonio
W.H. Brandenburg, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 598.1 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	2
93	*Ictalurus punctatus*	6

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-024**
Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters.

Site Number: 17 River Mile: 79.1 03 April 2017
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San Antonio SE
W.H. Brandenburg, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 495.0 sq. m

FAMILY		N
	No Fish Collected	

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-023**
Rio Grande, at San Marcial Railroad Bridge, San Marcial.

Site Number: 18 River Mile: 68.6 03 April 2017
UTM Easting: 315284 UTM Northing: 3728347 Zone: 13 Quad: San Marcial
W.H. Brandenburg, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 504.1 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	29
76	*Hybognathus amarus**	2
93	*Ictalurus punctatus*	1

***Hybognathus amarus* (age-classes):**

age-0	
age-1	2
age-2+	

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-022**
Rio Grande, ca. 8 miles downstream of the San Marcial railroad bridge crossing

Site Number: 19 River Mile: 60.5 03 April 2017
UTM Easting: 309487 UTM Northing: 3718178 Zone: 13 Quad: Paraje Well
W.H. Brandenburg, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 507.5 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	1
76	*Hybognathus amarus**	1

***Hybognathus amarus* (age-classes):**

age-0	
age-1	1
age-2+	

Rio Grande Silvery Minnow Population Monitoring
April 2017

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD17-021**
Rio Grande, ca. 10 mi downstream of the San Marcial railroad bridge crossing

Site Number: 20 River Mile: 58.8 03 April 2017
UTM Easting: 307846 UTM Northing: 3716150 Zone: 13 Quad: Paraje Well
W.H. Brandenburg, J.L. Kennedy, R.A. Reese, C.A. Peralta Effort: 461.2 sq. m

FAMILY		N
76	*Cyprinella lutrensis*	7
76	*Platygobio gracilis*	1
93	*Ictalurus punctatus*	1