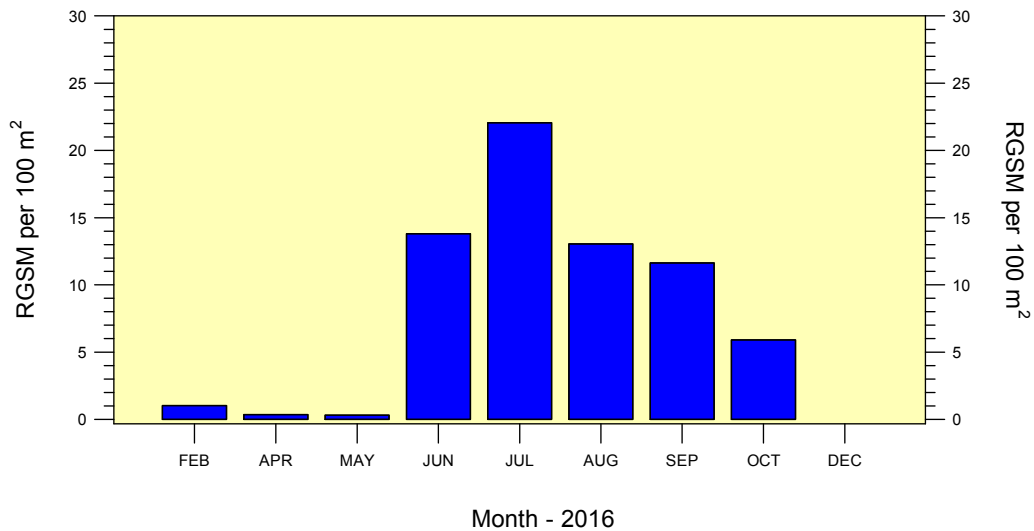
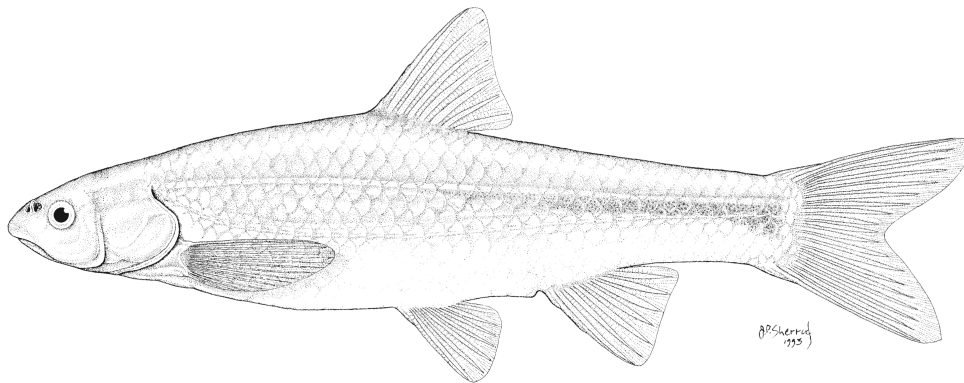


**RIO GRANDE SILVERY MINNOW POPULATION MONITORING RESULTS FROM  
OCTOBER 2016**

**A MIDDLE RIO GRANDE ENDANGERED SPECIES  
COLLABORATIVE PROGRAM FUNDED RESEARCH PROJECT**



Robert K. Dudley and Steven P. Platania  
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800 Encino Place, NE; Albuquerque, NM 87102-2606

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**Contract GS-10F-0249X:**

**Order R15PD00171**

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  
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## SUMMARY OF OCTOBER 2016 POPULATION MONITORING

The October 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 (3/16<sup>th</sup> inch) seine through discrete mesohabitats. Larval fish were also collected with a 1.0 m x 1.0 m fine mesh (1/16<sup>th</sup> 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. May–June). Figures illustrating fish densities (i.e., fish per 100 m<sup>2</sup>) were prepared for the ten focal species to facilitate comparisons across reaches.

During October, sampling covered 9,891.9 m<sup>2</sup> (surface area) of water and yielded 2,798 fish. Cumulative fish density during October was 28.3 individuals/100 m<sup>2</sup> sampled. The three most common species were Red Shiner (n = 1,574), Rio Grande Silvery Minnow (n = 584), and Western Mosquitofish (n = 206). The 20 sampling sites yielded a total of 13 fish species. Rio Grande Silvery Minnow was present in 114 of the 284 seine hauls that yielded fish. We collected Rio Grande Silvery Minnow at 18 of the 20 sampling sites, and its overall density was 5.90 (n = 584) individuals/100 m<sup>2</sup> sampled. Densities of unmarked and marked individuals were 5.90 (n = 584) and 0.00 (n = 0) individuals/100 m<sup>2</sup> sampled, respectively. Densities of age-0, age-1, and age-2+ individuals were 5.85 (n = 579), 0.05 (n = 5), and 0.00 (n = 0) individuals/100 m<sup>2</sup> sampled, respectively.

Rio Grande Silvery Minnow that were stocked during autumn 2015 (ca. 200,000; Thomas P. Archdeacon, New Mexico Fish and Wildlife Conservation Office, pers. comm.) resulted in modest densities of this species during the winter of 2015/2016. However, the overwinter mortality of Rio Grande Silvery Minnow resulted in substantial losses of individuals from December 2015 to May 2016. The abundance of this species increased substantially in June and July, following elevated flows and spawning during spring. Densities of age-0 Rio Grande Silvery Minnow were much higher in October 2016 than in other October collections taken during recent years. Maintaining reasonable autumn flows will be crucial for the successful survival of Rio Grande Silvery Minnow during 2016.

## OCTOBER 2016 POPULATION MONITORING BY RIVER REACH

### *Angostura Reach*

Mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gage 8330000) averaged 202.7 and ranged from 120 to 366 cfs from 16 September to 15 October. Water temperatures ranged from 13.1 to 20.3 °C during the Angostura Reach sampling efforts (ca. 0830–1530 h). Secchi disk measurements of water clarity ranged from 18 to 38 cm.

Sampling for fishes in the Angostura Reach during October yielded 392 individuals with a cumulative fish density of 15.4 individuals/100 m<sup>2</sup> sampled. The overall sampling effort in the Angostura Reach covered 2,543.6 m<sup>2</sup> (surface area) of water. Densities of all fish species combined ranged from 10.3 to 22.0 individuals per 100 m<sup>2</sup> at the five sampling sites. In October, there were 11 fish species collected in the Angostura Reach. Red Shiner was the most abundant taxon (n = 112), followed by Flathead Chub (n = 96), and Rio Grande Silvery Minnow (n = 79). Densities of Rio Grande Silvery Minnow ranged from 0.0 to 7.9 individuals per 100 m<sup>2</sup>. Rio Grande Silvery Minnow (n = 79) was present in 20 of the 62 seine hauls that yielded fish during October.

### *Isleta Reach*

In the Isleta Reach, mean daily discharge (Rio Grande at Isleta Lakes near Isleta, NM; USGS Gage 08354900) averaged 195.9 and ranged from 103 to 277 cfs from 16 September to 15 October. Water temperatures ranged from 12.5 to 22.8 °C throughout the sampling localities during the day (ca. 0930–1600 h). Secchi disk measurements ranged from 3 to 20 cm during sampling.

Isleta Reach population monitoring efforts produced 1,139 individuals in October with a cumulative fish density of 35.6 individuals/100 m<sup>2</sup> sampled. The total sampling effort in the Isleta Reach during October covered 3,197.0 m<sup>2</sup> (surface area) of water. Fish densities (all species combined) at the six sites ranged from 7.7 to 68.9 individuals per 100 m<sup>2</sup> sampled. There were 10 fish species collected in the Isleta Reach during October. Red Shiner was the most abundant taxon (n = 732), followed by Rio Grande Silvery Minnow (n = 196), and Western Mosquitofish (n = 135). Densities of Rio Grande Silvery Minnow ranged from 0.2 to 25.9 individuals per 100 m<sup>2</sup>. Rio Grande Silvery Minnow (n = 196) was present in 21 of the 84 seine hauls that yielded fish during October.

### *San Acacia Reach*

Mean daily discharge at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gage 08354900) from 16 September to 15 October was generally higher (average = 58.9; range = 33–164 cfs) as compared to San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gage 08358400) during the same period (average = 27.0; range = 20–76 cfs). Water temperatures in October for the San Acacia Reach ranged from 13.3 to 26.6 °C (ca. 0930–1600 h). Water clarity was generally lower in this reach (Secchi disk range = 2–10 cm) compared to the two upstream reaches.

Population monitoring efforts in the San Acacia Reach during October yielded 1,267 individuals with a cumulative fish density of 30.5 individuals per 100 m<sup>2</sup> sampled. Sampling in the San Acacia Reach covered an area of 4,151.4 m<sup>2</sup> of water. Fish densities (all species combined) ranged from 0.0 to 106.3 individuals per 100 m<sup>2</sup> at the nine sites sampled in the San Acacia Reach. In October, there were 11 fish species collected in the San Acacia Reach. Red Shiner was the most abundant taxon (n = 730), followed by Rio Grande Silvery Minnow (n = 309), and Channel Catfish (n = 89). Densities of Rio Grande Silvery Minnow ranged from 0.0 to 18.0 individuals per 100 m<sup>2</sup>. Rio Grande Silvery Minnow (n = 309) was present in 73 of the 138 seine hauls that yielded fish during October.

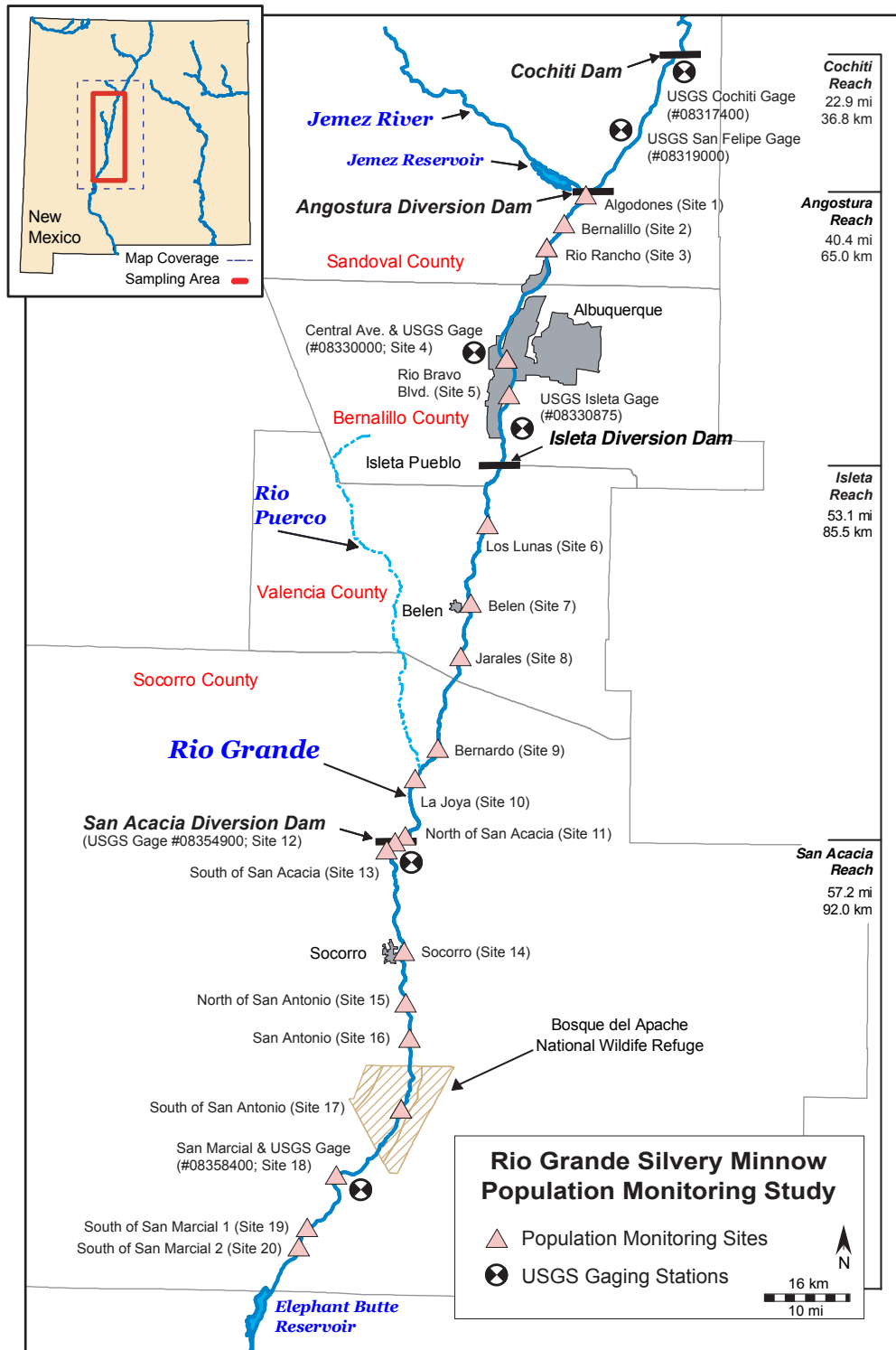


Figure 1. Map of the study area and sampling localities (numbered). Sampling locality information that corresponds with the numbered localities is provided in Appendix A (Table A-1).

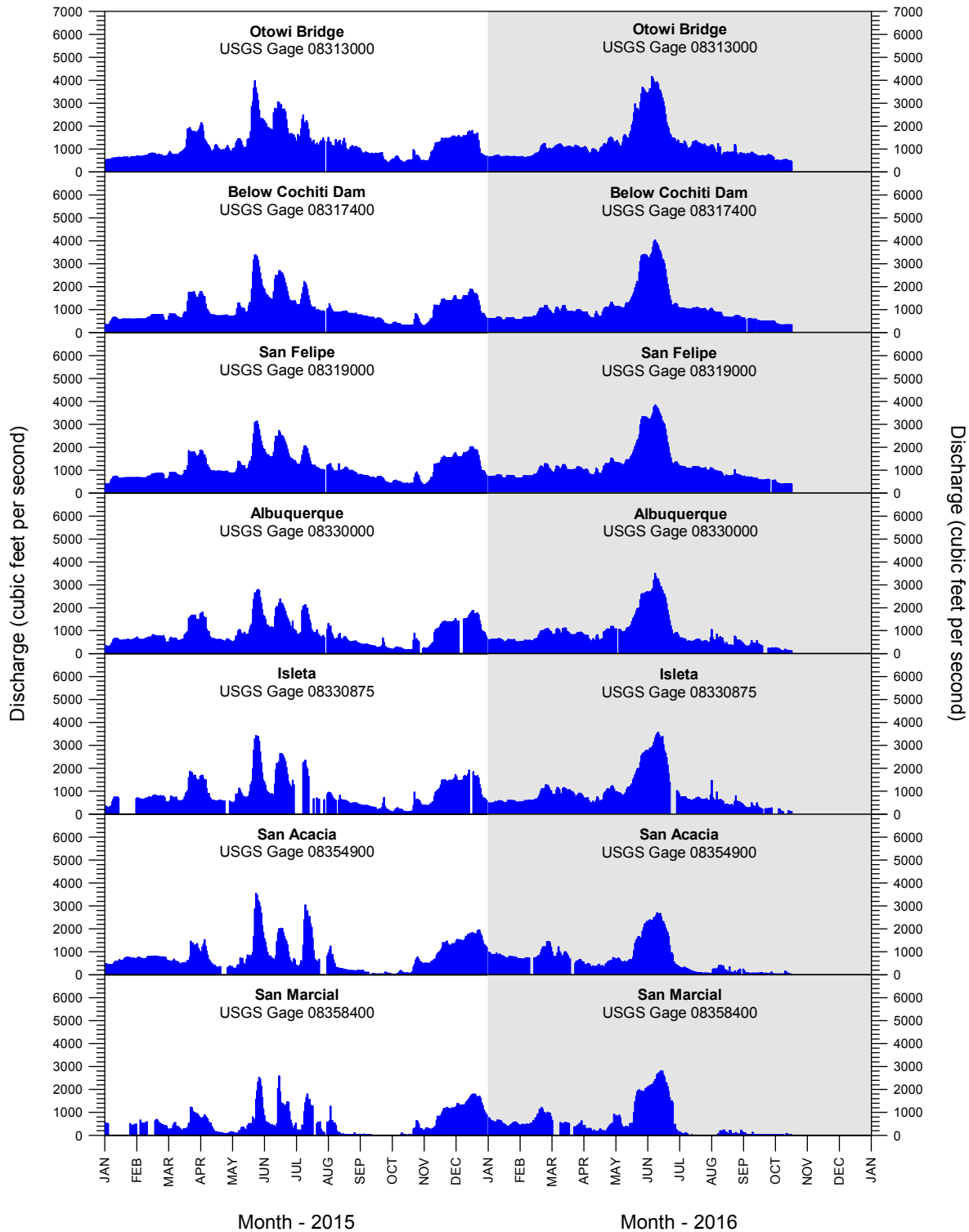


Figure 2. Rio Grande discharge from 1 January 2015 to 15 October 2016 at U.S. Geological Survey (USGS) gaging stations. The Otowi Bridge gage site is outside of the study area but is provided for reference. Discharge data are provisional and subject to change.

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

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

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

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

<sup>1</sup> = Focal taxa were the most abundant species from recent Middle Rio Grande collections



Table 2. Summary of the October 2016 Rio Grande Silvery Minnow population monitoring results (species list is based on fish collected since 1993).

FAMILY	SPECIES COMMON NAME	RESIDENCE STATUS <sup>1</sup>	TOTAL NUMBER OF SPECIMENS	PERCENT (%) OF TOTAL	FREQUENCY OF OCCURRENCE <sup>2</sup>	% FREQUENCY OCCURRENCE <sup>2</sup>
Clupeidae	Gizzard Shad	N	-	-	-	-
Clupeidae	Threadfin Shad	I	-	-	-	-
Cyprinidae	Central Stoneroller	I	-	-	-	-
Cyprinidae	Goldfish	I	-	-	-	-
Cyprinidae	Red Shiner	N	1,574	56.25	19	95
Cyprinidae	Common Carp	I	37	1.32	13	65
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	584	20.87	18	90
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	18	0.64	7	35
Cyprinidae	Bullhead Minnow	I	7	0.25	2	10
Cyprinidae	Flathead Chub	N	183	6.54	15	75
Cyprinidae	Longnose Dace	N	39	1.39	5	25
Catostomidae	River Carpsucker	N	9	0.32	7	35
Catostomidae	White Sucker	I	2	0.07	1	5
Catostomidae	Smallmouth Buffalo	N	-	-	-	-
Ictaluridae	Black Bullhead	I	-	-	-	-
Ictaluridae	Yellow Bullhead	I	-	-	-	-
Ictaluridae	Blue Catfish	N	-	-	-	-
Ictaluridae	Channel Catfish	I	135	4.82	13	65
Ictaluridae	Flathead Catfish	N	1	0.04	1	5
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	206	7.36	13	65
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	3	0.11	2	10
Centrarchidae	White Crappie	I	-	-	-	-
Centrarchidae	Black Crappie	I	-	-	-	-
Percidae	Yellow Perch	I	-	-	-	-
Percidae	Bigscale Logperch	I	-	-	-	-
Percidae	Walleye	I	-	-	-	-
<b>MONTHLY TOTALS</b>			<b>2,798</b>	<b>100.00</b>		

<sup>1</sup> N = native; I = introduced

<sup>2</sup> Frequency of occurrence values were based on 20 sampling sites

Table 3. Summary of the monthly catch of all fish species during 2016 (species list is based on fish collected since 1993).

FAMILY	SPECIES COMMON NAME	F E B	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	D E C	T O T A L
Clupeidae	Gizzard Shad	-	2	-	-	4	1	-	-	-	7
Clupeidae	Threadfin Shad	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Central Stoneroller	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Goldfish	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Red Shiner	362	1,054	1,218	439	699	1,678	524	1,574	-	7,548
Cyprinidae	Common Carp	3	5	3	71	1,232	530	54	37	-	1,935
Cyprinidae	Rio Grande Chub	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Rio Grande Silvery Minnow	120	36	32	1,437	2,178	1,222	1,149	584	-	6,758
Cyprinidae	Golden Shiner	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Fathead Minnow	8	11	8	70	52	115	6	18	-	288
Cyprinidae	Bullhead Minnow	-	5	9	-	1	-	-	7	-	22
Cyprinidae	Flathead Chub	73	174	313	248	268	388	179	183	-	1,826
Cyprinidae	Longnose Dace	1	8	181	272	142	166	68	39	-	877
Catostomidae	River Carpsucker	1	3	3	55	304	178	26	9	-	579
Catostomidae	White Sucker	1	4	654	32	157	64	6	2	-	920
Catostomidae	Smallmouth Buffalo	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Black Bullhead	-	-	-	-	-	-	2	-	-	2
Ictaluridae	Yellow Bullhead	-	-	-	1	26	28	4	-	-	59
Ictaluridae	Blue Catfish	-	-	-	1	9	1	-	-	-	11
Ictaluridae	Channel Catfish	34	52	127	82	137	1,085	305	135	-	1,957
Ictaluridae	Flathead Catfish	-	1	-	-	1	-	2	1	-	5
Salmonidae	Rainbow Trout	-	-	-	-	-	-	-	-	-	0
Salmonidae	Brown Trout	-	-	-	-	-	-	-	-	-	0
Poeciliidae	Western Mosquitofish	15	39	64	14	621	1,229	238	206	-	2,426
Moronidae	White Bass	-	-	-	-	-	-	-	-	-	0
Moronidae	Striped Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Green Sunfish	-	-	1	-	1	2	-	-	-	4
Centrarchidae	Bluegill	-	-	-	1	-	-	-	-	-	1
Centrarchidae	Longear Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Smallmouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Largemouth Bass	-	-	-	-	104	42	4	3	-	153
Centrarchidae	White Crappie	1	-	1	-	2	1	-	-	-	5
Centrarchidae	Black Crappie	-	-	-	-	-	-	-	-	-	0
Percidae	Yellow Perch	-	-	-	-	2	1	-	-	-	3
Percidae	Bigscale Logperch	-	-	-	-	1	-	-	-	-	1
Percidae	Walleye	-	-	-	-	-	-	-	-	-	0
<b>MONTHLY TOTALS</b>		<b>619</b>	<b>1,394</b>	<b>2,614</b>	<b>2,723</b>	<b>5,941</b>	<b>6,731</b>	<b>2,567</b>	<b>2,798</b>	<b>-</b>	<b>25,387</b>

Table 4. Summary of the monthly catch of Rio Grande Silvery Minnow, by site and reach, during 2016. All marked individuals at a site are shown in parentheses (subset of the total).

REACH	SITE	SITE NAME	F E B	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	D E C	T O T A L
Angostura	1	Angostura Dam	-	-	-	-	-	15(0)	-	-	-	15
Angostura	2	Bernalillo	-	1(0)	-	-	144(0)	199(0)	4(0)	2(0)	-	350
Angostura	3	Rio Rancho	-	-	4(0)	209(0)	49(1)	21(0)	47(0)	13(0)	-	343
Angostura	4	Central Ave.	-	4(0)	-	2(0)	207(0)	127(0)	82(0)	25(0)	-	447
Angostura	5	Rio Bravo Blvd.	-	2(0)	-	42(0)	69(0)	105(0)	55(0)	39(0)	-	312
Angostura Totals			-	7	4	253	469	467	188	79	-	1,467
Isleta	6	Los Lunas	-	-	8(1)	844(0)	410(0)	107(0)	71(0)	139(0)	-	1,579
Isleta	7	Belen	3(1)	1(0)	2(0)	-	224(0)	59(0)	132(0)	15(0)	-	436
Isleta	8	Jarales	2(1)	-	-	228(0)	21(0)	40(0)	5(0)	1(0)	-	297
Isleta	9	Bernardo	6(1)	3(2)	3(2)	65(0)	138(0)	88(0)	12(0)	12(0)	-	327
Isleta	10	La Joya	22(16)	1(0)	-	-	49(2)	83(0)	72(0)	28(0)	-	255
Isleta	11	North of San Acacia	1(0)	-	-	-	275(0)	137(0)	31(0)	1(0)	-	445
Isleta Totals			34	5	13	1,137	1,117	514	323	196	-	3,339
San Acacia	12	San Acacia Dam	1(1)	10(2)	-	-	5(1)	38(0)	162(0)	46(0)	-	262
San Acacia	13	South of San Acacia	7(4)	4(1)	2(1)	3(0)	29(0)	82(0)	33(0)	9(0)	-	169
San Acacia	14	Socorro	37(34)	1(1)	-	-	42(0)	60(0)	194(0)	85(0)	-	419
San Acacia	15	North of San Antonio	6(4)	7(5)	1(1)	43(1)	218(2)	1(0)	105(0)	98(0)	-	479
San Acacia	16	San Antonio	10(10)	-	-	-	162(0)	-	51(0)	50(0)	-	273
San Acacia	17	South of San Antonio	3(2)	1(1)	5(4)	-	84(0)	-	11(0)	-	-	104
San Acacia	18	San Marcial	1(0)	-	5(4)	1(1)	25(0)	48(0)	49(0)	14(0)	-	143
San Acacia	19	South of San Marcial 1	14(13)	1(1)	2(2)	-	24(0)	10(0)	17(0)	5(0)	-	73
San Acacia	20	South of San Marcial 2	7(5)	-	-	-	3(0)	2(0)	16(0)	2(0)	-	30
San Acacia Totals			86	24	15	47	592	241	638	309	-	1,952
<b>MONTHLY TOTALS</b>			<b>120</b>	<b>36</b>	<b>32</b>	<b>1,437</b>	<b>2,178</b>	<b>1,222</b>	<b>1,149</b>	<b>584</b>	<b>-</b>	<b>6,758</b>

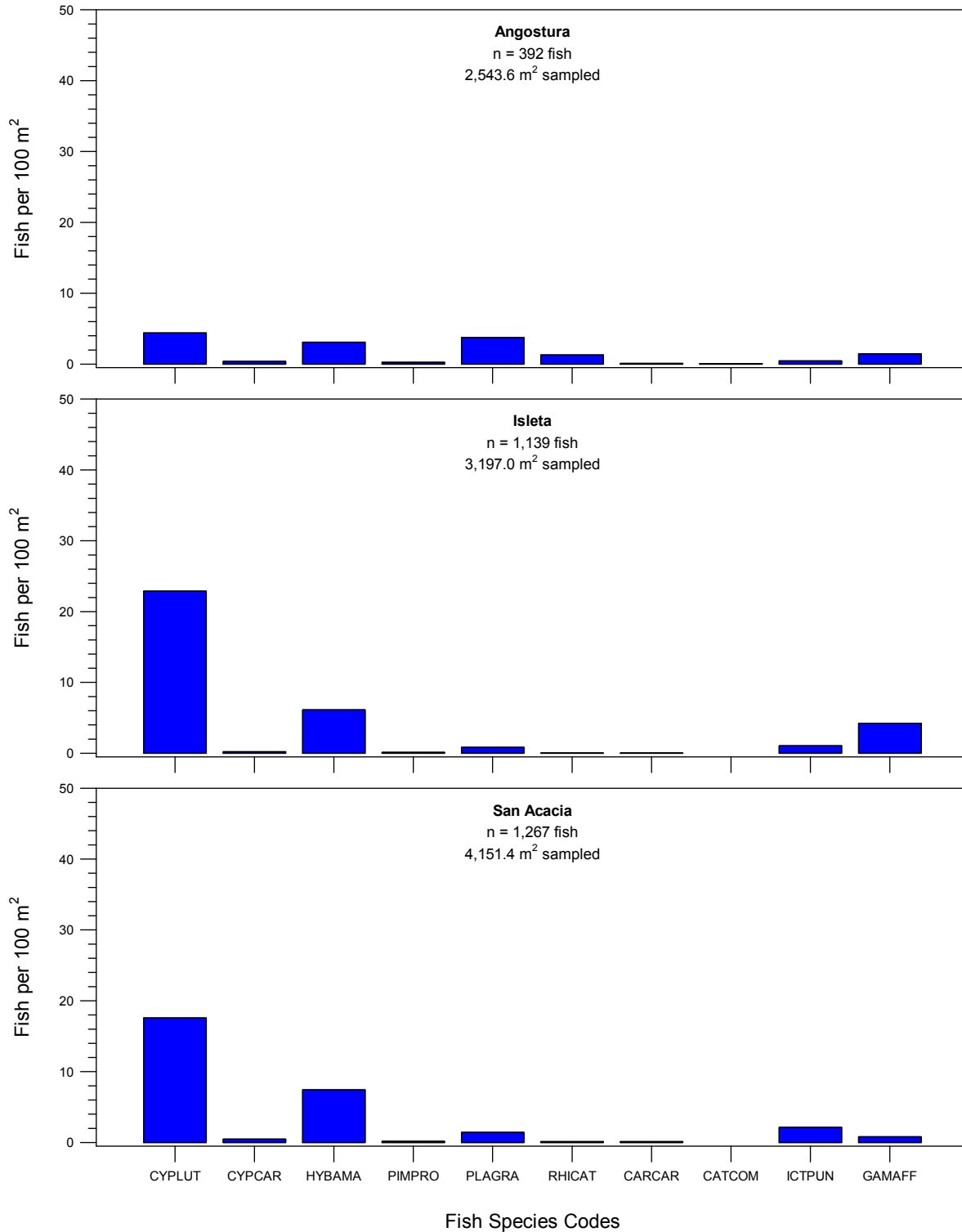


Figure 3. Fish densities from October 2016 for each focal species in the three reaches of the Middle Rio Grande (see Table 1 for fish species codes).

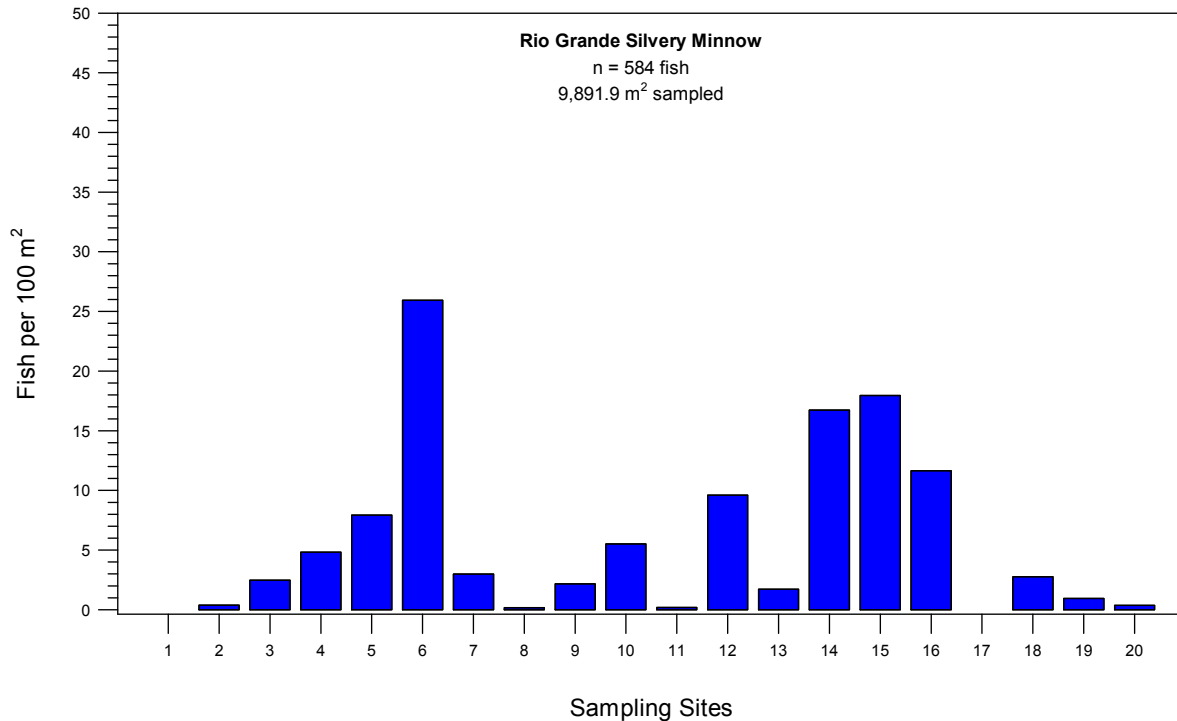
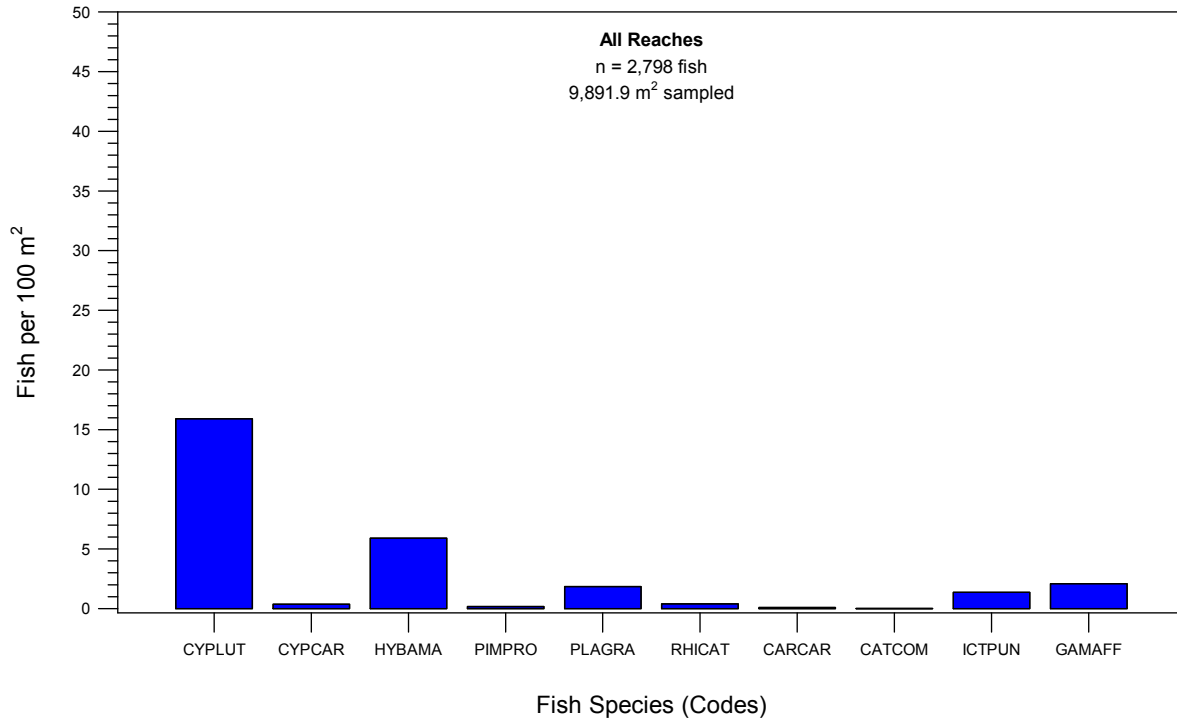


Figure 4. Catch rates for ten focal species from all reaches combined, and site-specific Rio Grande Silvery Minnow catch rates, during October 2016 (see Table 1 for fish species codes).

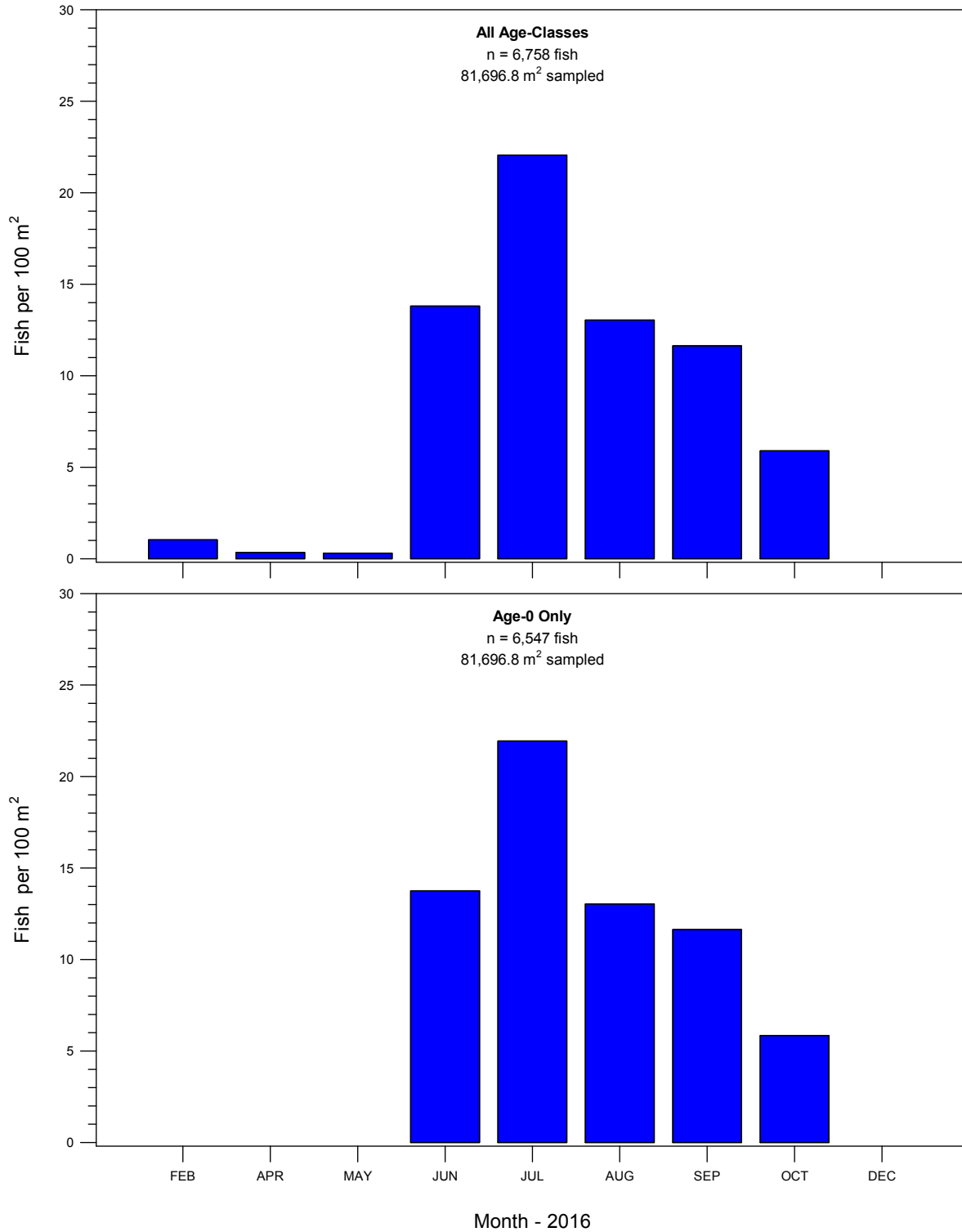


Figure 5. Inter-month fluctuations in densities of Rio Grande Silvery Minnow (all age-classes and age-0 only) during 2016.

## APPENDIX A.

Collection localities of the Rio Grande Silvery Minnow population monitoring study

Table A. Fish collection localities, by reach, for the Rio Grande Silvery Minnow population monitoring study.

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<b>Site #</b>	<b>Site Locality</b>
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**ANGOSTURA REACH SITES**

- 1 New Mexico, Sandoval County, Rio Grande, downstream of Angostura Diversion Dam, Algodones.
- 2 New Mexico, Sandoval County, Rio Grande, upstream of US Highway 550 bridge crossing, Bernalillo.
- 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.
- 4 New Mexico, Bernalillo County, Rio Grande, upstream of Central Avenue (US Highway 66) bridge crossing, Albuquerque.
- 5 New Mexico, Bernalillo County, Rio Grande, upstream of Rio Bravo Boulevard bridge crossing, Albuquerque.

**ISLETA REACH SITES**

- 6 New Mexico, Valencia County, Rio Grande, ca. 0.3 miles upstream of Los Lunas (NM State Highway 49) bridge crossing, Los Lunas.
- 7 New Mexico, Valencia County, Rio Grande, ca. 1.0 miles upstream of NM State Highway 309/6 bridge crossing, Belen.
- 8 New Mexico, Valencia County, Rio Grande, ca. 2.2 miles upstream of NM State Highway 346 bridge crossing (near Transwestern Natural Gas Pipeline crossing), Jarales.
- 9 New Mexico, Socorro County, Rio Grande, upstream of US Highway 60 bridge crossing, Bernardo.
- 10 New Mexico, Socorro County, Rio Grande, ca. 3.5 miles downstream of US Highway 60 bridge crossing, La Joya.
- 11 New Mexico, Socorro County, Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia.

**SAN ACACIA REACH SITES**

- 12 New Mexico, Socorro County, Rio Grande, downstream of San Acacia Diversion Dam, San Acacia.
- 13 New Mexico, Socorro County, Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia.
- 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.
- 15 New Mexico, Socorro County, Rio Grande, ca. 4.0 miles upstream of US Highway 380 bridge crossing, San Antonio.

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Table A. Fish collection localities, by reach, for the Rio Grande Silvery Minnow population monitoring study (continued).

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<b>Site #</b>	<b>Site Locality</b>
<b>SAN ACACIA REACH SITES (continued)</b>	
16	New Mexico, Socorro County, Rio Grande, upstream of US Highway 380 bridge crossing, San Antonio.
17	New Mexico, Socorro County, Rio Grande, directly east of Bosque del Apache National Wildlife Refuge headquarters, San Antonio.
18	New Mexico, Socorro County, Rio Grande, downstream of the San Marcial railroad crossing, San Marcial.
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.
20	New Mexico, Socorro County, Rio Grande, ca. 10.0 miles downstream of the San Marcial Railroad Bridge crossing, San Marcial.

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## APPENDIX B.

Site-specific ichthyofaunal composition during the October 2016  
Rio Grande Silvery Minnow population monitoring study

Monthly and annual reports 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  
October 2016**

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

**RKD16-158**

Site Number: 1 River Mile: 209.7 06 October 2016  
UTM Easting: 363811 UTM Northing: 3916006 Zone: 13 Quad: San Felipe Pueblo  
J.L. Kennedy, A.J. Schroeder, C.A. Peralta Effort: 486.5 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	11
76	<i>Pimephales promelas</i>	2
76	<i>Platygobio gracilis</i>	14
76	<i>Rhinichthys cataractae</i>	22
294	<i>Micropterus salmoides</i>	1

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

**RKD16-159**

Site Number: 2 River Mile: 203.8 06 October 2016  
UTM Easting: 358543 UTM Northing: 3909722 Zone: 13 Quad: Bernalillo  
J.L. Kennedy, A.J. Schroeder, C.A. Peralta Effort: 521.0 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	31
76	<i>Cyprinus carpio</i>	2
76	<i>Hybognathus amarus*</i>	2
76	<i>Platygobio gracilis</i>	17
76	<i>Rhinichthys cataractae</i>	8
81	<i>Catostomus commersonii</i>	2
93	<i>Ictalurus punctatus</i>	3
212	<i>Gambusia affinis</i>	2

\* *Hybognathus amarus* by age class:  
age-0: 2  
age-1:  
age-2+:

### Rio Grande Silvery Minnow Population Monitoring October 2016

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD16-160**

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 October 2016  
UTM Easting: 354772 UTM Northing: 3905355 Zone: 13 Quad: Bernalillo Effort: 525.2 sq. m  
J.L. Kennedy, A.J. Schroeder, C.A. Peralta

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	36
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	13
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	41
76	<i>Rhinichthys cataractae</i>	3

**\* Hybognathus amarus by age class:**

age-0: 13  
age-1:  
age-2+:

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage **RKD16-157**

Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque.

Site Number: 4 River Mile: 183.4 06 October 2016  
UTM Easting: 346840 UTM Northing: 3884094 Zone: 13 Quad: Albuquerque West Effort: 518.9 sq. m  
J.L. Kennedy, A.J. Schroeder, C.A. Peralta

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	28
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	25
76	<i>Platygobio gracilis</i>	18
93	<i>Ictalurus punctatus</i>	7
212	<i>Gambusia affinis</i>	35

**\* Hybognathus amarus by age class:**

age-0: 25  
age-1:  
age-2+:



**Rio Grande Silvery Minnow Population Monitoring  
October 2016**

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

**RKD16-155**

Site Number: 6 River Mile: 161.4 05 October 2016  
UTM Easting: 342898 UTM Northing: 3852531 Zone: 13 Quad: Los Lunas  
R.K. Dudley, A.J. Schroeder, R.A. Reese Effort: 535.8 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	179
76	<i>Cyprinus carpio</i>	2
76	<i>Hybognathus amarus*</i>	139
76	<i>Pimephales promelas</i>	3
76	<i>Platygobio gracilis</i>	9
93	<i>Ictalurus punctatus</i>	21
212	<i>Gambusia affinis</i>	16

**\* *Hybognathus amarus* by age class:**

age-0: 136  
age-1: 3  
age-2+:

**Rio Grande Silvery Minnow Population Monitoring  
October 2016**

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

**RKD16-154**

Site Number: 7 River Mile: 151.5  
UTM Easting: 339972 UTM Northing: 3837061 Zone: 13 Quad: Tome  
R.K. Dudley, A.J. Schroeder, R.A. Reese

05 October 2016

Effort: 500.6 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	86
76	<i>Cyprinus carpio</i>	5
76	<i>Hybognathus amarus*</i>	15
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	1
81	<i>Carpionodes carpio</i>	1
93	<i>Ictalurus punctatus</i>	5
212	<i>Gambusia affinis</i>	49

**\* Hybognathus amarus by age class:**

age-0: 15

age-1:

age-2+:

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

**RKD16-153**

Site Number: 8 River Mile: 143.2  
UTM Easting: 338136 UTM Northing: 3827329 Zone: 13 Quad: Veguita  
R.K. Dudley, A.J. Schroeder, R.A. Reese

05 October 2016

Effort: 565.0 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	182
76	<i>Hybognathus amarus*</i>	1
212	<i>Gambusia affinis</i>	59
294	<i>Micropterus salmoides</i>	2

**\* Hybognathus amarus by age class:**

age-0: 1

age-1:

age-2+:

### Rio Grande Silvery Minnow Population Monitoring October 2016

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

**RKD16-152**

Site Number: 9 River Mile: 130.6  
UTM Easting: 334604 UTM Northing: 3809726 Zone: 13 Quad: Abeytas  
R.K. Dudley, A.J. Schroeder, R.A. Reese

05 October 2016  
Effort: 554.7 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	250
76	<i>Hybognathus amarus*</i>	12
76	<i>Rhinichthys cataractae</i>	1
212	<i>Gambusia affinis</i>	3

**\* *Hybognathus amarus* by age class:**

age-0: 12  
age-1:  
age-2+:

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

**RKD16-151**

Site Number: 10 River Mile: 127.0  
UTM Easting: 331094 UTM Northing: 3805229 Zone: 13 Quad: Abeytas  
R.K. Dudley, A.J. Schroeder, R.A. Reese

05 October 2016  
Effort: 507.8 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	28
76	<i>Hybognathus amarus*</i>	28

**\* *Hybognathus amarus* by age class:**

age-0: 28  
age-1:  
age-2+:



**Rio Grande Silvery Minnow Population Monitoring  
October 2016**

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

**RKD16-150**

Site Number: 11 River Mile: 116.8  
UTM Easting: 327902 UTM Northing: 3792603 Zone: 13 Quad: La Joya  
W.H. Brandenburg, E.I. Gilbert, A.J. Schroeder

04 October 2016

Effort: 533.1 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	7
76	<i>Hybognathus amarus</i> *	1
76	<i>Platygobio gracilis</i>	17
93	<i>Ictalurus punctatus</i>	8
212	<i>Gambusia affinis</i>	8

**\* *Hybognathus amarus* by age class:**

age-0: 1  
age-1:  
age-2+:

**Rio Grande Silvery Minnow Population Monitoring  
October 2016**

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

**RKD16-149**

Site Number: 12 River Mile: 116.2 04 October 2016  
UTM Easting: 326162 UTM Northing: 3791977 Zone: 13 Quad: San Acacia  
W.H. Brandenburg, E.I. Gilbert, A.J. Schroeder Effort: 479.0 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	413
76	<i>Cyprinus carpio</i>	4
76	<i>Hybognathus amarus*</i>	46
76	<i>Pimephales promelas</i>	6
76	<i>Platygobio gracilis</i>	19
76	<i>Rhinichthys cataractae</i>	5
81	<i>Carpodes carpio</i>	1
93	<i>Ictalurus punctatus</i>	5
212	<i>Gambusia affinis</i>	10

**\* *Hybognathus amarus* by age class:**

age-0: 46  
age-1:  
age-2+:

**Rio Grande Silvery Minnow Population Monitoring  
October 2016**

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

**RKD16-148**

Site Number: 13 River Mile: 114.6 04 October 2016  
UTM Easting: 325263 UTM Northing: 3790442 Zone: 13 Quad: Lemitar  
W.H. Brandenburg, E.I. Gilbert, A.J. Schroeder Effort: 523.1 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	15
76	<i>Cyprinus carpio</i>	3
76	<i>Hybognathus amarus*</i>	9
76	<i>Platygobio gracilis</i>	17
81	<i>Carpoides carpio</i>	1
93	<i>Ictalurus punctatus</i>	7

**\* Hybognathus amarus by age class:**

age-0: 9  
age-1:  
age-2+:

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage  
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.

**RKD16-147**

Site Number: 14 River Mile: 99.5 04 October 2016  
UTM Easting: 327097 UTM Northing: 3771043 Zone: 13 Quad: Loma de las Canas  
W.H. Brandenburg, E.I. Gilbert, A.J. Schroeder Effort: 507.9 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	10
76	<i>Hybognathus amarus*</i>	85
76	<i>Platygobio gracilis</i>	5
81	<i>Carpoides carpio</i>	1
93	<i>Ictalurus punctatus</i>	36
212	<i>Gambusia affinis</i>	1

**\* Hybognathus amarus by age class:**

age-0: 85  
age-1:  
age-2+:

**Rio Grande Silvery Minnow Population Monitoring  
October 2016**

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

**RKD16-146**

Site Number: 15 River Mile: 91.7 04 October 2016  
UTM Easting: 328140 UTM Northing: 3761283 Zone: 13 Quad: San Antonio  
W.H. Brandenburg, E.I. Gilbert, A.J. Schroeder Effort: 545.7 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	20
76	<i>Cyprinus carpio</i>	6
76	<i>Hybognathus amarus*</i>	98
76	<i>Platygobio gracilis</i>	14
81	<i>Carpionodes carpio</i>	1
93	<i>Ictalurus punctatus</i>	25
212	<i>Gambusia affinis</i>	16

**\* *Hybognathus amarus* by age class:**

age-0: 98  
age-1:  
age-2+:

**Rio Grande Silvery Minnow Population Monitoring  
October 2016**

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

**RKD16-145**

Site Number: 16 River Mile: 87.1 03 October 2016  
UTM Easting: 328914 UTM Northing: 3754471 Zone: 13 Quad: San Antonio  
J.L. Kennedy, R.C. Keller, R.A. Reese Effort: 429.1 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	5
76	<i>Cyprinus carpio</i>	3
76	<i>Hybognathus amarus*</i>	50
76	<i>Platygobio gracilis</i>	1
81	<i>Carpoides carpio</i>	1
93	<i>Ictalurus punctatus</i>	1
212	<i>Gambusia affinis</i>	3

**\* *Hybognathus amarus* by age class:**

age-0: 50  
age-1:  
age-2+:

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

**RKD16-144**

Site Number: 17 River Mile: 79.1 03 October 2016  
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San Antonio SE  
J.L. Kennedy, R.C. Keller, R.A. Reese Effort: 95.8 sq. m

<u>FAMILY</u>		<u>N</u>
	<i>No Fish Collected</i>	

### Rio Grande Silvery Minnow Population Monitoring October 2016

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

**RKD16-143**

Site Number: 18 River Mile: 68.6 03 October 2016  
UTM Easting: 315284 UTM Northing: 3728347 Zone: 13 Quad: San Marcial  
J.L. Kennedy, R.C. Keller, R.A. Reese Effort: 507.4 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	57
76	<i>Cyprinus carpio</i>	2
76	<i>Hybognathus amarus*</i>	14
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	2
93	<i>Ictalurus punctatus</i>	1

**\* Hybognathus amarus by age class:**

age-0: 12  
age-1: 2  
age-2+:

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

**RKD16-142**

Site Number: 19 River Mile: 60.5 03 October 2016  
UTM Easting: 309487 UTM Northing: 3718178 Zone: 13 Quad: Paraje Well  
J.L. Kennedy, R.C. Keller, R.A. Reese Effort: 530.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	151
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	5
76	<i>Pimephales vigilax</i>	4
76	<i>Platygobio gracilis</i>	2
212	<i>Gambusia affinis</i>	1

**\* Hybognathus amarus by age class:**

age-0: 5  
age-1:  
age-2+:

**Rio Grande Silvery Minnow Population Monitoring  
October 2016**

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

**RKD16-141**

Site Number: 20 River Mile: 58.8 03 October 2016  
UTM Easting: 307846 UTM Northing: 3716150 Zone: 13 Quad: Paraje Well  
J.L. Kennedy, R.C. Keller, R.A. Reese Effort: 533.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	59
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	2
76	<i>Pimephales vigilax</i>	3
93	<i>Ictalurus punctatus</i>	14
93	<i>Pylodictis olivaris</i>	1
212	<i>Gambusia affinis</i>	3

**\* *Hybognathus amarus* by age class:**

age-0: 2  
age-1:  
age-2+: