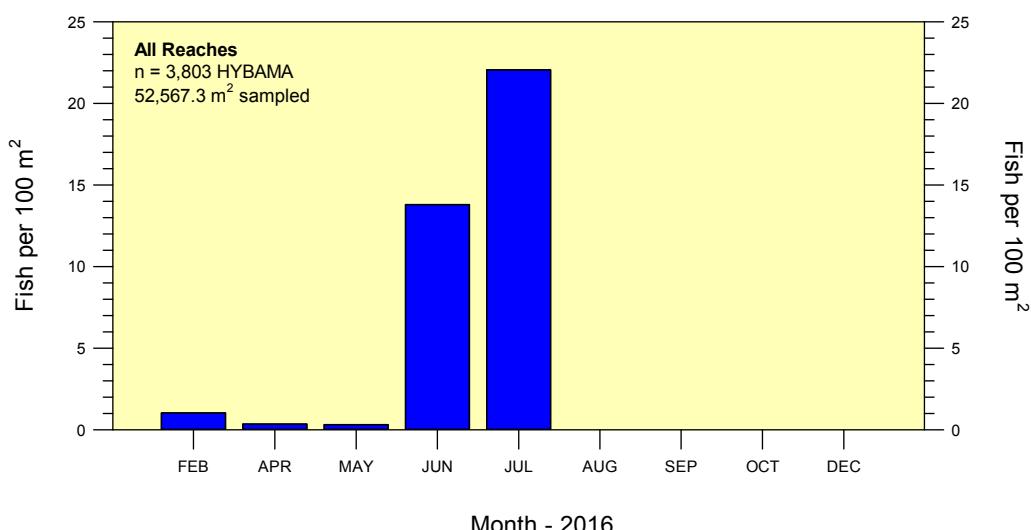
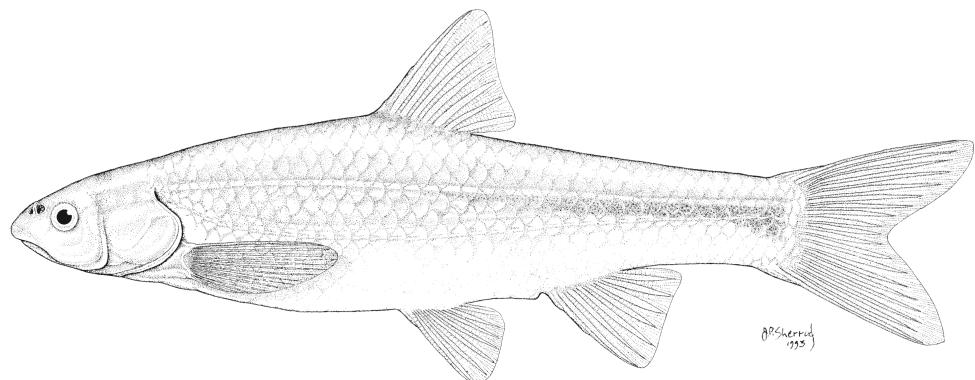


**RIO GRANDE SILVERY MINNOW POPULATION MONITORING RESULTS FROM  
JULY 2016**

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



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15 August 2016

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prepared for:

**MIDDLE RIO GRANDE ENDANGERED SPECIES COLLABORATIVE PROGRAM**

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U.S. Bureau of Reclamation  
Albuquerque Area Office  
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## SUMMARY OF OVERALL JULY 2016 POPULATION MONITORING EFFORTS

The July 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-1). 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 measured and aged all Rio Grande Silvery Minnow. Age-0 individuals are only present after annual 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 among reaches.

During July, sampling covered 9,872.1 m<sup>2</sup> (surface area) of water and yielded 5,941 fish. Cumulative fish density during July was 60.2 individuals/100 m<sup>2</sup> sampled. The three most common species were Rio Grande Silvery Minnow (n = 2,178), Common Carp (n = 1,232), and Red Shiner (n = 699). The 20 sampling sites yielded a total of 20 fish species. Rio Grande Silvery Minnow was present in 161 of the 341 seine hauls that yielded fish. We collected Rio Grande Silvery Minnow at 19 of the 20 sampling sites, and its overall density was 22.06 (n = 2,178) individuals/100 m<sup>2</sup> sampled. Densities of unmarked and marked individuals were 22.00 (n = 2,172) and 0.06 (n = 6) individuals/100 m<sup>2</sup> sampled, respectively. Densities of age-0, age-1, and age-2+ individuals were 21.94 (n = 2,166), 0.12 (n = 12), 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, following elevated flows during spring. Densities of age-0 Rio Grande Silvery Minnow were much higher in July 2016 than in other July collections taken during recent years. Summer flows will likely be crucial for the successful recruitment of Rio Grande Silvery Minnow during 2016.

## SUMMARY OF JULY 2016 POPULATION MONITORING EFFORT BY RIVER REACH

### **Angostura Reach**

Mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gage 8330000) averaged 975.8 and ranged from 504 to 2,590 cfs from 16 June to 15 July. Water temperatures ranged from 22.1 to 24.1 °C during the Angostura Reach sampling efforts (ca. 0830–1530 h). Secchi disk measurements of water clarity ranged from 18 to 28 cm.

Sampling for fishes in the Angostura Reach during July yielded 1,243 individuals with a cumulative fish density of 48.9 individuals/100 m<sup>2</sup> sampled. The overall sampling effort in the Angostura Reach covered 2,542.9 m<sup>2</sup> (surface area) of water. Densities of all fish species combined ranged from 26.2 to 81.8 individuals per 100 m<sup>2</sup> at the five sampling sites. In July, there were 13 fish species collected in the Angostura Reach. Rio Grande Silvery Minnow was the most abundant taxon (n = 469), followed by White Sucker (n = 146), and Common Carp (n = 139). Densities of Rio Grande Silvery Minnow ranged from 0.0 to 43.5 individuals per 100 m<sup>2</sup>. Rio Grande Silvery Minnow (n = 469) was present in 42 of the 92 seine hauls that yielded fish during July.

### **Isleta Reach**

In the Isleta Reach, mean daily discharge (Rio Grande at Isleta Lakes near Isleta, NM; USGS Gage 08354900) averaged 1,096.8 and ranged from 585 to 2,770 cfs from 16 June to 15 July. Water temperatures ranged from 24.4 to 31.1 °C throughout the sampling localities during the day (ca. 0930–1600 h). Secchi disk measurements ranged from 12 to 22 cm during sampling.

Isleta Reach population monitoring efforts produced 2,565 individuals in July with a cumulative fish density of 86.5 individuals/100 m<sup>2</sup> sampled. The total sampling effort in the Isleta Reach during July covered 2,964.7 m<sup>2</sup> (surface area) of water. Fish densities (all species combined) at the six sites ranged from 56.5 to 122.2 individuals per 100 m<sup>2</sup> sampled. There were 13 fish species collected in the Isleta Reach during July. Rio Grande Silvery Minnow was the most abundant taxon (n = 1,117), followed by Common Carp (n = 595), and Western Mosquitofish (n = 302). Densities of Rio Grande Silvery Minnow ranged from 4.0 to 77.7 individuals per 100 m<sup>2</sup>. Rio Grande Silvery Minnow (n = 1,117) was present in 70 of the 108 seine hauls that yielded fish during July.

### **San Acacia Reach**

Mean daily discharge at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gage 08354900) from 16 June to 15 July was generally higher (average = 665.6; range = 126–2,190 cfs) as compared to San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gage 08358400) during the same period (average = 794.5; range = 17–2,540 cfs). Water temperatures in July for the San Acacia Reach ranged from 22.4 to 31.7 °C (ca. 0930–1600 h). Water clarity was generally lower in this reach (Secchi disk range = 7–19 cm) as compared to the two upstream reaches.

Population monitoring efforts in the San Acacia Reach during July yielded 2,133 individuals with a cumulative fish density of 48.9 individuals per 100 m<sup>2</sup> sampled. Sampling in the San Acacia Reach covered an area of 4,364.5 m<sup>2</sup> of water. Fish densities (all species combined) ranged from 15.8 to 297.1 individuals per 100 m<sup>2</sup> at the nine sites sampled in the San Acacia Reach. In July, there were 16 fish species collected in the San Acacia Reach. Rio Grande Silvery Minnow was the most abundant taxon (n = 592), followed by Common Carp (n = 498), and Red Shiner (n = 333). Densities of Rio Grande Silvery Minnow ranged from 0.6 to 101.0 individuals per 100 m<sup>2</sup>. Rio Grande Silvery Minnow (n = 592) was present in 49 of the 141 seine hauls that yielded fish during July.

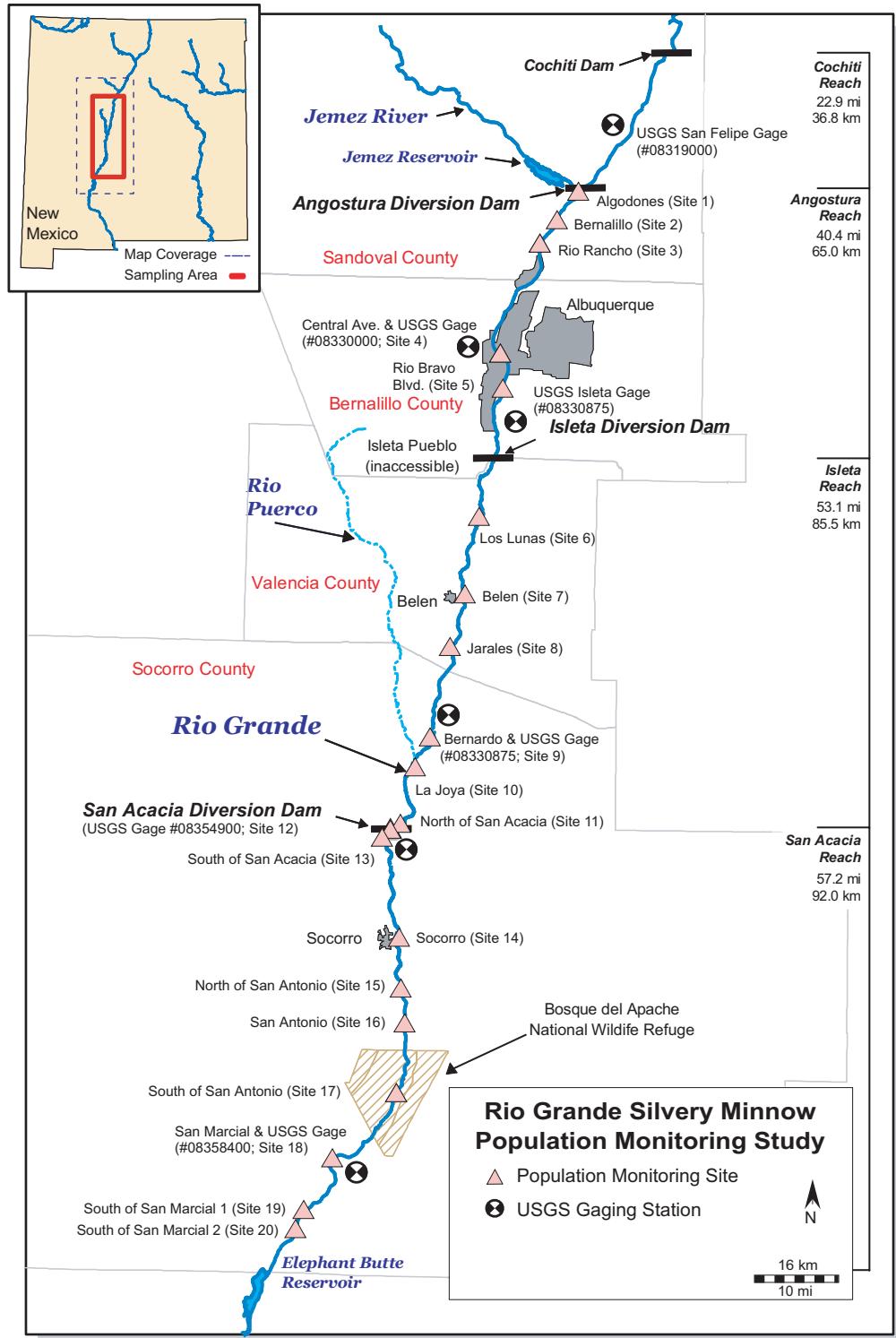


Figure 1. Map of the study area and sampling localities (numbered). Sampling locality information that corresponds with the numbered localities is provided in Appendix A (Table A-1).

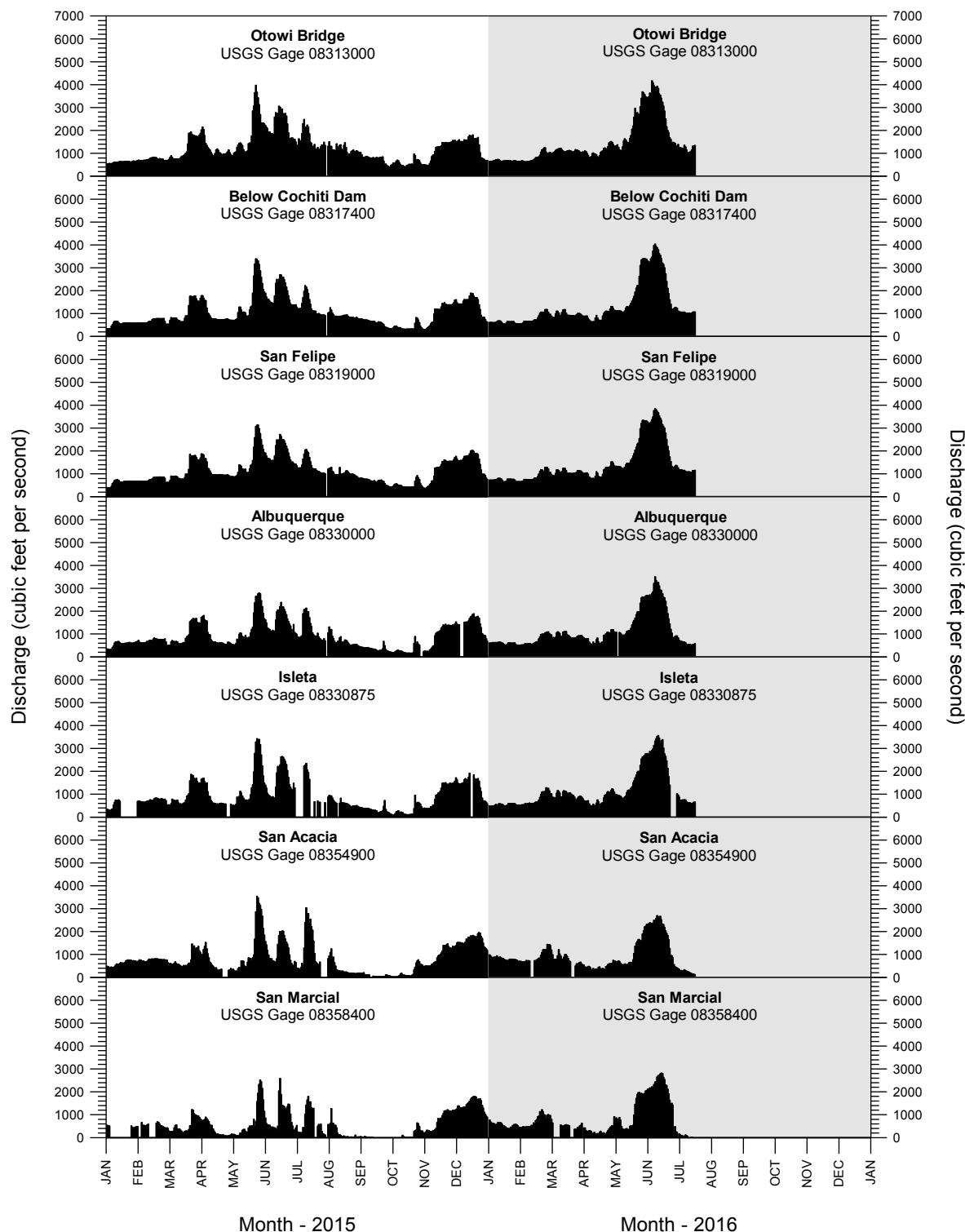


Figure 2. Discharge in the Rio Grande from 1 January 2015 to 15 July 2016 at U. S. Geological Survey (USGS) gaging stations. The Otowi Bridge gage site is outside of the study area but is provided for reference. \*\*Discharge data are provisional and subject to change.

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

Scientific Name	Common Name	Code
Order Clupeiformes		
Family Clupeidae	herrings	
<i>Dorosoma cepedianum</i>	Gizzard Shad	(DORCEP)
<i>Dorosoma petenense</i>	Threadfin Shad	(DORPET)
Order Cypriniformes		
Family Cyprinidae	carps and minnows	
<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)
Family Catostomidae	suckers	
<i>Carpoides 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)
Order Siluriformes		
Family Ictaluridae	North American catfishes	
<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)
Order Salmoniformes		
Family Salmonidae	trouts and salmons	
<i>Oncorhynchus mykiss</i>	Rainbow Trout	(ONCMYK)
<i>Salmo trutta</i>	Brown Trout	(SALTRU)
Order Cyprinodontiformes		
Family Poeciliidae	livebearers	
<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
Order Perciformes		
Family Moronidae	temperate basses	
<i>Morone chrysops</i> .....	White Bass	(MORCHR)
<i>Morone saxatilis</i> .....	Striped Bass	(MORSAX)
Family Centrarchidae	sunfishes	
<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)
Family Percidae	perches	
<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 July 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	4	0.07	2	10
Clupeidae	Threadfin Shad	I	-	-	-	-
Cyprinidae	Central Stoneroller	I	-	-	-	-
Cyprinidae	Goldfish	I	-	-	-	-
Cyprinidae	Red Shiner	N	699	11.77	20	100
Cyprinidae	Common Carp	I	1,232	20.74	19	95
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	2,178	36.66	19	95
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	52	0.88	14	70
Cyprinidae	Bullhead Minnow	I	1	0.02	1	5
Cyprinidae	Flathead Chub	N	268	4.51	18	90
Cyprinidae	Longnose Dace	N	142	2.39	8	40
Catostomidae	River Carpsucker	N	304	5.12	16	80
Catostomidae	White Sucker	I	157	2.64	8	40
Catostomidae	Smallmouth Buffalo	N	-	-	-	-
Ictaluridae	Black Bullhead	I	-	-	-	-
Ictaluridae	Yellow Bullhead	I	26	0.44	7	35
Ictaluridae	Blue Catfish	N	9	0.15	3	15
Ictaluridae	Channel Catfish	I	137	2.31	12	60
Ictaluridae	Flathead Catfish	N	1	0.02	1	5
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	621	10.45	18	90
Moronidae	White Bass	I	-	-	-	-
Moronidae	Striped Bass	I	-	-	-	-
Centrarchidae	Green Sunfish	I	1	0.02	1	5
Centrarchidae	Bluegill	N	-	-	-	-
Centrarchidae	Longear Sunfish	I	-	-	-	-
Centrarchidae	Smallmouth Bass	I	-	-	-	-
Centrarchidae	Largemouth Bass	I	104	1.75	14	70
Centrarchidae	White Crappie	I	2	0.03	2	10
Centrarchidae	Black Crappie	I	-	-	-	-
Percidae	Yellow Perch	I	2	0.03	2	10
Percidae	Bigscale Logperch	I	1	0.02	1	5
Percidae	Walleye	I	-	-	-	-
MONTHLY TOTALS			5,941	100.00		

<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	A	M	J	J	A	S	O	D	T
		E	P	A	U	U	U	E	C	E	O
		B	R	Y	N	L	G	P	T	C	A
Clupeidae	Gizzard Shad	-	2	-	-	4	-	-	-	-	6
Clupeidae	Threadfin Shad	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Central Stoneroller	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Goldfish	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Red Shiner	362	1,054	1,218	439	699	-	-	-	-	3,772
Cyprinidae	Common Carp	3	5	3	71	1,232	-	-	-	-	1,314
Cyprinidae	Rio Grande Chub	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Rio Grande Silvery Minnow	120	36	32	1,437	2,178	-	-	-	-	3,803
Cyprinidae	Golden Shiner	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Fathead Minnow	8	11	8	70	52	-	-	-	-	149
Cyprinidae	Bullhead Minnow	-	5	9	-	1	-	-	-	-	15
Cyprinidae	Flathead Chub	73	174	313	248	268	-	-	-	-	1,076
Cyprinidae	Longnose Dace	1	8	181	272	142	-	-	-	-	604
Catostomidae	River Carpsucker	1	3	3	55	304	-	-	-	-	366
Catostomidae	White Sucker	1	4	654	32	157	-	-	-	-	848
Catostomidae	Smallmouth Buffalo	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Black Bullhead	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Yellow Bullhead	-	-	-	1	26	-	-	-	-	27
Ictaluridae	Blue Catfish	-	-	-	1	9	-	-	-	-	10
Ictaluridae	Channel Catfish	34	52	127	82	137	-	-	-	-	432
Ictaluridae	Flathead Catfish	-	1	-	-	1	-	-	-	-	2
Salmonidae	Rainbow Trout	-	-	-	-	-	-	-	-	-	0
Salmonidae	Brown Trout	-	-	-	-	-	-	-	-	-	0
Poeciliidae	Western Mosquitofish	15	39	64	14	621	-	-	-	-	753
Moronidae	White Bass	-	-	-	-	-	-	-	-	-	0
Moronidae	Striped Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Green Sunfish	-	-	1	-	1	-	-	-	-	2
Centrarchidae	Bluegill	-	-	-	1	-	-	-	-	-	1
Centrarchidae	Longear Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Smallmouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Largemouth Bass	-	-	-	-	104	-	-	-	-	104
Centrarchidae	White Crappie	1	-	1	-	2	-	-	-	-	4
Centrarchidae	Black Crappie	-	-	-	-	-	-	-	-	-	0
Percidae	Yellow Perch	-	-	-	-	2	-	-	-	-	2
Percidae	Bigscale Logperch	-	-	-	-	1	-	-	-	-	1
Percidae	Walleye	-	-	-	-	-	-	-	-	-	0
<b>MONTHLY TOTALS</b>		619	1,394	2,614	2,723	5,941	-	-	-	-	13,291

**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	A	M	J	J	A	S	O	D	T
			E	P	A	U	U	U	E	C	E	O
			B	R	Y	N	L	G	P	T	C	A
Angostura	1	Angostura Dam	-	-	-	-	-	-	-	-	-	0
Angostura	2	Bernalillo	-	1(0)	-	-	144(0)	-	-	-	-	145
Angostura	3	Rio Rancho	-	-	4(0)	209(0)	49(1)	-	-	-	-	262
Angostura	4	Central Ave.	-	4(0)	-	2(0)	207(0)	-	-	-	-	213
Angostura	5	Rio Bravo Blvd.	-	2(0)	-	42(0)	69(0)	-	-	-	-	113
Angostura Totals			-	7	4	253	469	-	-	-	-	733
Isleta	6	Los Lunas	-	-	8(1)	844(0)	410(0)	-	-	-	-	1,262
Isleta	7	Belen	3(1)	1(0)	2(0)	-	224(0)	-	-	-	-	230
Isleta	8	Jarales	2(1)	-	-	228(0)	21(0)	-	-	-	-	251
Isleta	9	Bernardo	6(1)	3(2)	3(2)	65(0)	138(0)	-	-	-	-	215
Isleta	10	La Joya	22(16)	1(0)	-	-	49(2)	-	-	-	-	72
Isleta	11	North of San Acacia	1(0)	-	-	-	275(0)	-	-	-	-	276
Isleta Totals			34	5	13	1,137	1,117	-	-	-	-	2,306
San Acacia	12	San Acacia Dam	1(1)	10(2)	-	-	5(1)	-	-	-	-	16
San Acacia	13	South of San Acacia	7(4)	4(1)	2(1)	3(0)	29(0)	-	-	-	-	45
San Acacia	14	Socorro	37(34)	1(1)	-	-	42(0)	-	-	-	-	80
San Acacia	15	North of San Antonio	6(4)	7(5)	1(1)	43(1)	218(2)	-	-	-	-	275
San Acacia	16	San Antonio	10(10)	-	-	-	162(0)	-	-	-	-	172
San Acacia	17	South of San Antonio	3(2)	1(1)	5(4)	-	84(0)	-	-	-	-	93
San Acacia	18	San Marcial	1(0)	-	5(4)	1(1)	25(0)	-	-	-	-	32
San Acacia	19	South of San Marcial 1	14(13)	1(1)	2(2)	-	24(0)	-	-	-	-	41
San Acacia	20	South of San Marcial 2	7(5)	-	-	-	3(0)	-	-	-	-	10
San Acacia Totals			86	24	15	47	592	-	-	-	-	764
MONTHLY TOTALS			120	36	32	1,437	2,178	-	-	-	-	3,803

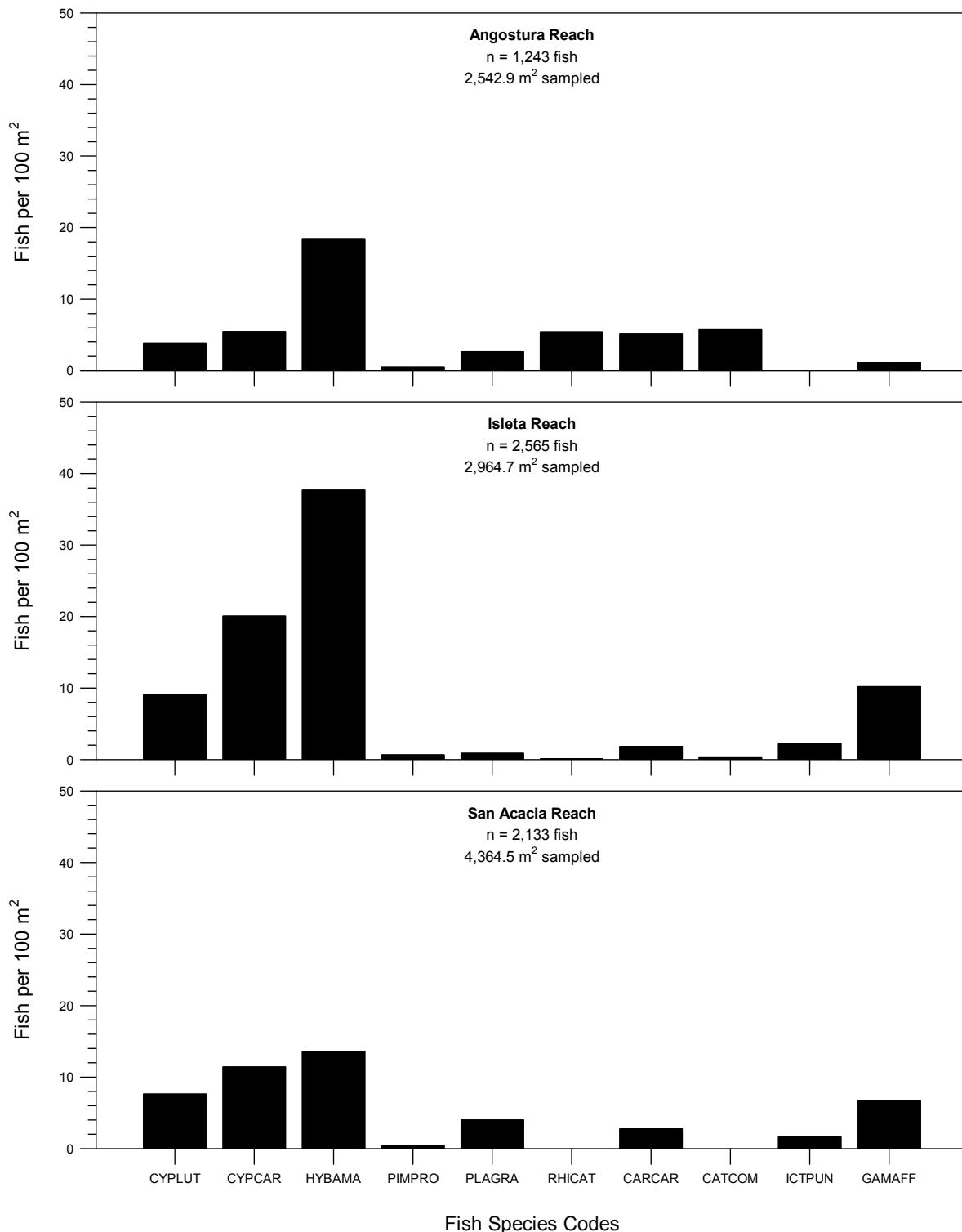


Figure 3. Fish densities from July 2016 for each focal species in the three reaches of the Middle Rio Grande (see Table 1 for fish species codes).

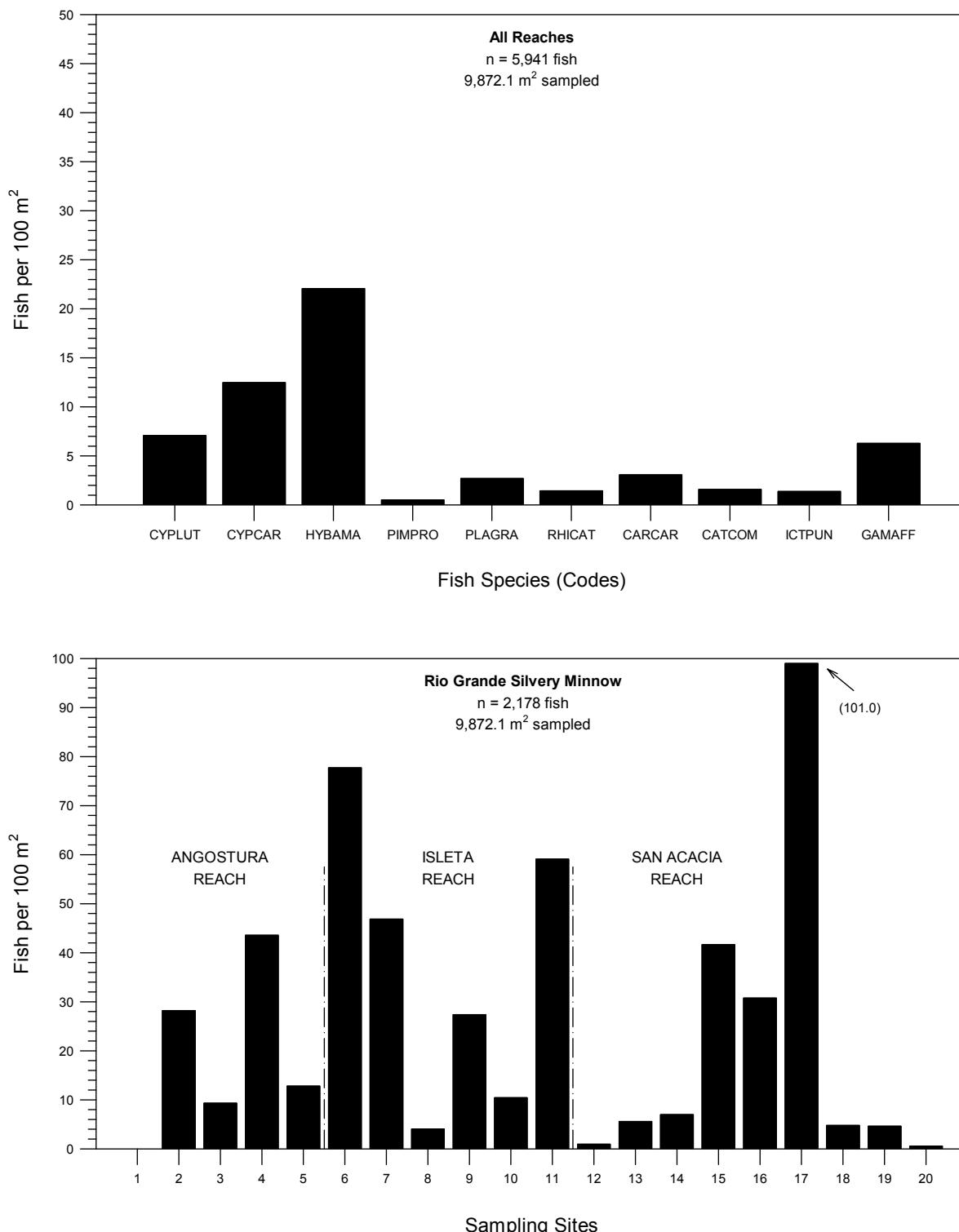


Figure 4. Catch rates for ten focal species from all reaches combined, including Rio Grande Silvery Minnow, during July 2016 (see Table 1 for fish species codes).

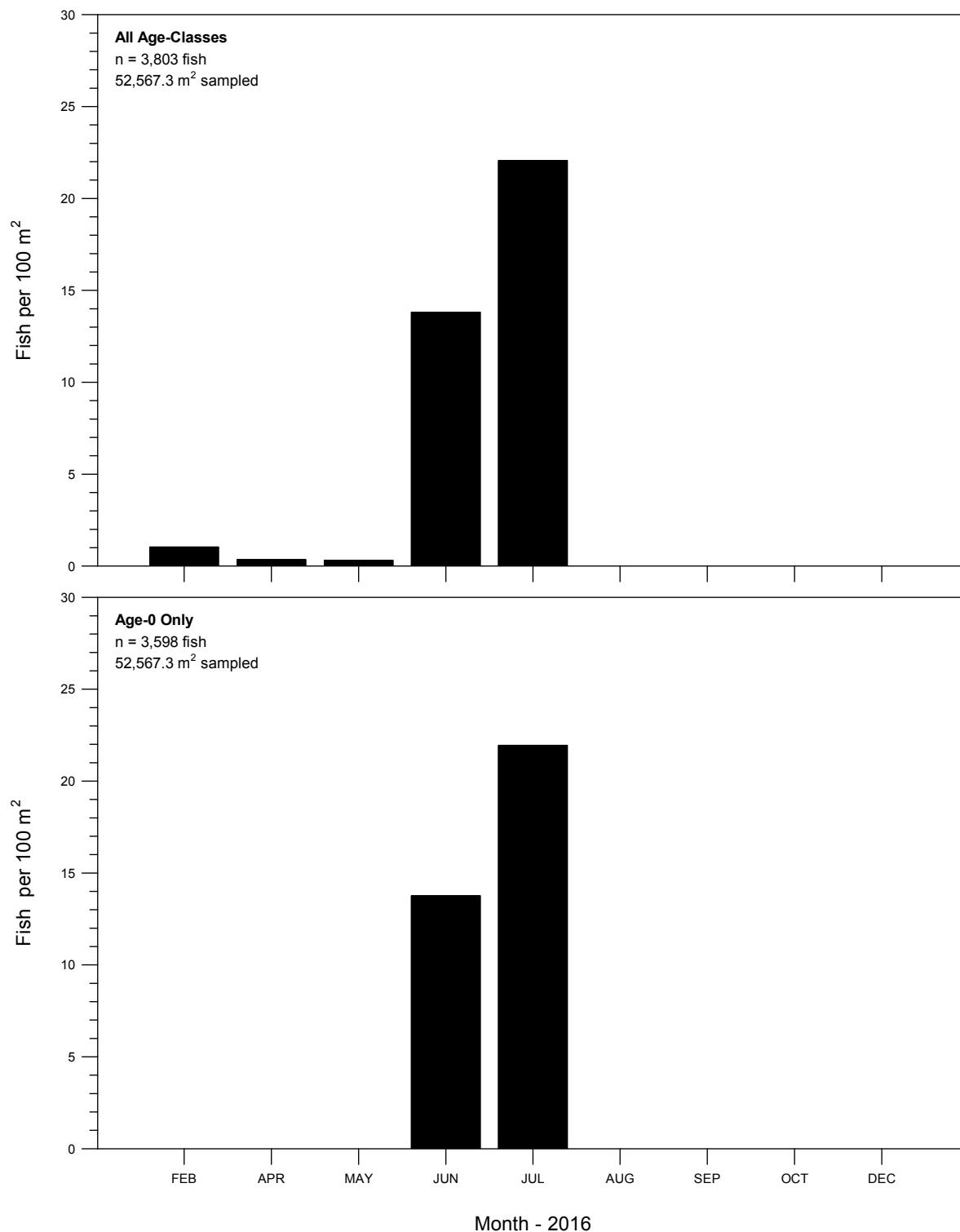


Figure 5. Inter-month fluctuations in densities of Rio Grande Silvery Minnow (all age-classes and age-0 only) during 2016.

## 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.

Site #	Site Locality
<b>ANGOSTURA REACH SITES</b>	
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.
<b>ISLETA REACH SITES</b>	
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.
<b>SAN ACACIA REACH SITES</b>	
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.

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

Site #	Site Locality
<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.

## APPENDIX B.

Site-specific ichthyofaunal composition during the July 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**  
**July 2016**

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

**RKD16-098**

Site Number: 1 River Mile: 209.7 08 July 2016  
UTM Easting: 363811 UTM Northing: 3916006 Zone: 13 Quad: San Felipe Pueblo  
W.H. Brandenburg, R.C. Keller, A.J. Schroeder Effort: 490.4 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	30
76	<i>Platygobio gracilis</i>	16
76	<i>Rhinichthys cataractae</i>	76
81	<i>Catostomus commersonii</i>	55
212	<i>Gambusia affinis</i>	7
294	<i>Lepomis cyanellus</i>	1
294	<i>Micropterus salmoides</i>	2
294	<i>Pomoxis annularis</i>	1
295	<i>Perca flavescens</i>	1

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

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

**RKD16-099**

Site Number: 2 River Mile: 203.8 08 July 2016  
UTM Easting: 358543 UTM Northing: 3909722 Zone: 13 Quad: Bernalillo  
W.H. Brandenburg, R.C. Keller, A.J. Schroeder Effort: 511.0 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	17
76	<i>Cyprinus carpio</i>	21
76	<i>Hybognathus amarus*</i>	144
76	<i>Platygobio gracilis</i>	13
76	<i>Rhinichthys cataractae</i>	50
81	<i>Carpoides carpio</i>	7
81	<i>Catostomus commersonii</i>	44
212	<i>Gambusia affinis</i>	2
294	<i>Micropterus salmoides</i>	2

\* *Hybognathus amarus* by age class:

age-0: 141  
age-1: 3  
age-2+:

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

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD16-100**  
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 08 July 2016  
UTM Easting: 354772 UTM Northing: 3905355 Zone: 13 Quad: Bernalillo  
W.H. Brandenburg, R.C. Keller, A.J. Schroeder Effort: 526.9 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	24
76	<i>Cyprinus carpio</i>	17
76	<i>Hybognathus amarus*</i>	49
76	<i>Pimephales promelas</i>	6
76	<i>Platygobio gracilis</i>	23
76	<i>Rhinichthys cataractae</i>	10
81	<i>Catostomus commersonii</i>	9

\* *Hybognathus amarus* by age class:

age-0: 48  
age-1: 1  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-097

Site Number: 4 River Mile: 183.4 08 July 2016  
UTM Easting: 346840 UTM Northing: 3884094 Zone: 13 Quad: Albuquerque West  
W.H. Brandenburg, R.C. Keller, A.J. Schroeder Effort: 475.4 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	24
76	<i>Cyprinus carpio</i>	86
76	<i>Hybognathus amarus*</i>	207
76	<i>Pimephales promelas</i>	6
76	<i>Platygobio gracilis</i>	2
76	<i>Rhinichthys cataractae</i>	2
81	<i>Catostomus commersonii</i>	34
212	<i>Gambusia affinis</i>	20
294	<i>Micropterus salmoides</i>	7
294	<i>Pomoxis annularis</i>	1

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

age-0: 206  
age-1: 1  
age-2+:

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

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage **RKD16-096**  
Rio Grande, at Rio Bravo Blvd. Bridge crossing (NM State HWY 500) crossing, Albuquerque.

Site Number: 5 River Mile: 178.3 08 July 2016  
UTM Easting: 347554 UTM Northing: 3877163 Zone: 13 Quad: Albuquerque West  
W.H. Brandenburg, R.C. Keller, A.J. Schroeder Effort: 539.3 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	2
76	<i>Cyprinus carpio</i>	15
76	<i>Hybognathus amarus*</i>	69
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	13
81	<i>Carpoides carpio</i>	123
81	<i>Catostomus commersonii</i>	4

\* *Hybognathus amarus* by age class:

age-0: 69  
age-1:  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-095

Site Number: 6 River Mile: 161.4 07 July 2016  
UTM Easting: 342898 UTM Northing: 3852531 Zone: 13 Quad: Los Lunas  
R.K. Dudley, R.C. Keller, A.J. Schroeder Effort: 527.7 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	17
76	<i>Cyprinus carpio</i>	30
76	<i>Hybognathus amarus*</i>	410
76	<i>Pimephales promelas</i>	4
76	<i>Platygobio gracilis</i>	7
81	<i>Carpoides carpio</i>	8
81	<i>Catostomus commersonii</i>	4
212	<i>Gambusia affinis</i>	12
294	<i>Micropterus salmoides</i>	2

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

age-0: 410  
age-1:  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-094

Site Number: 7 River Mile: 151.5 07 July 2016  
UTM Easting: 339972 UTM Northing: 3837061 Zone: 13 Quad: Tome  
R.K. Dudley, R.C. Keller, A.J. Schroeder Effort: 478.1 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	32
76	<i>Cyprinus carpio</i>	92
76	<i>Hybognathus amarus*</i>	224
76	<i>Pimephales promelas</i>	6
76	<i>Platygobio gracilis</i>	10
76	<i>Rhinichthys cataractae</i>	1
81	<i>Carpoides carpio</i>	3
212	<i>Gambusia affinis</i>	63
294	<i>Micropterus salmoides</i>	4

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

age-0: 224  
age-1:  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-093

Site Number: 8 River Mile: 143.2 07 July 2016  
UTM Easting: 338136 UTM Northing: 3827329 Zone: 13 Quad: Veguita  
R.K. Dudley, R.C. Keller, A.J. Schroeder Effort: 518.9 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	65
76	<i>Cyprinus carpio</i>	54
76	<i>Hybognathus amarus*</i>	21
76	<i>Pimephales promelas</i>	4
76	<i>Platygobio gracilis</i>	2
76	<i>Rhinichthys cataractae</i>	1
81	<i>Carpoides carpio</i>	1
81	<i>Catostomus commersonii</i>	5
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	1
212	<i>Gambusia affinis</i>	92
294	<i>Micropterus salmoides</i>	46

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

age-0: 21  
age-1:  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-092

Site Number: 9 River Mile: 130.6 07 July 2016  
UTM Easting: 334604 UTM Northing: 3809726 Zone: 13 Quad: Abeytas  
R.K. Dudley, R.C. Keller, A.J. Schroeder Effort: 504.1 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	72
76	<i>Cyprinus carpio</i>	156
76	<i>Hybognathus amarus*</i>	138
76	<i>Pimephales promelas</i>	2
76	<i>Platygobio gracilis</i>	4
81	<i>Carpoides carpio</i>	19
93	<i>Ameiurus natalis</i>	4
93	<i>Ictalurus punctatus</i>	3
212	<i>Gambusia affinis</i>	74
294	<i>Micropterus salmoides</i>	10

\* *Hybognathus amarus* by age class:

age-0: 138  
age-1:  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-091

Site Number: 10 River Mile: 127.0 07 July 2016  
UTM Easting: 331094 UTM Northing: 3805229 Zone: 13 Quad: Abeytas  
R.K. Dudley, R.C. Keller, A.J. Schroeder Effort: 470.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	38
76	<i>Cyprinus carpio</i>	128
76	<i>Hybognathus amarus*</i>	49
76	<i>Platygobio gracilis</i>	1
81	<i>Carpoides carpio</i>	14
93	<i>Ameiurus natalis</i>	5
93	<i>Ictalurus punctatus</i>	4
212	<i>Gambusia affinis</i>	35
294	<i>Micropterus salmoides</i>	17
295	<i>Perca flavescens</i>	1

\* *Hybognathus amarus* by age class:

age-0: 47  
age-1: 2  
age-2+:

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

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

**RKD16-090**

Site Number: 11 River Mile: 116.8 06 July 2016  
UTM Easting: 327902 UTM Northing: 3792603 Zone: 13 Quad: La Joya  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 465.7 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	45
76	<i>Cyprinus carpio</i>	135
76	<i>Hybognathus amarus*</i>	275
76	<i>Pimephales promelas</i>	3
76	<i>Platygobio gracilis</i>	2
81	<i>Carpoides carpio</i>	9
81	<i>Catostomus commersonii</i>	2
93	<i>Ameiurus natalis</i>	12
93	<i>Ictalurus punctatus</i>	58
212	<i>Gambusia affinis</i>	26
294	<i>Micropterus salmoides</i>	2

\* *Hybognathus amarus* by age class:

age-0: 274  
age-1: 1  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-089

Site Number: 12 River Mile: 116.2 06 July 2016  
UTM Easting: 326162 UTM Northing: 3791977 Zone: 13 Quad: San Acacia  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 522.4 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	117
76	<i>Cyprinus carpio</i>	45
76	<i>Hybognathus amarus*</i>	5
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	70
76	<i>Rhinichthys cataractae</i>	1
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	2
212	<i>Gambusia affinis</i>	63
294	<i>Micropterus salmoides</i>	1

\* *Hybognathus amarus* by age class:

age-0: 4  
age-1: 1  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-088

Site Number: 13 River Mile: 114.6 06 July 2016  
UTM Easting: 325263 UTM Northing: 3790442 Zone: 13 Quad: Lemitar  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 521.4 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	39
76	<i>Cyprinus carpio</i>	31
76	<i>Hybognathus amarus*</i>	29
76	<i>Pimephales promelas</i>	3
76	<i>Platygobio gracilis</i>	50
81	<i>Carpoides carpio</i>	2
93	<i>Ictalurus punctatus</i>	5
212	<i>Gambusia affinis</i>	9
294	<i>Micropterus salmoides</i>	3

\* *Hybognathus amarus* by age class:

age-0: 29  
age-1:  
age-2+:

## Rio Grande Silvery Minnow Population Monitoring July 2016

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD16-087**  
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 06 July 2016  
UTM Easting: 327097 UTM Northing: 3771043 Zone: 13 Quad: Loma de las Canas  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 601.2 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	29
76	<i>Cyprinus carpio</i>	12
76	<i>Hybognathus amarus*</i>	42
76	<i>Platygobio gracilis</i>	9
76	<i>Rhinichthys cataractae</i>	1
81	<i>Carpoides carpio</i>	20
93	<i>Ameiurus natalis</i>	2
93	<i>Ictalurus punctatus</i>	5
212	<i>Gambusia affinis</i>	48
294	<i>Micropterus salmoides</i>	6

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

age-0: 42  
age-1:  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-086

Site Number: 15 River Mile: 91.7 06 July 2016  
UTM Easting: 328140 UTM Northing: 3761283 Zone: 13 Quad: San Antonio  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 523.5 sq. m

<u>FAMILY</u>		<u>N</u>
69	<i>Dorosoma cepedianum</i>	2
76	<i>Cyprinella lutrensis</i>	39
76	<i>Cyprinus carpio</i>	106
76	<i>Hybognathus amarus*</i>	218
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	26
81	<i>Carpoides carpio</i>	73
93	<i>Ictalurus punctatus</i>	4
212	<i>Gambusia affinis</i>	54
294	<i>Micropterus salmoides</i>	1

\* *Hybognathus amarus* by age class:

age-0: 215  
age-1: 3  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-085

Site Number: 16 River Mile: 87.1 05 July 2016  
UTM Easting: 328914 UTM Northing: 3754471 Zone: 13 Quad: San Antonio  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 526.6 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	111
76	<i>Cyprinus carpio</i>	119
76	<i>Hybognathus amarus*</i>	162
76	<i>Platygobio gracilis</i>	15
81	<i>Carpoides carpio</i>	10
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	28
212	<i>Gambusia affinis</i>	20

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

age-0: 162  
age-1:  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring July 2016

## **NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage**

Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters.

RKD16-084

Site Number: 17 River Mile: 79.1 18 July 2016  
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San Antonio SE  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 83.2 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	31
76	<i>Cyprinus carpio</i>	61
76	<i>Hybognathus amarus*</i>	84
76	<i>Pimephales promelas</i>	9
76	<i>Platygobio gracilis</i>	2
81	<i>Carpoides carpio</i>	7
93	<i>Ictalurus furcatus</i>	1
93	<i>Ictalurus punctatus</i>	19
93	<i>Pylodictis olivaris</i>	1
212	<i>Gambusia affinis</i>	32

\* *Hybognathus amarus* by age class:

age-0: 84  
age-1:  
age-2+:

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-083

Site Number: 18 River Mile: 68.6 05 July 2016  
UTM Easting: 315284 UTM Northing: 3728347 Zone: 13 Quad: San Marcial  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 523.0 sq. m

<b>FAMILY</b>		<b>N</b>
69	<i>Dorosoma cepedianum</i>	2
76	<i>Cyprinella lutrensis</i>	43
76	<i>Cyprinus carpio</i>	72
76	<i>Hybognathus amarus*</i>	25
76	<i>Pimephales promelas</i>	1
81	<i>Carpoides carpio</i>	3
212	<i>Gambusia affinis</i>	19
294	<i>Micropterus salmoides</i>	1

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

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

# Rio Grande Silvery Minnow Population Monitoring

## July 2016

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

RKD16-082

Site Number: 19 River Mile: 60.5 05 July 2016  
UTM Easting: 309487 UTM Northing: 3718178 Zone: 13 Quad: Paraje Well  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 520.1 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	5
76	<i>Cyprinus carpio</i>	30
76	<i>Hybognathus amarus*</i>	24
76	<i>Pimephales promelas</i>	5
76	<i>Pimephales vigilax</i>	1
76	<i>Platygobio gracilis</i>	3
81	<i>Carpoides carpio</i>	4
93	<i>Ictalurus furcatus</i>	2
93	<i>Ictalurus punctatus</i>	3
212	<i>Gambusia affinis</i>	16

\* *Hybognathus amarus* by age class:

age-0: 24  
age-1:  
age-2+:

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

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

**RKD16-081**

Site Number: 20 River Mile: 58.8 05 July 2016  
UTM Easting: 307846 UTM Northing: 3716150 Zone: 13 Quad: Paraje Well  
J.L. Kennedy, R.C. Keller, A.J. Schroeder Effort: 543.3 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	19
76	<i>Cyprinus carpio</i>	22
76	<i>Hybognathus amarus*</i>	3
81	<i>Carpoides carpio</i>	1
93	<i>Ictalurus furcatus</i>	6
93	<i>Ictalurus punctatus</i>	5
212	<i>Gambusia affinis</i>	29
295	<i>Percina macrolepida</i>	1

\* *Hybognathus amarus* by age class:

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