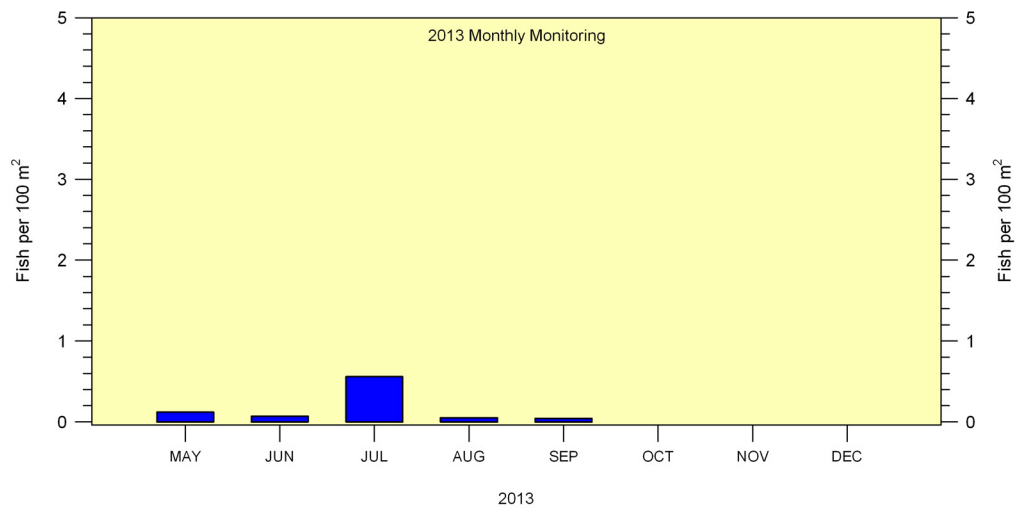
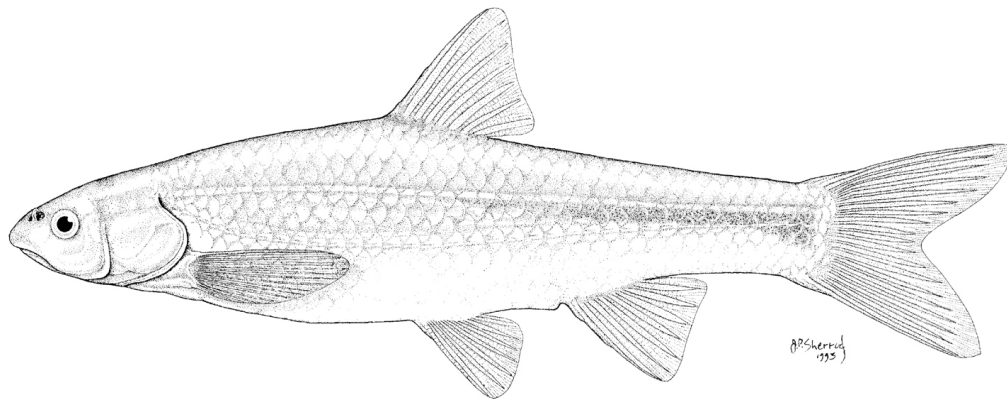


**SUMMARY OF THE RIO GRANDE SILVERY MINNOW  
POPULATION MONITORING PROGRAM RESULTS FROM SEPTEMBER 2013**

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



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18 October 2013

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prepared for:

***MIDDLE RIO GRANDE ENDANGERED SPECIES COLLABORATIVE PROGRAM***

under Contract GS-10F-0249X:

**Order R13PD43013**

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## **SUMMARY OF OVERALL SEPTEMBER 2013 POPULATION MONITORING EFFORTS**

All data presented in this report were collected under Contract GS-10F-0249X (Order R13PD43013) between USBR and ASIR, L.L.C. The September 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. From April through October, larval fish were also collected with a 1.0 m x 1.0 m fine mesh (1/16<sup>th</sup> inch) seine. Rio Grande Silvery Minnow were counted and identified to age-class. Other fishes were identified to species and enumerated, but age-class was not determined. Figures illustrating fish densities (i.e., fish per 100 m<sup>2</sup>) were prepared for the ten focal species, including Rio Grande Silvery Minnow, to facilitate comparisons among reaches.

During September, sampling covered 9,713.8 m<sup>2</sup> (surface area) of water and yielded 7,802 fish. Cumulative fish density during September was 80.3 individuals/100 m<sup>2</sup> sampled as compared with 54.1 individuals/100 m<sup>2</sup> sampled in August. The most common species included Red Shiner (n = 4,740), Western Mosquitofish (n = 1,112), and Fathead Minnow (n = 648). Thirteen fish species were collected and Rio Grande Silvery Minnow (n = 4) was found in the Isleta and San Acacia reaches. Rio Grande Silvery Minnow was present in 3 of the 325 seine hauls that yielded fish during September, as compared with 4 of the 297 seine hauls that yielded fish during August.

## **SUMMARY OF SEPTEMBER 2013 POPULATION MONITORING EFFORT BY RIVER REACH**

### **Angostura Reach**

Mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gauge 8330000) ranged from 52 to 2,540 cfs from 16 August to 15 September, which was similar as compared to the period from 16 July to 15 August (range = 89 to 2,270 cfs). Water temperatures were modest and stable (range = 19.2–21.3 °C) during the Angostura Reach sampling efforts (ca. 0830–1430 h); temperatures during September sampling were lower as compared to those recorded in August (range = 20.8–23.2 °C). The water clarity was low throughout the reach; Secchi disk measurements ranged from 0 to 7 cm.

Sampling for fishes in the Angostura Reach during September yielded 1,797 individuals as compared with 1,036 individuals observed in August. The overall sampling effort in the Angostura Reach covered 2,508.8 m<sup>2</sup> (surface area) of water. Densities in the Angostura Reach, for all fish species combined, ranged from 41.2 to 99.6 individuals per 100 m<sup>2</sup>. Ten fish species were collected during September. Red Shiner was the most abundant taxon (n = 424), followed by Longnose Dace (n = 411), and Channel Catfish (n = 288). Rio Grande Silvery Minnow was not observed at any of the five sampling sites in the Angostura Reach.

### **Isleta Reach**

In the Isleta Reach, mean daily discharge (Rio Grande at Isleta Lakes near Isleta, NM; USGS Gauge 08354900) ranged from 75 to 3,230 cfs from 16 August to 15 September, which was more variable as compared to the period from 16 July to 15 August (range = 78 to 2,300 cfs). Water temperatures ranged from 20.4 to 32.2 °C throughout the sampling localities during the day (ca. 0930–1600 h); temperatures in September were more variable as compared to August (range = 22.1 to 29.9 °C). The water was turbid throughout portions of the reach; Secchi disk readings ranged from 0 to 27 cm during sampling.

The Isleta Reach produced the highest number of fish in any of the three sampling reaches. There were 4,704 individuals collected in September as compared with 2,901 individuals collected in August. The total sampling effort in the Isleta Reach during September covered 2,966.6 m<sup>2</sup> (surface

area) of water. Fish densities (all species combined) at the six sites ranged from 26.7 to 261.4 individuals per 100 m<sup>2</sup> sampled. Ten fish species were collected in the Isleta Reach during September 2013. Red Shiner was the most abundant taxon (n = 3,348), followed by Western Mosquitofish (n = 800), and Fathead Minnow (n = 385). One wild age-0 Rio Grande Silvery Minnow was collected at Site # 8.

### San Acacia Reach

Flow at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gauge 08354900) from 16 August to 15 September was more variable (range = 14 to 3,890 cfs) as compared to San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gauge 08358400) during the same period (range = 35 to 1,380 cfs). Water temperatures in September for the San Acacia Reach ranged from 18.0 to 25.3 °C (ca. 0930–1500 h), which was lower as compared with August (range = 23.8 to 29.2 °C). Water turbidity was elevated throughout the reach (Secchi disk range = 1 to 10 cm).

Population monitoring efforts in the San Acacia Reach during September yielded 1,301 individuals as compared with 1,415 individuals collected during August. Sampling in the San Acacia Reach covered an area of 4,238.4 m<sup>2</sup> of water during September. Fish densities (all species combined) ranged from 0.2 to 89.3 individuals per 100 m<sup>2</sup> sampled in the San Acacia Reach. Of the ten fish species collected in the San Acacia Reach, Red Shiner was the most abundant taxon (n = 968), followed by Western Mosquitofish (n = 154), and Channel Catfish (n = 79). Rio Grande Silvery Minnow (n = 3) was observed at two of the nine sampling sites in the San Acacia Reach. All Rio Grande Silvery Minnow were wild age-0 individuals.

### CONCLUSIONS

During the September sampling effort, Rio Grande Silvery Minnow was present at three of the 20 sampling sites in the Middle Rio Grande, New Mexico. With the addition of large numbers of hatchery-reared Rio Grande Silvery Minnow in 2012 (ca. 300,000; Thomas P. Archdeacon, New Mexico Fish and Wildlife Conservation Office, pers. comm.), there should have presumably been adequate numbers of individuals for spawning in 2013. However, Rio Grande Silvery Minnow was only rarely collected during April and May 2013. While there were higher numbers of Rio Grande Silvery Minnow collected during July, nearly all (95.6%) were hatchery-reared individuals and many were found in areas of the river with low flows (i.e., concentrating fish into remaining wetted habitats). Only four wild age-0 Rio Grande Silvery Minnow were collected during September. The rarity of age-0 Rio Grande Silvery Minnow during sampling from June to September is concerning since peak-spawning activity has historically occurred most frequently during mid-May. Based on data collected in 2013 at the San Marcial spawning periodicity site, the densities of Rio Grande Silvery Minnow eggs were elevated during mid-May and peaked on May 20. Further, all age-0 Rio Grande Silvery Minnow collected during September were about 40 mm SL, indicating that they were spawned several months ago. The September sampling effort indicates poor recruitment success of Rio Grande Silvery Minnow during 2013.

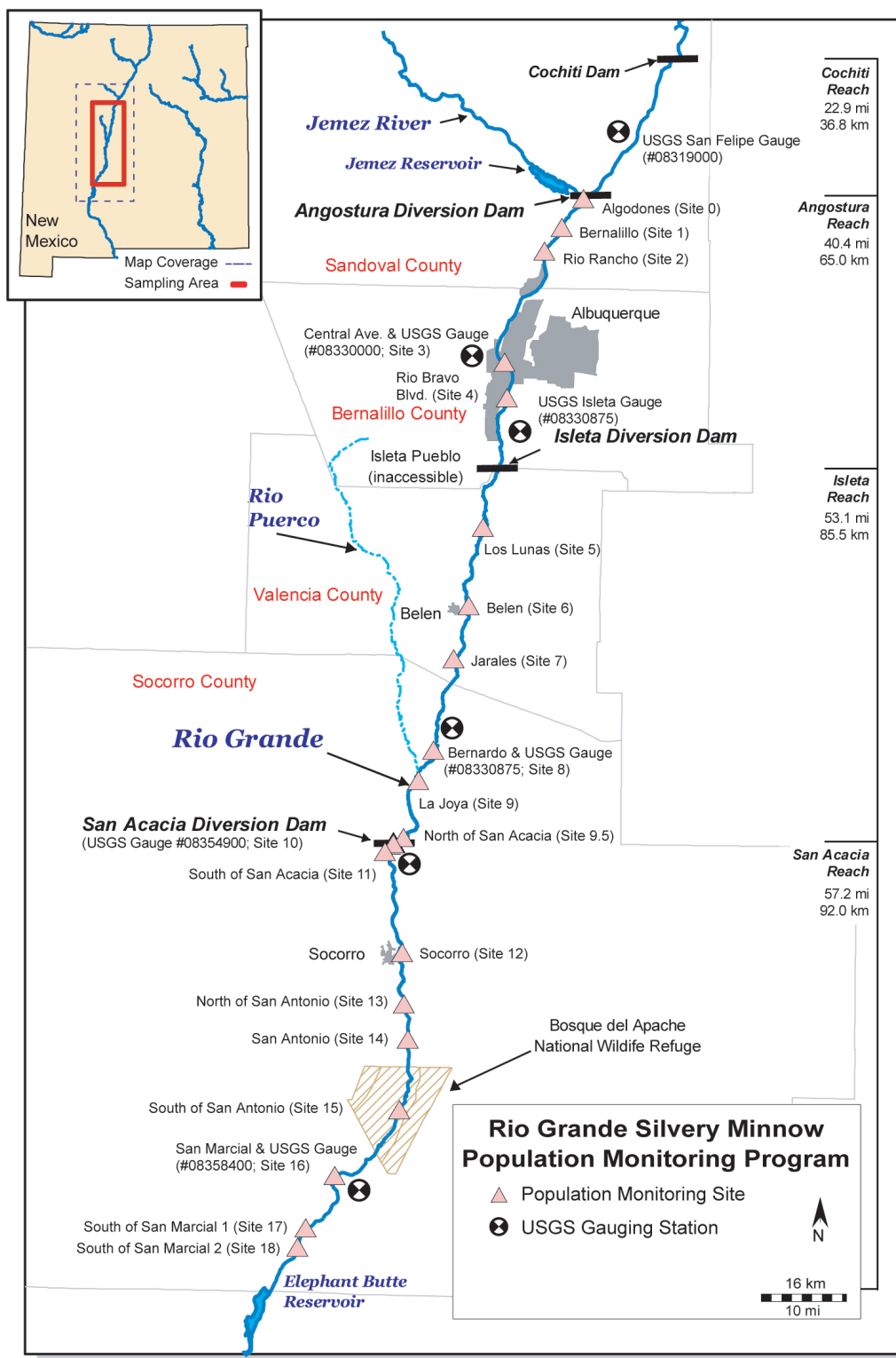


Figure 1. Map of the study area and sampling localities (numbered) for the Rio Grande Silvery Minnow population monitoring program. Sampling locality information that corresponds with the numbered localities is provided in Appendix A (Table A-1).

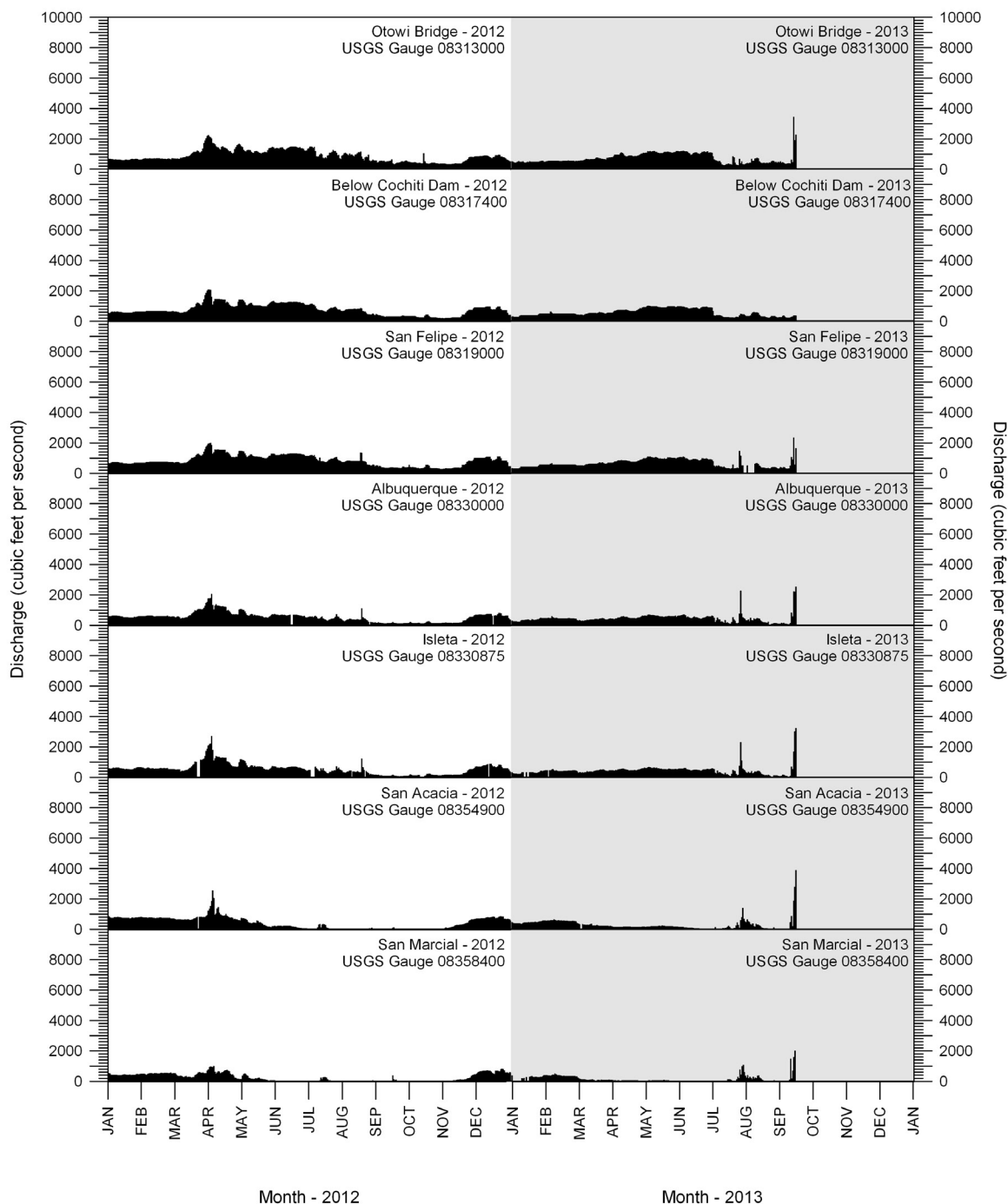


Figure 2. Discharge in the Rio Grande from 1 January 2012 through 15 September 2013 as recorded at seven U. S. Geological Survey (USGS) gauge stations. The Otowi Bridge gauge site is outside of the study area (ca. 25.5 river miles upstream of Cochiti Dam) and provided for reference. \*\*Discharge data are provisional and subject to change.

Table 1. Scientific and common names and species codes of fish collected in the Middle Rio Grande during the Rio Grande Silvery Minnow population monitoring program (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>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)
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)



Table 1. Scientific and common names and species codes of fish collected in the Middle Rio Grande during the Rio Grande Silvery Minnow population monitoring program (since 1993).

Scientific Name	Common Name	Code
Order Cyprinodontiformes		
Family Poeciliidae	livebearers	
<i>Gambusia affinis</i> .....	Western Mosquitofish <sup>1</sup>	(GAMAFF)
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 represent the most abundant species present in recent Middle Rio Grande collections; these species are illustrated in monthly plots of data.



Table 2. Summary of the September 2013 Rio Grande Silvery Minnow population monitoring program 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	4,740	60.75	20	100
Cyprinidae	Common Carp	I	36	0.46	8	40
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	4	0.05	3	15
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	648	8.31	15	75
Cyprinidae	Bullhead Minnow	I	5	0.06	3	15
Cyprinidae	Flathead Chub	N	261	3.35	10	50
Cyprinidae	Longnose Dace	N	411	5.27	4	20
Catostomidae	River Carpsucker	N	118	1.51	9	45
Catostomidae	White Sucker	I	37	0.47	4	20
Catostomidae	Smallmouth Buffalo	N	-	-	-	-
Ictaluridae	Black Bullhead	I	2	0.03	2	10
Ictaluridae	Yellow Bullhead	I	11	0.14	9	45
Ictaluridae	Blue Catfish	N	-	-	-	-
Ictaluridae	Channel Catfish	I	417	5.34	17	85
Ictaluridae	Flathead Catfish	N	-	-	-	-
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	1,112	14.25	18	90
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	-	-	-	-
Centrarchidae	White Crappie	I	-	-	-	-
Centrarchidae	Black Crappie	I	-	-	-	-
Percidae	Yellow Perch	I	-	-	-	-
Percidae	Bigscale Logperch	I	-	-	-	-
Percidae	Walleye	I	-	-	-	-
TOTAL			7,802			

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

<sup>2</sup> Frequency and % frequency of occurrence are based on 20 sample sites.

Table 3. Summary of the monthly 2013 Rio Grande Silvery Minnow population monitoring program results (species list is based on fish collected since 1993).

FAMILY	SPECIES COMMON NAME	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	-	-	-	-	-	-	-	0
Clupeidae	Threadfin Shad	-	-	-	-	-	-	-	0
Cyprinidae	Central Stoneroller	-	-	-	-	-	-	-	0
Cyprinidae	Goldfish	-	-	-	-	-	-	-	0
Cyprinidae	Red Shiner	3,098	2,483	8,249	2,639	4,740	-	-	21,209
Cyprinidae	Common Carp	13	408	377	61	36	-	-	895
Cyprinidae	Rio Grande Chub	-	-	-	-	-	-	-	0
Cyprinidae	Rio Grande Silvery Minnow	12	7	45	5	4	-	-	73
Cyprinidae	Golden Shiner	-	-	-	-	-	-	-	0
Cyprinidae	Fathead Minnow	563	1,017	742	554	648	-	-	3,524
Cyprinidae	Bullhead Minnow	-	2	28	28	5	-	-	63
Cyprinidae	Flathead Chub	176	204	137	209	261	-	-	987
Cyprinidae	Longnose Dace	41	55	71	252	411	-	-	830
Catostomidae	River Carpsucker	7	216	1,243	47	118	-	-	1,631
Catostomidae	White Sucker	75	344	335	70	37	-	-	861
Catostomidae	Smallmouth Buffalo	-	278	52	-	-	-	-	330
Ictaluridae	Black Bullhead	-	-	-	-	2	-	-	2
Ictaluridae	Yellow Bullhead	-	-	1	21	11	-	-	33
Ictaluridae	Blue Catfish	-	-	-	-	-	-	-	0
Ictaluridae	Channel Catfish	19	10	12	324	417	-	-	782
Ictaluridae	Flathead Catfish	-	-	-	-	-	-	-	0
Salmonidae	Rainbow Trout	-	-	-	-	-	-	-	0
Salmonidae	Brown Trout	-	-	-	-	-	-	-	0
Poeciliidae	Western Mosquitofish	198	857	2,260	1,142	1,112	-	-	5,569
Moronidae	White Bass	-	-	-	-	-	-	-	0
Moronidae	Striped Bass	-	-	-	-	-	-	-	0
Centrarchidae	Green Sunfish	-	-	-	-	-	-	-	0
Centrarchidae	Bluegill	1	-	-	-	-	-	-	1
Centrarchidae	Longear Sunfish	-	-	-	-	-	-	-	0
Centrarchidae	Smallmouth Bass	-	-	-	-	-	-	-	0
Centrarchidae	Largemouth Bass	-	2	3	-	-	-	-	5
Centrarchidae	White Crappie	-	-	1	-	-	-	-	1
Centrarchidae	Black Crappie	-	-	-	-	-	-	-	0
Percidae	Yellow Perch	-	-	-	-	-	-	-	0
Percidae	Bigscale Logperch	-	-	-	-	-	-	-	0
Percidae	Walleye	-	-	-	-	-	-	-	0
MONTHLY TOTALS		4,203	5,883	13,556	5,352	7,802	0	0	36,796

Table 4. Summary of the monthly catch of Rio Grande Silvery Minnow, by site and reach, during the 2013 Rio Grande Silvery Minnow population monitoring program. Numerals in parentheses are the number of individuals in a site collection that were marked (subset of the total).

REACH	SITE #	SITE NAME	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	0	Angostura Dam	-	-	-	-	-	-	-	0
Angostura	1	Bernalillo	-	-	-	-	-	-	-	0
Angostura	2	Rio Rancho	-	-	-	-	-	-	-	0
Angostura	3	Central Ave.	-	-	-	-	-	-	-	0
Angostura	4	Rio Bravo Blvd.	-	-	-	-	-	-	-	0
Angostura Totals			0	0	0	0	0	0	0	0
Isleta	5	Los Lunas	-	-	1(1)	-	-	-	-	1
Isleta	6	Belen	-	-	1	-	-	-	-	1
Isleta	7	Jarales	-	-	1(1)	1	-	-	-	2
Isleta	8	Bernardo	-	-	-	-	1	-	-	1
Isleta	9	La Joya	-	-	2(2)	-	-	-	-	2
Isleta	9.5	North of San Acacia	2(2)	-	-	-	-	-	-	2
Isleta Totals			2	0	5	1	1	0	0	9
San Acacia	10	San Acacia Dam	8(8)	4(4)	7(6)	-	2	-	-	21
San Acacia	11	South of San Acacia	-	1(1)	5(5)	-	-	-	-	6
San Acacia	12	Socorro	-	-	28(28)	-	1	-	-	29
San Acacia	13	North of San Antonio	1(1)	1	-	-	-	-	-	2
San Acacia	14	San Antonio	-	-	-	-	-	-	-	0
San Acacia	15	South of San Antonio	-	1	-	1(1)	-	-	-	2
San Acacia	16	San Marcial	1(1)	-	-	-	-	-	-	1
San Acacia	17	South of San Marcial 1	-	-	-	3	-	-	-	3
San Acacia	18	South of San Marcial 2	-	-	-	-	-	-	-	0
San Acacia Totals			10	7	40	4	3	0	0	64
MONTHLY TOTALS			12	7	45	5	4	0	0	73

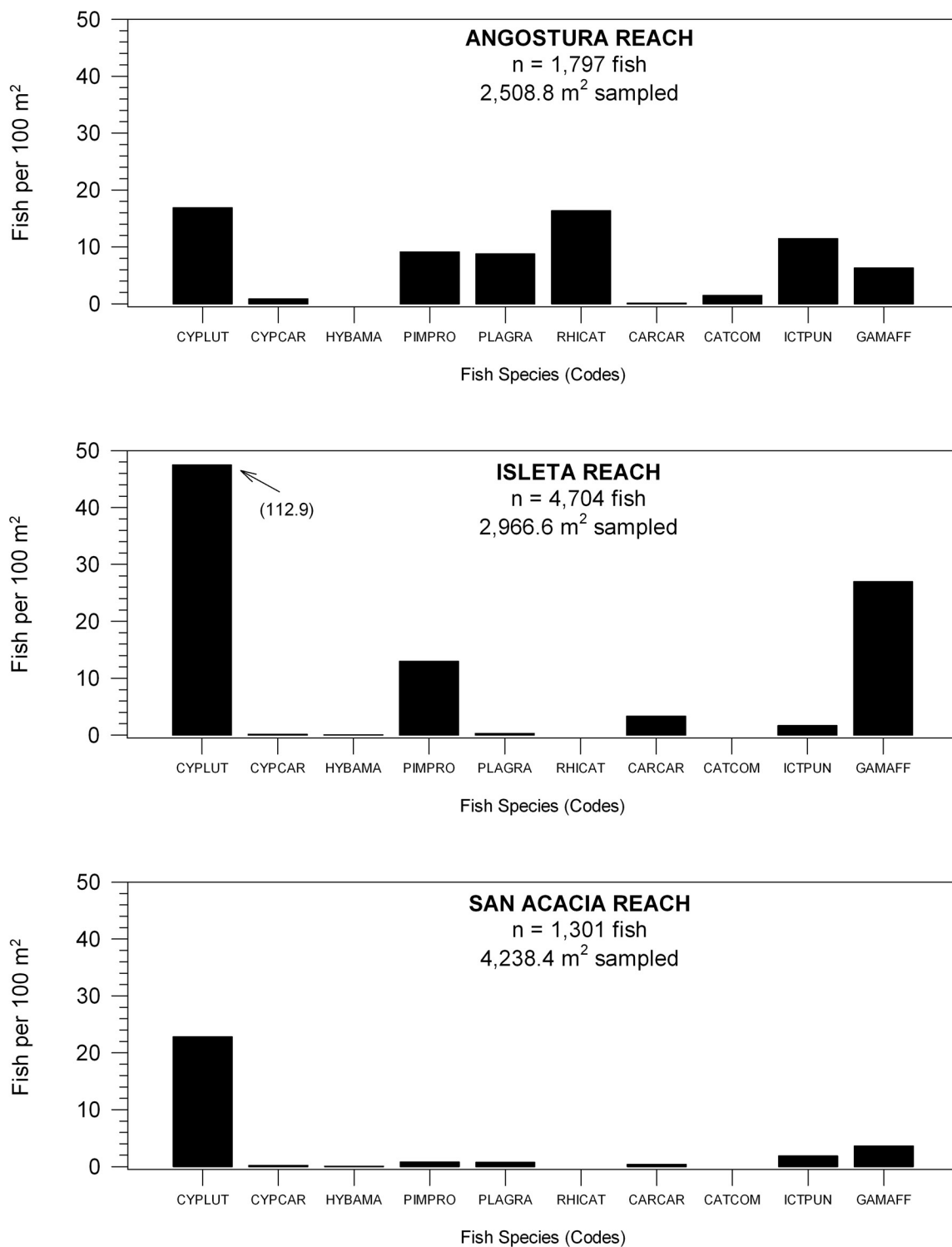


Figure 3. Fish densities from September 2013 for each focal species in the Middle Rio Grande (see Table 1 for fish species codes).

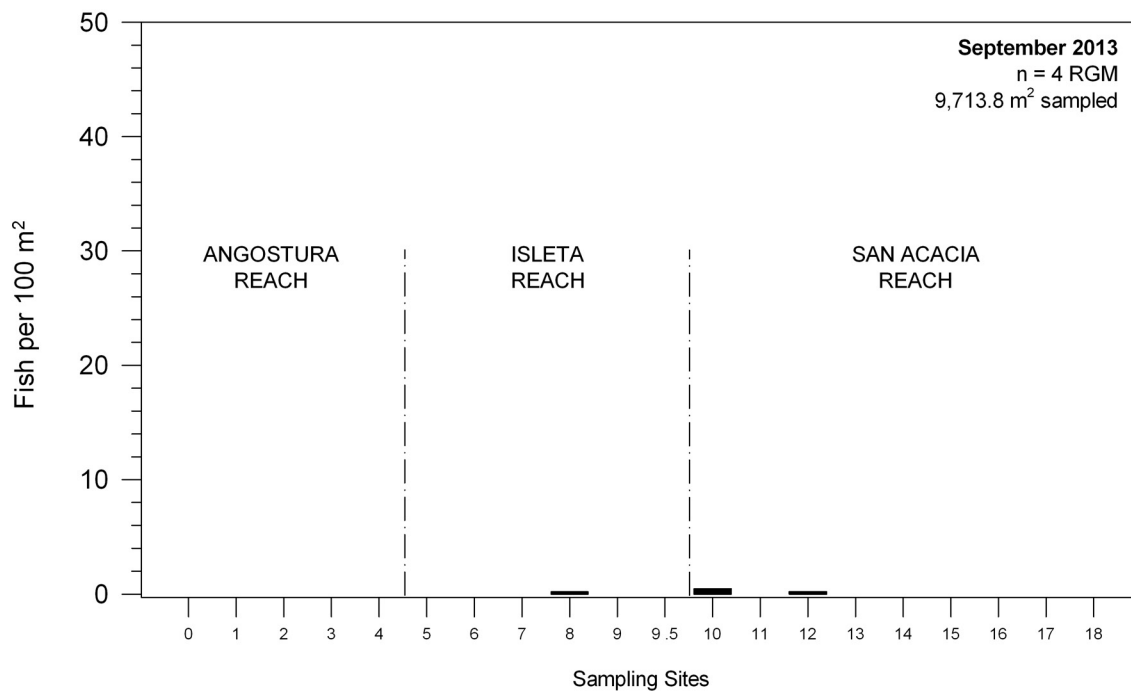
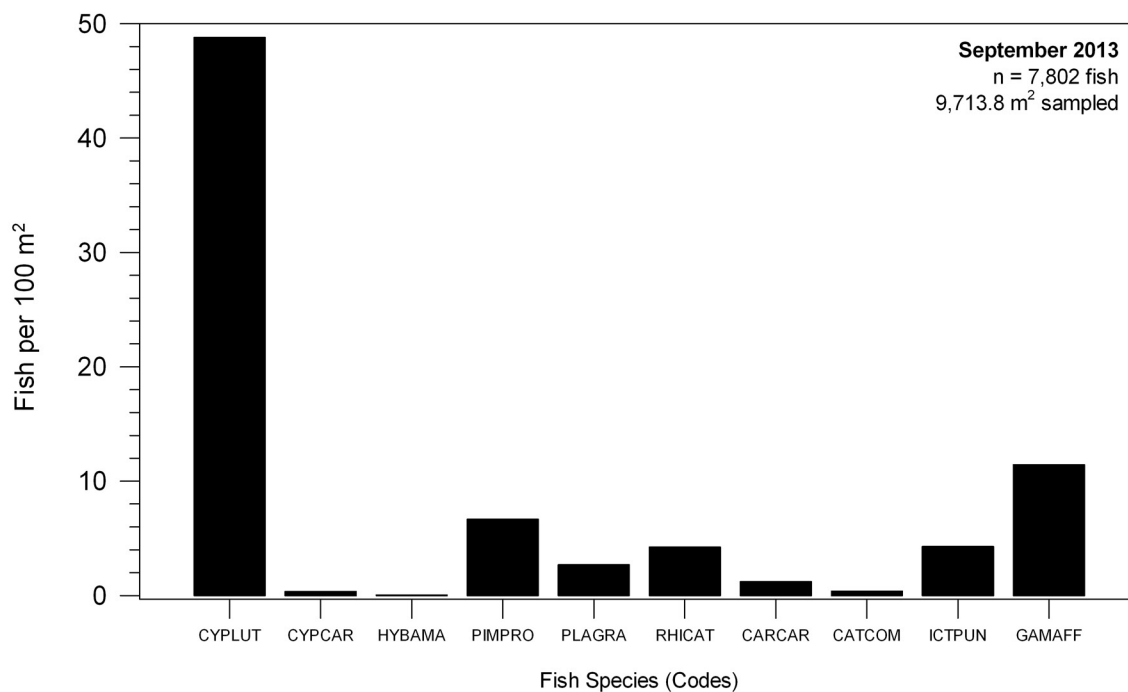


Figure 4. Catch rates for ten focal species (upper graph\*), including Rio Grande Silvery Minnow, (RGM; lower graph\*) during September 2013 at Rio Grande Silvery Minnow population monitoring program collection sites (see Table 1 for fish species codes).

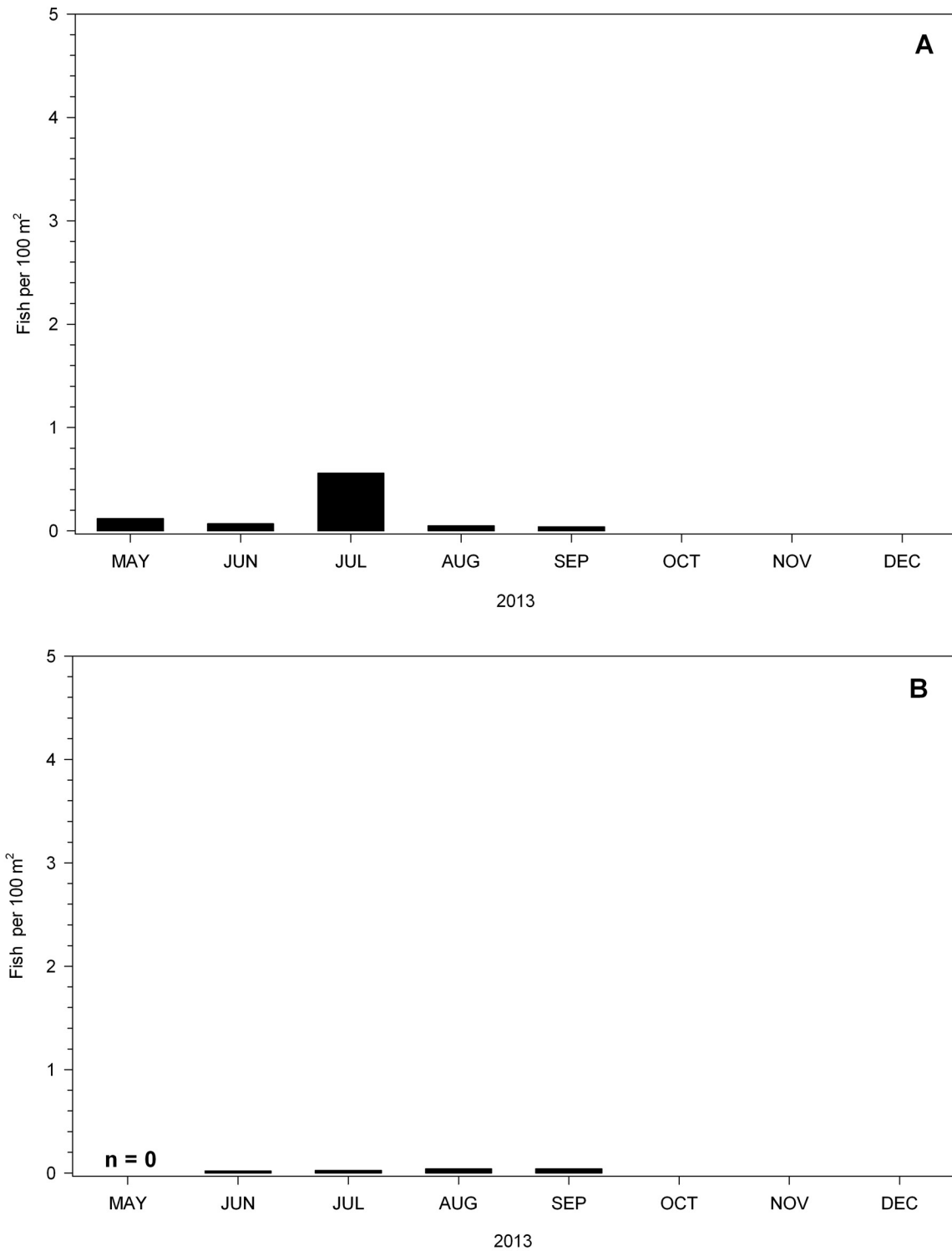


Figure 5. Inter-month fluctuations in densities of Rio Grande Silvery Minnow from May 2013 to December 2013 (A = all age-classes; B = age-0 only).

#### APPENDIX A.

Collection localities of the Rio Grande Silvery Minnow population monitoring program.



Table A-1. Collection localities of the Rio Grande Silvery Minnow population monitoring program.

Site #	Site Locality
<b>ANGOSTURA REACH SITES</b>	
<b>SITE #</b>	
0	New Mexico, Sandoval County, Rio Grande, below Angostura Diversion Dam, Algodones. River Mile 209.7 3916006 N
	SAN FELIPE PUEBLO QUADRANGLE 363811 E
1	New Mexico, Sandoval County, Rio Grande, at US Highway 550 bridge crossing, (formerly NM State Highway 44 bridge crossing), Bernalillo. River Mile 203.8 3909722 N
	BERNALILLO QUADRANGLE 358543 E
2	New Mexico, Sandoval County, Rio Grande, ca. 4 miles downstream of US Highway 550 bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho. River Mile 200.0 3905355 N
	BERNALILLO QUADRANGLE 354772 E
3	New Mexico, Bernalillo County, Rio Grande, at Central Avenue (US Highway 66) bridge crossing, Albuquerque. River Mile 183.4 3884094 N
	ALBUQUERQUE WEST QUADRANGLE 346840 E
4	New Mexico, Bernalillo County, Rio Grande, at Rio Bravo Boulevard bridge crossing, Albuquerque. River Mile 178.3 3877163 N
	ALBUQUERQUE WEST QUADRANGLE 347554 E
<b>ISLETA REACH SITES</b>	
<b>SITE #</b>	
5	New Mexico, Valencia County, Rio Grande, at Los Lunas (NM State Highway 49) bridge crossing, Los Lunas. River Mile 161.4 3852531 N
	LOS LUNAS QUADRANGLE 342898 E
6	New Mexico, Valencia County, Rio Grande, ca. 1.0 miles upstream of NM State Highway 309/6 bridge crossing, Belen. River Mile 151.5 3837061 N
	TOME QUADRANGLE 339972 E
7	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. River Mile 143.2 3827329 N
	VEGUITA QUADRANGLE 338136 E

Table A-1. Collection localities of the Rio Grande Silvery Minnow population monitoring program (continued).

Site #	Site Locality
<b>ISLETA REACH SITES (continued)</b>	
<b>SITE #</b>	
8	New Mexico, Socorro County, Rio Grande, at US Highway 60 bridge crossing, Bernardo. River Mile 130.6 3809726 N
	ABEYTAS QUADRANGLE 334604 E
9	New Mexico, Socorro County, Rio Grande, ca. 3.5 miles downstream of US Highway 60 bridge crossing, La Joya. River Mile 127.0 3805229 N
	ABEYTAS QUADRANGLE 331094 E
9.5	New Mexico, Socorro County, Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia. River Mile 116.8 3792603 N
	LA JOYA QUADRANGLE 327902 E
<b>SAN ACACIA REACH SITES</b>	
<b>SITE #</b>	
10	New Mexico, Socorro County, Rio Grande, directly below San Acacia Diversion Dam, San Acacia. River Mile 116.2 3791977 N
	SAN ACACIA QUADRANGLE 326162 E
11	New Mexico, Socorro County, Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia. River Mile 114.6 3790442 N
	LEMITAR QUADRANGLE 325263 E
12	New Mexico, Socorro County, Rio Grande, 0.5 miles upstream of the Low Flow Conveyance Channel bridge, east and upstream of Socorro Wastewater Treatment Plant, Socorro. River Mile 99.5 3771043 N
	LOMA DE LAS CANAS QUADRANGLE 327097 E
13	New Mexico, Socorro County, Rio Grande, ca. 4.0 miles upstream of US Highway 380 bridge crossing, San Antonio. River Mile 91.7 3761283 N
	SAN ANTONIO QUADRANGLE 328140 E
14	New Mexico, Socorro County, Rio Grande, at US Highway 380 bridge crossing, San Antonio. River Mile 87.1 3754471 N
	SAN ANTONIO QUADRANGLE 328914 E

Table A-1. Collection localities of the Rio Grande Silvery Minnow population monitoring program (continued).

Site #	Site Locality
<b>SAN ACACIA REACH SITES (continued)</b>	
<b>SITE #</b>	
15	New Mexico, Socorro County, Rio Grande, directly east of Bosque del Apache National Wildlife Refuge headquarters, San Antonio.
River Mile 79.1	SAN ANTONIO, SE QUADRANGLE
3740839 N	327055 E
16	New Mexico, Socorro County, Rio Grande, at the San Marcial railroad crossing, San Marcial.
River Mile 68.6	SAN MARCIAL QUADRANGLE
3728347 N	315284 E
17	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	PARAJE WELL QUADRANGLE
3718178 N	309487 E
18	New Mexico, Socorro County, Rio Grande, ca. 10 miles downstream of the San Marcial Railroad Bridge crossing, San Marcial.
River Mile 58.8	PARAJE WELL QUADRANGLE
3716150 N	307846 E

## APPENDIX B.

### Ichthyofaunal composition of the September 2013 Rio Grande Silvery Minnow population monitoring efforts

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

**Rio Grande silvery minnow Population Monitoring**  
**September 2013**

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

**RKD13-138**

Site Number: 0 River Mile: 209.7 12 September 2013  
UTM Easting: 363811 UTM Northing: 3916006 Zone: 13 Quad: San Felipe Pueblo  
R.K. Dudley, J.L. Hester, J.M. Barkstedt Effort: 483.7 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	100
76	<i>Pimephales promelas</i>	72
76	<i>Platygobio gracilis</i>	22
76	<i>Rhinichthys cataractae</i>	212
81	<i>Catostomus commersonii</i>	9
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	64
212	<i>Gambusia affinis</i>	2

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

**RKD13-139**

Site Number: 1 River Mile: 203.8 12 September 2013  
UTM Easting: 358543 UTM Northing: 3909722 Zone: 13 Quad: Bernalillo  
R.K. Dudley, J.L. Hester, J.M. Barkstedt Effort: 535.4 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	30
76	<i>Cyprinus carpio</i>	1
76	<i>Pimephales promelas</i>	31
76	<i>Platygobio gracilis</i>	147
76	<i>Rhinichthys cataractae</i>	190
81	<i>Catostomus commersonii</i>	6
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	9
212	<i>Gambusia affinis</i>	87

**Rio Grande silvery minnow Population Monitoring**  
**September 2013**

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD13-140**

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: 2 River Mile: 200.0 12 September 2013  
UTM Easting: 354772 UTM Northing: 3905355 Zone: 13 Quad: Bernalillo  
R.K. Dudley, J.L. Hester, J.M. Barkstedt Effort: 504.9 sq. m

<u>FAMILY</u>	<u>N</u>
76 <i>Cyprinella lutrensis</i>	87
76 <i>Pimephales promelas</i>	28
76 <i>Platygobio gracilis</i>	22
76 <i>Rhinichthys cataractae</i>	5
81 <i>Catostomus commersonii</i>	19
93 <i>Ictalurus punctatus</i>	118
212 <i>Gambusia affinis</i>	36

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage

**RKD13-137**

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

Site Number: 3 River Mile: 183.4 12 September 2013  
UTM Easting: 346840 UTM Northing: 3884094 Zone: 13 Quad: Albuquerque West  
R.K. Dudley, J.L. Hester, J.M. Barkstedt Effort: 504.5 sq. m

<u>FAMILY</u>	<u>N</u>
76 <i>Cyprinella lutrensis</i>	61
76 <i>Cyprinus carpio</i>	11
76 <i>Pimephales promelas</i>	38
76 <i>Platygobio gracilis</i>	25
76 <i>Rhinichthys cataractae</i>	4
81 <i>Carpodes carpio</i>	1
81 <i>Catostomus commersonii</i>	3
93 <i>Ameiurus natalis</i>	2
93 <i>Ictalurus punctatus</i>	47
212 <i>Gambusia affinis</i>	16

**Rio Grande silvery minnow Population Monitoring**  
**September 2013**

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage

**RKD13-136**

Rio Grande, at Rio Bravo Blvd. Bridge crossing (NM State HWY 500) crossing, Albuquerque.

Site Number: 4

River Mile: 178.3

12 September 2013

UTM Easting: 347554

UTM Northing: 3877163

Zone: 13

Quad: Albuquerque West

R.K. Dudley, J.L. Hester, J.M. Barkstedt

Effort: 480.4 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	146
76	<i>Cyprinus carpio</i>	10
76	<i>Pimephales promelas</i>	60
76	<i>Platygobio gracilis</i>	4
81	<i>Carpoides carpio</i>	2
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	50
212	<i>Gambusia affinis</i>	17

NEW MEXICO: VALENCIA Co., RIO GRANDE Drainage

**RKD13-135**

Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas.

Site Number: 5

River Mile: 161.4

11 September 2013

UTM Easting: 342898

UTM Northing: 3852531

Zone: 13

Quad: Los Lunas

W.H. Brandenburg, J.L. Hester, J.M. Barkstedt

Effort: 468.8 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	353
76	<i>Pimephales promelas</i>	18
81	<i>Carpoides carpio</i>	1
93	<i>Ictalurus punctatus</i>	10
212	<i>Gambusia affinis</i>	94



**Rio Grande silvery minnow Population Monitoring  
September 2013**

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

**RKD13-134**

Site Number: 6 River Mile: 151.5  
UTM Easting: 339972 UTM Northing: 3837061 Zone: 13 Quad: Tome  
W.H. Brandenburg, J.L. Hester, J.M. Barkstedt

11 September 2013

Effort: 469.8 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	758
76	<i>Pimephales promelas</i>	243
81	<i>Carpoides carpio</i>	92
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	18
212	<i>Gambusia affinis</i>	107

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

**RKD13-133**

Site Number: 7 River Mile: 143.2  
UTM Easting: 338136 UTM Northing: 3827329 Zone: 13 Quad: Veguita  
W.H. Brandenburg, J.L. Hester, J.M. Barkstedt

11 September 2013

Effort: 494.2 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	826
76	<i>Cyprinus carpio</i>	4
76	<i>Pimephales promelas</i>	27
81	<i>Carpoides carpio</i>	4
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	20
212	<i>Gambusia affinis</i>	247

**Rio Grande silvery minnow Population Monitoring  
September 2013**

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

**RKD13-132**

Site Number: 8 River Mile: 130.6 11 September 2013  
UTM Easting: 334604 UTM Northing: 3809726 Zone: 13 Quad: Abeytas  
W.H. Brandenburg, J.L. Hester, J.M. Barkstedt Effort: 502.2 sq. m

<u>FAMILY</u>	<u>N</u>
76 <i>Cyprinella lutrensis</i>	991
76 <i>Cyprinus carpio</i>	1
76 <i>Hybognathus amarus</i> *	1
76 <i>Pimephales promelas</i>	58
76 <i>Platygobio gracilis</i>	1
81 <i>Carpionodes carpio</i>	1
93 <i>Ameiurus melas</i>	1
93 <i>Ameiurus natalis</i>	1
93 <i>Ictalurus punctatus</i>	1
212 <i>Gambusia affinis</i>	257

\* *Hybognathus amarus* by age class:

age-0: 1

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.

**RKD13-131**

Site Number: 9 River Mile: 127.0 11 September 2013  
UTM Easting: 331094 UTM Northing: 3805229 Zone: 13 Quad: Abeytas  
W.H. Brandenburg, J.L. Hester, J.M. Barkstedt Effort: 484.6 sq. m

<u>FAMILY</u>	<u>N</u>
76 <i>Cyprinella lutrensis</i>	321
76 <i>Pimephales promelas</i>	38
81 <i>Carpionodes carpio</i>	1
93 <i>Ameiurus melas</i>	1
93 <i>Ictalurus punctatus</i>	1
212 <i>Gambusia affinis</i>	59

**Rio Grande silvery minnow Population Monitoring  
September 2013**

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

**RKD13-130**

Site Number: 9.5 River Mile: 116.8 09 September 2013  
UTM Easting: 327902 UTM Northing: 3792603 Zone: 13 Quad: La Joya  
R.K. Dudley, J.L. Hester, J.M. Barkstedt Effort: 547.1 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	99
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	8
93	<i>Ameiurus natalis</i>	2
212	<i>Gambusia affinis</i>	36

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

**RKD13-129**

Site Number: 10 River Mile: 116.2 09 September 2013  
UTM Easting: 326162 UTM Northing: 3791977 Zone: 13 Quad: San Acacia  
R.K. Dudley, J.L. Hester, J.M. Barkstedt Effort: 433.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	92
76	<i>Hybognathus amarus</i> *	2
76	<i>Pimephales promelas</i>	26
76	<i>Platygobio gracilis</i>	21
93	<i>Ictalurus punctatus</i>	30
212	<i>Gambusia affinis</i>	2

\* *Hybognathus amarus* by age class:

age-0: 2

age-1:

age-2:

**Rio Grande silvery minnow Population Monitoring  
September 2013**

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

**RKD13-128**

Site Number: 11 River Mile: 114.6 09 September 2013  
UTM Easting: 325263 UTM Northing: 3790442 Zone: 13 Quad: Lemitar  
R.K. Dudley, J.L. Hester, J.M. Barkstedt Effort: 532.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	27
76	<i>Cyprinus carpio</i>	1
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	10
93	<i>Ictalurus punctatus</i>	13
212	<i>Gambusia affinis</i>	1

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.

**RKD13-127**

Site Number: 12 River Mile: 99.5 09 September 2013  
UTM Easting: 327097 UTM Northing: 3771043 Zone: 13 Quad: Loma de las Canas  
R.K. Dudley, J.L. Hester, J.M. Barkstedt Effort: 485.2 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	58
76	<i>Cyprinus carpio</i>	6
76	<i>Hybognathus amarus</i> *	1
76	<i>Pimephales promelas</i>	6
76	<i>Platygobio gracilis</i>	1
81	<i>Carpodes carpio</i>	14
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	12
212	<i>Gambusia affinis</i>	3

\* *Hybognathus amarus* by age class:

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

**Rio Grande silvery minnow Population Monitoring  
September 2013**

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

**RKD13-126**

Site Number: 13 River Mile: 91.7 09 September 2013  
UTM Easting: 328140 UTM Northing: 3761283 Zone: 13 Quad: San Antonio  
R.K. Dudley, J.L. Hester, J.M. Barkstedt Effort: 480.6 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	36
76	<i>Cyprinus carpio</i>	2
93	<i>Ictalurus punctatus</i>	16
212	<i>Gambusia affinis</i>	4

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

**RKD13-125**

Site Number: 14 River Mile: 87.1 10 September 2013  
UTM Easting: 328914 UTM Northing: 3754471 Zone: 13 Quad: San Antonio  
M.A. Farrington, J.L. Hester, J.M. Barkstedt Effort: 238.8 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	2
81	<i>Carpoides carpio</i>	2

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

**RKD13-124**

Site Number: 15 River Mile: 79.1 10 September 2013  
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San Antonio SE  
M.A. Farrington, J.L. Hester, J.M. Barkstedt Effort: 525.7 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	1

**Rio Grande silvery minnow Population Monitoring  
September 2013**

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

**RKD13-123**

Site Number: 16 River Mile: 68.6 10 September 2013  
UTM Easting: 315284 UTM Northing: 3728347 Zone: 13 Quad: San Marcial  
M.A. Farrington, J.L. Hester, J.M. Barkstedt Effort: 482.9 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	186
76	<i>Pimephales vigilax</i>	3
93	<i>Ictalurus punctatus</i>	1
212	<i>Gambusia affinis</i>	9

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

**RKD13-122**

Site Number: 17 River Mile: 60.5 10 September 2013  
UTM Easting: 309487 UTM Northing: 3718178 Zone: 13 Quad: Paraje Well  
M.A. Farrington, J.L. Hester, J.M. Barkstedt Effort: 522.9 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	389
76	<i>Pimephales promelas</i>	1
76	<i>Pimephales vigilax</i>	1
93	<i>Ictalurus punctatus</i>	6
212	<i>Gambusia affinis</i>	70

**Rio Grande silvery minnow Population Monitoring  
September 2013**

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

**RKD13-121**

Site Number: 18 River Mile: 58.8 10 September 2013  
UTM Easting: 307846 UTM Northing: 3716150 Zone: 13 Quad: Paraje Well  
M.A. Farrington, J.L. Hester, J.M. Barkstedt Effort: 536.8 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	177
76	<i>Pimephales vigilax</i>	1
93	<i>Ictalurus punctatus</i>	1
212	<i>Gambusia affinis</i>	65