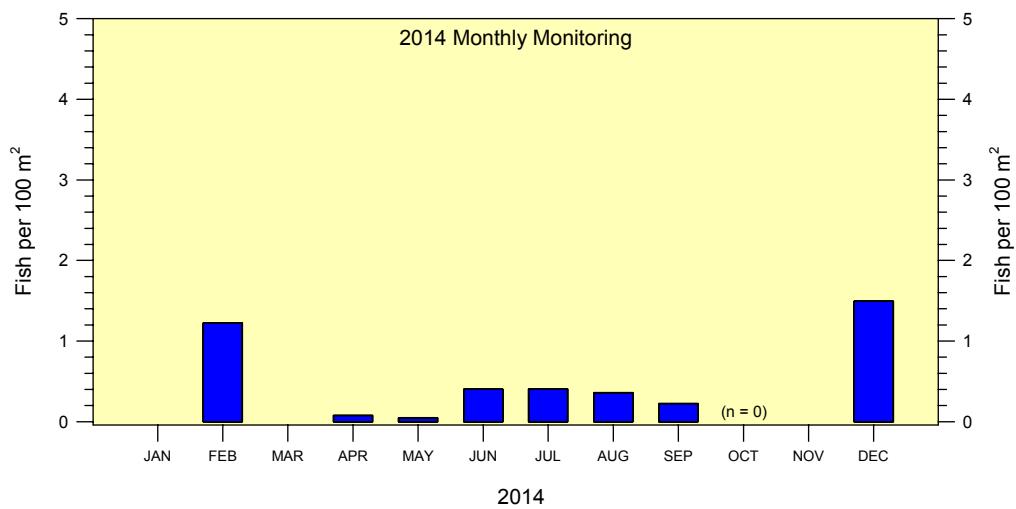
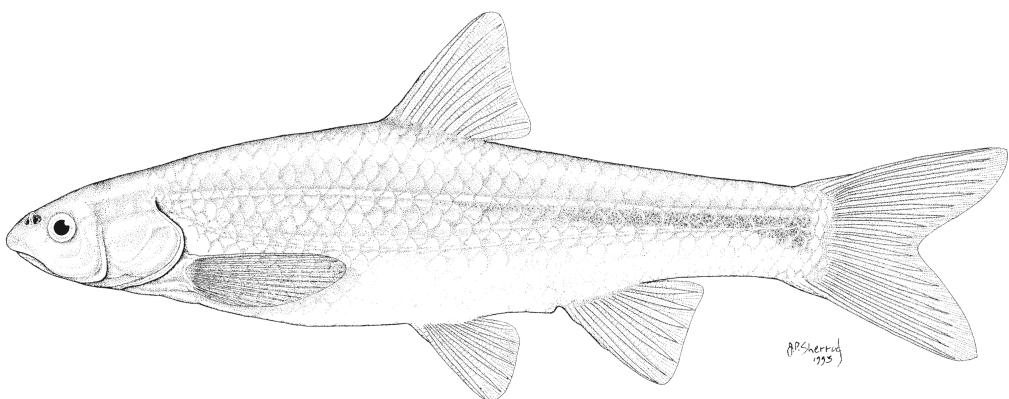


**SUMMARY OF THE RIO GRANDE SILVERY MINNOW  
POPULATION MONITORING PROGRAM RESULTS FROM DECEMBER 2014**

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



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16 January 2015

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prepared for:

**MIDDLE RIO GRANDE ENDANGERED SPECIES COLLABORATIVE PROGRAM**

under Contract GS-10F-0249X:

**Order R14PD00314**  
U.S. Bureau of Reclamation  
Albuquerque Area Office  
555 Broadway NE, Suite 100  
Albuquerque, NM 87102-2352

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## SUMMARY OF OVERALL DECEMBER 2014 POPULATION MONITORING EFFORTS

The December 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 are 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. 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 December, sampling covered 11,783.3 m<sup>2</sup> (surface area) of water and yielded 1,324 fish. Cumulative fish density during December was 11.2 individuals/100 m<sup>2</sup> sampled. The three most common species were Red Shiner (n = 679), Flathead Chub (n = 202), and Rio Grande Silvery Minnow (n = 176). The 20 sampling sites yielded a total of 14 fish species. Rio Grande Silvery Minnow was present in 64 of the 253 seine hauls that yielded fish during December, as compared with 0 of the 273 seine hauls that yielded fish during October. The density of Rio Grande Silvery Minnow was 1.49 individuals/100 m<sup>2</sup> sampled (n = 176 {91% marked}) and this species composed 13.3% of the total number of fish collected during December.

## SUMMARY OF DECEMBER 2014 POPULATION MONITORING EFFORT BY RIVER REACH

### Angostura Reach

Mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gauge 8330000) averaged 433.9 and ranged from 264 to 647 cfs from 16 November to 15 December. Water temperatures were modest and stable (range = 6.1–10.3 °C) during the Angostura Reach sampling efforts (ca. 0830–1530 h). The water clarity was modest throughout the reach; Secchi disk measurements ranged from 12 to 37 cm.

Sampling for fishes in the Angostura Reach during December yielded 283 individuals with a cumulative fish density of 9.8 individuals/100 m<sup>2</sup> sampled. The overall sampling effort in the Angostura Reach covered 2,887.8 m<sup>2</sup> (surface area) of water. Densities of all fish species combined ranged from 0.9 to 14.4 individuals per 100 m<sup>2</sup> at the five sampling sites. In December, species richness (n = 12) was modest in the Angostura Reach. Flathead Chub was the most abundant taxon (n = 80), followed by Red Shiner (n = 58), and Rio Grande Silvery Minnow (n = 42). Rio Grande Silvery Minnow was present in 19 of the 60 seine hauls that yielded fish during December. Densities of Rio Grande Silvery Minnow ranged from 0.0 to 3.1 individuals per 100 m<sup>2</sup> at the five sampling sites.

### Isleta Reach

In the Isleta Reach, mean daily discharge (Rio Grande at Isleta Lakes near Isleta, NM; USGS Gauge 08354900) averaged 460.5 and ranged from 319 to 675 cfs from 16 November to 15 December. Water temperatures ranged from 5.8 to 8.0 °C throughout the sampling localities during the day (ca. 0930–1600 h). The water was turbid throughout portions of the reach; Secchi disk readings ranged from 6 to 10 cm during sampling.

Isleta Reach population monitoring efforts produced 541 individuals in December with a cumulative fish density of 15.4 individuals/100 m<sup>2</sup> sampled. The total sampling effort in the Isleta Reach during December covered 3,520.8 m<sup>2</sup> (surface area) of water. Fish densities (all species combined) at the six sites ranged from 5.4 to 25.0 individuals per 100 m<sup>2</sup> sampled. In December, species richness (n = 10) was modest in the Isleta Reach. Red Shiner was the most abundant taxon (n = 392), followed by Flathead Chub (n = 46), and Channel Catfish (n = 43). Rio Grande Silvery Minnow was present in 11 of the 83 seine hauls that yielded fish during December. Densities of Rio Grande Silvery Minnow ranged from 0.0 to 0.9 individuals per 100 m<sup>2</sup> at the six sampling sites.

### **San Acacia Reach**

Mean daily discharge at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gauge 08354900) from 16 November to 15 December was generally higher (average = 317.1; range = 104 to 708 cfs) as compared to San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gauge 08358400) during the same period (average = 231.3; range = 34 to 732 cfs). Water temperatures in December for the San Acacia Reach ranged from 5.8 to 8.8 °C (ca. 0930–1600 h). Water clarity was low throughout the reach (Secchi disk range = 2 to 6 cm).

Population monitoring efforts in the San Acacia Reach during December yielded 500 individuals with a cumulative fish density of 9.3 individuals per 100 m<sup>2</sup> sampled. Sampling in the San Acacia Reach covered an area of 5,374.8 m<sup>2</sup> of water during December. Fish densities (all species combined) ranged from 4.3 to 17.4 individuals per 100 m<sup>2</sup> at the nine sites sampled in the San Acacia Reach. In December, species richness (n = 9) was modest in the San Acacia Reach. Red Shiner was the most abundant taxon (n = 229), followed by Rio Grande Silvery Minnow (n = 121), and Flathead Chub (n = 76). Rio Grande Silvery Minnow was present in 34 of the 110 seine hauls that yielded fish during December. Densities of Rio Grande Silvery Minnow ranged from 0.0 to 8.9 individuals per 100 m<sup>2</sup> at the nine sampling sites.

### **CONCLUSIONS**

The addition of large numbers of hatchery-reared Rio Grande Silvery Minnow in the autumn of 2014 (ca. 268,000; Thomas P. Archdeacon, New Mexico Fish and Wildlife Conservation Office, pers. comm.) resulted in relatively high densities of this species in December 2014. With the addition of large numbers of hatchery-reared Rio Grande Silvery Minnow, there should presumably be adequate numbers of individuals available in the river for spawning during 2015. However, the total overwinter mortality for the current population of Rio Grande Silvery Minnow, which is composed almost entirely of hatchery-reared individuals, will likely result in substantial losses of individuals by April/May 2015 as it has in past years. In light of this recurring pattern, there may be merit in evaluating the possibility of stocking fish during early spring, prior to spawning, as a means of reducing this annual mortality of stocked individuals. Despite the relatively low abundance of Rio Grande Silvery Minnow during spring of 2014, managed flow increases over an extended duration during May (to coincide with typical spring runoff timing) appear to have resulted in a slight improvement in spawning and recruitment of Rio Grande Silvery Minnow in 2014 as compared to other recent years (e.g., 2012–2013). Rio Grande Silvery Minnow was present at 14 of the 20 sampling sites and there were 167 age-0 individuals (out of 176 total) collected during sampling efforts in December 2014. However, over 90% of those individuals were stocked. An assessment of the conservation status of Rio Grande Silvery Minnow in 2014 (based on the occurrence and abundance of wild individuals from September–December) indicated little improvement since 2012.

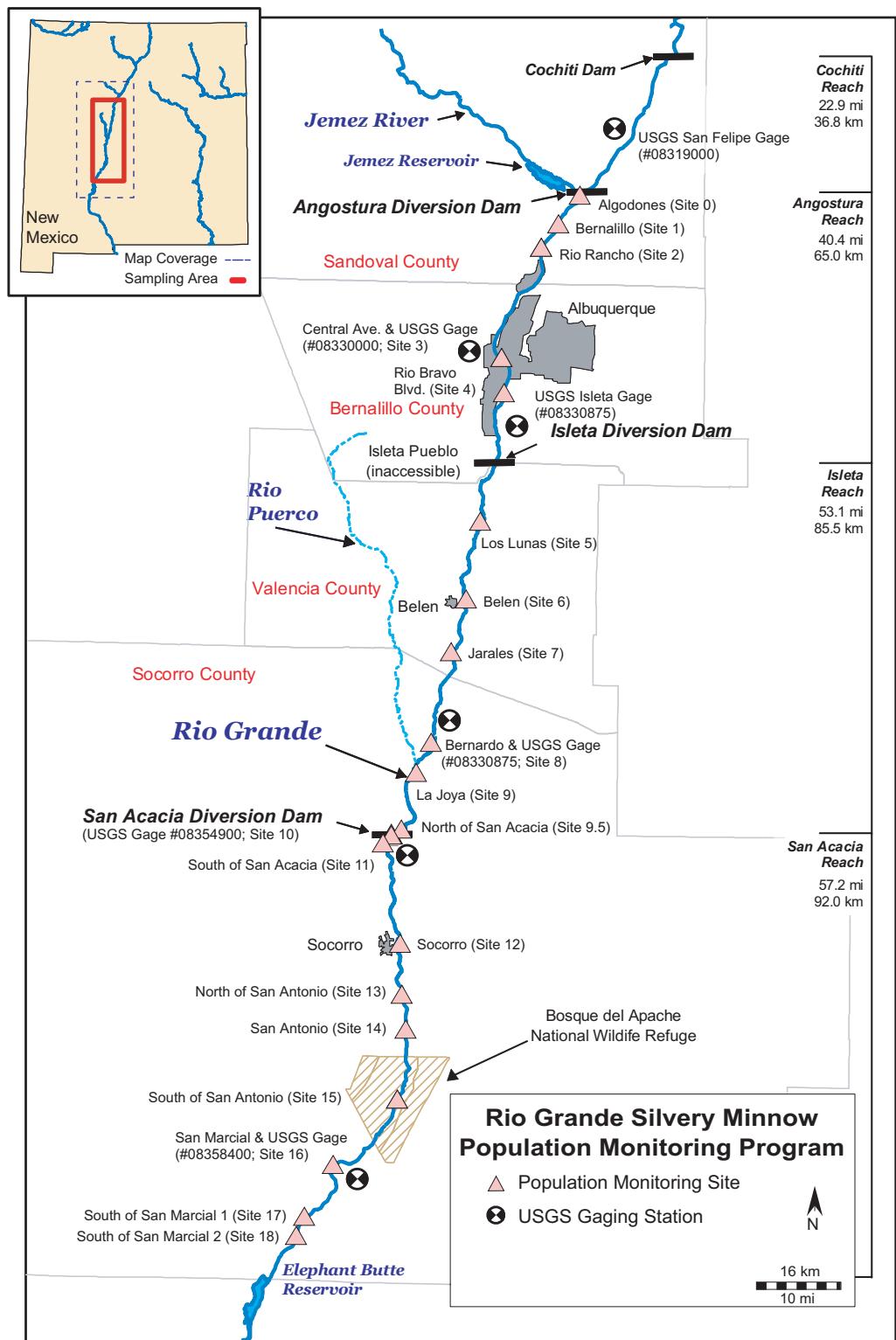


Figure 1. Map of the study area and sampling localities (numbered) for the Rio Grande Silvery Minnow population monitoring program. Sampling locality information that corresponds with the numbered localities is provided in Appendix A (Table A-1).

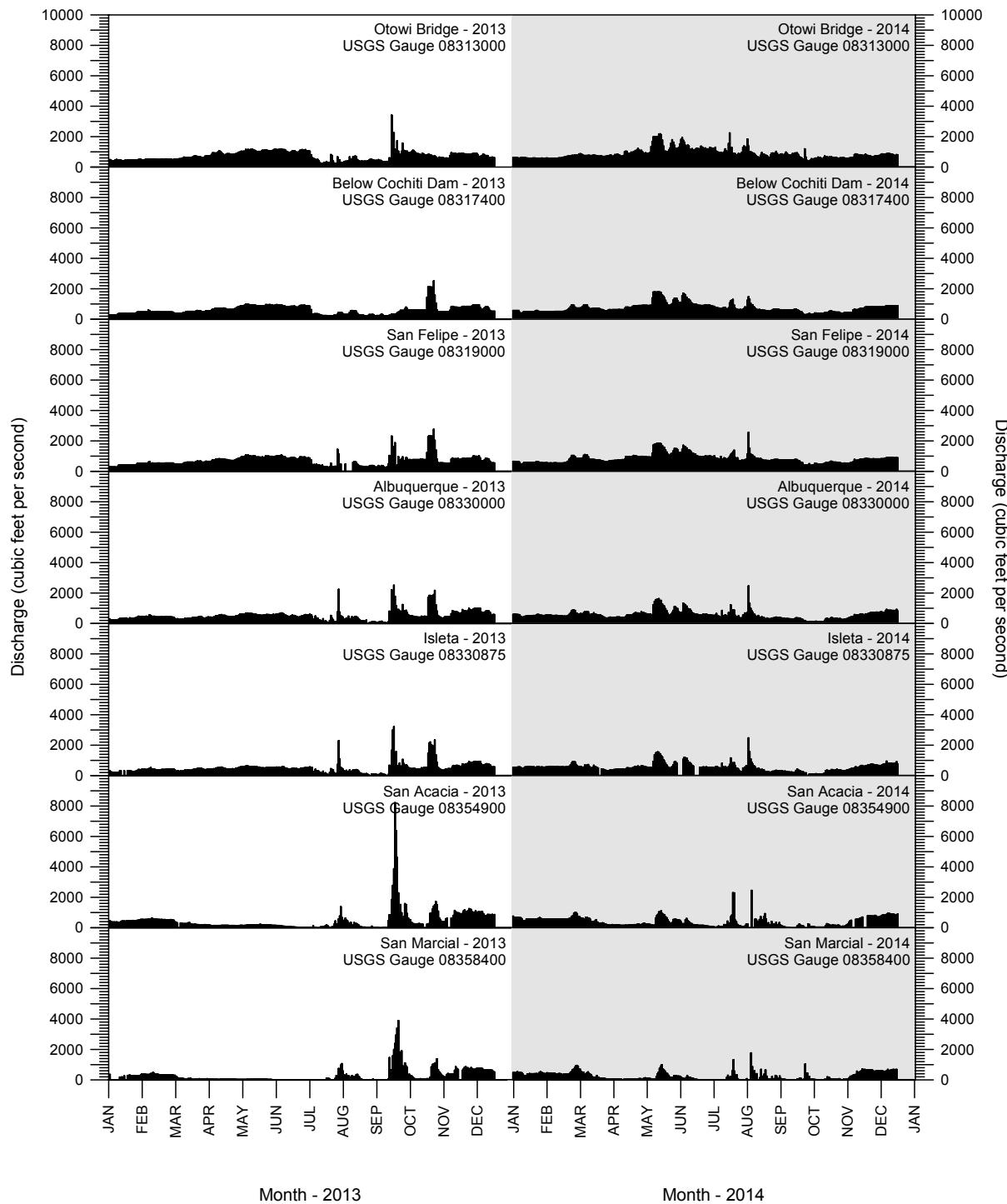


Figure 2. Discharge in the Rio Grande from 1 January 2013 through 15 December 2014 as recorded at seven U. S. Geological Survey (USGS) gauge stations. The Otowi Bridge gauge site is outside of the study area (ca. 25.5 river miles upstream of Cochiti Dam) and provided for reference. \*\*Discharge data 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>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)

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 December 2014 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	679	51.28	18	90
Cyprinidae	Common Carp	I	2	0.15	2	10
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	176	13.29	14	70
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	36	2.72	11	55
Cyprinidae	Bullhead Minnow	I	2	0.15	1	5
Cyprinidae	Flathead Chub	N	202	15.26	15	75
Cyprinidae	Longnose Dace	N	12	0.91	7	35
Catostomidae	River Carpsucker	N	14	1.06	7	35
Catostomidae	White Sucker	I	8	0.60	3	15
Catostomidae	Smallmouth Buffalo	N	-	-	-	-
Ictaluridae	Black Bullhead	I	-	-	-	-
Ictaluridae	Yellow Bullhead	I	1	0.08	1	5
Ictaluridae	Blue Catfish	N	-	-	-	-
Ictaluridae	Channel Catfish	I	123	9.29	13	65
Ictaluridae	Flathead Catfish	N	-	-	-	-
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	66	4.98	7	35
Moronidae	White Bass	I	-	-	-	-
Moronidae	Striped Bass	I	-	-	-	-
Centrarchidae	Green Sunfish	I	1	0.08	1	5
Centrarchidae	Bluegill	N	-	-	-	-
Centrarchidae	Longear Sunfish	I	-	-	-	-
Centrarchidae	Smallmouth Bass	I	-	-	-	-
Centrarchidae	Largemouth Bass	I	-	-	-	-
Centrarchidae	White Crappie	I	2	0.15	2	10
Centrarchidae	Black Crappie	I	-	-	-	-
Percidae	Yellow Perch	I	-	-	-	-
Percidae	Bigscale Logperch	I	-	-	-	-
Percidae	Walleye	I	-	-	-	-

<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 catch of all fish species during 2014 (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	1	4	14	-	-	-	-	21
Clupeidae	Threadfin Shad	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Central Stoneroller	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Goldfish	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Red Shiner	2,603	4,650	3,453	3,277	6,493	3,294	1,258	1,506	679	27,213
Cyprinidae	Common Carp	3	1	9	51	133	16	13	8	2	236
Cyprinidae	Rio Grande Chub	-	-	-	-	1	-	-	-	-	1
Cyprinidae	Rio Grande Silvery Minnow	142	8	5	43	37	39	21	-	176	471
Cyprinidae	Golden Shiner	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Fathead Minnow	108	21	49	196	179	164	127	52	36	932
Cyprinidae	Bullhead Minnow	5	2	2	5	-	2	1	1	2	20
Cyprinidae	Flathead Chub	41	17	100	175	639	371	292	215	202	2,052
Cyprinidae	Longnose Dace	-	2	61	96	240	233	110	58	12	812
Catostomidae	River Carpsucker	9	5	4	124	497	68	31	12	14	764
Catostomidae	White Sucker	1	2	32	268	130	24	26	2	8	493
Catostomidae	Smallmouth Buffalo	-	-	-	-	48	-	-	-	-	48
Ictaluridae	Black Bullhead	-	-	-	-	-	1	-	-	-	1
Ictaluridae	Yellow Bullhead	-	-	1	2	2	17	3	-	1	26
Ictaluridae	Blue Catfish	-	-	-	10	1	-	-	-	-	11
Ictaluridae	Channel Catfish	7	5	59	49	846	1,669	390	167	123	3,315
Ictaluridae	Flathead Catfish	-	-	-	-	-	1	1	-	-	2
Salmonidae	Rainbow Trout	-	-	-	-	-	-	-	-	-	0
Salmonidae	Brown Trout	-	-	-	-	-	-	-	-	-	0
Poeciliidae	Western Mosquitofish	24	54	38	101	457	279	363	338	66	1,720
Moronidae	White Bass	5	-	-	-	-	-	-	-	-	5
Moronidae	Striped Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Green Sunfish	-	-	-	-	-	-	-	-	1	1
Centrarchidae	Bluegill	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Longear Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Smallmouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Largemouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	White Crappie	1	2	-	8	2	-	-	-	2	15
Centrarchidae	Black Crappie	-	-	-	-	-	-	-	-	-	0
Percidae	Yellow Perch	-	-	-	-	-	-	-	-	-	0
Percidae	Bigscale Logperch	1	-	-	-	-	-	-	-	-	1
Percidae	Walleye	-	-	-	2	3	-	-	-	-	5
<b>MONTHLY TOTALS</b>		2,950	4,771	3,814	4,411	9,722	6,178	2,636	2,359	1,324	38,165

Table 4. Summary of the monthly catch of Rio Grande Silvery Minnow, by site and reach, during 2014. 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	T
Angostura	0	Angostura Dam	-	-	-	-	-	-	-	-	-	0
Angostura	1	Bernalillo	-	-	-	-	3(0)	-	11(2)	-	9(9)	23
Angostura	2	Rio Rancho	-	-	-	-	5(0)	-	-	-	16(12)	21
Angostura	3	Central Ave.	1(1)	-	-	-	3(2)	2(0)	1(1)	-	-	7
Angostura	4	Rio Bravo Blvd.	3(3)	-	-	3(0)	-	-	-	-	17(16)	23
Angostura Totals			4	0	0	3	11	2	12	0	42	74
Isleta	5	Los Lunas	2(2)	-	2(2)	2(0)	1(0)	7(0)	1(0)	-	5(5)	20
Isleta	6	Belen	9(9)	-	-	15(0)	1(0)	3(0)	1(0)	-	5(4)	34
Isleta	7	Jarales	1(1)	-	-	3(1)	2(0)	1(0)	-	-	1(0)	8
Isleta	8	Bernardo	10(10)	1(1)	-	-	4(0)	2(0)	-	-	-	17
Isleta	9	La Joya	2(2)	-	-	3(0)	-	6(0)	-	-	2(1)	13
Isleta	9.5	North of San Acacia	2(2)	-	-	3(0)	1(0)	-	-	-	-	6
Isleta Totals			26	1	2	26	9	19	2	0	13	98
San Acacia	10	San Acacia Dam	14(14)	4(2)	2(2)	4(3)	10(3)	-	4(0)	-	1(1)	39
San Acacia	11	South of San Acacia	29(28)	2(1)	1(1)	3(0)	3(2)	-	-	-	-	38
San Acacia	12	Socorro	27(26)	1(0)	-	2(0)	-	2(1)	-	-	57(57)	89
San Acacia	13	North of San Antonio	8(8)	-	-	3(0)	-	-	3(1)	-	38(38)	52
San Acacia	14	San Antonio	9(8)	-	-	-	-	1(0)	-	-	4(4)	14
San Acacia	15	South of San Antonio	-	-	-	2(2)	-	1(0)	-	-	2(2)	5
San Acacia	16	San Marcial	1(1)	-	-	-	4(1)	-	-	-	-	5
San Acacia	17	South of San Marcial 1	15(14)	-	-	-	-	13(0)	-	-	11(5)	39
San Acacia	18	South of San Marcial 2	9(8)	-	-	-	-	1(0)	-	-	8(7)	18
San Acacia Totals			112	7	3	14	17	18	7	0	121	299
<b>MONTHLY TOTALS</b>			<b>142</b>	<b>8</b>	<b>5</b>	<b>43</b>	<b>37</b>	<b>39</b>	<b>21</b>	<b>0</b>	<b>176</b>	<b>471</b>

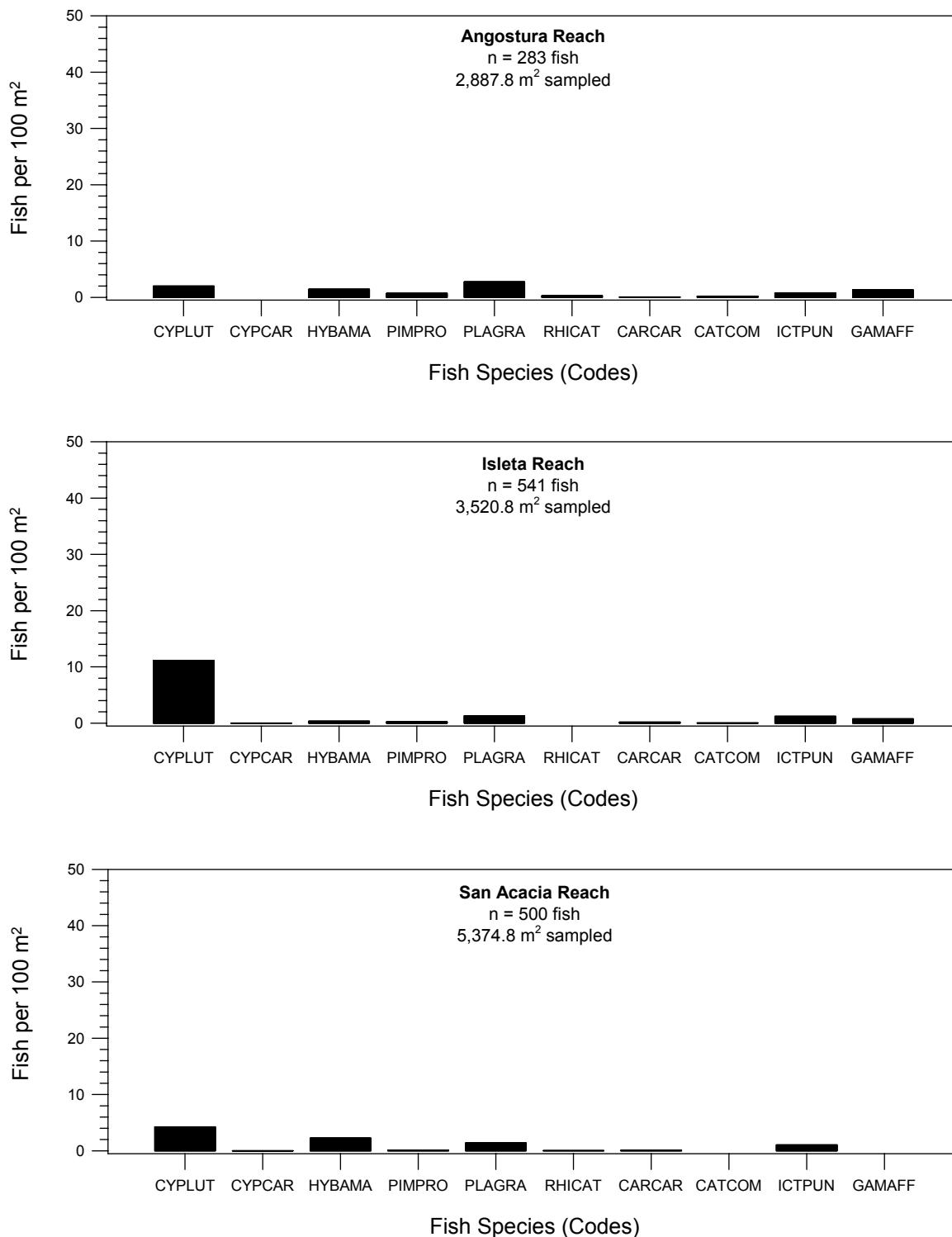


Figure 3. Fish densities from December 2014 for each focal species in the three reaches of the Middle Rio Grande (see Table 1 for fish species codes).

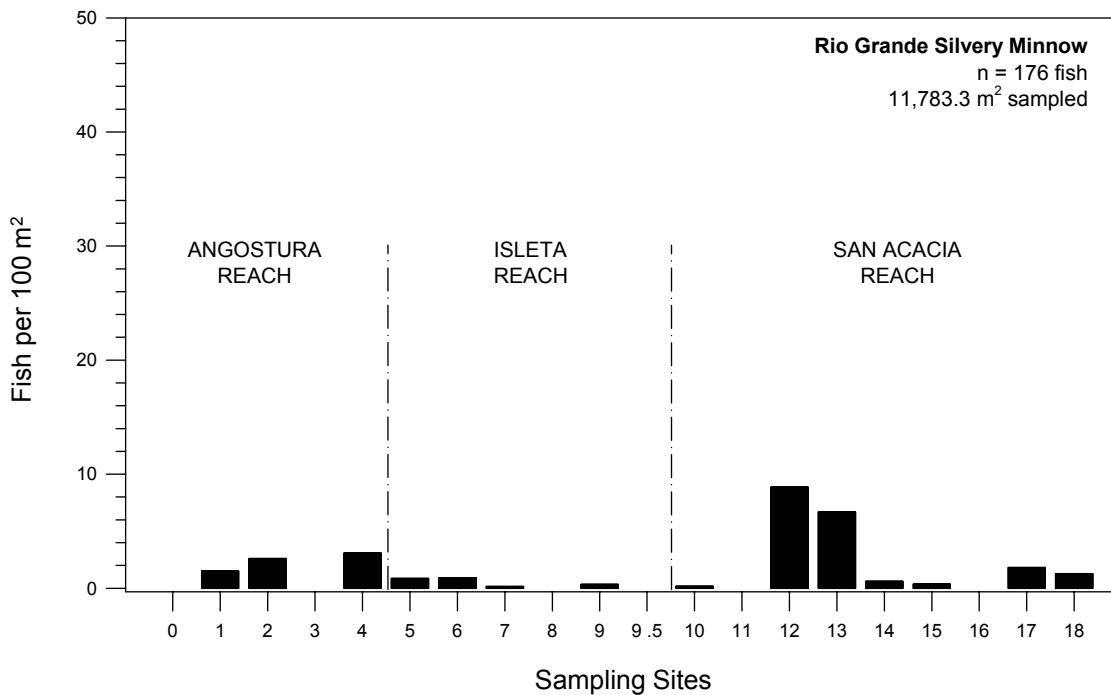
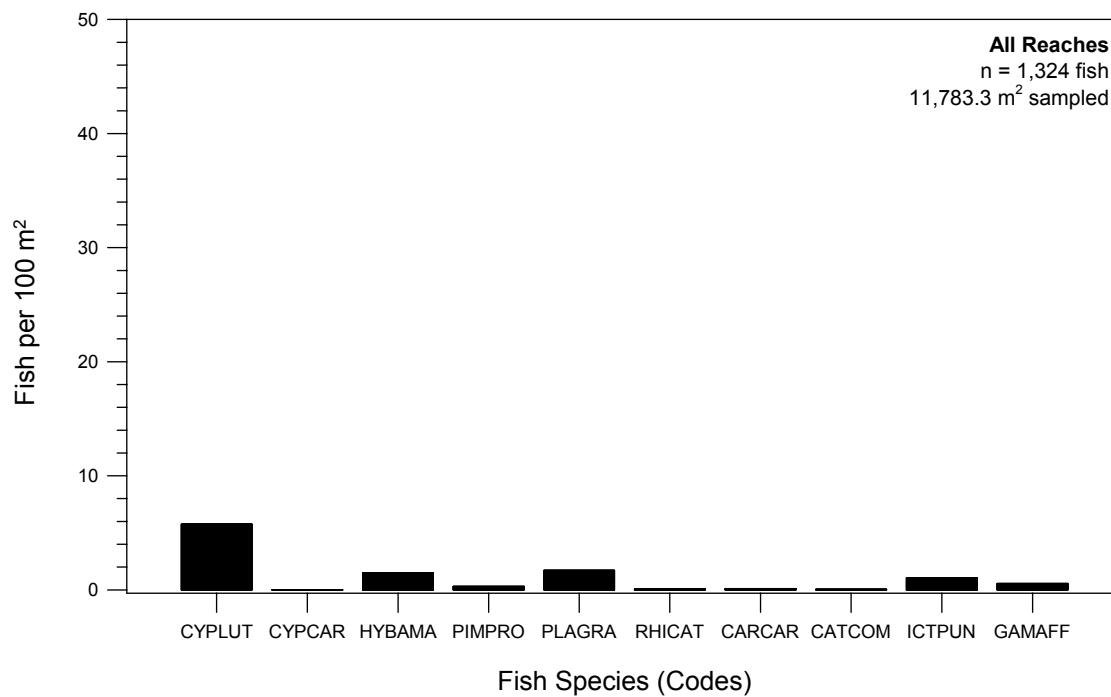


Figure 4. Catch rates for ten focal species from all reaches combined, including Rio Grande Silvery Minnow, during December 2014 at Rio Grande Silvery Minnow population monitoring program collection sites (see Table 1 for fish species codes).

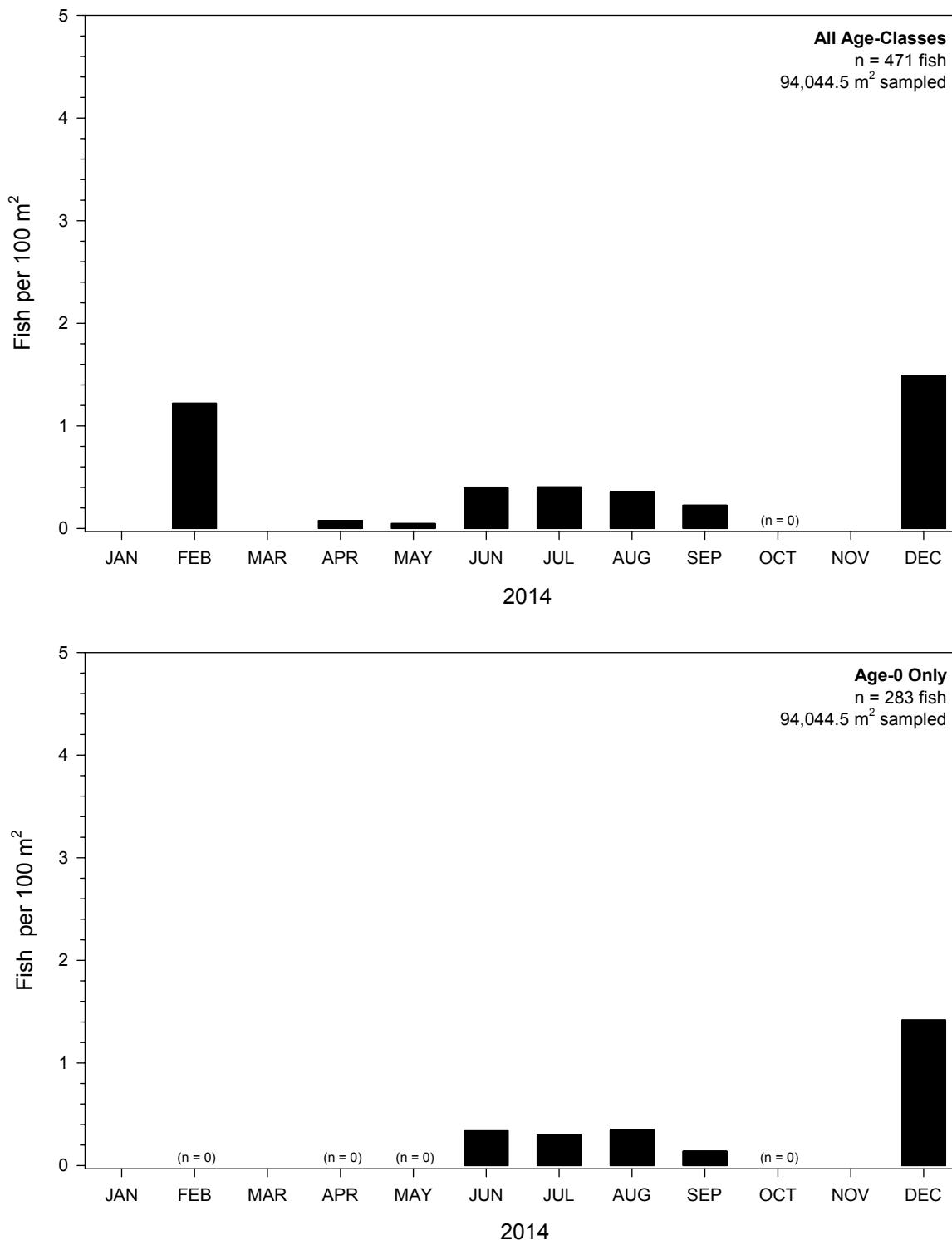


Figure 5. Inter-month fluctuations in densities of Rio Grande Silvery Minnow (all age-classes and age-0 only) during 2014.

#### 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 December 2014  
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**  
**December 2014**

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

**RKD14-258**

Site Number: 0 River Mile: 209.7 04 December 2014  
UTM Easting: 363811 UTM Northing: 3916006 Zone: 13 Quad: San Felipe Pueblo  
W.H. Brandenburg, S.L. Clark Barkalow, J.L. Kennedy Effort: 557.8 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Platygobio gracilis</i>	4
76	<i>Rhinichthys cataractae</i>	1

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

**RKD14-259**

Site Number: 1 River Mile: 203.8 04 December 2014  
UTM Easting: 358543 UTM Northing: 3909722 Zone: 13 Quad: Bernalillo  
W.H. Brandenburg, S.L. Clark Barkalow, J.L. Kennedy Effort: 591.8 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	15
76	<i>Hybognathus amarus*</i>	9
76	<i>Pimephales promelas</i>	9
76	<i>Platygobio gracilis</i>	30
76	<i>Rhinichthys cataractae</i>	3
212	<i>Gambusia affinis</i>	19

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

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

**Rio Grande Silvery Minnow Population Monitoring**  
**December 2014**

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage **RKD14-260**  
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 04 December 2014  
UTM Easting: 354772 UTM Northing: 3905355 Zone: 13 Quad: Bernalillo  
W.H. Brandenburg, S.L. Clark Barkalow, J.L. Kennedy Effort: 613.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	8
76	<i>Hybognathus amarus*</i>	16
76	<i>Pimephales promelas</i>	9
76	<i>Platygobio gracilis</i>	20
76	<i>Rhinichthys cataractae</i>	3
212	<i>Gambusia affinis</i>	9
294	<i>Lepomis cyanellus</i>	1
294	<i>Pomoxis annularis</i>	1

\* *Hybognathus amarus* by age class:

age-0: 14  
age-1: 1  
age-2: 1

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage **RKD14-257**  
Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque.  
Site Number: 3 River Mile: 183.4 04 December 2014  
UTM Easting: 346840 UTM Northing: 3884094 Zone: 13 Quad: Albuquerque West  
W.H. Brandenburg, S.L. Clark Barkalow, J.L. Kennedy Effort: 575.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	27
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	14
76	<i>Rhinichthys cataractae</i>	1
81	<i>Carpoides carpio</i>	2
81	<i>Catostomus commersonii</i>	5
93	<i>Ictalurus punctatus</i>	6

**Rio Grande Silvery Minnow Population Monitoring**  
**December 2014**

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage **RKD14-256**  
Rio Grande, at Rio Bravo Blvd. Bridge crossing (NM State HWY 500) crossing, Albuquerque.

Site Number: 4 River Mile: 178.3 03 December 2014  
UTM Easting: 347554 UTM Northing: 3877163 Zone: 13 Quad: Albuquerque West  
W.H. Brandenburg, S.L. Clark Barkalow, J.L. Kennedy Effort: 549.8 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	8
76	<i>Hybognathus amarus*</i>	17
76	<i>Pimephales promelas</i>	2
76	<i>Platygobio gracilis</i>	12
76	<i>Rhinichthys cataractae</i>	1
81	<i>Catostomus commersonii</i>	1
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	17
212	<i>Gambusia affinis</i>	11

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

age-0: 16  
age-1: 1  
age-2:

**Rio Grande Silvery Minnow Population Monitoring**  
**December 2014**

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

**RKD14-255**

Site Number: 5 River Mile: 161.4 02 December 2014  
UTM Easting: 342898 UTM Northing: 3852531 Zone: 13 Quad: Los Lunas  
R.K. Dudley, M.A. Farrington, J.L. Kennedy Effort: 577.5 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	38
76	<i>Hybognathus amarus*</i>	5
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	7
81	<i>Carpoides carpio</i>	4
81	<i>Catostomus commersonii</i>	2
212	<i>Gambusia affinis</i>	18

\* *Hybognathus amarus* by age class:

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

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

**RKD14-254**

Site Number: 6 River Mile: 151.5 02 December 2014  
UTM Easting: 339972 UTM Northing: 3837061 Zone: 13 Quad: Tome  
R.K. Dudley, M.A. Farrington, J.L. Kennedy Effort: 539.8 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	115
76	<i>Hybognathus amarus*</i>	5
76	<i>Pimephales promelas</i>	6
93	<i>Ictalurus punctatus</i>	4
212	<i>Gambusia affinis</i>	4
294	<i>Pomoxis annularis</i>	1

\* *Hybognathus amarus* by age class:

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

# Rio Grande Silvery Minnow Population Monitoring

## December 2014

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

RKD14-253

Site Number: 7 River Mile: 143.2  
UTM Easting: 338136 UTM Northing: 3827329 Zone: 13 Quad: Veguita  
R.K. Dudley, M.A. Farrington, J.L. Kennedy

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	119
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	1
76	<i>Pimephales promelas</i>	2
81	<i>Carpoides carpio</i>	1
93	<i>Ictalurus punctatus</i>	8
212	<i>Gambusia affinis</i>	4

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

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

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

RKD14-252

Site Number: 8 River Mile: 130.6  
UTM Easting: 334604 UTM Northing: 3809726 Zone: 13 Quad: Abeytas  
R.K. Dudley, M.A. Farrington, J.L. Kennedy

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	49
81	<i>Carpoides carpio</i>	2
93	<i>Ictalurus punctatus</i>	14

# Rio Grande Silvery Minnow Population Monitoring

## December 2014

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

RKD14-251

Site Number: 9 River Mile: 127.0 02 December 2014  
UTM Easting: 331094 UTM Northing: 3805229 Zone: 13 Quad: Abeytas  
R.K. Dudley, M.A. Farrington, J.L. Kennedy Effort: 572.5 sq. m.

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	71
76	<i>Hybognathus amarus*</i>	2
76	<i>Platygobio gracilis</i>	4
93	<i>Ictalurus punctatus</i>	17
212	<i>Gambusia affinis</i>	1

\* *Hybognathus amarus* by age class:

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

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

RKD14-250

Site Number: 9.5 River Mile: 116.8 01 December 2014  
UTM Easting: 327902 UTM Northing: 3792603 Zone: 13 Quad: La Joya  
R.K. Dudley, J.L. Kennedy, S.L. Clark Barkalow Effort: 648.3 sq. m.

<b>FAMILY</b>		<b>N</b>
76	<i>Platygobio gracilis</i>	35

# Rio Grande Silvery Minnow Population Monitoring

## December 2014

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

RKD14-249

Site Number: 10 River Mile: 116.2 01 December 2014  
UTM Easting: 326162 UTM Northing: 3791977 Zone: 13 Quad: San Acacia  
R.K. Dudley, J.L. Kennedy, S.L. Clark Barkalow Effort: 552.5 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	2
76	<i>Hybognathus amarus*</i>	1
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	16
81	<i>Carpoides carpio</i>	1
93	<i>Ictalurus punctatus</i>	3

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

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

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

RKD14-248

Site Number: 11 River Mile: 114.6  
UTM Easting: 325263 UTM Northing: 3790442 Zone: 13 Quad: Lemitar  
R.K. Dudley, J.L. Kennedy, S.L. Clark Barkalow

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	21
76	<i>Pimephales promelas</i>	3
76	<i>Platygobio gracilis</i>	54
76	<i>Rhinichthys cataractae</i>	2

**Rio Grande Silvery Minnow Population Monitoring**  
**December 2014**

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-247**  
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: 12 River Mile: 99.5 01 December 2014  
UTM Easting: 327097 UTM Northing: 3771043 Zone: 13 Quad: Loma de las Canas  
R.K. Dudley, J.L. Kennedy, S.L. Clark Barkalow Effort: 643.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	50
76	<i>Hybognathus amarus*</i>	57
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	1
76	<i>Rhinichthys cataractae</i>	1
93	<i>Ictalurus punctatus</i>	2

\* *Hybognathus amarus* by age class:  
age-0: 57  
age-1:  
age-2:

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage **RKD14-246**  
Rio Grande, ca. 4.0 miles upstream of U.S. 380 bridge crossing.  
Site Number: 13 River Mile: 91.7 01 December 2014  
UTM Easting: 328140 UTM Northing: 3761283 Zone: 13 Quad: San Antonio  
R.K. Dudley, J.L. Kennedy, S.L. Clark Barkalow Effort: 569.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	14
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	38
76	<i>Platygobio gracilis</i>	1
81	<i>Carpoides carpio</i>	2
93	<i>Ictalurus punctatus</i>	9

\* *Hybognathus amarus* by age class:  
age-0: 38  
age-1:  
age-2:

**Rio Grande Silvery Minnow Population Monitoring**  
**December 2014**

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

**RKD14-245**

Site Number: 14 River Mile: 87.1 03 December 2014  
UTM Easting: 328914 UTM Northing: 3754471 Zone: 13 Quad: San Antonio  
W.H. Brandenburg, S.L. Clark Barkalow, J.L. Kennedy Effort: 651.3 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	23
76	<i>Hybognathus amarus*</i>	4
76	<i>Platygobio gracilis</i>	2

\* *Hybognathus amarus* by age class:

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

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

**RKD14-244**

Site Number: 15 River Mile: 79.1 03 December 2014  
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San Antonio SE  
W.H. Brandenburg, S.L. Clark Barkalow, J.L. Kennedy Effort: 561.8 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	21
76	<i>Hybognathus amarus*</i>	2
81	<i>Carpioles carpio</i>	2
93	<i>Ictalurus punctatus</i>	1

\* *Hybognathus amarus* by age class:

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

**Rio Grande Silvery Minnow Population Monitoring**  
**December 2014**

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

**RKD14-243**

Site Number: 16 River Mile: 68.6 03 December 2014  
UTM Easting: 315284 UTM Northing: 3728347 Zone: 13 Quad: San Marcial  
W.H. Brandenburg, S.L. Clark Barkalow, J.L. Kennedy Effort: 570.3 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	24
76	<i>Platygobio gracilis</i>	1
93	<i>Ictalurus punctatus</i>	6

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

**RKD14-242**

Site Number: 17 River Mile: 60.5 10 December 2014  
UTM Easting: 309487 UTM Northing: 3718178 Zone: 13 Quad: Paraje Well  
J.L. Kennedy, M.A. Farrington, S.L. Clark Barkalow Effort: 606.3 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	28
76	<i>Hybognathus amarus*</i>	11
76	<i>Pimephales promelas</i>	1
76	<i>Pimephales vigilax</i>	2
76	<i>Platygobio gracilis</i>	1
93	<i>Ictalurus punctatus</i>	21

\* *Hybognathus amarus* by age class:

age-0: 11  
age-1:  
age-2:

# Rio Grande Silvery Minnow Population Monitoring

## December 2014

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

RKD14-241

Site Number: 18 River Mile: 58.8 10 December 2014  
UTM Easting: 307846 UTM Northing: 3716150 Zone: 13 Quad: Paraje Well  
J.L. Kennedy, M.A. Farrington, S.L. Clark Barkalow Effort: 621.8 sq. m

<b>FAMILY</b>		<b>N</b>
76	<i>Cyprinella lutrensis</i>	46
76	<i>Hybognathus amarus*</i>	8
93	<i>Ictalurus punctatus</i>	15

\* *Hybognathus amarus* by age class:

age-0: 7  
age-1: 1  
age-2: