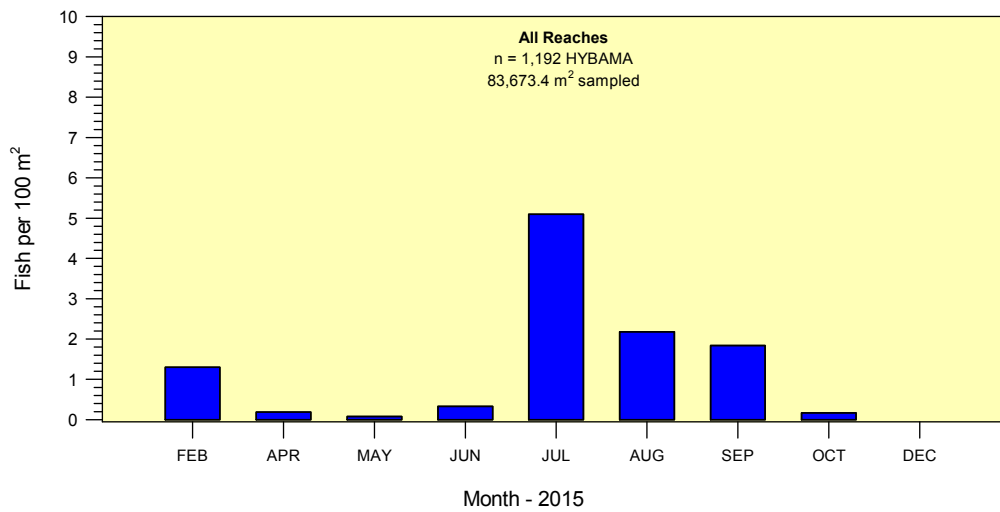
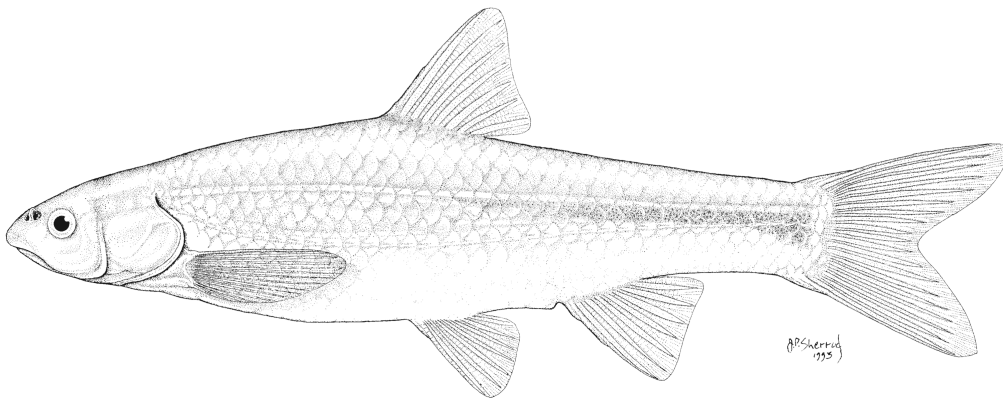


**SUMMARY OF THE RIO GRANDE SILVERY MINNOW
POPULATION MONITORING PROGRAM RESULTS FROM OCTOBER 2015**

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



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19 November 2015

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prepared for:

MIDDLE RIO GRANDE ENDANGERED SPECIES COLLABORATIVE PROGRAM

under Contract GS-10F-0249X:

Order R15PD00171

U.S. Bureau of Reclamation
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SUMMARY OF OVERALL OCTOBER 2015 POPULATION MONITORING EFFORTS

The October population monitoring efforts were conducted at 20 sites throughout the Middle Rio Grande. Five sites were located in the Angostura Reach, six sites in the Isleta Reach, and nine sites in the San Acacia Reach. A list of collection localities is appended (Table A-1).

Adult and juvenile fish were obtained by rapidly drawing a 3.1 m x 1.8 m small mesh (3/16th inch) seine through discrete mesohabitats. Larval fish were also collected with a 1.0 m x 1.0 m fine mesh (1/16th inch) seine in all seasons except winter. All fishes were identified to species and enumerated. However, Rio Grande Silvery Minnow individuals were also measured and identified to age-class. Figures illustrating fish densities (i.e., fish per 100 m²) were prepared for the ten focal species, including Rio Grande Silvery Minnow, to facilitate comparisons among reaches.

During October, sampling covered 9,624.3 m² (surface area) of water and yielded 1,752 fish. Cumulative fish density during October was 18.2 individuals/100 m² sampled. The three most common species were Red Shiner (n = 690), Western Mosquitofish (n = 639), and Flathead Chub (n = 169). The 20 sampling sites yielded a total of 14 fish species. Rio Grande Silvery Minnow was present in 13 of the 233 seine hauls that yielded fish during October, as compared with 23 of the 280 seine hauls that yielded fish during September. The density of Rio Grande Silvery Minnow was 0.17 individuals/100 m² sampled (n = 16 {0.0% marked}) and this species composed 0.9% of the total number of fish collected during October.

SUMMARY OF OCTOBER 2015 POPULATION MONITORING EFFORT BY RIVER REACH

Angostura Reach

Mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gage 8330000) averaged 266.1 and ranged from 168 to 678 cfs from 16 September to 15 October. Water temperatures ranged from 14.5 to 16.8 °C during the Angostura Reach sampling efforts (ca. 0830–1530 h). Secchi disk measurements of water clarity ranged from 5 to 30 cm.

Sampling for fishes in the Angostura Reach during October yielded 675 individuals with a cumulative fish density of 26.6 individuals/100 m² sampled. The overall sampling effort in the Angostura Reach covered 2,540.7 m² (surface area) of water. Densities of all fish species combined ranged from 10.2 to 63.8 individuals per 100 m² at the five sampling sites. In October, there were 11 fish species collected in the Angostura Reach. Western Mosquitofish was the most abundant taxon (n = 358), followed by Red Shiner (n = 101), and Flathead Chub (n = 84). Rio Grande Silvery Minnow was present in 4 of the 70 seine hauls that yielded fish during October. Densities of Rio Grande Silvery Minnow ranged from 0.0 to 0.4 individuals per 100 m² at the five sampling sites.

Isleta Reach

In the Isleta Reach, mean daily discharge (Rio Grande at Isleta Lakes near Isleta, NM; USGS Gage 08354900) averaged 219.0 and ranged from 91 to 730 cfs from 16 September to 15 October. Water temperatures ranged from 14.2 to 22.3 °C throughout the sampling localities during the day (ca. 0930–1600 h). Secchi disk measurements ranged from 10 to 29 cm during sampling.

Isleta Reach population monitoring efforts produced 735 individuals in October with a cumulative fish density of 24.5 individuals/100 m² sampled. The total sampling effort in the Isleta Reach during October covered 3,003.8 m² (surface area) of water. Fish densities (all species combined) at the six sites

ranged from 16.0 to 40.9 individuals per 100 m² sampled. There were 10 fish species collected in the Isleta Reach during October. Red Shiner was the most abundant taxon (n = 416), followed by Western Mosquitofish (n = 234), and Channel Catfish (n = 36). Rio Grande Silvery Minnow was present in 6 of the 83 seine hauls that yielded fish during October. Densities of Rio Grande Silvery Minnow ranged from 0.0 to 0.6 individuals per 100 m² at the six sampling sites.

San Acacia Reach

Mean daily discharge at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gage 08354900) from 16 September to 15 October was generally higher (average = 67.9; range = 32–189 cfs) as compared to San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gage 08358400) during the same period (average = 21.8; range = 14–108 cfs). Water temperatures in October for the San Acacia Reach ranged from 18.1 to 22.6 °C (ca. 0930–1600 h). Water clarity was generally lower in this reach (Secchi disk range = 8–24 cm) as compared to the two upstream reaches.

Population monitoring efforts in the San Acacia Reach during October yielded 342 individuals with a cumulative fish density of 8.4 individuals per 100 m² sampled. Sampling in the San Acacia Reach covered an area of 4,079.9 m² of water. Fish densities (all species combined) ranged from 0.0 to 19.4 individuals per 100 m² at the nine sites sampled in the San Acacia Reach. In October, there were 8 fish species collected in the San Acacia Reach. Red Shiner was the most abundant taxon (n = 173), followed by Channel Catfish (n = 60), and Flathead Chub (n = 56). Rio Grande Silvery Minnow was present in 3 of the 80 seine hauls that yielded fish during October. Densities of Rio Grande Silvery Minnow ranged from 0.0 to 0.6 individuals per 100 m² at the nine sampling sites.

CONCLUSIONS

The addition of large numbers of hatchery-reared Rio Grande Silvery Minnow in autumn 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 February 2015. Following the substantial annual stocking of Rio Grande Silvery Minnow, there should have presumably been adequate numbers of individuals available in the river for spawning during spring 2015. However, the total overwinter mortality for the Middle Rio Grande population of Rio Grande Silvery Minnow, which was composed almost entirely of hatchery-reared individuals, appears to have resulted in substantial losses of individuals from autumn 2014 to spring 2015. Spawning was documented in the study area during May and June 2015, which resulted in the presence of recently hatched larvae in relatively shallow and low velocity mesohabitats along the margins of the river. Rio Grande Silvery Minnow was present at 8 of the 20 sampling sites, and there were 14 age-0 individuals (out of 16 total) collected during sampling efforts in October 2015. In contrast, 192 total individuals were collected in September 2015. During September 2015, flows dropped rapidly throughout the study area and the river dried or nearly dried in substantial portions of the southern reaches. The abundance of all age-classes of Rio Grande Silvery Minnow also declined during this period. The maintenance of suitable flow and habitat conditions for Rio Grande Silvery Minnow will be crucial for their successful growth and survival during the autumn of 2015.

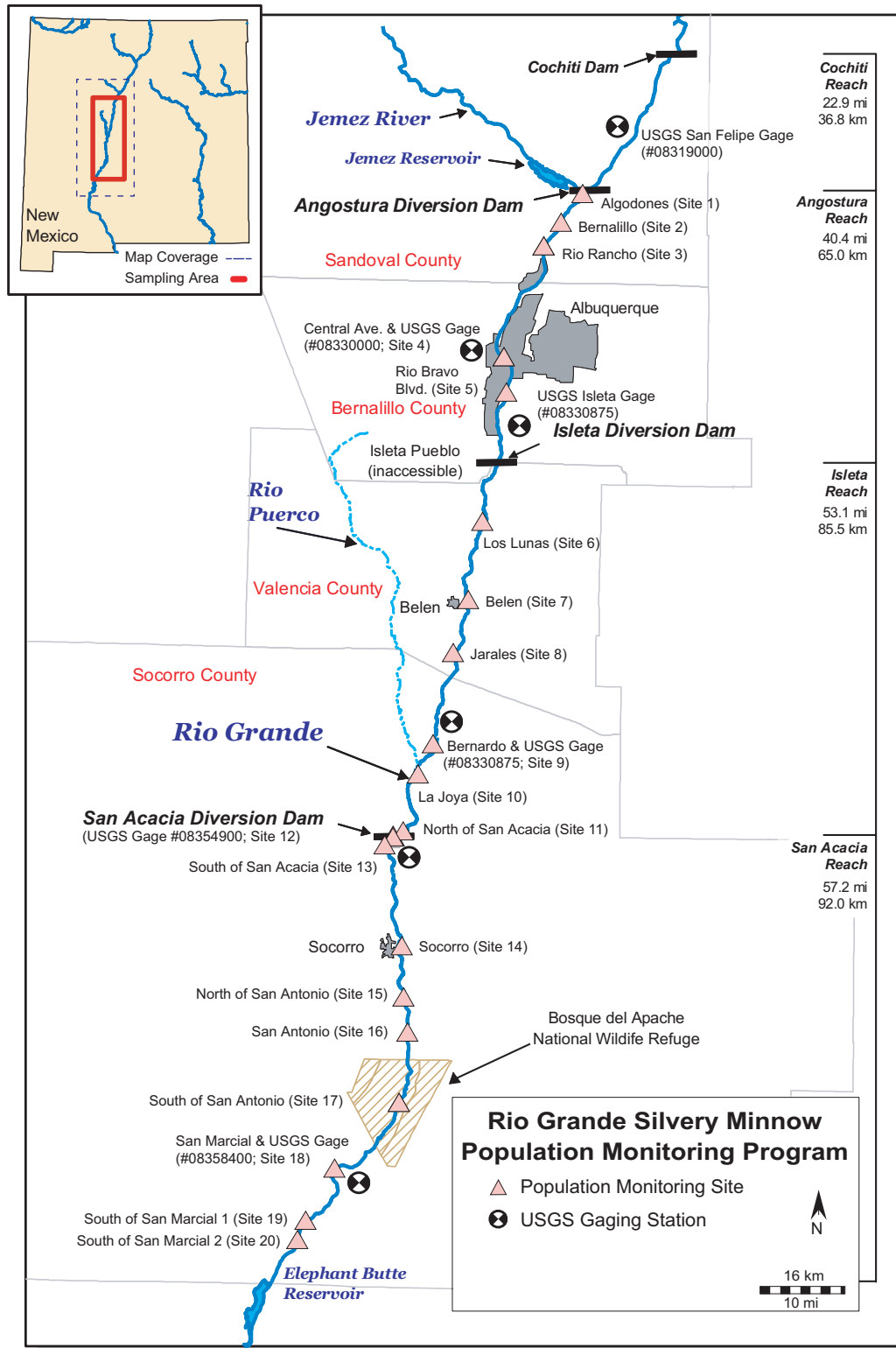


Figure 1. Map of the study area and sampling localities (numbered) for the Rio Grande Silvery Minnow population monitoring program. Sampling locality information that corresponds with the numbered localities is provided in Appendix A (Table A-1).

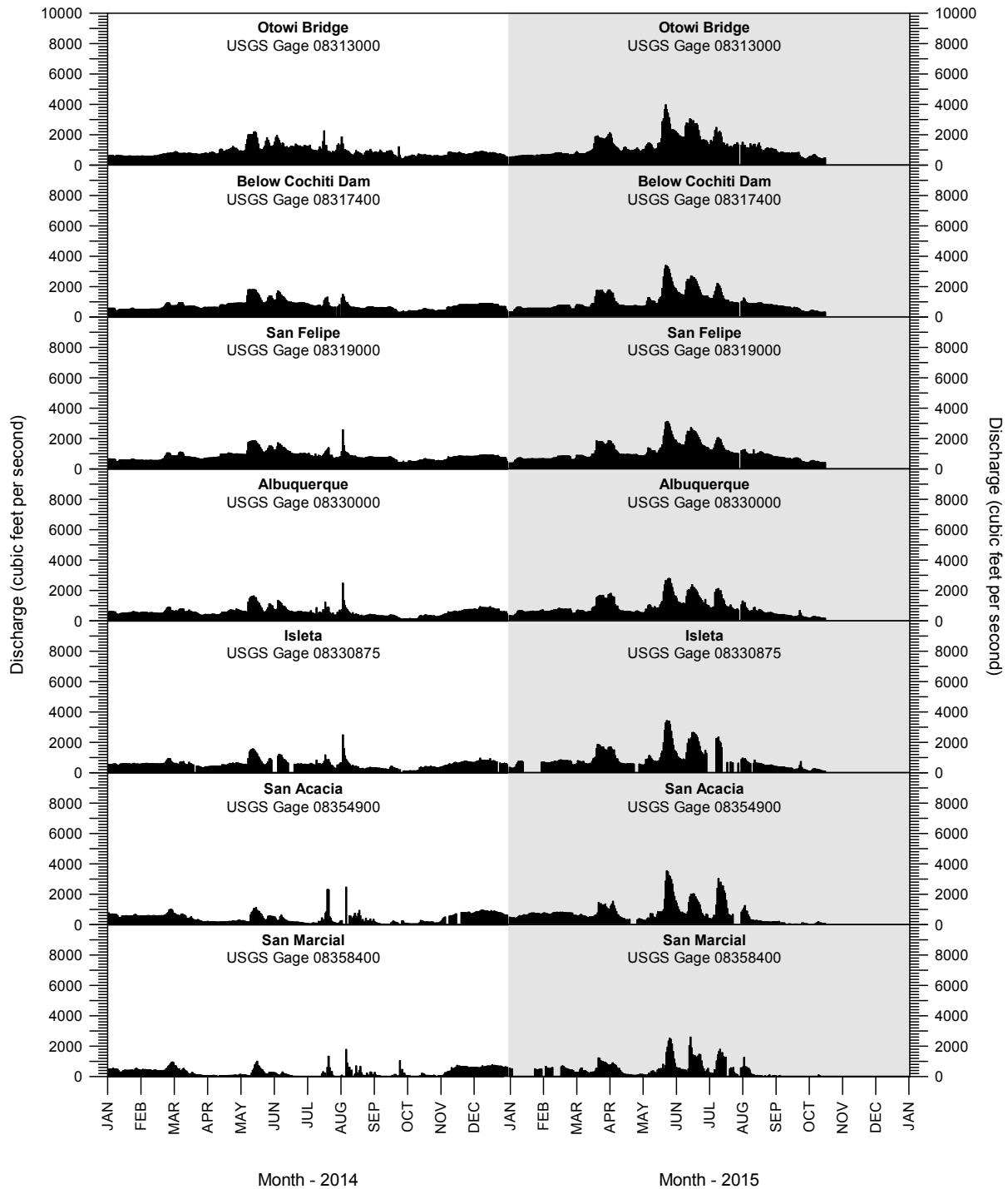


Figure 2. Discharge in the Rio Grande from 1 January 2014 through 15 October 2015 as recorded at seven U. S. Geological Survey (USGS) gage stations. The Otowi Bridge gage site is outside of the study area (ca. 25.5 river miles upstream of Cochiti Dam) and provided for reference. **Discharge data are 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 ¹	(CYPLUT)
<i>Cyprinus carpio</i>	Common Carp ¹	(CYPCAR)
<i>Gila pandora</i>	Rio Grande Chub	(GILPAN)
<i>Hybognathus amarus</i>	Rio Grande Silvery Minnow ¹	(HYBAMA)
<i>Notemigonus crysoleucas</i>	Golden Shiner	(NOTCRY)
<i>Pimephales promelas</i>	Fathead Minnow ¹	(PIMPRO)
<i>Pimephales vigilax</i>	Bullhead Minnow	(PIMVIG)
<i>Platygobio gracilis</i>	Flathead Chub ¹	(PLAGRA)
<i>Rhinichthys cataractae</i>	Longnose Dace ¹	(RHICAT)
Family Catostomidae		
	suckers	
<i>Carpodes carpio</i>	River Carpsucker ¹	(CARCAR)
<i>Catostomus commersonii</i>	White Sucker ¹	(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 ¹	(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 ¹	(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)

¹ 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 October 2015 Rio Grande Silvery Minnow population monitoring program results (species list is based on fish collected since 1993).

FAMILY	SPECIES COMMON NAME	RESIDENCE STATUS ¹	TOTAL NUMBER OF SPECIMENS	PERCENT (%) OF TOTAL	FREQUENCY OF OCCURRENCE ²	% FREQUENCY OCCURRENCE ²
Clupeidae	Gizzard Shad	N	-	-	-	-
Clupeidae	Threadfin Shad	I	-	-	-	-
Cyprinidae	Central Stoneroller	I	-	-	-	-
Cyprinidae	Goldfish	I	-	-	-	-
Cyprinidae	Red Shiner	N	690	39.38	18	90
Cyprinidae	Common Carp	I	6	0.34	6	30
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	16	0.91	8	40
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	18	1.03	7	35
Cyprinidae	Bullhead Minnow	I	-	-	-	-
Cyprinidae	Flathead Chub	N	169	9.65	17	85
Cyprinidae	Longnose Dace	N	68	3.88	4	20
Catostomidae	River Carpsucker	N	12	0.68	7	35
Catostomidae	White Sucker	I	-	-	-	-
Catostomidae	Smallmouth Buffalo	N	-	-	-	-
Ictaluridae	Black Bullhead	I	-	-	-	-
Ictaluridae	Yellow Bullhead	I	1	0.06	1	5
Ictaluridae	Blue Catfish	N	-	-	-	-
Ictaluridae	Channel Catfish	I	129	7.36	15	75
Ictaluridae	Flathead Catfish	N	1	0.06	1	5
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	639	36.47	17	85
Moronidae	White Bass	I	-	-	-	-
Moronidae	Striped Bass	I	-	-	-	-
Centrarchidae	Green Sunfish	I	1	0.06	1	5
Centrarchidae	Bluegill	N	1	0.06	1	5
Centrarchidae	Longear Sunfish	I	-	-	-	-
Centrarchidae	Smallmouth Bass	I	-	-	-	-
Centrarchidae	Largemouth Bass	I	-	-	-	-
Centrarchidae	White Crappie	I	1	0.06	1	5
Centrarchidae	Black Crappie	I	-	-	-	-
Percidae	Yellow Perch	I	-	-	-	-
Percidae	Bigscale Logperch	I	-	-	-	-
Percidae	Walleye	I	-	-	-	-
MONTHLY TOTALS			1,752	100.00		

¹ N = native; I = introduced

² Frequency and % frequency of occurrence are based on 20 sample sites.

Table 3. Summary of the monthly catch of all fish species during 2015 (species list is based on fish collected since 1993).

FAMILY	SPECIES COMMON NAME	F E B	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	D E C	T O T A L
Clupeidae	Gizzard Shad	-	7	1	5	1	2	-	-	-	16
Clupeidae	Threadfin Shad	-	-	20	-	-	-	-	-	-	20
Cyprinidae	Central Stoneroller	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Goldfish	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Red Shiner	1,828	2,540	3,088	2,871	1,235	797	502	690	-	13,551
Cyprinidae	Common Carp	1	3	27	50	213	18	9	6	-	327
Cyprinidae	Rio Grande Chub	-	-	-	4	-	-	-	-	-	4
Cyprinidae	Rio Grande Silvery Minnow	151	19	9	36	538	231	192	16	-	1,192
Cyprinidae	Golden Shiner	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Fathead Minnow	103	17	72	11	18	36	18	18	-	293
Cyprinidae	Bullhead Minnow	1	1	1	2	2	-	-	-	-	7
Cyprinidae	Flathead Chub	195	222	241	233	598	496	417	169	-	2,571
Cyprinidae	Longnose Dace	4	124	233	152	158	62	77	68	-	878
Catostomidae	River Carpsucker	10	15	31	22	51	6	9	12	-	156
Catostomidae	White Sucker	7	13	68	43	81	6	1	-	-	219
Catostomidae	Smallmouth Buffalo	-	-	-	5	-	1	-	-	-	6
Ictaluridae	Black Bullhead	-	-	-	-	1	1	-	-	-	2
Ictaluridae	Yellow Bullhead	-	-	1	-	34	18	1	1	-	55
Ictaluridae	Blue Catfish	-	-	13	20	29	5	-	-	-	67
Ictaluridae	Channel Catfish	102	223	173	106	1,088	751	185	129	-	2,757
Ictaluridae	Flathead Catfish	-	-	-	-	1	3	6	1	-	11
Salmonidae	Rainbow Trout	-	-	-	-	-	-	-	-	-	0
Salmonidae	Brown Trout	-	-	-	-	-	-	-	-	-	0
Poeciliidae	Western Mosquitofish	8	57	36	111	120	330	535	639	-	1,836
Moronidae	White Bass	1	2	-	-	-	-	-	-	-	3
Moronidae	Striped Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Green Sunfish	-	-	-	-	-	-	-	1	-	1
Centrarchidae	Bluegill	-	-	1	-	-	1	1	1	-	4
Centrarchidae	Longear Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Smallmouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Largemouth Bass	-	1	-	-	-	-	-	-	-	1
Centrarchidae	White Crappie	-	2	4	1	1	1	2	1	-	12
Centrarchidae	Black Crappie	-	-	0	-	-	-	-	-	-	0
Percidae	Yellow Perch	-	-	-	-	1	-	-	-	-	1
Percidae	Bigscale Logperch	-	-	-	-	-	-	-	-	-	0
Percidae	Walleye	-	-	1	-	-	-	-	-	-	1
MONTHLY TOTALS		2,411	3,246	4,020	3,672	4,170	2,765	1,955	1,752	-	23,991

Table 4. Summary of the monthly catch of Rio Grande Silvery Minnow, by site and reach, during 2015. All marked individuals at a site are shown in parentheses (subset of the total).

REACH	SITE #	SITE NAME	F E B	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	D E C	T O T A L
Angostura	1	Angostura Dam	-	-	-	-	-	-	-	-	-	0
Angostura	2	Bernalillo	8(5)	1(0)	1(0)	-	12(0)	3(0)	-	-	-	25
Angostura	3	Rio Rancho	3(2)	-	-	-	8(0)	14(0)	1(0)	2(0)	-	28
Angostura	4	Central Ave.	2(2)	-	3(3)	-	297(0)	9(0)	-	1(0)	-	312
Angostura	5	Rio Bravo Blvd.	10(10)	-	-	-	18(0)	-	-	2(0)	-	30
Angostura Totals			23	1	4	-	335	26	1	5	-	395
Isleta	6	Los Lunas	6(1)	-	-	3(1)	3(0)	47(0)	16(0)	3(0)	-	78
Isleta	7	Belen	3(3)	3(3)	-	8(0)	9(0)	51(0)	148(2)	-	-	222
Isleta	8	Jarales	3(1)	1(0)	-	5(0)	11(0)	16(0)	-	-	-	36
Isleta	9	Bernardo	4(3)	-	1(1)	1(1)	6(0)	46(0)	1(0)	1(0)	-	60
Isleta	10	La Joya	-	1(1)	-	-	48(0)	8(0)	-	1(0)	-	58
Isleta	11	North of San Acacia	1(1)	-	-	-	21(0)	4(0)	4(0)	3(0)	-	33
Isleta Totals			17	5	1	17	98	172	169	8	-	487
San Acacia	12	San Acacia Dam	5(0)	-	-	-	5(0)	1(0)	-	-	-	11
San Acacia	13	South of San Acacia	1(0)	2(2)	-	-	-	-	-	-	-	3
San Acacia	14	Socorro	52(52)	1(1)	1(1)	-	1(0)	4(0)	1(0)	3(0)	-	63
San Acacia	15	North of San Antonio	15(15)	2(1)	-	14(3)	32(0)	2(0)	17(0)	-	-	82
San Acacia	16	San Antonio	11(7)	2(2)	2(2)	-	-	8(1)	2(0)	-	-	25
San Acacia	17	South of San Antonio	1(1)	2(2)	1(0)	3(3)	16(0)	13(0)	2(0)	-	-	38
San Acacia	18	San Marcial	5(5)	2(2)	-	-	48(1)	-	-	-	-	55
San Acacia	19	South of San Marcial 1	18(15)	2(2)	-	2(2)	3(0)	4(0)	-	-	-	29
San Acacia	20	South of San Marcial 2	3(1)	-	-	-	-	1(0)	-	-	-	4
San Acacia Totals			111	13	4	19	105	33	22	3	-	310
MONTHLY TOTALS			151	19	9	36	538	231	192	16	-	1,192

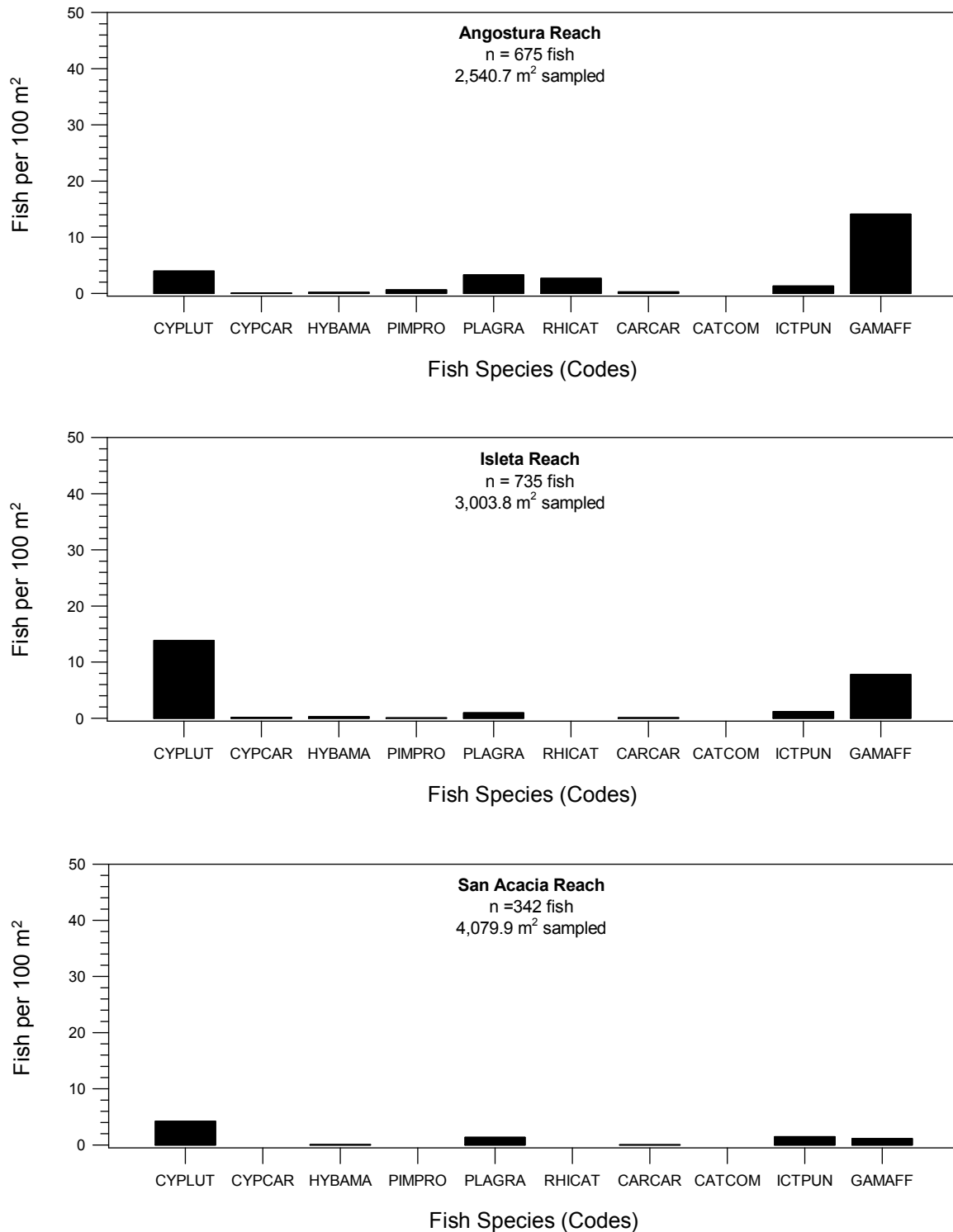


Figure 3. Fish densities from October 2015 for each focal species in the three reaches of the Middle Rio Grande (see Table 1 for fish species codes).

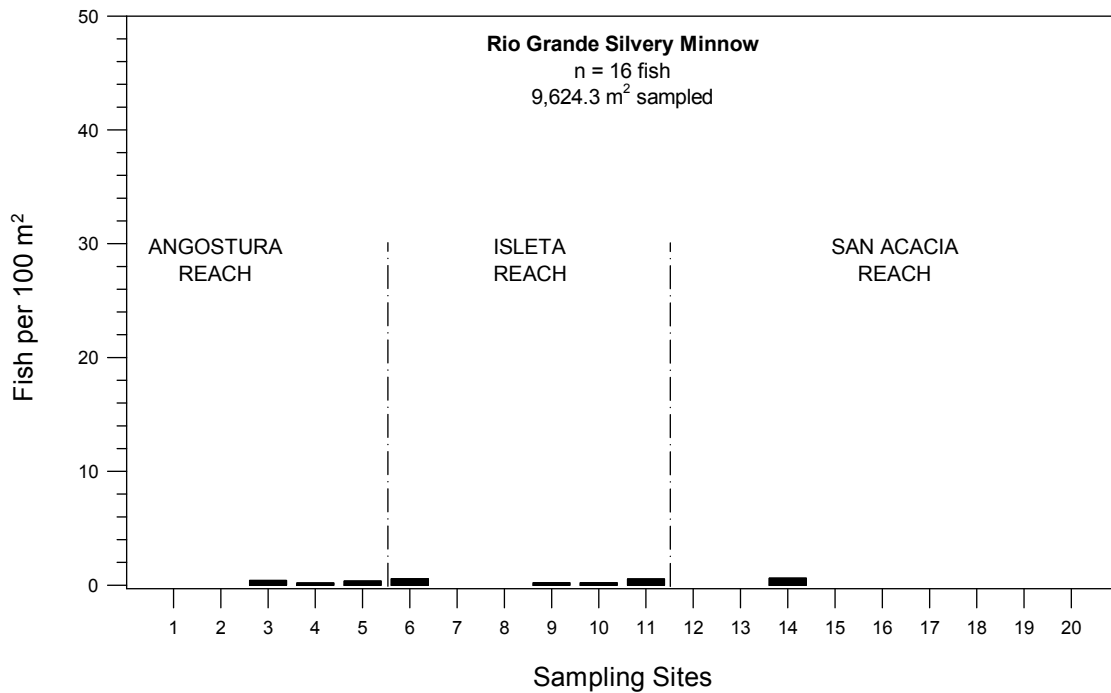
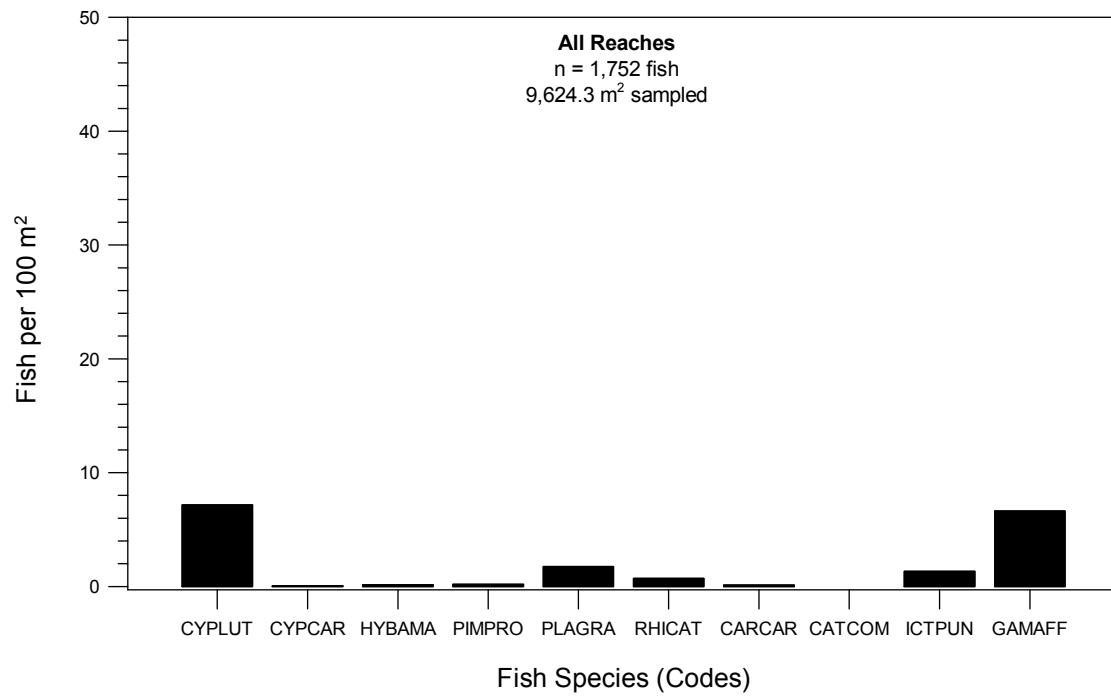


Figure 4. Catch rates for ten focal species from all reaches combined, including Rio Grande Silvery Minnow, during October 2015 at Rio Grande Silvery Minnow population monitoring program collection sites (see Table 1 for fish species codes).

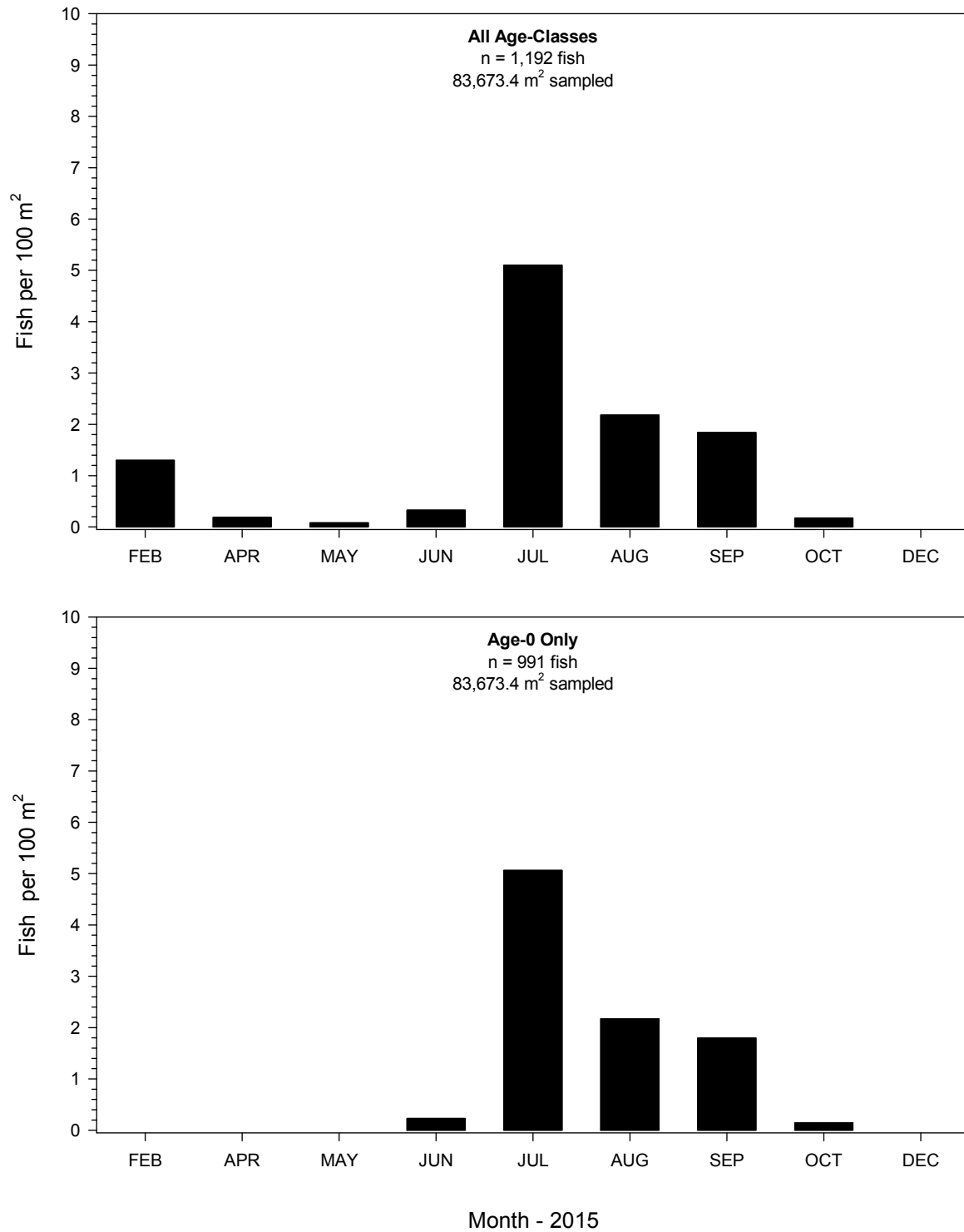


Figure 5. Inter-month fluctuations in densities of Rio Grande Silvery Minnow (all age-classes and age-0 only) during 2015.

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
ANGOSTURA REACH SITES	
SITE #	
1	New Mexico, Sandoval County, Rio Grande, downstream of Angostura Diversion Dam, Algodones.
2	New Mexico, Sandoval County, Rio Grande, upstream of US Highway 550 bridge crossing, Bernalillo.
3	New Mexico, Sandoval County, Rio Grande, ca. 4.0 miles downstream of US Highway 550 bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho.
4	New Mexico, Bernalillo County, Rio Grande, upstream of Central Avenue (US Highway 66) bridge crossing, Albuquerque.
5	New Mexico, Bernalillo County, Rio Grande, upstream of Rio Bravo Boulevard bridge crossing, Albuquerque.
ISLETA REACH SITES	
SITE #	
6	New Mexico, Valencia County, Rio Grande, ca. 0.3 miles upstream of Los Lunas (NM State Highway 49) bridge crossing, Los Lunas.
7	New Mexico, Valencia County, Rio Grande, ca. 1.0 miles upstream of NM State Highway 309/6 bridge crossing, Belen.
8	New Mexico, Valencia County, Rio Grande, ca. 2.2 miles upstream of NM State Highway 346 bridge crossing (near Transwestern Natural Gas Pipeline crossing), Jarales.
9	New Mexico, Socorro County, Rio Grande, upstream of US Highway 60 bridge crossing, Bernardo.
10	New Mexico, Socorro County, Rio Grande, ca. 3.5 miles downstream of US Highway 60 bridge crossing, La Joya.
11	New Mexico, Socorro County, Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia.
SAN ACACIA REACH SITES	
SITE #	
12	New Mexico, Socorro County, Rio Grande, downstream of San Acacia Diversion Dam, San Acacia.

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

Site #	Site Locality
SAN ACACIA REACH SITES (continued)	
SITE #	
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.
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.

Ichthyofaunal composition of the October 2015 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 October 2015

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

RKD15-158

Site Number: 1 River Mile: 209.7 08 October 2015
UTM Easting: 363811 UTM Northing: 3916006 Zone: 13 Quad: San Felipe Pueblo
M.A. Farrington, S.L. Clark Baralow, R. C. Keller Effort: 482.8 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	2
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	19
76	<i>Rhinichthys cataractae</i>	27
212	<i>Gambusia affinis</i>	257
294	<i>Lepomis cyanellus</i>	1
294	<i>Lepomis macrochirus</i>	1

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

RKD15-159

Site Number: 2 River Mile: 203.8 08 October 2015
UTM Easting: 358543 UTM Northing: 3909722 Zone: 13 Quad: Bernalillo
M.A. Farrington, S.L. Clark Baralow, R. C. Keller Effort: 488.8 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	3
76	<i>Pimephales promelas</i>	2
76	<i>Platygobio gracilis</i>	39
76	<i>Rhinichthys cataractae</i>	14
212	<i>Gambusia affinis</i>	2

Rio Grande Silvery Minnow Population Monitoring October 2015

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage

RKD15-160

Rio Grande, ca. 4.0 miles downstream of US HWY 550 (formerly NM State HWY 44) bridge crossing, at
 Rio Rancho Wastewater Treatment Plant, Rio Rancho.

Site Number: 3

River Mile: 200.0

08 October 2015

UTM Easting: 354772

UTM Northing: 3905355

Zone: 13

Quad: Bernalillo

M.A. Farrington, S.L. Clark Baralow, R. C. Keller

Effort: 494.7 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	74
76	<i>Hybognathus amarus</i> *	2
76	<i>Pimephales promelas</i>	2
76	<i>Platygobio gracilis</i>	20
76	<i>Rhinichthys cataractae</i>	24
81	<i>Carpodes carpio</i>	5
212	<i>Gambusia affinis</i>	61

* *Hybognathus amarus* by age class:

age-0: 2

age-1:

age-2+:

Rio Grande Silvery Minnow Population Monitoring October 2015

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

RKD15-157

Site Number: 4 River Mile: 183.4 08 October 2015
 UTM Easting: 346840 UTM Northing: 3884094 Zone: 13 Quad: Albuquerque West
 M.A. Farrington, S.L. Clark Baralow, R. C. Keller Effort: 526.2 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	19
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus</i> *	1
76	<i>Pimephales promelas</i>	4
76	<i>Platygobio gracilis</i>	4
76	<i>Rhinichthys cataractae</i>	3
81	<i>Carpodes carpio</i>	2
93	<i>Ictalurus punctatus</i>	19
212	<i>Gambusia affinis</i>	10

* *Hybognathus amarus* by age class:

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

Rio Grande Silvery Minnow Population Monitoring October 2015

NEW MEXICO: BERNALILLO Co., RIO GRANDE Drainage **RKD15-156**
Rio Grande, at Rio Bravo Blvd. Bridge crossing (NM State HWY 500) crossing, Albuquerque.

Site Number: 5 River Mile: 178.3 08 October 2015
UTM Easting: 347554 UTM Northing: 3877163 Zone: 13 Quad: Albuquerque West
M.A. Farrington, S.L. Clark Baralow, R. C. Keller Effort: 548.3 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	3
76	<i>Hybognathus amarus</i> *	2
76	<i>Pimephales promelas</i>	7
76	<i>Platygobio gracilis</i>	2
93	<i>Ictalurus punctatus</i>	14
212	<i>Gambusia affinis</i>	28

*** Hybognathus amarus by age class:**

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

NEW MEXICO: VALENCIA Co., RIO GRANDE Drainage **RKD15-155**
Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas.

Site Number: 6 River Mile: 161.4 07 October 2015
UTM Easting: 342898 UTM Northing: 3852531 Zone: 13 Quad: Los Lunas
R.K. Dudley, S.L. Clark Barkalow, R.C. Keller Effort: 525.4 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	70
76	<i>Hybognathus amarus</i> *	3
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	3
81	<i>Carpodes carpio</i>	1
93	<i>Ictalurus punctatus</i>	5
212	<i>Gambusia affinis</i>	1

*** Hybognathus amarus by age class:**

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

Rio Grande Silvery Minnow Population Monitoring October 2015

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

RKD15-154

Site Number: 7 River Mile: 151.5
UTM Easting: 339972 UTM Northing: 3837061 Zone: 13 Quad: Tome
R.K. Dudley, S.L. Clark Barkalow, R.C. Keller

07 October 2015

Effort: 458.2 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	83
76	<i>Cyprinus carpio</i>	1
76	<i>Platygobio gracilis</i>	2
93	<i>Ictalurus punctatus</i>	10
212	<i>Gambusia affinis</i>	17
294	<i>Pomoxis annularis</i>	1

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

RKD15-153

Site Number: 8 River Mile: 143.2
UTM Easting: 338136 UTM Northing: 3827329 Zone: 13 Quad: Veguita
R.K. Dudley, S.L. Clark Barkalow, R.C. Keller

07 October 2015

Effort: 502.4 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	70
76	<i>Cyprinus carpio</i>	1
76	<i>Platygobio gracilis</i>	6
93	<i>Ictalurus punctatus</i>	1
212	<i>Gambusia affinis</i>	9

Rio Grande Silvery Minnow Population Monitoring October 2015

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

RKD15-152

Site Number: 9 River Mile: 130.6
 UTM Easting: 334604 UTM Northing: 3809726 Zone: 13
 R.K. Dudley, S.L. Clark Barkalow, R.C. Keller

07 October 2015
 Quad: Abeytas
 Effort: 487.1 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	63
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus</i> *	1
76	<i>Platygobio gracilis</i>	1
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	3
212	<i>Gambusia affinis</i>	129

* *Hybognathus amarus* by age class:

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

Rio Grande Silvery Minnow Population Monitoring October 2015

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

RKD15-151

Site Number: 10 River Mile: 127.0
 UTM Easting: 331094 UTM Northing: 3805229 Zone: 13 Quad: Abeytas
 R.K. Dudley, S.L. Clark Barkalow, R.C. Keller

07 October 2015

Effort: 485.7 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	98
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus</i> *	1
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	2
81	<i>Carpionodes carpio</i>	1
93	<i>Ictalurus punctatus</i>	1
212	<i>Gambusia affinis</i>	54

* *Hybognathus amarus* by age class:

age-0: 1

age-1:

age-2+:

Rio Grande Silvery Minnow Population Monitoring October 2015

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

RKD15-150

Site Number: 11 River Mile: 116.8
UTM Easting: 327902 UTM Northing: 3792603 Zone: 13 Quad: La Joya
J.L. Kennedy, S.L. Clark Barkalow, R.C. Keller

06 October 2015
Effort: 545.0 sq. m

<u>FAMILY</u>	<u>N</u>
76 <i>Cyprinella lutrensis</i>	32
76 <i>Cyprinus carpio</i>	1
76 <i>Hybognathus amarus</i> *	3
76 <i>Platygobio gracilis</i>	15
81 <i>Carpionodes carpio</i>	1
93 <i>Ictalurus punctatus</i>	16
212 <i>Gambusia affinis</i>	24

* *Hybognathus amarus* by age class:
age-0: 3
age-1:
age-2+:

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

RKD15-149

Site Number: 12 River Mile: 116.2
UTM Easting: 326162 UTM Northing: 3791977 Zone: 13 Quad: San Acacia
J.L. Kennedy, S.L. Clark Barkalow, R.C. Keller

06 October 2015
Effort: 495.6 sq. m

<u>FAMILY</u>	<u>N</u>
76 <i>Cyprinella lutrensis</i>	43
76 <i>Platygobio gracilis</i>	39
81 <i>Carpionodes carpio</i>	1
93 <i>Ictalurus punctatus</i>	13

Rio Grande Silvery Minnow Population Monitoring October 2015

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

RKD15-148

Site Number: 13 River Mile: 114.6 06 October 2015
 UTM Easting: 325263 UTM Northing: 3790442 Zone: 13 Quad: Lemitar
 J.L. Kennedy, S.L. Clark Barkalow, R.C. Keller Effort: 530.8 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	32
76	<i>Platygobio gracilis</i>	6
93	<i>Ictalurus punctatus</i>	12
212	<i>Gambusia affinis</i>	3

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.

RKD15-147

Site Number: 14 River Mile: 99.5 06 October 2015
 UTM Easting: 327097 UTM Northing: 3771043 Zone: 13 Quad: Loma de las Canas
 J.L. Kennedy, S.L. Clark Barkalow, R.C. Keller Effort: 483.1 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	8
76	<i>Hybognathus amarus</i> *	3
76	<i>Platygobio gracilis</i>	5
93	<i>Ictalurus punctatus</i>	12
212	<i>Gambusia affinis</i>	1

* *Hybognathus amarus* by age class:

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

Rio Grande Silvery Minnow Population Monitoring October 2015

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

RKD15-146

Site Number: 15 River Mile: 91.7 06 October 2015
UTM Easting: 328140 UTM Northing: 3761283 Zone: 13 Quad: San Antonio
J.L. Kennedy, S.L. Clark Barkalow, R.C. Keller Effort: 484.7 sq. m

FAMILY

212 *Gambusia affinis*

N
2

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

RKD15-145

Site Number: 16 River Mile: 87.1 05 October 2015
UTM Easting: 328914 UTM Northing: 3754471 Zone: 13 Quad: San Antonio
W.H. Brandenburg, J.L. Kennedy, R.C. Keller Effort: sq. m

FAMILY

No Fish Collected

N

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

RKD15-144

Site Number: 17 River Mile: 79.1 05 October 2015
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San Antonio SE
W.H. Brandenburg, J.L. Kennedy, R.C. Keller Effort: 499.8 sq. m

FAMILY

76 *Cyprinella lutrensis*
76 *Platygobio gracilis*
93 *Ictalurus punctatus*

N
2
1
3

Rio Grande Silvery Minnow Population Monitoring October 2015

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

RKD15-143

Site Number: 18 River Mile: 68.6 05 October 2015
UTM Easting: 315284 UTM Northing: 3728347 Zone: 13 Quad: San Marcial
W.H. Brandenburg, J.L. Kennedy, R.C. Keller Effort: 472.9 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	30
76	<i>Platygobio gracilis</i>	2
93	<i>Ictalurus punctatus</i>	5
212	<i>Gambusia affinis</i>	3

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

RKD15-142

Site Number: 19 River Mile: 60.5 05 October 2015
UTM Easting: 309487 UTM Northing: 3718178 Zone: 13 Quad: Paraje Well
W.H. Brandenburg, J.L. Kennedy, R.C. Keller Effort: 561.0 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	24
76	<i>Platygobio gracilis</i>	3
93	<i>Ictalurus punctatus</i>	1
212	<i>Gambusia affinis</i>	35

Rio Grande Silvery Minnow Population Monitoring October 2015

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

RKD15-141

Site Number: 20 River Mile: 58.8 05 October 2015
UTM Easting: 307846 UTM Northing: 3716150 Zone: 13 Quad: Paraje Well
W.H. Brandenburg, J.L. Kennedy, R.C. Keller Effort: 552.1 sq. m

<u>FAMILY</u>		<u>N</u>
76	<i>Cyprinella lutrensis</i>	34
81	<i>Carpoides carpio</i>	1
93	<i>Ictalurus punctatus</i>	14
93	<i>Pylodictis olivaris</i>	1
212	<i>Gambusia affinis</i>	3