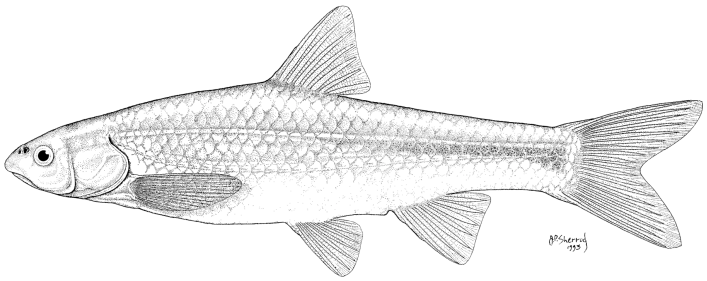
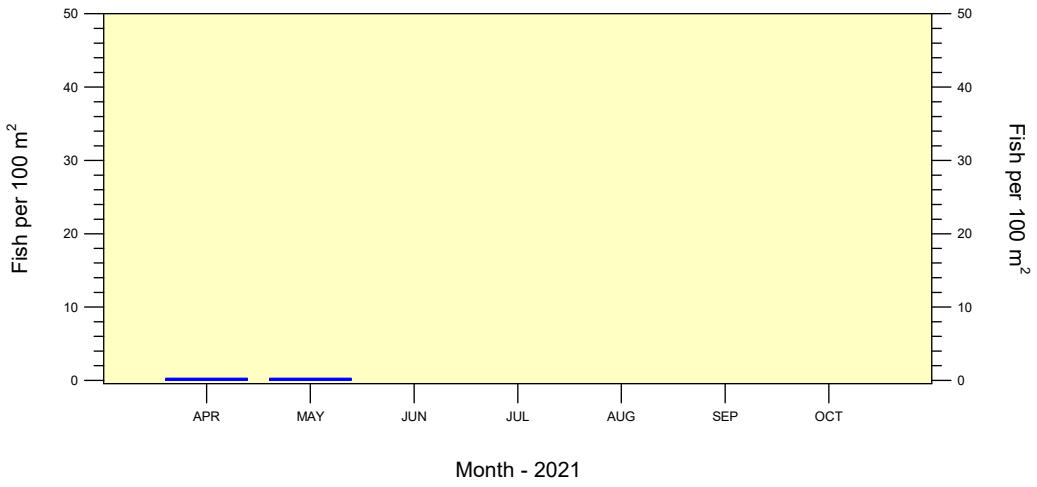
Rio Grande Silvery Minnow Population Monitoring during May 2021

A U.S. Bureau of Reclamation Funded Research Program





17 June 2021

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555 Broadway NE, Suite 100
Albuquerque, NM 87102

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U.S. Bureau of Reclamation
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17 June 2021

SUMMARY OF MAY 2021 POPULATION MONITORING

The May 2021 population monitoring efforts were conducted at the 20 standard sites. Five sites were located in the Angostura Reach, six sites were located in the Isleta Reach, and nine sites were located in the San Acacia Reach. For the 2021 monthly trends, data were based on all sites (i.e., standard, additional, and replacement sites) to maintain consistency across all monthly reports. A list of all collection localities is appended (Appendix A). Adult and juvenile fish were obtained by rapidly drawing a 3.0 m x 1.8 m small-mesh (ca. 5 mm) seine through discrete mesohabitats. Larval fish were collected with a 1.2 m x 1.2 m fine-mesh (ca. 1 mm) seine. All fishes were identified to species and enumerated. We used length-age relationships to assign ages (i.e., age-0, age-1, and age-2+) to all Rio Grande Silvery Minnow collected. Age-0 individuals are only present, however, after annual spring spawning occurs (ca. April–June). Figures illustrating fish densities (i.e., fish per 100 m^2) were prepared for the ten focal species to facilitate comparisons across reaches.

Angostura Reach

From 16 April to 15 May, provisional mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gage 08330000) averaged 1,174 ft^3/s and ranged from 698 to 1,730 ft^3/s. Water temperatures ranged from 14.6 to 16.4 ºC during the Angostura Reach sampling efforts (ca. 0830–1530 h). Secchi disk measurements of water clarity ranged from 13 to 32 cm.

Sampling for fishes in the Angostura Reach during May yielded 1,335 individuals with a cumulative fish density of 52.3 individuals per 100 m^2 sampled. The overall sampling effort in the Angostura Reach covered 2,550.5 m^2 (surface area) of water. Densities of all fish species combined ranged from 15.3 to 95.0 individuals per 100 m^2 at the different sampling sites. In May, there were 10 fish species collected in the Angostura Reach. Red Shiner was the most abundant taxon (n = 894), followed by White Sucker (n = 257), and Flathead Chub (n = 94). We collected Rio Grande Silvery Minnow (n = 2) in 2 of the 82 seine hauls that yielded fish, and its overall density was 0.08 (range = 0.00–0.19) individuals per 100 m^2.

Isleta Reach

Provisional mean daily discharge in the Isleta Reach (Rio Grande near Bosque Farms, NM; USGS Gage 08331160), from 16 April to 15 May, averaged 756 ft^3/s and ranged from 323 to 1,340 ft^3/s. During the Isleta Reach sampling efforts (ca. 0930–1600 h), water temperatures ranged from 17.9 to 22.7 ºC. Secchi disk measurements ranged from 7 to 16 cm during sampling.

Isleta Reach population monitoring efforts produced 3,231 individuals in May with a cumulative fish density of 105.2 individuals per 100 m^2 sampled. The total sampling effort in the Isleta Reach during May covered 3,070.2 m^2 (surface area) of water. Fish densities (all species combined) at the sampling sites ranged from 11.6 to 220.5 individuals per 100 m^2 sampled. There were 8 fish species collected in the Isleta Reach during May. Red Shiner was the most abundant taxon (n = 3,056), followed by Western Mosquitofish (n = 124), and Channel Catfish (n = 20). We collected Rio Grande Silvery Minnow (n = 4) in 4 of the 107 seine hauls that yielded fish, and its overall density was 0.13 (range = 0.00–0.41) individuals per 100 m^2.

San Acacia Reach

From 16 April to 15 May, provisional mean daily discharge at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gage 08354900) was generally higher (average = 583; range = 273–1,140 ft^3/s) than at San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gage 08358400) during the same period (average = 352; range = 104–926 ft^3/s). Water temperatures in May for the San Acacia Reach ranged from 15.7 to 20.6 ºC (ca. 0930–1600 h). Secchi disk measurements ranged from 7 to 17 cm during sampling.

Population monitoring efforts in the San Acacia Reach during May yielded 4,743 individuals with a cumulative fish density of 98.8 individuals per 100 m^2 sampled. Sampling in the San Acacia Reach covered an area of 4,799.1 m^2 of water. Fish densities (all species combined) ranged from 1.1 to 332.8 individuals per 100 m^2 at sites sampled in the San Acacia Reach. In May, there were 8 fish species collected in the San Acacia Reach. Red Shiner was the most abundant taxon (n = 4,705), followed by Flathead Chub (n = 12), and Rio Grande Silvery Minnow (n = 9). We collected Rio Grande Silvery Minnow (n = 9) in 9 of the 126 seine hauls that yielded fish, and its overall density was 0.19 (range = 0.00–0.76) individuals per 100 m^2.

All Sites

During May, sampling covered 10,419.7 m^2 (surface area) of water and yielded 9,309 fish. There were no dry sampling sites. Cumulative fish density during May was 89.34 individuals per 100 m^2 sampled. The three most common species were Red Shiner (n = 8,655), White Sucker (n = 261), and Western Mosquitofish (n = 131). The sampling sites yielded a total of 12 fish species.

Rio Grande Silvery Minnow was present in 15 of the 315 seine hauls that yielded fish and at 8 of the 20 sampling sites. Densities of unmarked and marked individuals were 0.14 (n = 15) and 0.00 (n = 0) individuals per 100 m^2 sampled, respectively. Densities of age-0, age-1, and age-2+ individuals were 0.00 (n = 0), 0.07 (n = 7), and 0.08 (n = 8) individuals per 100 m^2 sampled, respectively. Based on all May surveys since 1993, the overall density of Rio Grande Silvery Minnow averaged 6.16 (range = 0.05–86.28) individuals per 100 m^2 sampled. During May 2021, its overall density was 0.14 (n = 15) individuals per 100 m^2 sampled.

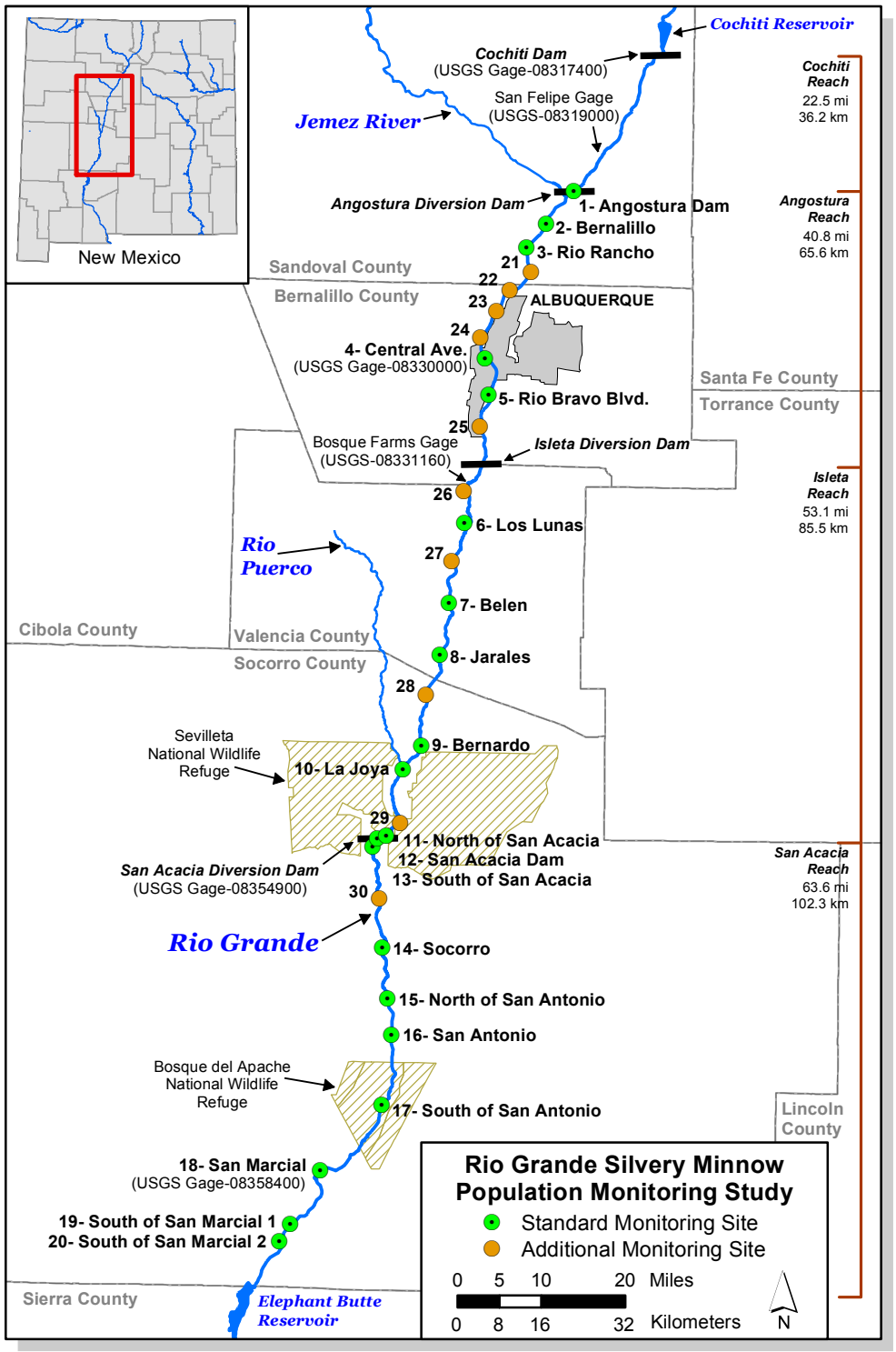

Figure 1. Map of the study area, standard sites, and additional sites for the Rio Grande Silvery Minnow population monitoring study. Sampling site descriptions are provided in Appendix A.

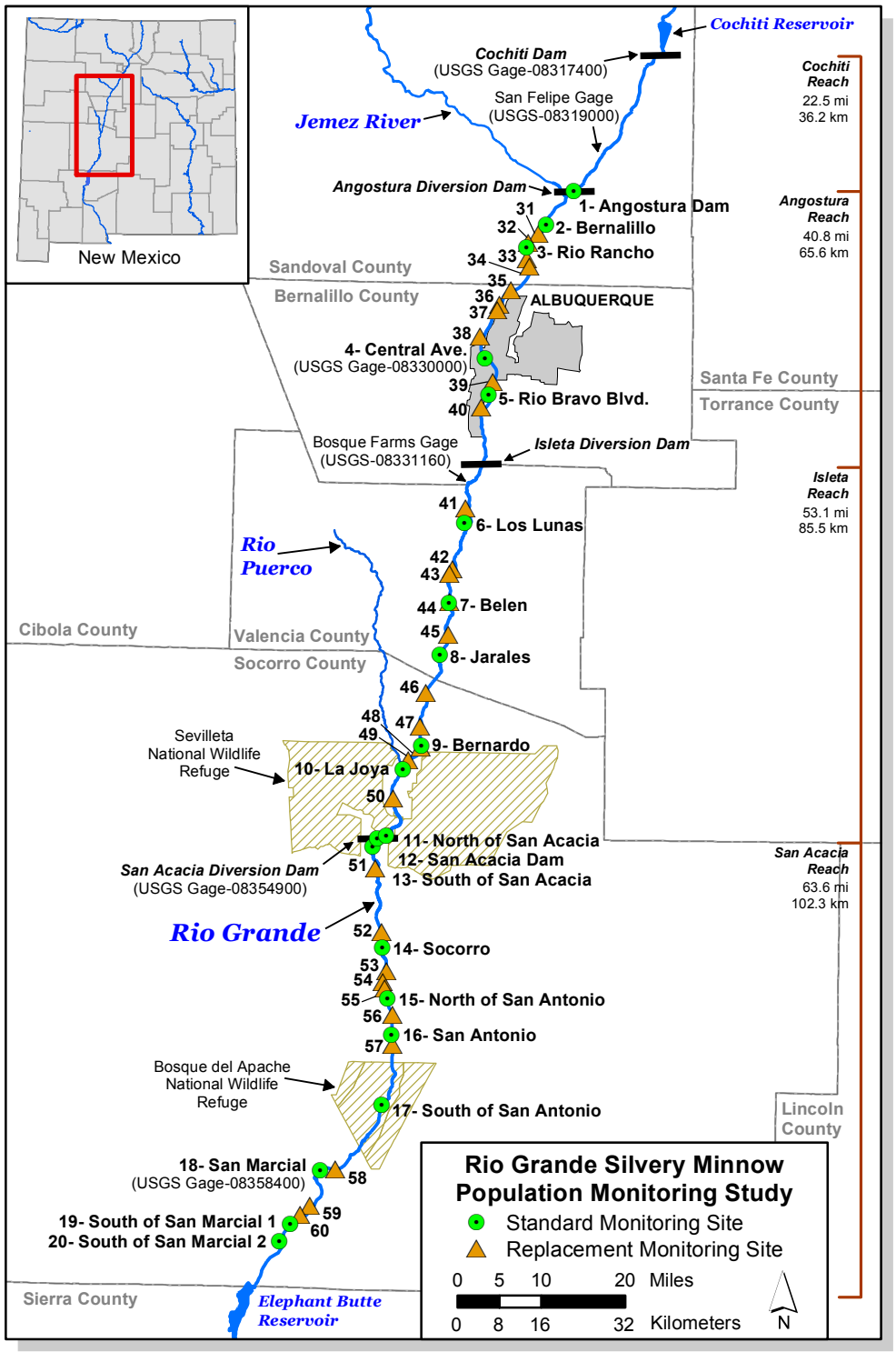

Figure 2. Map of the study area, standard sites, and replacement sites for the Rio Grande Silvery Minnow population monitoring study. Sampling site descriptions are provided in Appendix A.

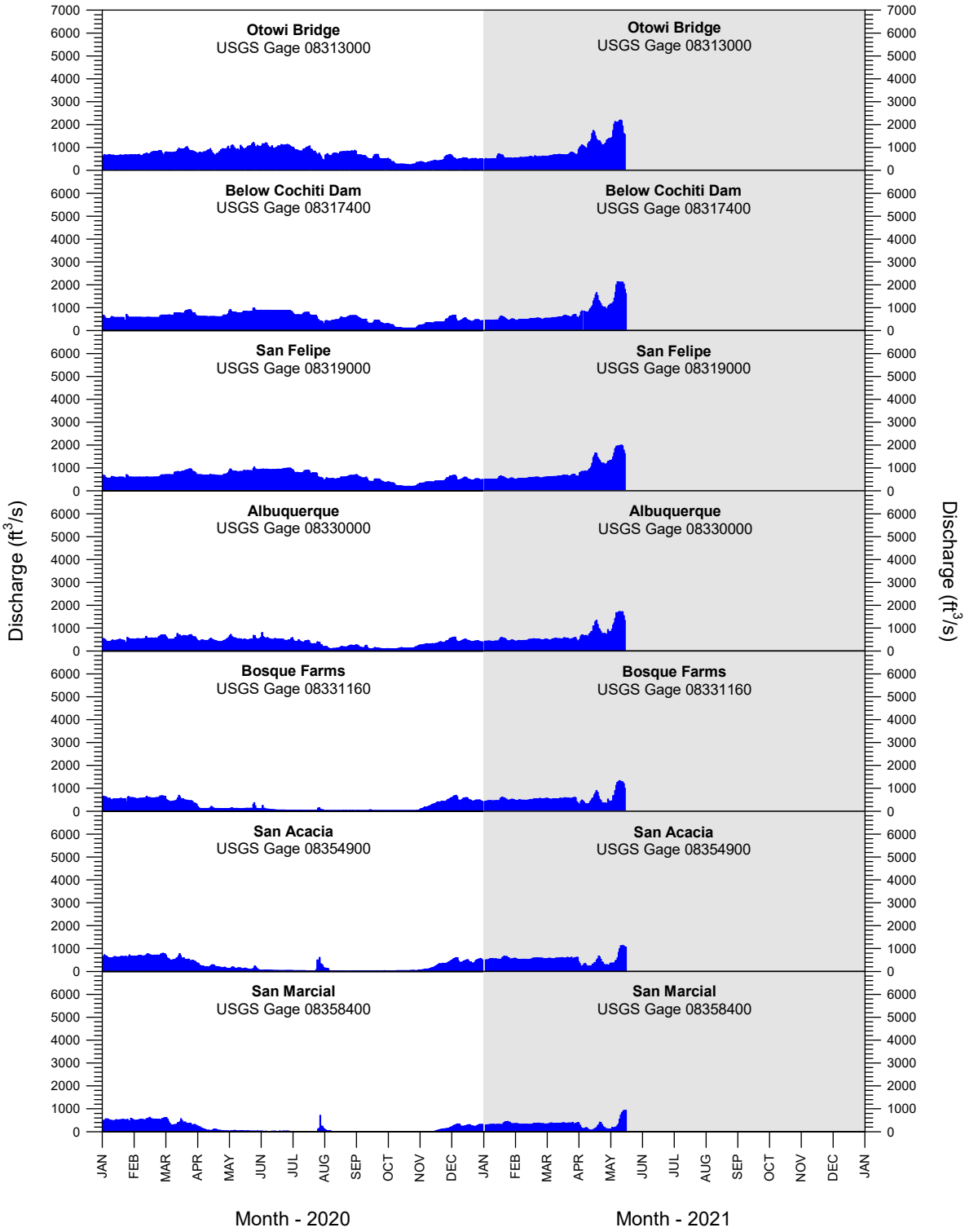

Figure 3. Rio Grande mean-daily discharge, by U.S. Geological Survey (USGS) gaging station, from 1 January 2020 to 15 May 2021. All discharge data are provisional and subject to change.

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

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

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

Scientific Name	Common Name	Species Code
Order Cyprinodontiformes		
Family Poeciliidae	**livebearers**	
Gambusia affinis	Western Mosquitofish[1]	(GAMAFF)
Order Perciformes		
Family Moronidae	**temperate basses**	
Morone chrysops	White Bass	(MORCHR)
Morone saxatilis	Striped Bass	(MORSAX)
Family Centrarchidae	**sunfishes**	
Lepomis cyanellus	Green Sunfish	(LEPCYA)
Lepomis macrochirus	Bluegill	(LEPMAC)
Lepomis megalotis	Longear Sunfish	(LEPMEG)
Micropterus dolomieu	Smallmouth Bass	(MICDOL)
Micropterus salmoides	Largemouth Bass	(MICSAL)
Pomoxis annularis	White Crappie	(POMANN)
Pomoxis nigromaculatus	Black Crappie	(POMNIG)
Family Percidae	**perches and darters**	
Perca flavescens	Yellow Perch	(PERFLA)
Percina macrolepida	Bigscale Logperch	(PERMAC)
Sander vitreus	Walleye	(SANVIT)
Family Sciaenidae	**drums and croakers**	
Aplodinotus grunniens	Freshwater Drum	(APLGRU)

[1] = Focal taxa were typically the 10 most abundant species collected during October.

Table 2. Rio Grande Silvery Minnow abundance, by reach, site, and mesohabitat, during May 2021. Marked and unmarked individuals were included. Blank cells indicate site-specific mesohabitats that were unavailable for sampling.

Reach	Site	Locality	BW	PO	RU	SHPO	SHRU	Total
Angostura	1	Angostura Dam		0	0	0	0	0
Angostura	2	Bernalillo			0	0	0	0
Angostura	3	Rio Rancho		0	0	0	0	0
Angostura	4	Central Ave.			0	0	1	1
Angostura	5	Rio Bravo Blvd.			0	0	1	1
Angostura Totals			*0*	*0*	*0*	*0*	*2*	*2*
Isleta	6	Los Lunas		0	0	0	0	0
Isleta	7	Belen	0		1	0	0	1
Isleta	8	Jarales			1	0	0	1
Isleta	9	Bernardo		0	1	0	1	2
Isleta	10	La Joya			0	0	0	0
Isleta	11	North of San Acacia			0	0	0	0
Isleta Totals			*0*	*0*	*3*	*0*	*1*	*4*
San Acacia	12	San Acacia Dam		0	0	0	0	0
San Acacia	13	South of San Acacia	0		1	0	3	4
San Acacia	14	Socorro		0	0	0	0	0
San Acacia	15	North of San Antonio	0	0	0	0	0	0
San Acacia	16	San Antonio		0	0	0	0	0
San Acacia	17	South of San Antonio			0	2	2	4
San Acacia	18	San Marcial	0		0	0	0	0
San Acacia	19	South of San Marcial 1	0		0	0	0	0
San Acacia	20	South of San Marcial 2			0	0	1	1
San Acacia Totals			*0*	*0*	*1*	*2*	*6*	*9*
Monthly Totals			**0**	**0**	**4**	**2**	**9**	**15**

Table 3. Rio Grande Silvery Minnow abundance, by reach, site, and month, during 2021. Marked individuals are shown in parentheses, as a subset of the site-specific total. Blank cells indicate months when a site was not visited or will not be visited.

Reach	Site	Locality	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Angostura	1	Angostura Dam	0	0	0	0	0	0	0	0
Angostura	2	Bernalillo	2(0)	0	0	0	0	0	0	2
Angostura	3	Rio Rancho	1(0)	0	0	0	0	0	0	1
Angostura	21	Site 21	4(0)						0	4
Angostura	22	Site 22	0						0	0
Angostura	23	Site 23	0						0	0
Angostura	24	Site 24	1(1)						0	1
Angostura	4	Central Ave.	0	1(0)	0	0	0	0	0	1
Angostura	5	Rio Bravo Blvd.	1(0)	1(0)	0	0	0	0	0	2
Angostura	25	Site 25	0						0	0
Angostura Totals			*9*	*2*	*0*	*0*	*0*	*0*	*0*	*11*
Isleta	26	Site 26	0						0	0
Isleta	6	Los Lunas	1(0)	0	0	0	0	0	0	1
Isleta	27	Site 27	2(1)						0	2
Isleta	7	Belen	1(0)	1(0)	0	0	0	0	0	2
Isleta	8	Jarales	0	1(0)	0	0	0	0	0	1
Isleta	28	Site 28	0						0	0
Isleta	9	Bernardo	1(0)	2(0)	0	0	0	0	0	3
Isleta	10	La Joya	0	0	0	0	0	0	0	0
Isleta	29	Site 29	2(0)						0	2
Isleta	11	North of San Acacia	0	0	0	0	0	0	0	0
Isleta Totals			*7*	*4*	*0*	*0*	*0*	*0*	*0*	*11*
San Acacia	12	San Acacia Dam	1(0)	0	0	0	0	0	0	1
San Acacia	13	South of San Acacia	0	4(0)	0	0	0	0	0	4
San Acacia	30	Site 30	0						0	0
San Acacia	14	Socorro	1(0)	0	0	0	0	0	0	1
San Acacia	15	North of San Antonio	0	0	0	0	0	0	0	0
San Acacia	16	San Antonio	0	0	0	0	0	0	0	0
San Acacia	17	South of San Antonio	1(0)	4(0)	0	0	0	0	0	5
San Acacia	18	San Marcial	0	0	0	0	0	0	0	0
San Acacia	19	South of San Marcial 1	0	0	0	0	0	0	0	0
San Acacia	20	South of San Marcial 2	0	1(0)	0	0	0	0	0	1
San Acacia Totals			*3*	*9*	*0*	*0*	*0*	*0*	*0*	*12*
Monthly Totals			**19**	**15**	**0**	**0**	**0**	**0**	**0**	**34**

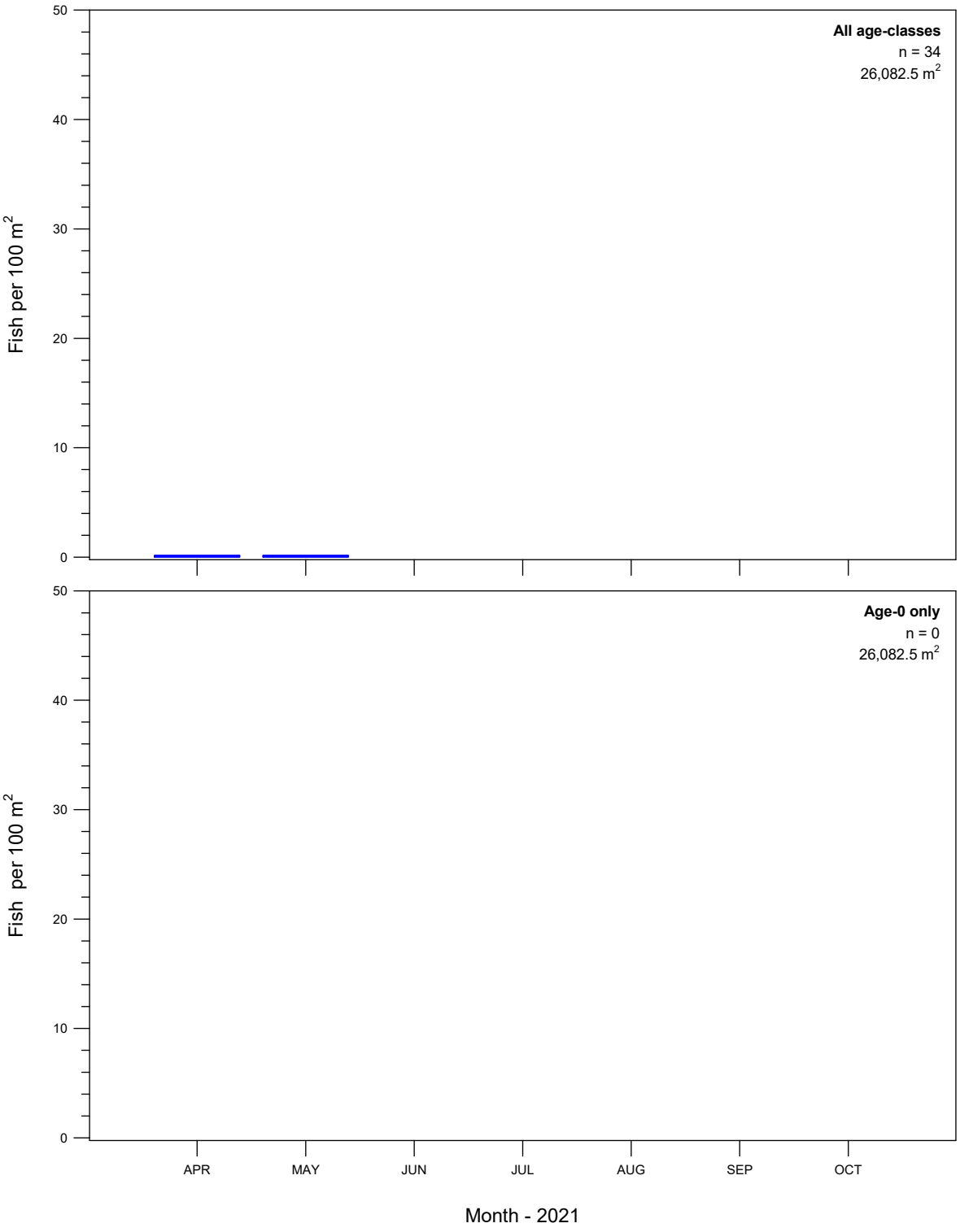

Figure 4. Rio Grande Silvery Minnow densities based on all sites, by age-class and month, during 2021. Marked and unmarked individuals were included.

Table 4. Ichthyofaunal summary based on all sites, by species, during May 2021. Marked and unmarked Rio Grande Silvery Minnow were included. Dashes (-) indicate species that were absent during sampling.

Family	Common Name	Residence Status[1]	Total Number of Individuals	Percent (%) of Total	Frequency of Occurrence[2]	% Frequency of Occurrence[2]
Clupeidae	Gizzard Shad	N	-	-	-	-
Clupeidae	Threadfin Shad	I	-	-	-	-
Cyprinidae	Central Stoneroller	I	-	-	-	-
Cyprinidae	Goldfish	I	-	-	-	-
Cyprinidae	Red Shiner	N	8,655	92.97	20	100.00
Cyprinidae	Common Carp	I	1	0.01	1	5.00
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	15	0.16	8	40.00
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	49	0.53	9	45.00
Cyprinidae	Bullhead Minnow	I	-	-	-	-
Cyprinidae	Flathead Chub	N	108	1.16	11	55.00
Cyprinidae	Longnose Dace	N	41	0.44	2	10.00
Catostomidae	River Carpsucker	N	12	0.13	6	30.00
Catostomidae	White Sucker	I	261	2.80	6	30.00
Catostomidae	Smallmouth Buffalo	N	-	-	-	-
Ictaluridae	Black Bullhead	I	-	-	-	-
Ictaluridae	Yellow Bullhead	I	1	0.01	1	5.00
Ictaluridae	Blue Catfish	N	1	0.01	1	5.00
Ictaluridae	Channel Catfish	I	34	0.37	10	50.00
Ictaluridae	Flathead Catfish	N	-	-	-	-
Loricariidae	Vermiculated Sailfin Catfish	I	-	-	-	-
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	131	1.41	9	45.00
Moronidae	White Bass	I	-	-	-	-
Moronidae	Striped Bass	I	-	-	-	-
Centrarchidae	Green Sunfish	I	-	-	-	-
Centrarchidae	Bluegill	I	-	-	-	-
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	-	-	-	-
Sciaenidae	Freshwater Drum	N	-	-	-	-
Monthly Total			**9,309**	**100.00**		

[1] = N (native); I (introduced)
[2] = Frequency and % frequency of occurrence were based on all sites.

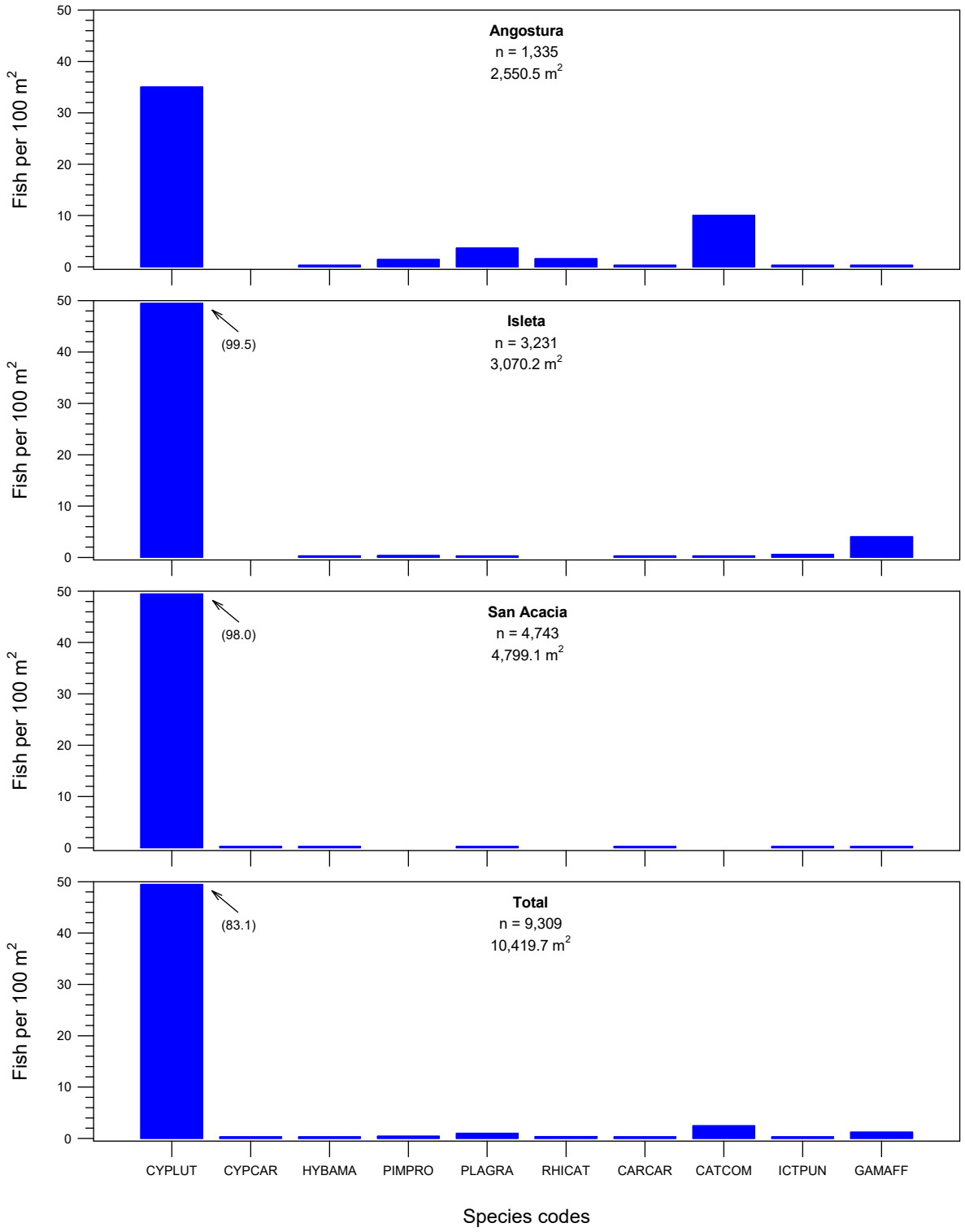

Figure 5. Fish densities based on all sites, by reach and focal taxa, during May 2021. Marked and unmarked Rio Grande Silvery Minnow were included.

Table 5. Ichthyofaunal summary based on all sites, by species and month, during 2021. Marked and unmarked Rio Grande Silvery Minnow were included.

Family	Common Name	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Clupeidae	Gizzard Shad	0	0	0	0	0	0	0	0
Clupeidae	Threadfin Shad	0	0	0	0	0	0	0	0
Cyprinidae	Central Stoneroller	0	0	0	0	0	0	0	0
Cyprinidae	Goldfish	0	0	0	0	0	0	0	0
Cyprinidae	Red Shiner	12,968	8,655	0	0	0	0	0	21,623
Cyprinidae	Common Carp	12	1	0	0	0	0	0	13
Cyprinidae	Rio Grande Chub	0	0	0	0	0	0	0	0
Cyprinidae	Rio Grande Silvery Minnow	19	15	0	0	0	0	0	34
Cyprinidae	Golden Shiner	0	0	0	0	0	0	0	0
Cyprinidae	Fathead Minnow	140	49	0	0	0	0	0	189
Cyprinidae	Bullhead Minnow	1	0	0	0	0	0	0	1
Cyprinidae	Flathead Chub	271	108	0	0	0	0	0	379
Cyprinidae	Longnose Dace	20	41	0	0	0	0	0	61
Catostomidae	River Carpsucker	24	12	0	0	0	0	0	36
Catostomidae	White Sucker	91	261	0	0	0	0	0	352
Catostomidae	Smallmouth Buffalo	0	0	0	0	0	0	0	0
Ictaluridae	Black Bullhead	0	0	0	0	0	0	0	0
Ictaluridae	Yellow Bullhead	1	1	0	0	0	0	0	2
Ictaluridae	Blue Catfish	0	1	0	0	0	0	0	1
Ictaluridae	Channel Catfish	102	34	0	0	0	0	0	136
Ictaluridae	Flathead Catfish	1	0	0	0	0	0	0	1
Loricariidae	Vermiculated Sailfin Catfish	0	0	0	0	0	0	0	0
Salmonidae	Rainbow Trout	0	0	0	0	0	0	0	0
Salmonidae	Brown Trout	0	0	0	0	0	0	0	0
Poeciliidae	Western Mosquitofish	409	131	0	0	0	0	0	540
Moronidae	White Bass	0	0	0	0	0	0	0	0
Moronidae	Striped Bass	0	0	0	0	0	0	0	0
Centrarchidae	Green Sunfish	0	0	0	0	0	0	0	0
Centrarchidae	Bluegill	0	0	0	0	0	0	0	0
Centrarchidae	Longear Sunfish	0	0	0	0	0	0	0	0
Centrarchidae	Smallmouth Bass	0	0	0	0	0	0	0	0
Centrarchidae	Largemouth Bass	0	0	0	0	0	0	0	0
Centrarchidae	White Crappie	0	0	0	0	0	0	0	0
Centrarchidae	Black Crappie	0	0	0	0	0	0	0	0
Percidae	Yellow Perch	0	0	0	0	0	0	0	0
Percidae	Bigscale Logperch	0	0	0	0	0	0	0	0
Percidae	Walleye	0	0	0	0	0	0	0	0
Sciaenidae	Freshwater Drum	0	0	0	0	0	0	0	0
Monthly Totals		**14,059**	**9,309**	**0**	**0**	**0**	**0**	**0**	**23,368**

APPENDIX A (Sampling Sites)

Middle Rio Grande Fish Sampling Sites

Table A1. Sampling reaches and standard sites for population monitoring of Rio Grande Silvery Minnow in the Middle Rio Grande.

Reach and Site	Locality
Angostura Reach	
1	New Mexico, Sandoval County, Rio Grande, just downstream of Angostura Diversion Dam, Algodones. River Mile: 209.9; UTM Easting: 363665; UTM Northing: 3916331; Zone: 13; Datum: NAD83
2	New Mexico, Sandoval County, Rio Grande, at US HWY 550 bridge crossing, Bernalillo. River Mile: 203.9; UTM Easting: 358457; UTM Northing: 3909887; Zone: 13; Datum: NAD83
3	New Mexico, Sandoval County, Rio Grande, ca. 4.0 mi downstream of US HWY 550 bridge crossing, Rio Rancho. River Mile: 199.9; UTM Easting: 354728; UTM Northing: 3905587; Zone: 13; Datum: NAD83
4	New Mexico, Bernalillo County, Rio Grande, at Central Ave. bridge crossing (US HWY 66), Albuquerque. River Mile: 183.4; UTM Easting: 346719; UTM Northing: 3884331; Zone: 13; Datum: NAD83
5	New Mexico, Bernalillo County, Rio Grande, at Rio Bravo Blvd. bridge crossing (NM State HWY 500), Albuquerque. River Mile: 178.4; UTM Easting: 347468; UTM Northing: 3877400; Zone: 13; Datum: NAD83
Isleta Reach	
6	New Mexico, Valencia County, Rio Grande, just upstream of NM State HWY 6 bridge crossing, Los Lunas. River Mile: 161.7; UTM Easting: 343149; UTM Northing: 3853187; Zone: 13; Datum: NAD83
7	New Mexico, Valencia County, Rio Grande, ca. 1.0 mi upstream of NM State HWY 309 bridge crossing, Belen. River Mile: 150.8; UTM Easting: 340105; UTM Northing: 3837722; Zone: 13; Datum: NAD83
8	New Mexico, Valencia County, Rio Grande, ca. 2.2 mi upstream of NM State HWY 346 bridge crossing, Jarales. River Mile: 143.2; UTM Easting: 338020; UTM Northing: 3827545; Zone: 13; Datum: NAD83
9	New Mexico, Socorro County, Rio Grande, at US HWY 60 bridge crossing, Bernardo. River Mile: 130.6; UTM Easting: 334578; UTM Northing: 3809921; Zone: 13; Datum: NAD83
10	New Mexico, Socorro County, Rio Grande, ca. 3.7 mi downstream of US HWY 60 bridge crossing, Bernardo. River Mile: 126.8; UTM Easting: 330946; UTM Northing: 3805307; Zone: 13; Datum: NAD83
11	New Mexico, Socorro County, Rio Grande, ca. 1.2 mi upstream of San Acacia Diversion Dam, San Acacia. River Mile: 117.3; UTM Easting: 328152; UTM Northing: 3792564; Zone: 13; Datum: NAD83

Table A1. Sampling reaches and standard sites for population monitoring of Rio Grande Silvery Minnow in the Middle Rio Grande (continued).

Reach and Site	Locality
San Acacia Reach	
12	New Mexico, Socorro County, Rio Grande, just downstream of San Acacia Diversion Dam, San Acacia. River Mile: 115.6; UTM Easting: 325960; UTM Northing: 3792183; Zone: 13; Datum: NAD83
13	New Mexico, Socorro County, Rio Grande, ca. 1.5 mi downstream of San Acacia Diversion Dam, San Acacia. River Mile: 114.1; UTM Easting: 325390; UTM Northing: 3790397; Zone: 13; Datum: NAD83
14	New Mexico, Socorro County, Rio Grande, ca. 0.5 mi upstream of Socorro Low Flow Conveyance Channel bridge crossing, Socorro. River Mile: 99.6; UTM Easting: 327231; UTM Northing: 3771432; Zone: 13; Datum: NAD83
15	New Mexico, Socorro County, Rio Grande, ca. 4.5 mi upstream of US HWY 380 bridge crossing, San Antonio. River Mile: 92.0; UTM Easting: 328151; UTM Northing: 3761487; Zone: 13; Datum: NAD83
16	New Mexico, Socorro County, Rio Grande, at US HWY 380 bridge crossing, San Antonio. River Mile: 87.8; UTM Easting: 328907; UTM Northing: 3754926; Zone: 13; Datum: NAD83
17	New Mexico, Socorro County, Rio Grande, east of Bosque del Apache NWR headquarters, San Antonio. River Mile: 79.0; UTM Easting: 327219; UTM Northing: 3740906; Zone: 13; Datum: NAD83
18	New Mexico, Socorro County, Rio Grande, at San Marcial Railroad bridge crossing, San Marcial. River Mile: 68.3; UTM Easting: 315091; UTM Northing: 3728487; Zone: 13; Datum: NAD83
19	New Mexico, Socorro County, Rio Grande, ca. 8.0 mi downstream of San Marcial Railroad bridge crossing, San Marcial. River Mile: 60.1; UTM Easting: 309441; UTM Northing: 3718309; Zone: 13; Datum: NAD83
20	New Mexico, Socorro County, Rio Grande, ca. 10.0 mi downstream of San Marcial Railroad bridge crossing, San Marcial. River Mile: 58.5; UTM Easting: 307767; UTM Northing: 3716360; Zone: 13; Datum: NAD83

Table A2. Sampling reaches and additional sites for population monitoring of Rio Grande Silvery Minnow in the Middle Rio Grande.

Reach and Site	Locality
Angostura Reach	
21	New Mexico, Sandoval County, Rio Grande, ca. 4.4 miles upstream of Alameda Blvd. (NM State Hwy. 528) bridge crossing, Corrales. River Mile: 196.6; UTM Easting: 355531; UTM Northing: 3900626; Zone: 13; Datum: NAD83
22	New Mexico, Sandoval County, Rio Grande, ca. 1.1 miles upstream of Alameda Blvd. (NM State Hwy. 528) bridge crossing, Corrales. River Mile: 193.1; UTM Easting: 351562; UTM Northing: 3897190; Zone: 13; Datum: NAD83
23	New Mexico, Bernalillo County, Rio Grande, ca. 1.0 miles downstream of Paseo del Norte Blvd. (NM State Hwy. 423) bridge crossing Albuquerque. River Mile: 190.0; UTM Easting: 349214; UTM Northing: 3893063; Zone: 13; Datum: NAD83
24	New Mexico, Bernalillo County, Rio Grande, ca. 1.1 miles upstream of I-40 bridge crossing, Albuquerque. River Mile: 186.1; UTM Easting: 346011; UTM Northing: 3887973; Zone: 13; Datum: NAD83
25	New Mexico, Bernalillo County, Rio Grande, ca. 1.5 miles upstream of I-25 bridge crossing, Isleta. River Mile: 174.0; UTM Easting: 345900; UTM Northing: 3870990; Zone: 13; Datum: NAD83
Isleta Reach	
26	New Mexico, Valencia County, Rio Grande, ca. 4.1 miles upstream of NM State Hwy. 6 bridge crossing, Los Lunas. River Mile: 165.2; UTM Easting: 342799; UTM Northing: 3858637; Zone: 13; Datum: NAD83
27	New Mexico, Valencia County, Rio Grande, ca. 6.2 miles upstream of NM State Hwy. 309 bridge crossing, Belen. River Mile: 156.0; UTM Easting: 340647; UTM Northing: 3845146; Zone: 13; Datum: NAD83
28	New Mexico, Socorro County, Rio Grande, ca. 6.3 miles upstream of U.S. Hwy. 60 bridge crossing, Bernardo. River Mile: 137.1; UTM Easting: 335554; UTM Northing: 3819543; Zone: 13; Datum: NAD83
29	New Mexico, Socorro County, Rio Grande, ca. 1.5 miles upstream of confluence with the Rio Salado, San Acacia. River Mile: 120.1; UTM Easting: 330498; UTM Northing: 3795053; Zone: 13; Datum: NAD83
San Acacia Reach	
30	New Mexico, Socorro County, Rio Grande, ca. 2.6 miles upstream of Pueblitos Rd. bridge crossing, Escondida. River Mile: 107.1; UTM Easting: 326303; UTM Northing: 3781123; Zone: 13; Datum: NAD83

Table A3. Sampling reaches and replacement sites for population monitoring of Rio Grande Silvery Minnow in the Middle Rio Grande.

Reach and Site	Locality
Isleta Reach	
44	New Mexico, Valencia County, Rio Grande, ca. 1.0 mi upstream of NM State HWY 309 bridge crossing, Belen. River Mile: 150.5; UTM Easting: 340084; UTM Northing: 3837308; Zone: 13; Datum: NAD83
San Acacia Reach	
51	New Mexico, Socorro County, Rio Grande, ca. 5.0 mi downstream of San Acacia Diversion Dam, San Acacia. River Mile: 110.8; UTM Easting: 325855; UTM Northing: 3786216; Zone: 13; Datum: NAD83
52	New Mexico, Socorro County, Rio Grande, ca. 2.2 mi. downstream of Pueblitos Rd. bridge crossing, Escondida. River Mile: 101.7; UTM Easting: 327091; UTM Northing: 3773950; Zone: 13; Datum: NAD83
53	New Mexico, Socorro County, Rio Grande, ca. 3.1 mi downstream of the Socorro Low Flow Conveyance Channel bridge crossing, Socorro. River Mile: 96.0; UTM Easting: 327933; UTM Northing: 3766570; Zone: 13; Datum: NAD83
54	New Mexico, Socorro County, Rio Grande, ca. 4.7 mi. downstream of Socorro LFCC bridge crossing, Socorro. River Mile: 94.2; UTM Easting: 327288; UTM Northing: 3764453; Zone: 13; Datum: NAD83
56	New Mexico, Socorro County, Rio Grande, ca. 2.1 miles upstream of San Antonio bridge crossing, San Antonio. River Mile: 89.3; UTM Easting: 329188; UTM Northing: 3758027; Zone: 13; Datum: NAD83
58	New Mexico, Socorro County, Rio Grande, ca. 1.8 mi. upstream of San Marcial Railroad bridge crossing, San Marcial. River Mile: 70.1; UTM Easting: 318083; UTM Northing: 3728535; Zone: 13; Datum: NAD83
59	New Mexico, Socorro County, Rio Grande, ca. 5.1 mi. downstream of San Marcial Railroad bridge crossing, San Marcial. River Mile: 63.3; UTM Easting: 313269; UTM Northing: 3721434; Zone: 13; Datum: NAD83
60	New Mexico, Socorro County, Rio Grande, ca. 6.4 mi. downstream of San Marcial Railroad bridge crossing, San Marcial. River Mile: 61.8; UTM Easting: 311422; UTM Northing: 3719873; Zone: 13; Datum: NAD83

APPENDIX B (Site-Specific Population Monitoring Data)

Site-specific data, collected in May 2021, as part of the
Rio Grande Silvery Minnow Population Monitoring Program

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

Rio Grande Silvery Minnow Population Monitoring
May 2021

NEW MEXICO: SANDOVAL County, RIO GRANDE Drainage **RKD21-048**
Rio Grande, just downstream of Angostura Diversion Dam, Algodones.
Site Number: 1 River Mile: 209.9 06 May 2021
UTM Easting: 363665 UTM Northing: 3916331 Zone: 13 USGS Quad: San Felipe Pueblo
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 418.0 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	14
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	3
76	*Rhinichthys cataractae*	20
81	*Catostomus commersonii*	114

NEW MEXICO: SANDOVAL County, RIO GRANDE Drainage **RKD21-049**
Rio Grande, at US HWY 550 bridge crossing, Bernalillo.
Site Number: 2 River Mile: 203.9 06 May 2021
UTM Easting: 358457 UTM Northing: 3909887 Zone: 13 USGS Quad: Bernalillo
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 529.5 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	253
76	*Pimephales promelas*	9
76	*Platygobio gracilis*	76
76	*Rhinichthys cataractae*	21
81	*Catostomus commersonii*	48

NEW MEXICO: SANDOVAL County, RIO GRANDE Drainage **RKD21-050**
Rio Grande, ca. 4.0 mi downstream of US HWY 550 bridge crossing, Rio Rancho.
Site Number: 3 River Mile: 199.9 06 May 2021
UTM Easting: 354728 UTM Northing: 3905587 Zone: 13 USGS Quad: Bernalillo
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 499.9 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	355
76	*Pimephales promelas*	20
76	*Platygobio gracilis*	7
81	*Catostomus commersonii*	91
93	*Ameiurus natalis*	1
93	*Ictalurus punctatus*	1

Rio Grande Silvery Minnow Population Monitoring
May 2021

NEW MEXICO: BERNALILLO County, RIO GRANDE Drainage **RKD21-047**
Rio Grande, at Central Ave. bridge crossing (US HWY 66), Albuquerque.
Site Number: 4 River Mile: 183.4 06 May 2021
UTM Easting: 346719 UTM Northing: 3884331 Zone: 13 USGS Quad: Albuquerque West
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 585.5 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	204
76	*Hybognathus amarus**	1
76	*Platygobio gracilis*	7
81	*Carpiodes carpio*	1
81	*Catostomus commersonii*	4
93	*Ictalurus punctatus*	5

Hybognathus amarus	**(age-classes):**	
	age-0	
	age-1	1
	age-2+	

NEW MEXICO: BERNALILLO County, RIO GRANDE Drainage **RKD21-046**
Rio Grande, at Rio Bravo Blvd. bridge crossing (NM State HWY 500), Albuquerque.
Site Number: 5 River Mile: 178.4 06 May 2021
UTM Easting: 347468 UTM Northing: 3877400 Zone: 13 USGS Quad: Albuquerque West
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 517.7 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	68
76	*Hybognathus amarus**	1
76	*Pimephales promelas*	7
76	*Platygobio gracilis*	1
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	1

Hybognathus amarus	**(age-classes):**	
	age-0	
	age-1	
	age-2+	1

Rio Grande Silvery Minnow Population Monitoring
May 2021

NEW MEXICO: VALENCIA County, RIO GRANDE Drainage **RKD21-045**
Rio Grande, just upstream of NM State HWY 6 bridge crossing, Los Lunas.
Site Number: 6 River Mile: 161.7 05 May 2021
UTM Easting: 343149 UTM Northing: 3853187 Zone: 13 USGS Quad: Los Lunas
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 536.4 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	323
76	*Pimephales promelas*	4
81	*Carpiodes carpio*	1
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	9

NEW MEXICO: VALENCIA County, RIO GRANDE Drainage **RKD21-044**
Rio Grande, ca. 1.0 mi upstream of NM State HWY 309 bridge crossing, Belen.
Site Number: 7 River Mile: 150.8 05 May 2021
UTM Easting: 340105 UTM Northing: 3837722 Zone: 13 USGS Quad: Tome
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 505.5 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	499
76	*Hybognathus amarus**	1
76	*Pimephales promelas*	1
81	*Catostomus commersonii*	3
212	*Gambusia affinis*	1

Hybognathus amarus	**(age-classes):**	
	age-0	
	age-1	
	age-2+	1

Rio Grande Silvery Minnow Population Monitoring
May 2021

NEW MEXICO: VALENCIA County, RIO GRANDE Drainage **RKD21-043**
Rio Grande, ca. 2.2 mi upstream of NM State HWY 346 bridge crossing, Jarales.
Site Number: 8 River Mile: 143.2 05 May 2021
UTM Easting: 338020 UTM Northing: 3827545 Zone: 13 USGS Quad: Veguita
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 488.5 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	1,041
76	*Hybognathus amarus**	1
76	*Pimephales promelas*	4
81	*Carpiodes carpio*	2
81	*Catostomus commersonii*	1
212	*Gambusia affinis*	28

Hybognathus amarus	**(age-classes):**	
	age-0	
	age-1	
	age-2+	1

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-042**
Rio Grande, at US HWY 60 bridge crossing, Bernardo.
Site Number: 9 River Mile: 130.6 05 May 2021
UTM Easting: 334578 UTM Northing: 3809921 Zone: 13 USGS Quad: Abeytas
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 485.7 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	794
76	*Hybognathus amarus**	2
76	*Pimephales promelas*	2
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	4
212	*Gambusia affinis*	23

Hybognathus amarus	**(age-classes):**	
	age-0	
	age-1	1
	age-2+	1

Rio Grande Silvery Minnow Population Monitoring
May 2021

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-041**
Rio Grande, ca. 3.7 mi downstream of US HWY 60 bridge crossing, Bernardo.
Site Number: 10 River Mile: 126.8 05 May 2021
UTM Easting: 330946 UTM Northing: 3805307 Zone: 13 USGS Quad: Abeytas
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 475.4 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	359
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	2
93	*Ictalurus punctatus*	4
212	*Gambusia affinis*	51

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-040**
Rio Grande, ca. 1.2 mi upstream of San Acacia Diversion Dam, San Acacia.
Site Number: 11 River Mile: 117.3 04 May 2021
UTM Easting: 328152 UTM Northing: 3792564 Zone: 13 USGS Quad: La Joya
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 578.8 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	40
93	*Ictalurus punctatus*	15
212	*Gambusia affinis*	12

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-039**
Rio Grande, just downstream of San Acacia Diversion Dam, San Acacia.
Site Number: 12 River Mile: 115.6 04 May 2021
UTM Easting: 325960 UTM Northing: 3792183 Zone: 13 USGS Quad: San Acacia
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 460.1 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	1,520
76	*Platygobio gracilis*	8
81	*Carpiodes carpio*	2
212	*Gambusia affinis*	1

Rio Grande Silvery Minnow Population Monitoring
May 2021

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-038**
Rio Grande, ca. 1.5 mi downstream of San Acacia Diversion Dam, San Acacia.
Site Number: 13 River Mile: 114.1 04 May 2021
UTM Easting: 325390 UTM Northing: 3790397 Zone: 13 USGS Quad: Lemitar
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 565.3 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	1,625
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	4
76	*Platygobio gracilis*	2
93	*Ictalurus punctatus*	1

Hybognathus amarus	**(age-classes):**	
	age-0	
	age-1	4
	age-2+	

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-037**
Rio Grande, ca. 0.5 mi upstream of Socorro Low Flow Conveyance Channel bridge crossing, Socorro.
Site Number: 14 River Mile: 99.6 04 May 2021
UTM Easting: 327231 UTM Northing: 3771432 Zone: 13 USGS Quad: Loma de las Canas
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 580.8 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	383
76	*Platygobio gracilis*	1

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-036**
Rio Grande, ca. 4.5 mi upstream of US HWY 380 bridge crossing, San Antonio.
Site Number: 15 River Mile: 92.0 04 May 2021
UTM Easting: 328151 UTM Northing: 3761487 Zone: 13 USGS Quad: San Antonio
Collector(s): R.K. Dudley, J.G. Mortensen, T.O. Robbins Effort: 508.5 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	26
76	*Platygobio gracilis*	1

Rio Grande Silvery Minnow Population Monitoring
May 2021

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-035**
Rio Grande, at US HWY 380 bridge crossing, San Antonio.
Site Number: 16 River Mile: 87.8 03 May 2021
UTM Easting: 328907 UTM Northing: 3754926 Zone: 13 USGS Quad: San Antonio
Collector(s): R.K. Dudley, M.A. Farrington, T.O. Robbins Effort: 548.5 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	4
93	*Ictalurus punctatus*	2

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-034**
Rio Grande, east of Bosque del Apache NWR headquarters, San Antonio.
Site Number: 17 River Mile: 79.0 03 May 2021
UTM Easting: 327219 UTM Northing: 3740906 Zone: 13 USGS Quad: San Antonio SE
Collector(s): R.K. Dudley, M.A. Farrington, T.O. Robbins Effort: 526.4 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	15
76	*Hybognathus amarus**	4

Hybognathus amarus	**(age-classes):**	
	age-0	
	age-1	1
	age-2+	3

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-033**
Rio Grande, at San Marcial Railroad bridge crossing, San Marcial.
Site Number: 18 River Mile: 68.3 03 May 2021
UTM Easting: 315091 UTM Northing: 3728487 Zone: 13 USGS Quad: San Marcial
Collector(s): R.K. Dudley, M.A. Farrington, T.O. Robbins Effort: 511.6 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	93

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-032**
Rio Grande, ca. 8.0 mi downstream of San Marcial Railroad bridge crossing, San Marcial.
Site Number: 19 River Mile: 60.1 03 May 2021
UTM Easting: 309441 UTM Northing: 3718309 Zone: 13 USGS Quad: Paraje Well
Collector(s): R.K. Dudley, M.A. Farrington, T.O. Robbins Effort: 552.0 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	511
93	*Ictalurus punctatus*	3
212	*Gambusia affinis*	5

Rio Grande Silvery Minnow Population Monitoring
May 2021

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD21-031**
Rio Grande, ca. 10.0 mi downstream of San Marcial Railroad bridge crossing, San Marcial.
Site Number: 20 River Mile: 58.5 03 May 2021
UTM Easting: 307767 UTM Northing: 3716360 Zone: 13 USGS Quad: Paraje Well
Collector(s): R.K. Dudley, M.A. Farrington, T.O. Robbins Effort: 546.1 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	528
76	*Hybognathus amarus**	1
93	*Ictalurus furcatus*	1
93	*Ictalurus punctatus*	1

Hybognathus amarus	**(age-classes):**	
	age-0	
	age-1	
	age-2+	1