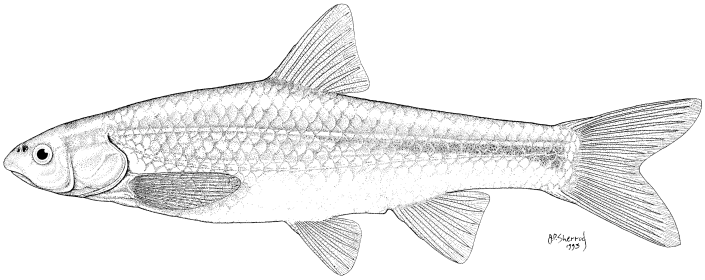
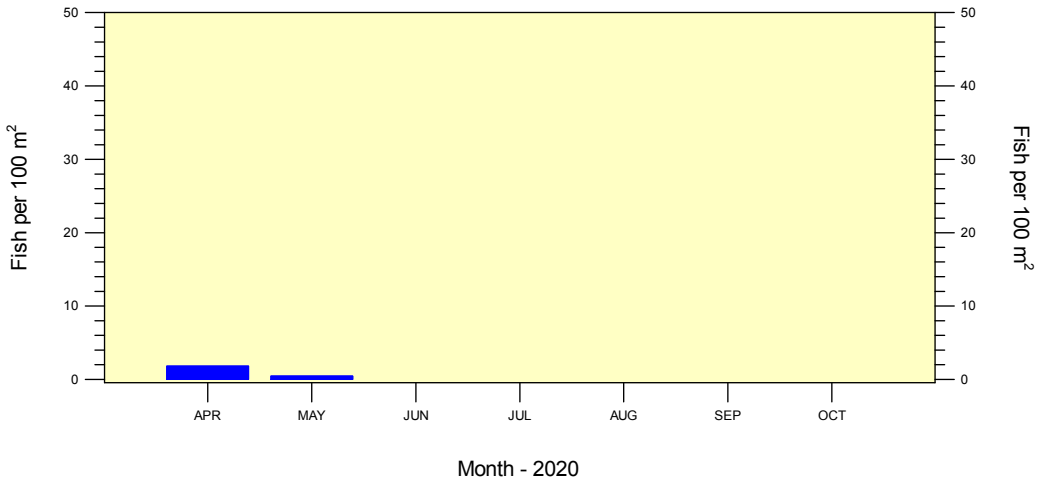
Rio Grande Silvery Minnow Population Monitoring during May 2020

A U.S. Bureau of Reclamation Funded Research Program





29 June 2020

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U.S. Bureau of Reclamation
Albuquerque Area Office
555 Broadway NE, Suite 100
Albuquerque, NM 87102

Submitted to:

U.S. Bureau of Reclamation
Albuquerque Area Office
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29 June 2020

SUMMARY OF MAY 2020 POPULATION MONITORING

The May 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 May 2020, no comparisons were made between standard sites and all sites (i.e., standard, additional, and replacement sites), as no additional/replacement sites were sampled. For the 2020 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 3.1 m x 1.8 m small mesh (ca. 5 mm) seine through discrete mesohabitats. Larval fish were collected with a 1.0 m x 1.0 m fine mesh (ca. 1.5 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, mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gage 08330000) averaged 512.4 ft^3/s and ranged from 396 to 723 ft^3/s. Water temperatures ranged from 13.2 to 18.9 ºC during the Angostura Reach sampling efforts (ca. 0830–1530 h). Secchi disk measurements of water clarity ranged from 13 to 77 cm.

Sampling for fishes in the Angostura Reach during May yielded 1,107 individuals with a cumulative fish density of 41.5 individuals per 100 m^2 sampled. The overall sampling effort in the Angostura Reach covered 2,668.9 m^2 (surface area) of water. Densities of all fish species combined ranged from 5.2 to 89.3 individuals per 100 m^2 at the different sampling sites. In May, there were 9 fish species collected in the Angostura Reach. White Sucker was the most abundant taxon (n = 944), followed by Red Shiner (n = 38), and Longnose Dace (n = 33). We collected Rio Grande Silvery Minnow (n = 4) in 4 of the 55 seine hauls that yielded fish, and its site-specific densities ranged from 0.0 to 0.4 individuals per 100 m^2.

Isleta Reach

Mean daily discharge in the Isleta Reach (Rio Grande near Bosque Farms, NM; USGS Gage 08331160), from 16 April to 15 May, averaged 120.2 ft^3/s and ranged from 105 to 161 ft^3/s. Water temperatures ranged from 20.0 to 28.8 ºC throughout the sampling localities during the day (ca. 0930–1600 h). Secchi disk measurements ranged from 11 to 16 cm during sampling.

Isleta Reach population monitoring efforts produced 604 individuals in May with a cumulative fish density of 20.0 individuals per 100 m^2 sampled. The total sampling effort in the Isleta Reach during May covered 3,024.8 m^2 (surface area) of water. Fish densities (all species combined) at the sampling sites ranged from 8.2 to 45.3 individuals per 100 m^2 sampled. There were 11 fish species collected in the Isleta Reach during May. Red Shiner was the most abundant taxon (n = 356), followed by Flathead Chub (n = 134), and Fathead Minnow (n = 52). We collected Rio Grande Silvery Minnow (n = 12) in 8 of the 85 seine hauls that yielded fish, and its site-specific densities ranged from 0.2 to 0.8 individuals per 100 m^2.

San Acacia Reach

From 16 April to 15 May, mean daily discharge at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gage 08354900) was generally higher (average = 168.0; range = 115–281 ft^3/s) than at San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gage 08358400) during the same period (average = 49.8; range = 21–120 ft^3/s). Water temperatures in May for the San Acacia Reach ranged from 19.1 to 29.1 ºC (ca. 0930–1600 h). Secchi disk measurements ranged from 10 to 15 cm during sampling.

Population monitoring efforts in the San Acacia Reach during May yielded 1,406 individuals with a cumulative fish density of 29.8 individuals per 100 m^2 sampled. Sampling in the San Acacia Reach covered an area of 4,717.8 m^2 of water. Fish densities (all species combined) ranged from 8.3 to 57.1 individuals per 100 m^2 at sites sampled in the San Acacia Reach. In May, there were 13 fish species collected in the San Acacia Reach. Red Shiner was the most abundant taxon (n = 1,228), followed by Flathead Chub (n = 57), and Channel Catfish (n = 42). We collected Rio Grande Silvery Minnow (n = 34) in 19 of the 144 seine hauls that yielded fish, and its site-specific densities ranged from 0.0 to 1.9 individuals per 100 m^2.

All Sites

During May, sampling covered 10,411.4 m^2 (surface area) of water and yielded 3,117 fish. There were no dry sampling sites. Cumulative fish density during May was 29.94 individuals per 100 m^2 sampled. The three most common species were Red Shiner (n = 1,622), White Sucker (n = 945), and Flathead Chub (n = 221). The sampling sites yielded a total of 16 fish species.

Rio Grande Silvery Minnow was present in 31 of the 284 seine hauls that yielded fish and at 16 of the 20 sampling sites. Densities of unmarked and marked individuals were 0.47 (n = 49) and 0.01 (n = 1) individuals per 100 m^2 sampled, respectively. Densities of age-0, age-1, and age-2+ individuals were 0.00 (n = 0), 0.43 (n = 45), and 0.05 (n = 5) individuals per 100 m^2 sampled, respectively. Based on all May surveys since 1993, the overall density of Rio Grande Silvery Minnow averaged 6.61 (range = 0.05–86.28) individuals per 100 m^2 sampled. During May 2020, its overall density was 0.48 (n = 50) individuals per 100 m^2 sampled.

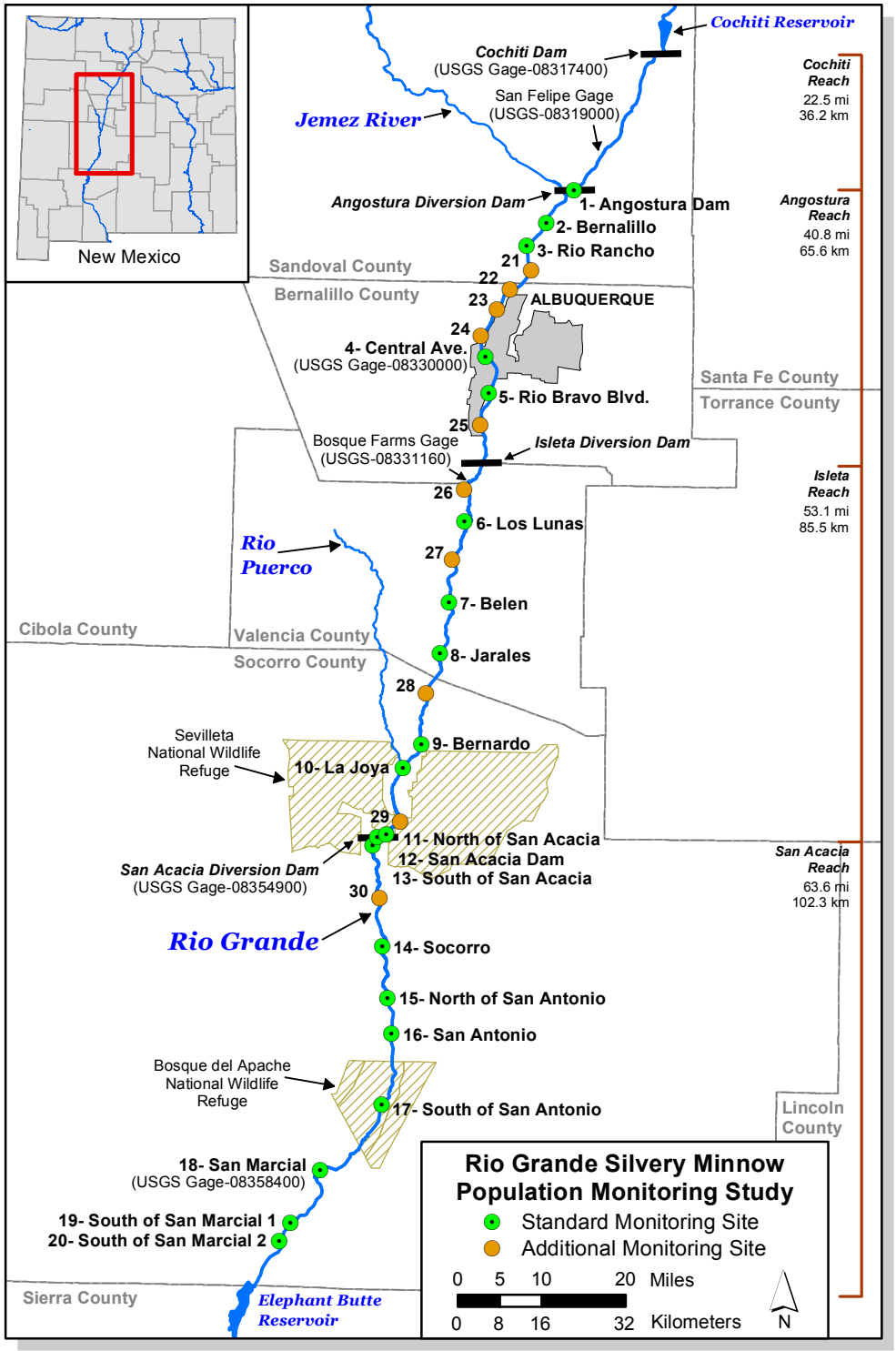

Figure 1. Map of the study area, standard sites, and additional sites for the Rio Grande Silvery Minnow population monitoring study. Sampling site descriptions are provided in Appendix A.

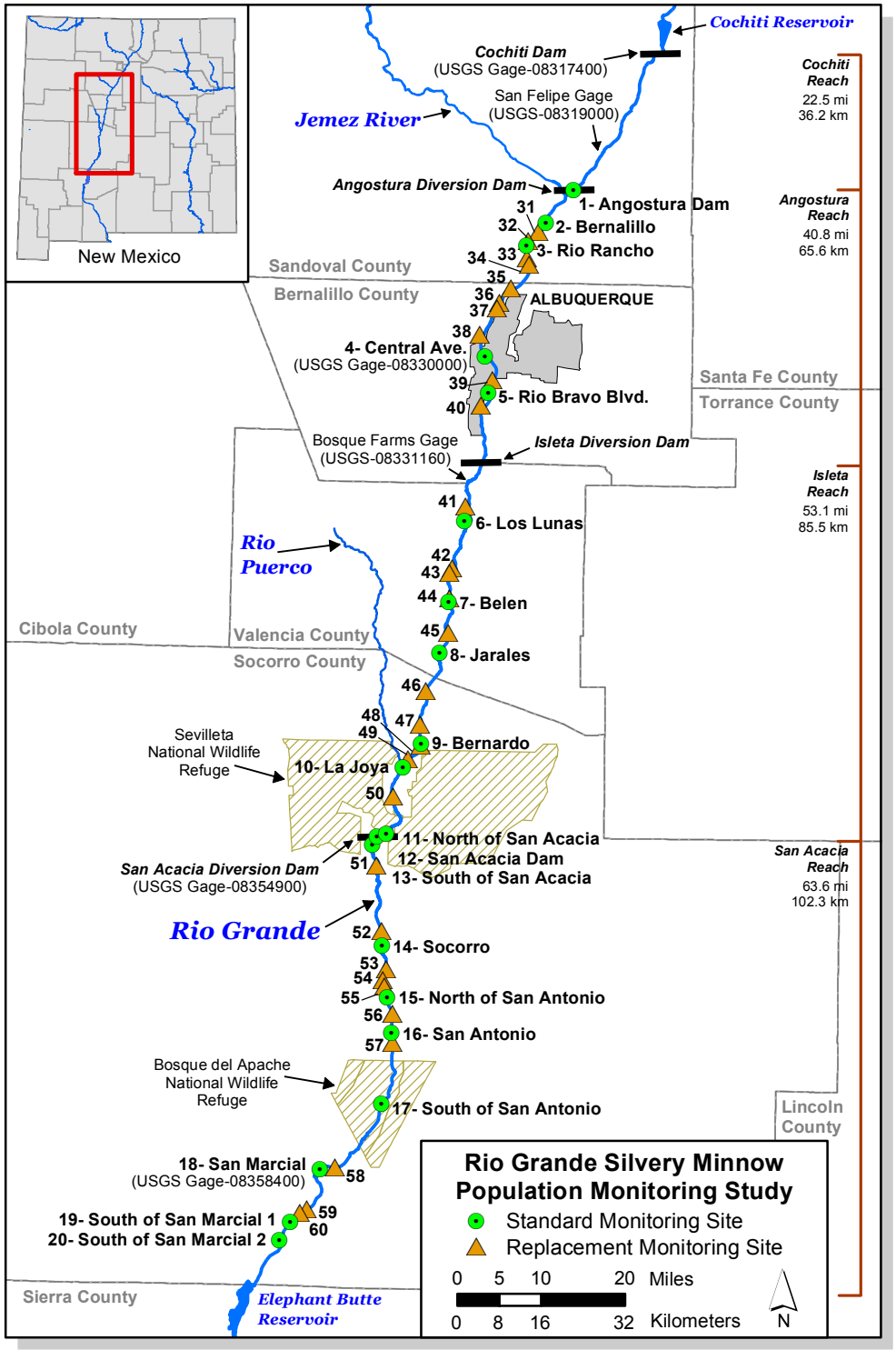

Figure 2. Map of the study area, standard sites, and replacement sites for the Rio Grande Silvery Minnow population monitoring study. Sampling site descriptions are provided in Appendix A.

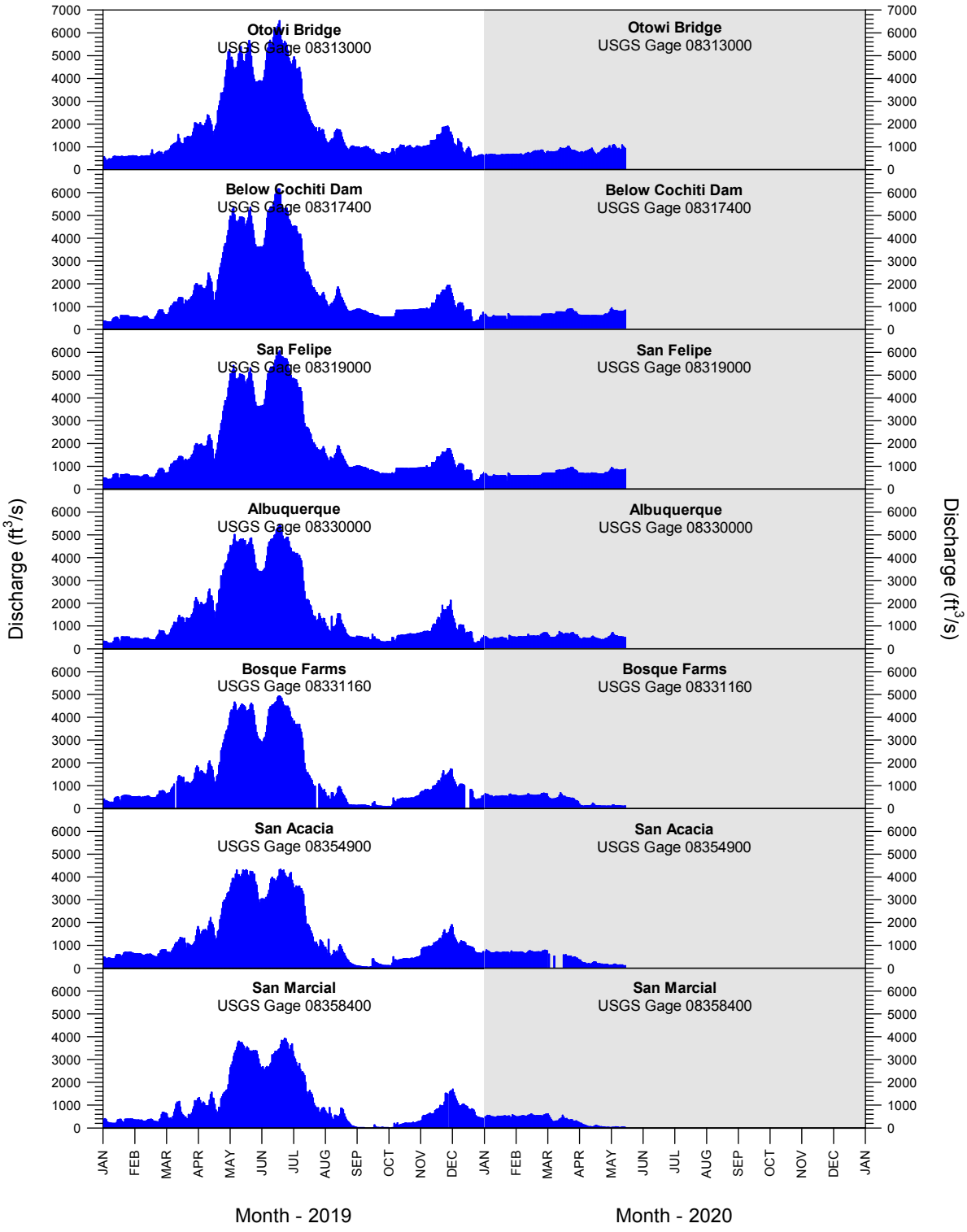

Figure 3. Rio Grande mean-daily discharge, by U.S. Geological Survey (USGS) gaging station, from 1 January 2019 to 15 May 2020. Discharge data are provisional and subject to change.

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 gulosus	Warmouth	(LEPGUL)
Lepomis macrochirus	Bluegill	(LEPMAC)
Lepomis megalotis	Longear Sunfish	(LEPMEG)
Micropterus punctulatus	Spotted Bass	(MICPUN)
Micropterus salmoides	Largemouth Bass	(MICSAL)
Pomoxis annularis	White Crappie	(POMANN)
Pomoxis nigromaculatus	Black Crappie	(POMNIG)
Family Percidae	**perches**	
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 2020. 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
Angostura	2	Bernalillo			-	-	-	0
Angostura	3	Rio Rancho		-	-	-	1	1
Angostura	4	Central Ave.			1	-	-	1
Angostura	5	Rio Bravo Blvd.	-	-	1	1	-	2
Angostura Totals			-	-	*2*	*1*	*1*	*4*
Isleta	6	Los Lunas	-	1	-	-	-	1
Isleta	7	Belen	-	-	1	-	-	1
Isleta	8	Jarales	-	-	1	-	3	4
Isleta	9	Bernardo	-	-	-	2	2	4
Isleta	10	La Joya	-	-	-	1	-	1
Isleta	11	North of San Acacia			-	-	1	1
Isleta Totals			-	*1*	*2*	*3*	*6*	*12*
San Acacia	12	San Acacia Dam	-		-	3	7	10
San Acacia	13	South of San Acacia	1		-	1	4	6
San Acacia	14	Socorro	-	-	2	5	-	7
San Acacia	15	North of San Antonio	-	3	-	-	-	3
San Acacia	16	San Antonio	-	-	-	1	2	3
San Acacia	17	South of San Antonio	-		3	-	-	3
San Acacia	18	San Marcial	-		-	-	-	0
San Acacia	19	South of San Marcial 1		-	-	-	2	2
San Acacia	20	South of San Marcial 2			-	-	-	0
San Acacia Totals			*1*	*3*	*5*	*10*	*15*	*34*
Monthly Totals			**1**	**4**	**9**	**14**	**22**	**50**

Table 3. Rio Grande Silvery Minnow abundance, by reach, site, and month, during 2020. 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
Angostura	2	Bernalillo	4(0)	-	-	-	-	-	-	4
Angostura	3	Rio Rancho	8(0)	1(0)	-	-	-	-	-	9
Angostura	21	Site 21	3(0)						-	3
Angostura	22	Site 22	99(0)						-	99
Angostura	23	Site 23	8(0)						-	8
Angostura	24	Site 24	7(0)						-	7
Angostura	4	Central Ave.	3(0)	1(0)	-	-	-	-	-	4
Angostura	5	Rio Bravo Blvd.	5(0)	2(0)	-	-	-	-	-	7
Angostura	25	Site 25	-						-	0
Angostura Totals			*137*	*4*	-	-	-	-	-	*141*
Isleta	26	Site 26	5(0)						-	5
Isleta	6	Los Lunas	11(0)	1(0)	-	-	-	-	-	12
Isleta	27	Site 27	14(0)						-	14
Isleta	7	Belen	5(0)	1(0)	-	-	-	-	-	6
Isleta	8	Jarales	1(0)	4(0)	-	-	-	-	-	5
Isleta	28	Site 28	6(0)						-	6
Isleta	9	Bernardo	7(0)	4(0)	-	-	-	-	-	11
Isleta	10	La Joya	1(0)	1(0)	-	-	-	-	-	2
Isleta	29	Site 29	4(0)						-	4
Isleta	11	North of San Acacia	4(0)	1(0)	-	-	-	-	-	5
Isleta Totals			*58*	*12*	-	-	-	-	-	*70*
San Acacia	12	San Acacia Dam	9(0)	10(0)	-	-	-	-	-	19
San Acacia	13	South of San Acacia	12(0)	6(0)	-	-	-	-	-	18
San Acacia	30	Site 30	7(0)						-	7
San Acacia	14	Socorro	16(6)	7(1)	-	-	-	-	-	23
San Acacia	15	North of San Antonio	4(0)	3(0)	-	-	-	-	-	7
San Acacia	16	San Antonio	7(0)	3(0)	-	-	-	-	-	10
San Acacia	17	South of San Antonio	10(0)	3(0)	-	-	-	-	-	13
San Acacia	18	San Marcial	4(0)	-	-	-	-	-	-	4
San Acacia	19	South of San Marcial 1	4(0)	2(0)	-	-	-	-	-	6
San Acacia	20	South of San Marcial 2	2(0)	-	-	-	-	-	-	2
San Acacia Totals			*75*	*34*	-	-	-	-	-	*109*
Monthly Totals			**270**	**50**	**-**	**-**	**-**	**-**	**-**	**320**

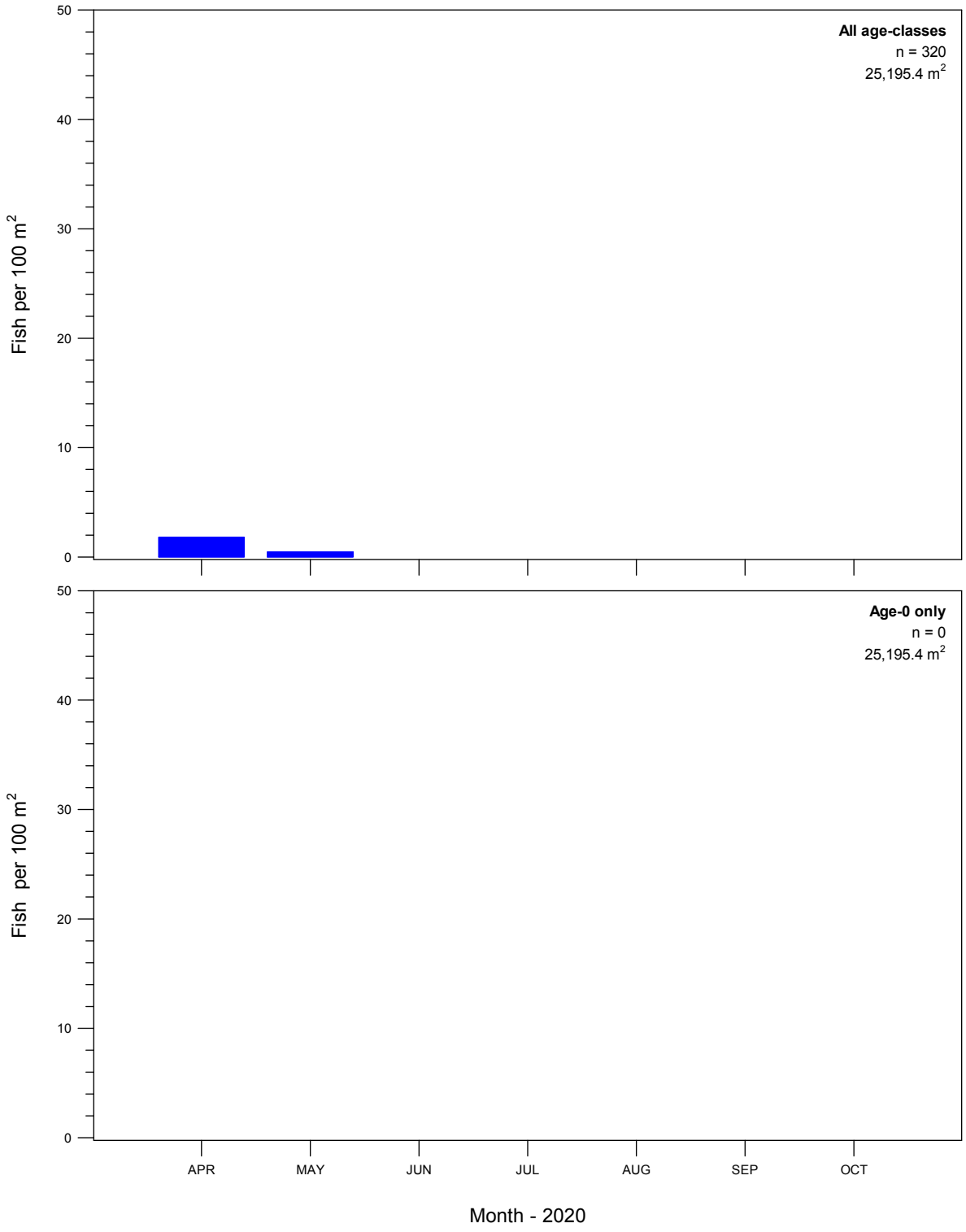

Figure 4. Rio Grande Silvery Minnow densities based on all sites, by age-class and month, during 2020. Marked and unmarked individuals were included.

Table 4. Ichthyofaunal summary based on standard sites, by species, during May 2020. Marked and unmarked Rio Grande Silvery Minnow were included.

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	4	0.13	1	5.00
Clupeidae	Threadfin Shad	I	-	-	-	-
Cyprinidae	Central Stoneroller	I	-	-	-	-
Cyprinidae	Goldfish	I	-	-	-	-
Cyprinidae	Red Shiner	N	1,622	52.04	18	90.00
Cyprinidae	Common Carp	I	18	0.58	7	35.00
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	50	1.60	16	80.00
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	69	2.21	4	20.00
Cyprinidae	Bullhead Minnow	I	-	-	-	-
Cyprinidae	Flathead Chub	N	221	7.09	13	65.00
Cyprinidae	Longnose Dace	N	33	1.06	2	10.00
Catostomidae	River Carpsucker	N	55	1.76	6	30.00
Catostomidae	White Sucker	I	945	30.32	6	30.00
Catostomidae	Smallmouth Buffalo	N	1	0.03	1	5.00
Ictaluridae	Black Bullhead	I	-	-	-	-
Ictaluridae	Yellow Bullhead	I	-	-	-	-
Ictaluridae	Blue Catfish	N	10	0.32	2	10.00
Ictaluridae	Channel Catfish	I	50	1.60	10	50.00
Ictaluridae	Flathead Catfish	N	-	-	-	-
Loricariidae	Vermiculated Sailfin Catfish	I	-	-	-	-
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	34	1.09	9	45.00
Moronidae	White Bass	I	3	0.10	3	15.00
Moronidae	Striped Bass	I	-	-	-	-
Centrarchidae	Green Sunfish	I	-	-	-	-
Centrarchidae	Bluegill	I	1	0.03	1	5.00
Centrarchidae	Longear Sunfish	I	-	-	-	-
Centrarchidae	Smallmouth Bass	I	-	-	-	-
Centrarchidae	Largemouth Bass	I	1	0.03	1	5.00
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			**3,117**	**100.00**		

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

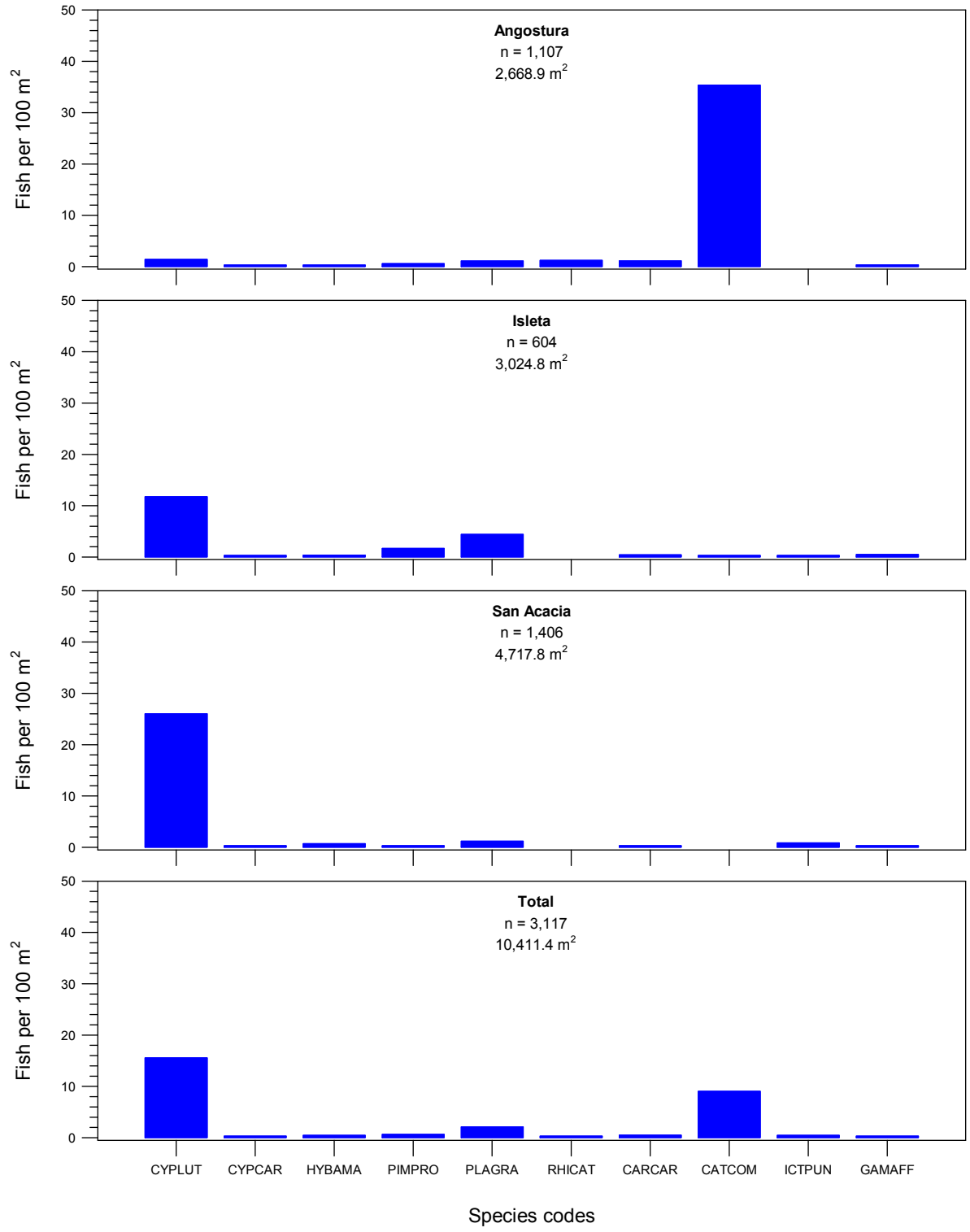

Figure 5. Fish densities based on standard sites, by reach and focal taxa, during May 2020. Marked and unmarked Rio Grande Silvery Minnow were included.

Table 5. Ichthyofaunal summary based on all sites, by species and month, during 2020. Marked and unmarked Rio Grande Silvery Minnow were included.

Family	Common Name	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Clupeidae	Gizzard Shad	2	4	-	-	-	-	-	6
Clupeidae	Threadfin Shad	-	-	-	-	-	-	-	0
Cyprinidae	Central Stoneroller	-	-	-	-	-	-	-	0
Cyprinidae	Goldfish	-	-	-	-	-	-	-	0
Cyprinidae	Red Shiner	2,618	1,622	-	-	-	-	-	4,240
Cyprinidae	Common Carp	33	18	-	-	-	-	-	51
Cyprinidae	Rio Grande Chub	-	-	-	-	-	-	-	0
Cyprinidae	Rio Grande Silvery Minnow	270	50	-	-	-	-	-	320
Cyprinidae	Golden Shiner	-	-	-	-	-	-	-	0
Cyprinidae	Fathead Minnow	21	69	-	-	-	-	-	90
Cyprinidae	Bullhead Minnow	-	-	-	-	-	-	-	0
Cyprinidae	Flathead Chub	349	221	-	-	-	-	-	570
Cyprinidae	Longnose Dace	83	33	-	-	-	-	-	116
Catostomidae	River Carpsucker	1	55	-	-	-	-	-	56
Catostomidae	White Sucker	4	945	-	-	-	-	-	949
Catostomidae	Smallmouth Buffalo	-	1	-	-	-	-	-	1
Ictaluridae	Black Bullhead	-	-	-	-	-	-	-	0
Ictaluridae	Yellow Bullhead	-	-	-	-	-	-	-	0
Ictaluridae	Blue Catfish	1	10	-	-	-	-	-	11
Ictaluridae	Channel Catfish	157	50	-	-	-	-	-	207
Ictaluridae	Flathead Catfish	-	-	-	-	-	-	-	0
Loricariidae	Vermiculated Sailfin Catfish	-	-	-	-	-	-	-	0
Salmonidae	Rainbow Trout	-	-	-	-	-	-	-	0
Salmonidae	Brown Trout	-	-	-	-	-	-	-	0
Poeciliidae	Western Mosquitofish	10	34	-	-	-	-	-	44
Moronidae	White Bass	1	3	-	-	-	-	-	4
Moronidae	Striped Bass	-	-	-	-	-	-	-	0
Centrarchidae	Green Sunfish	-	-	-	-	-	-	-	0
Centrarchidae	Bluegill	-	1	-	-	-	-	-	1
Centrarchidae	Longear Sunfish	-	-	-	-	-	-	-	0
Centrarchidae	Smallmouth Bass	-	-	-	-	-	-	-	0
Centrarchidae	Largemouth Bass	1	1	-	-	-	-	-	2
Centrarchidae	White Crappie	4	-	-	-	-	-	-	4
Centrarchidae	Black Crappie	-	-	-	-	-	-	-	0
Percidae	Yellow Perch	-	-	-	-	-	-	-	0
Percidae	Bigscale Logperch	-	-	-	-	-	-	-	0
Percidae	Walleye	-	-	-	-	-	-	-	0
Sciaenidae	Freshwater Drum	-	-	-	-	-	-	-	0
Monthly Totals		**3,555**	**3,117**	**-**	**-**	**-**	**-**	**-**	**6,672**

APPENDIX A (Sampling Sites)

Middle Rio Grande Fish Sampling Sites

Table A - 1. 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 A - 1. 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 A - 2. 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 A - 3. Sampling reaches and replacement sites for population monitoring of Rio Grande Silvery Minnow in the Middle Rio Grande.

Reach and Site	Locality
San Acacia Reach	
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: 327928; 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
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 2020, 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 2020

NEW MEXICO: SANDOVAL County, RIO GRANDE Drainage **RKD20-048**
Rio Grande, just downstream of Angostura Diversion Dam, Algodones.

Site Number: 1 River Mile: 209.9 08 May 2020
UTM Easting: 363665 UTM Northing: 3916331 Zone: 13 Quad: San Felipe Pueblo
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 473.8 sq. m

Family	Species	Total
76	*Platygobio gracilis*	1
81	*Catostomus commersonii*	420
212	*Gambusia affinis*	2

NEW MEXICO: SANDOVAL County, RIO GRANDE Drainage **RKD20-049**
Rio Grande, at US HWY 550 bridge crossing, Bernalillo.

Site Number: 2 River Mile: 203.9 08 May 2020
UTM Easting: 358457 UTM Northing: 3909887 Zone: 13 Quad: Bernalillo
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 566.4 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	5
76	*Platygobio gracilis*	14
76	*Rhinichthys cataractae*	19
81	*Catostomus commersonii*	429

Rio Grande Silvery Minnow Population Monitoring
May 2020

NEW MEXICO: SANDOVAL County, RIO GRANDE Drainage **RKD20-050**
Rio Grande, ca. 4.0 mi downstream of US HWY 550 bridge crossing, Rio Rancho.

Site Number: 3 River Mile: 199.9 08 May 2020
UTM Easting: 354728 UTM Northing: 3905587 Zone: 13 Quad: Bernalillo
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 526.7 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	13
76	*Hybognathus amarus**	1
76	*Platygobio gracilis*	8
76	*Rhinichthys cataractae*	14
81	*Catostomus commersonii*	84

***Hybognathus amarus* (age-classes):**

age-0	
age-1	1
age-2+	

NEW MEXICO: BERNALILLO County, RIO GRANDE Drainage **RKD20-047**
Rio Grande, at Central Ave. bridge crossing (US HWY 66), Albuquerque.

Site Number: 4 River Mile: 183.4 07 May 2020
UTM Easting: 346719 UTM Northing: 3884331 Zone: 13 Quad: Albuquerque West
R.K. Dudley, S.L. Clark-Barkalow, A.C. Wedemeyer Effort: 555.1 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	20
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	1
76	*Platygobio gracilis*	4
81	*Catostomus commersonii*	3

***Hybognathus amarus* (age-classes):**

age-0	
age-1	1
age-2+	

Rio Grande Silvery Minnow Population Monitoring
May 2020

NEW MEXICO: BERNALILLO County, RIO GRANDE Drainage **RKD20-046**
Rio Grande, at Rio Bravo Blvd. bridge crossing (NM State HWY 500), Albuquerque.

Site Number: 5 River Mile: 178.4 07 May 2020
UTM Easting: 347468 UTM Northing: 3877400 Zone: 13 Quad: Albuquerque West
R.K. Dudley, S.L. Clark-Barkalow, A.C. Wedemeyer Effort: 547.0 sq. m

Family	Species	Total
76	*Hybognathus amarus**	2
76	*Pimephales promelas*	16
76	*Platygobio gracilis*	3
81	*Carpiodes carpio*	31
81	*Catostomus commersonii*	8
212	*Gambusia affinis*	8

***Hybognathus amarus* (age-classes):**

age-0	
age-1	2
age-2+	

NEW MEXICO: VALENCIA County, RIO GRANDE Drainage **RKD20-045**
Rio Grande, just upstream of NM State HWY 6 bridge crossing, Los Lunas.

Site Number: 6 River Mile: 161.7 07 May 2020
UTM Easting: 343149 UTM Northing: 3853187 Zone: 13 Quad: Los Lunas
R.K. Dudley, S.L. Clark-Barkalow, A.C. Wedemeyer Effort: 523.8 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	62
76	*Hybognathus amarus**	1
76	*Platygobio gracilis*	3
212	*Gambusia affinis*	1

***Hybognathus amarus* (age-classes):**

age-0	
age-1	1
age-2+	

Rio Grande Silvery Minnow Population Monitoring
May 2020

NEW MEXICO: VALENCIA County, RIO GRANDE Drainage **RKD20-044**
Rio Grande, ca. 1.0 mi upstream of NM State HWY 309 bridge crossing, Belen.
Site Number: 7 River Mile: 150.8 07 May 2020
UTM Easting: 340105 UTM Northing: 3837722 Zone: 13 Quad: Tome
R.K. Dudley, S.L. Clark-Barkalow, A.C. Wedemeyer Effort: 489.0 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	48
76	*Cyprinus carpio*	4
76	*Hybognathus amarus**	1
76	*Pimephales promelas*	11
81	*Carpiodes carpio*	8
81	*Catostomus commersonii*	1
212	*Gambusia affinis*	8

***Hybognathus amarus* (age-classes):**

age-0	
age-1	
age-2+	1

NEW MEXICO: VALENCIA County, RIO GRANDE Drainage **RKD20-043**
Rio Grande, ca. 2.2 mi upstream of NM State HWY 346 bridge crossing, Jarales.
Site Number: 8 River Mile: 143.2 07 May 2020
UTM Easting: 338020 UTM Northing: 3827545 Zone: 13 Quad: Veguita
R.K. Dudley, S.L. Clark-Barkalow, A.C. Wedemeyer Effort: 489.9 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	57
76	*Cyprinus carpio*	5
76	*Hybognathus amarus**	4
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	2
93	*Ictalurus punctatus*	1

***Hybognathus amarus* (age-classes):**

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

Rio Grande Silvery Minnow Population Monitoring
May 2020

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-042**
Rio Grande, at US HWY 60 bridge crossing, Bernardo.

Site Number: 9 River Mile: 130.6 06 May 2020
UTM Easting: 334578 UTM Northing: 3809921 Zone: 13 Quad: Abeytas
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 473.0 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	35
76	*Hybognathus amarus**	4

***Hybognathus amarus* (age-classes):**

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

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-041**
Rio Grande, ca. 3.7 mi downstream of US HWY 60 bridge crossing, Bernardo.

Site Number: 10 River Mile: 126.8 06 May 2020
UTM Easting: 330946 UTM Northing: 3805307 Zone: 13 Quad: Abeytas
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 524.1 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	102
76	*Hybognathus amarus**	1
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	3
283	*Morone chrysops*	1
294	*Micropterus salmoides*	1

***Hybognathus amarus* (age-classes):**

age-0	
age-1	1
age-2+	

Rio Grande Silvery Minnow Population Monitoring
May 2020

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-040**
Rio Grande, ca. 1.2 mi upstream of San Acacia Diversion Dam, San Acacia.

Site Number: 11 River Mile: 117.3 06 May 2020
UTM Easting: 328152 UTM Northing: 3792564 Zone: 13 Quad: La Joya
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 525.1 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	52
76	*Hybognathus amarus**	1
76	*Pimephales promelas*	41
76	*Platygobio gracilis*	130
81	*Carpiodes carpio*	4
93	*Ictalurus punctatus*	6
212	*Gambusia affinis*	4

***Hybognathus amarus* (age-classes):**

age-0	
age-1	1
age-2+	

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-039**
Rio Grande, just downstream of San Acacia Diversion Dam, San Acacia.

Site Number: 12 River Mile: 115.6 06 May 2020
UTM Easting: 325960 UTM Northing: 3792183 Zone: 13 Quad: San Acacia
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 527.6 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	256
76	*Cyprinus carpio*	2
76	*Hybognathus amarus**	10
76	*Platygobio gracilis*	32
93	*Ictalurus punctatus*	1

***Hybognathus amarus* (age-classes):**

age-0	
age-1	10
age-2+	

Rio Grande Silvery Minnow Population Monitoring
May 2020

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-038**
Rio Grande, ca. 1.5 mi downstream of San Acacia Diversion Dam, San Acacia.
Site Number: 13 River Mile: 114.1 05 May 2020
UTM Easting: 325390 UTM Northing: 3790397 Zone: 13 Quad: Lemitar
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 529.2 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	61
76	*Hybognathus amarus**	6
76	*Platygobio gracilis*	10
93	*Ictalurus punctatus*	7
212	*Gambusia affinis*	3

***Hybognathus amarus* (age-classes):**

age-0	
age-1	6
age-2+	

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-037**
Rio Grande, ca. 0.5 mi upstream of Socorro Low Flow Conveyance Channel bridge crossing, Socorro.
Site Number: 14 River Mile: 99.6 05 May 2020
UTM Easting: 327231 UTM Northing: 3771432 Zone: 13 Quad: Loma de las Canas
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 505.4 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	184
76	*Hybognathus amarus**	7
76	*Platygobio gracilis*	2
81	*Carpiodes carpio*	9
93	*Ictalurus punctatus*	7

***Hybognathus amarus* (age-classes):**

age-0	
age-1	7
age-2+	

Rio Grande Silvery Minnow Population Monitoring
May 2020

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-036**
Rio Grande, ca. 4.5 mi upstream of US HWY 380 bridge crossing, San Antonio.

Site Number: 15 River Mile: 92.0 05 May 2020
UTM Easting: 328151 UTM Northing: 3761487 Zone: 13 Quad: San Antonio
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 525.5 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	120
76	*Hybognathus amarus**	3
76	*Platygobio gracilis*	11

***Hybognathus amarus* (age-classes):**

age-0	
age-1	3
age-2+	

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-035**
Rio Grande, at US HWY 380 bridge crossing, San Antonio.

Site Number: 16 River Mile: 87.8 05 May 2020
UTM Easting: 328907 UTM Northing: 3754926 Zone: 13 Quad: San Antonio
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 492.6 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	13
76	*Hybognathus amarus**	3
76	*Platygobio gracilis*	2
81	*Carpiodes carpio*	1
93	*Ictalurus punctatus*	22

***Hybognathus amarus* (age-classes):**

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

Rio Grande Silvery Minnow Population Monitoring
May 2020

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-034**
Rio Grande, east of Bosque del Apache NWR headquarters, San Antonio.

Site Number: 17 River Mile: 79.0 04 May 2020
UTM Easting: 327219 UTM Northing: 3740906 Zone: 13 Quad: San Antonio SE
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 542.6 sq. m

Family	Species	Total
69	*Dorosoma cepedianum*	4
76	*Cyprinella lutrensis*	56
76	*Cyprinus carpio*	4
76	*Hybognathus amarus**	3
81	*Ictiobus bubalus*	1
93	*Ictalurus furcatus*	9
93	*Ictalurus punctatus*	1
283	*Morone chrysops*	1

***Hybognathus amarus* (age-classes):**

age-0	
age-1	3
age-2+	

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-033**
Rio Grande, at San Marcial Railroad bridge crossing, San Marcial.

Site Number: 18 River Mile: 68.3 04 May 2020
UTM Easting: 315091 UTM Northing: 3728487 Zone: 13 Quad: San Marcial
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 500.3 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	95
76	*Cyprinus carpio*	1
93	*Ictalurus punctatus*	1

Rio Grande Silvery Minnow Population Monitoring
May 2020

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-032**
Rio Grande, ca. 8.0 mi downstream of San Marcial Railroad bridge crossing, San Marcial.
Site Number: 19 River Mile: 60.1 04 May 2020
UTM Easting: 309441 UTM Northing: 3718309 Zone: 13 Quad: Paraje Well
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 543.9 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	220
76	*Hybognathus amarus**	2
212	*Gambusia affinis*	1

***Hybognathus amarus* (age-classes):**

age-0	
age-1	2
age-2+	

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD20-031**
Rio Grande, ca. 10.0 mi downstream of San Marcial Railroad bridge crossing, San Marcial.
Site Number: 20 River Mile: 58.5 04 May 2020
UTM Easting: 307767 UTM Northing: 3716360 Zone: 13 Quad: Paraje Well
R.K. Dudley, M.A. Farrington, S.L. Clark-Barkalow Effort: 550.9 sq. m

Family	Species	Total
76	*Cyprinella lutrensis*	223
76	*Cyprinus carpio*	1
76	*Pimephales promelas*	1
93	*Ictalurus furcatus*	1
93	*Ictalurus punctatus*	3
212	*Gambusia affinis*	4
283	*Morone chrysops*	1
294	*Lepomis macrochirus*	1