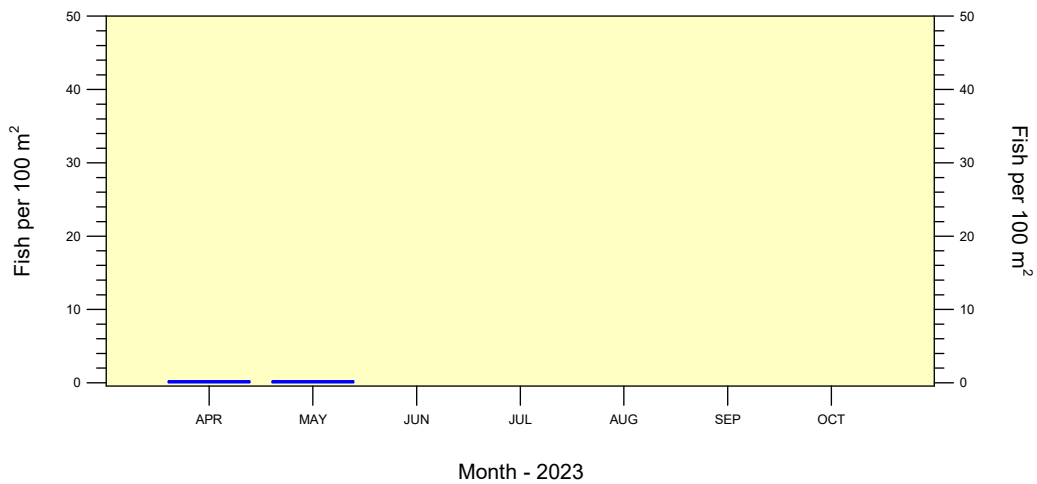
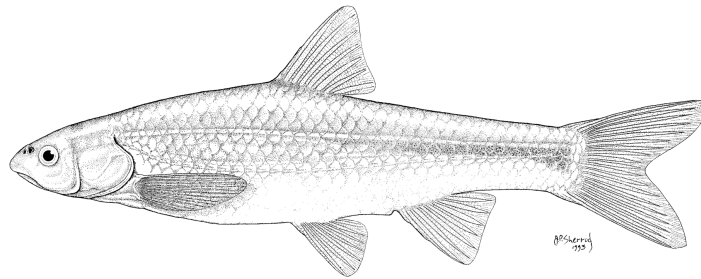


RIO GRANDE SILVERY MINNOW POPULATION MONITORING DURING MAY 2023

**A U.S. BUREAU OF RECLAMATION FUNDED
RESEARCH PROGRAM**



14 June 2023

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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
555 Broadway NE, Suite 100
Albuquerque, NM 87102

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14 June 2023

SUMMARY OF MAY 2023 POPULATION MONITORING

The May 2023 population monitoring efforts were conducted at the 20 standard sites. Five sites were in the Angostura Reach, six sites were in the Isleta Reach, and nine sites were in the San Acacia Reach. For the 2023 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 (ca. April–June). Figures illustrating fish densities (i.e., fish per 100 m²) were prepared for the ten focal species to facilitate comparisons across reaches.

Angostura Reach

From 16 April to 15 May, provisional U.S. Geological Survey (USGS) mean daily discharge in the Angostura Reach (Albuquerque: USGS Gage-08330000) averaged 3,849 ft³/s and ranged from 3,130 to 4,930 ft³/s. Water temperatures ranged from 13.5 to 15.9 °C during the Angostura Reach sampling efforts (ca. 0830–1530 h). Secchi disk measurements of water clarity ranged from 10 to 15 cm.

Sampling for fishes in the Angostura Reach during May yielded 89 individuals with a cumulative fish density of 4.6 individuals per 100 m² sampled. The overall sampling effort in the Angostura Reach covered 1,927.6 m² (surface area) of water. Densities of all fish species combined ranged from 0.2 to 14.2 individuals per 100 m² at the different sampling sites. In May, there were 5 fish species collected in the Angostura Reach. Flathead Chub was the most abundant taxon (n = 35), followed by Longnose Dace (n = 24), and Red Shiner (n = 21). We collected Rio Grande Silvery Minnow (n = 0) in 0 of the 40 seine hauls that yielded fish, and its overall density was 0.00 (range = 0.00–0.00) individuals per 100 m².

Isleta Reach

Provisional mean daily discharge in the Isleta Reach (Bosque Farms: USGS Gage-08331160), from 16 April to 15 May, averaged 3,846 ft³/s and ranged from 3,230 to 4,660 ft³/s. During the Isleta Reach sampling efforts (ca. 0930–1600 h), water temperatures ranged from 16.2 to 19.0 °C. Secchi disk measurements ranged from 6 to 13 cm during sampling.

Isleta Reach population monitoring efforts produced 292 individuals in May with a cumulative fish density of 14.5 individuals per 100 m² sampled. The total sampling effort in the Isleta Reach during May covered 2,016.9 m² (surface area) of water. Fish densities (all species combined) at the sampling sites ranged from 0.0 to 43.8 individuals per 100 m² sampled. There were 5 fish species collected in the Isleta Reach during May. Common Carp was the most abundant taxon (n = 153), followed by Red Shiner (n = 128), and Western Mosquitofish (n = 7). We collected Rio Grande Silvery Minnow (n = 0) in 0 of the 24 seine hauls that yielded fish, and its overall density was 0.00 (range = 0.00–0.00) individuals per 100 m².

San Acacia Reach

From 16 April to 15 May, provisional mean daily discharge at San Acacia (USGS Gage-08354900) was generally higher (average = 3,300; range = 2,310–4,430 ft³/s) than at San Marcial (USGS Gage-08358400) during the same period (average = 2,722; range = 2,070–3,380 ft³/s). Water temperatures in May for the San Acacia Reach ranged from 16.2 to 18.7 °C (ca. 0930–1600 h). Secchi disk measurements ranged from 3 to 10 cm during sampling.

Population monitoring efforts in the San Acacia Reach during May yielded 42 individuals with a cumulative fish density of 1.2 individuals per 100 m² sampled. Sampling in the San Acacia Reach covered an area of 3,651.6 m² of water. Fish densities (all species combined) ranged from 0.3 to 3.9 individuals per 100 m² at sites sampled in the San Acacia Reach. In May, there were 7 fish species collected in the San Acacia Reach. Red Shiner was the most abundant taxon (n = 20), followed by Gizzard Shad (n = 5), and Channel Catfish (n = 5). We collected Rio Grande Silvery Minnow (n = 4) in 4 of the 29 seine hauls that yielded fish, and its overall density was 0.11 (range = 0.00–0.86) individuals per 100 m².

All Sites

During May, sampling covered 7,596.1 m² (surface area) of water and yielded 423 fish. There were no dry sampling sites. Cumulative fish density during May was 5.57 individuals per 100 m² sampled. The three most common species were Red Shiner (n = 169), Common Carp (n = 155), and Flathead Chub (n = 39). The sampling sites yielded a total of 10 fish species.

Rio Grande Silvery Minnow was present in 4 of the 93 seine hauls that yielded fish and at 2 of the 20 sampling sites. Densities of unmarked and marked individuals were 0.01 (n = 1) and 0.04 (n = 3) individuals per 100 m² sampled, respectively. Densities of age-0, age-1, and age-2+ individuals were 0.00 (n = 0), 0.05 (n = 4), and 0.00 (n = 0) individuals per 100 m² sampled, respectively. Based on all May surveys since 1993, the overall density of Rio Grande Silvery Minnow averaged 5.67 (range = 0.05–86.28) individuals per 100 m² sampled. During May 2023, its overall density was 0.05 (n = 4) individuals per 100 m² sampled.

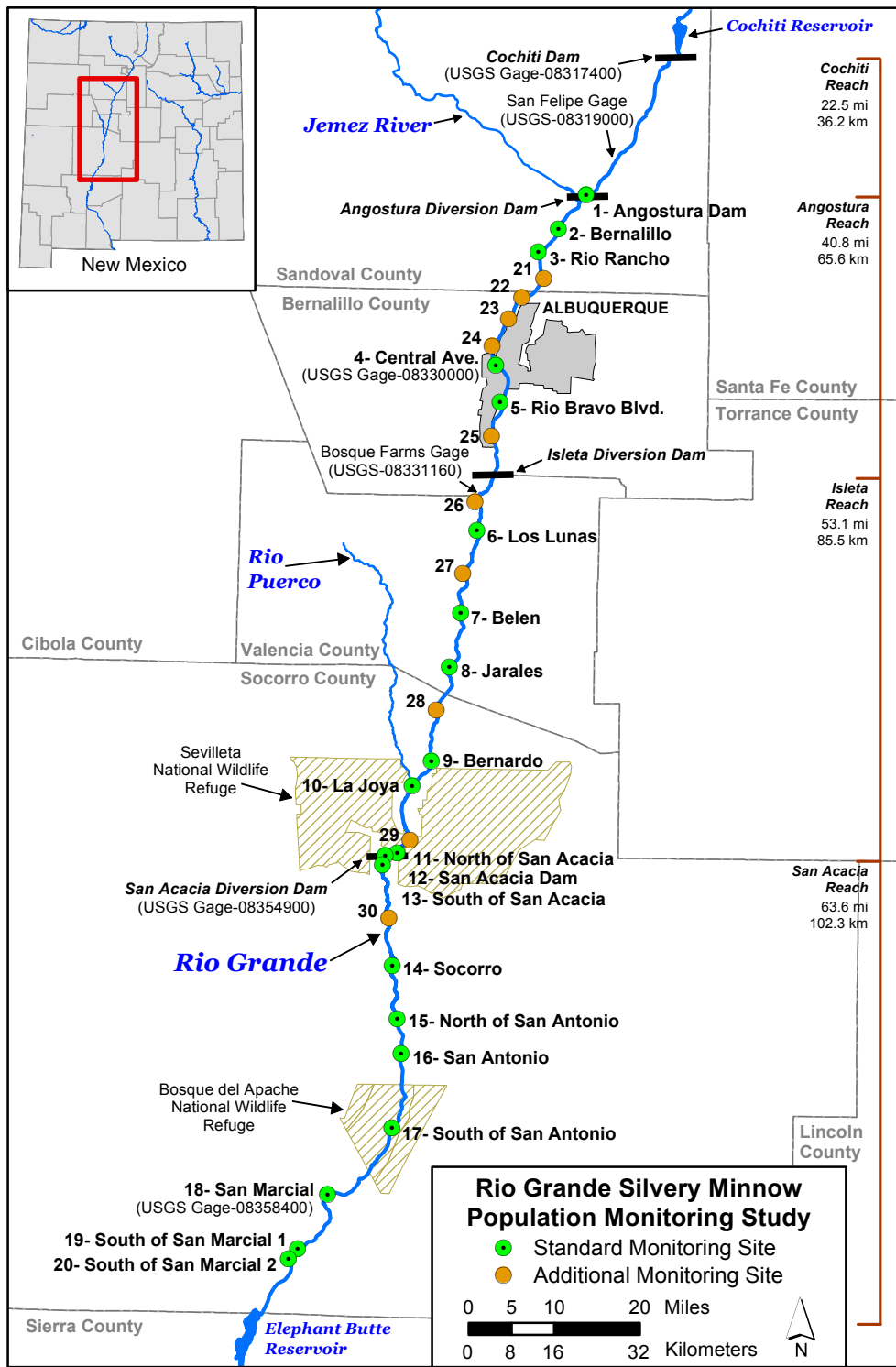


Figure 1. Map of the study area, standard sites, and additional sites for the Rio Grande Silvery Minnow population monitoring study. Sampling site descriptions are provided in Appendix A.

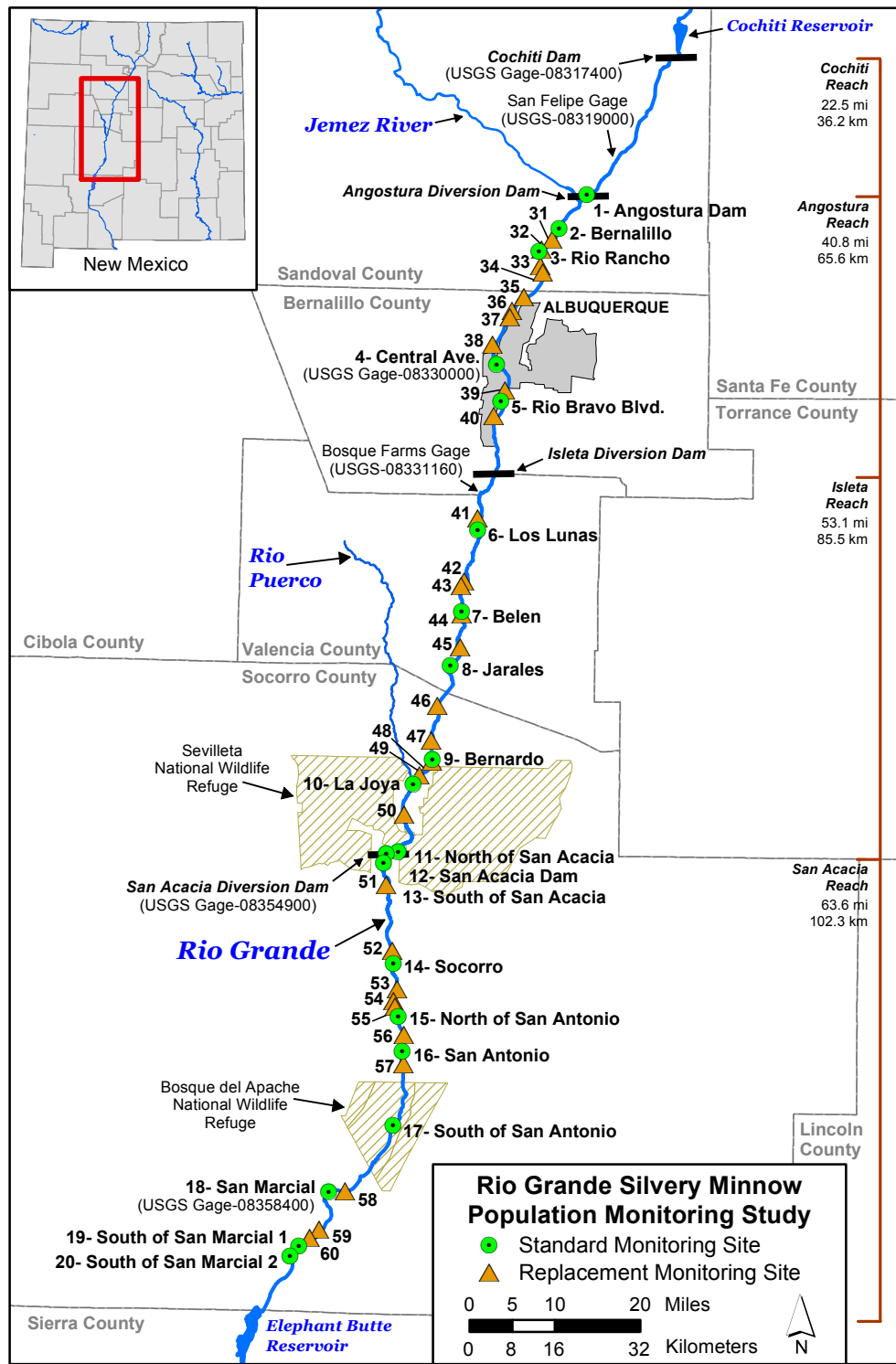


Figure 2. Map of the study area, standard sites, and replacement sites for the Rio Grande Silvery Minnow population monitoring study. Sampling site descriptions are provided in Appendix A.

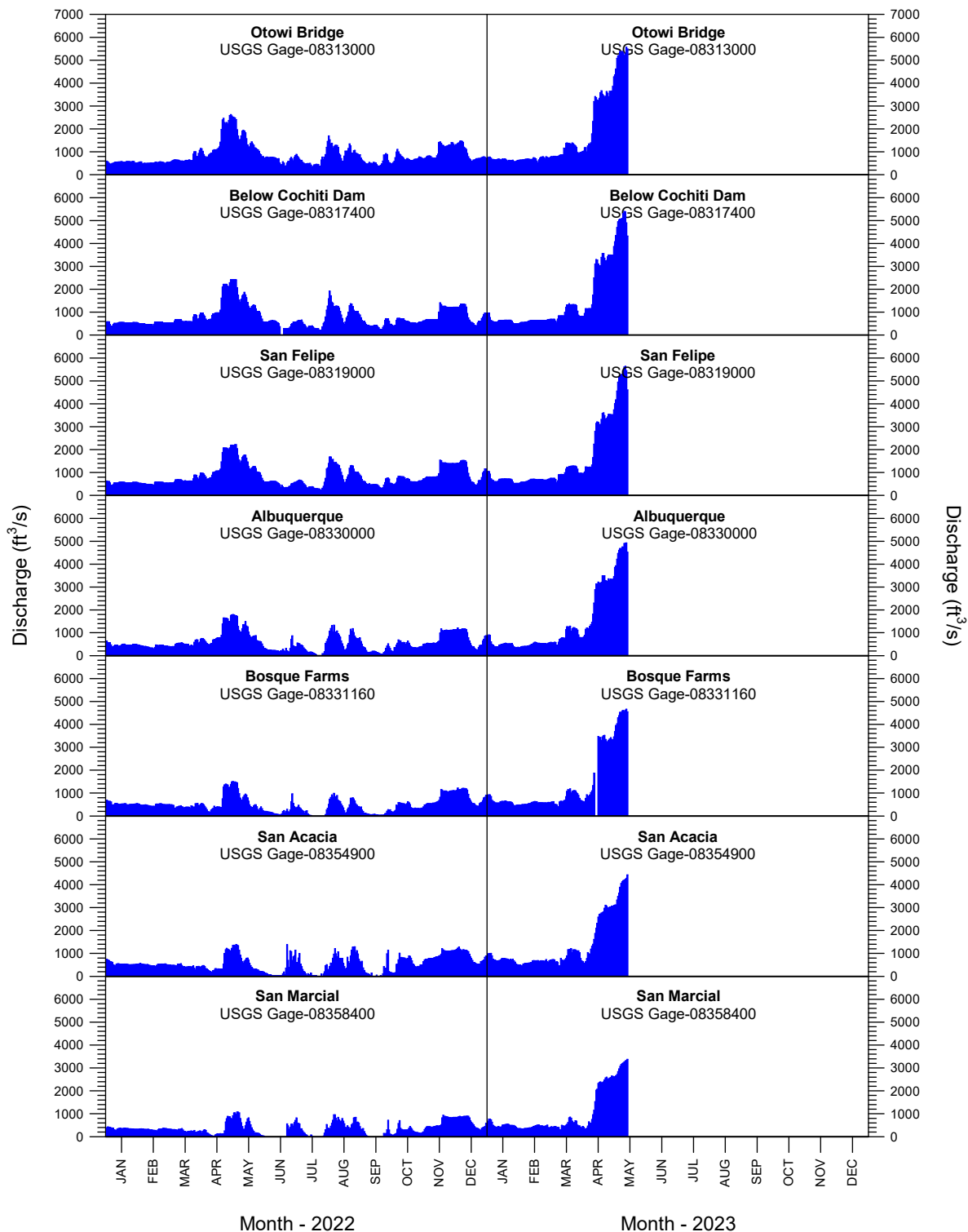


Figure 3. Rio Grande mean-daily discharge, by USGS gaging station, from 1 January 2022 to 15 May 2023. All discharge data are provisional and subject to change.

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	
<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)
Family Loricariidae		
	suckermouth armored catfishes	
<i>Pterygoplichthys disjunctivus</i>	Vermiculated Sailfin Catfish	(PTEDIS)
Order Salmoniformes		
Family Salmonidae		
	trouts and salmons	
<i>Oncorhynchus mykiss</i>	Rainbow Trout	(ONCMYK)
<i>Salmo trutta</i>	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	
<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 and darters	
<i>Perca flavescens</i>	Yellow Perch	(PERFLA)
<i>Percina macrolepida</i>	Bigscale Logperch	(PERMAC)
<i>Sander vitreus</i>	Walleye	(SANVIT)
Family Sciaenidae		
	drums and croakers	
<i>Aplodinotus grunniens</i>	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 2023. 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
Angostura	4	Central Ave.	0	0	0	0	0	0
Angostura	5	Rio Bravo Blvd.		0	0	0	0	0
<i>Angostura Totals</i>			<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Isleta	6	Los Lunas			0	0	0	0
Isleta	7	Belen		0		0		0
Isleta	8	Jarales	0	0		0	0	0
Isleta	9	Bernardo			0	0	0	0
Isleta	10	La Joya				0	0	0
Isleta	11	North of San Acacia			0	0	0	0
<i>Isleta Totals</i>			<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
San Acacia	12	San Acacia Dam		0	0	0	0	0
San Acacia	13	South of San Acacia				0	1	1
San Acacia	14	Socorro			0	0	0	0
San Acacia	15	North of San Antonio		0	0	0	0	0
San Acacia	16	San Antonio	0				3	3
San Acacia	17	South of San Antonio				0	0	0
San Acacia	18	San Marcial			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	0
<i>San Acacia Totals</i>			<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>4</i>	<i>4</i>
Monthly Totals			0	0	0	0	4	4

Table 3. Rio Grande Silvery Minnow abundance, by reach, site, and month, during 2023. 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	0	0	0	0	0	0	0	0
Angostura	3	Rio Rancho	0	0	0	0	0	0	0	0
Angostura	21	Site 21	0						0	0
Angostura	22	Site 22	2(0)						0	2
Angostura	23	Site 23	0						0	0
Angostura	24	Site 24	0						0	0
Angostura	4	Central Ave.	0	0	0	0	0	0	0	0
Angostura	5	Rio Bravo Blvd.	4(4)	0	0	0	0	0	0	4
Angostura	25	Site 25	0						0	0
<i>Angostura Totals</i>			6	0	0	0	0	0	0	6
Isleta	26	Site 26	1(1)						0	1
Isleta	6	Los Lunas	1(1)	0	0	0	0	0	0	1
Isleta	27	Site 27	0						0	0
Isleta	7	Belen	0	0	0	0	0	0	0	0
Isleta	8	Jarales	0	0	0	0	0	0	0	0
Isleta	28	Site 28	0						0	0
Isleta	9	Bernardo	0	0	0	0	0	0	0	0
Isleta	10	La Joya	0	0	0	0	0	0	0	0
Isleta	29	Site 29	0						0	0
Isleta	11	North of San Acacia	0	0	0	0	0	0	0	0
<i>Isleta Totals</i>			2	0	0	0	0	0	0	2
San Acacia	12	San Acacia Dam	4(2)	0	0	0	0	0	0	4
San Acacia	13	South of San Acacia	1(1)	1(1)	0	0	0	0	0	2
San Acacia	30	Site 30	3(3)						0	3
San Acacia	14	Socorro	0	0	0	0	0	0	0	0
San Acacia	15	North of San Antonio	0	0	0	0	0	0	0	0
San Acacia	16	San Antonio	2(2)	3(2)	0	0	0	0	0	5
San Acacia	17	South of San Antonio	0	0	0	0	0	0	0	0
San Acacia	18	San Marcial	1(1)	0	0	0	0	0	0	1
San Acacia	19	South of San Marcial 1	2(2)	0	0	0	0	0	0	2
San Acacia	20	South of San Marcial 2	0	0	0	0	0	0	0	0
<i>San Acacia Totals</i>			13	4	0	0	0	0	0	17
Monthly Totals			21	4	0	0	0	0	0	25

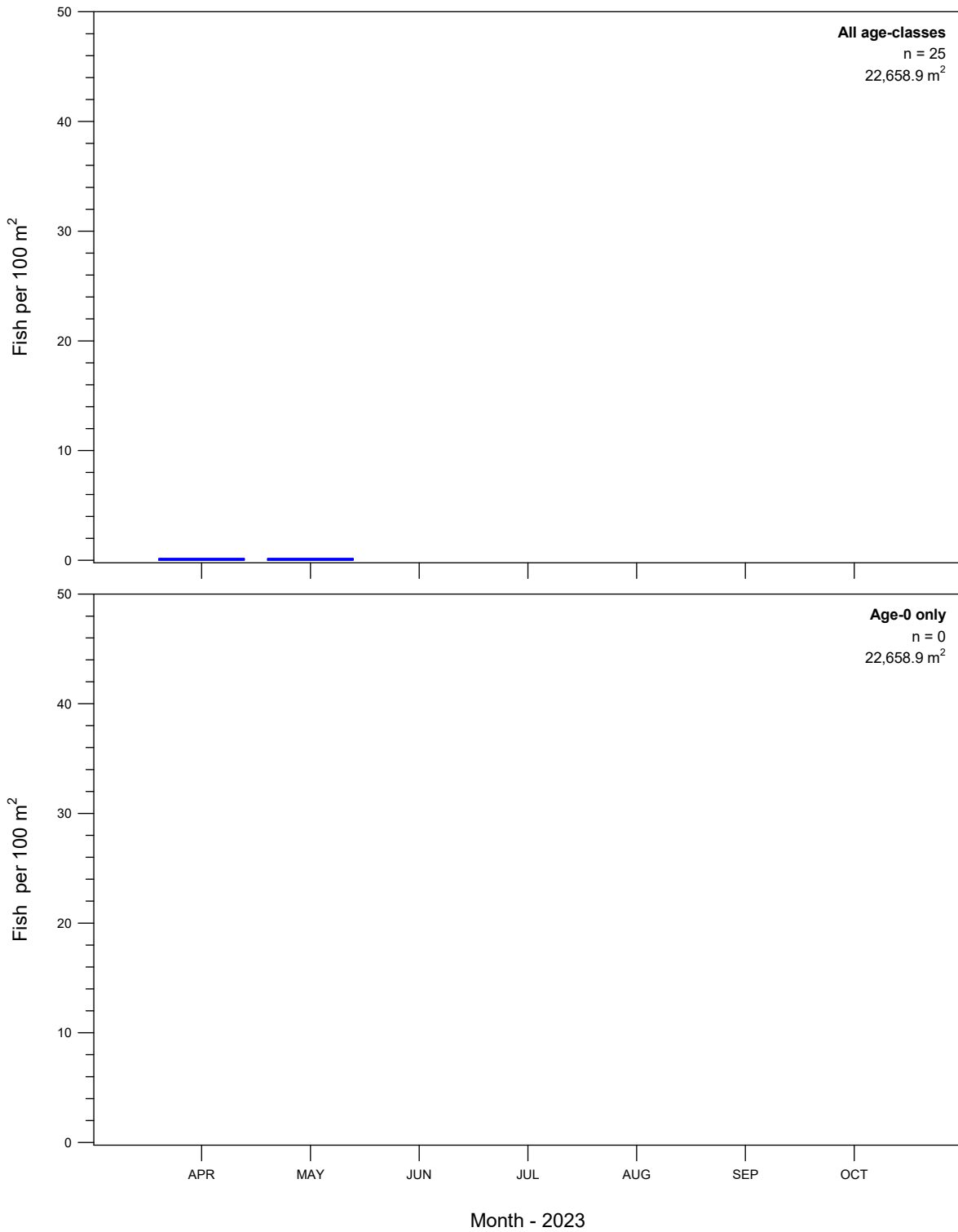


Figure 4. Rio Grande Silvery Minnow densities based on all sites, by age-class and month, during 2023. Marked and unmarked individuals were included.

Table 4. Ichthyofaunal summary based on all sites, by species, during May 2023. 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	5	1.18	2	10.00
Clupeidae	Threadfin Shad	I	-	-	-	-
Cyprinidae	Central Stoneroller	I	-	-	-	-
Cyprinidae	Goldfish	I	-	-	-	-
Cyprinidae	Red Shiner	N	169	39.95	13	65.00
Cyprinidae	Common Carp	I	155	36.64	3	15.00
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnow	N	4	0.95	2	10.00
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	-	-	-	-
Cyprinidae	Bullhead Minnow	I	-	-	-	-
Cyprinidae	Fathead Chub	N	39	9.22	7	35.00
Cyprinidae	Longnose Dace	N	24	5.67	3	15.00
Catostomidae	River Carpsucker	N	-	-	-	-
Catostomidae	White Sucker	I	2	0.47	1	5.00
Catostomidae	Smallmouth Buffalo	N	-	-	-	-
Ictaluridae	Black Bullhead	I	-	-	-	-
Ictaluridae	Yellow Bullhead	I	-	-	-	-
Ictaluridae	Blue Catfish	N	-	-	-	-
Ictaluridae	Channel Catfish	I	10	2.36	6	30.00
Ictaluridae	Fathead Catfish	N	-	-	-	-
Loricariidae	Vermiculated Sailfin Catfish	I	-	-	-	-
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	9	2.13	3	15.00
Moronidae	White Bass	I	-	-	-	-
Moronidae	Striped Bass	I	-	-	-	-
Centrarchidae	Green Sunfish	I	6	1.42	1	5.00
Centrarchidae	Bluegill	N	-	-	-	-
Centrarchidae	Longear Sunfish	I	-	-	-	-
Centrarchidae	Smallmouth Bass	I	-	-	-	-
Centrarchidae	Largemouth Bass	I	-	-	-	-
Centrarchidae	White Crappie	I	-	-	-	-
Centrarchidae	Black Crappie	I	-	-	-	-
Percidae	Yellow Perch	I	-	-	-	-
Percidae	Bigscale Logperch	I	-	-	-	-
Percidae	Walleye	I	-	-	-	-
Sciaenidae	Freshwater Drum	N	-	-	-	-
Monthly Total			423	100.00		

¹ = Native (N) or introduced (I) species

² = Based on all sites

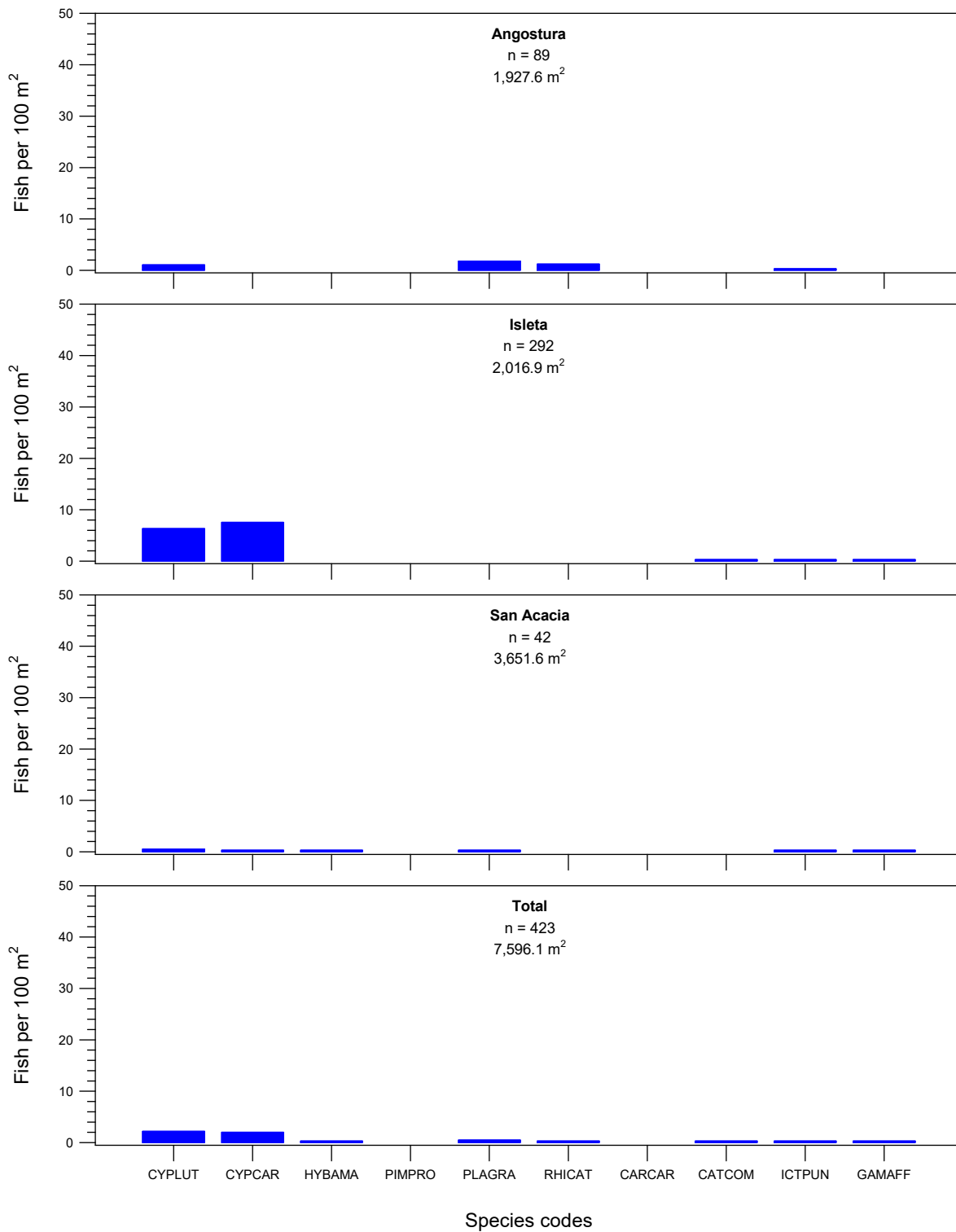


Figure 5. Fish densities based on all sites, by reach and focal taxa, during May 2023. Marked and unmarked Rio Grande Silvery Minnow were included.

Table 5. Ichthyofaunal summary based on all sites, by species and month, during 2023. Marked and unmarked Rio Grande Silvery Minnow were included.

Family	Common Name	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Clupeidae	Gizzard Shad	0	5	0	0	0	0	0	5
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	981	169	0	0	0	0	0	1,150
Cyprinidae	Common Carp	3	155	0	0	0	0	0	158
Cyprinidae	Rio Grande Chub	0	0	0	0	0	0	0	0
Cyprinidae	Rio Grande Silvery Minnow	21	4	0	0	0	0	0	25
Cyprinidae	Golden Shiner	0	0	0	0	0	0	0	0
Cyprinidae	Fathead Minnow	6	0	0	0	0	0	0	6
Cyprinidae	Bullhead Minnow	0	0	0	0	0	0	0	0
Cyprinidae	Flathead Chub	239	39	0	0	0	0	0	278
Cyprinidae	Longnose Dace	27	24	0	0	0	0	0	51
Catostomidae	River Carpsucker	0	0	0	0	0	0	0	0
Catostomidae	White Sucker	3	2	0	0	0	0	0	5
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	0	0	0	0	0	0	0	0
Ictaluridae	Blue Catfish	0	0	0	0	0	0	0	0
Ictaluridae	Channel Catfish	130	10	0	0	0	0	0	140
Ictaluridae	Flathead Catfish	0	0	0	0	0	0	0	0
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	16	9	0	0	0	0	0	25
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	1	6	0	0	0	0	0	7
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		1,427	423	0	0	0	0	0	1,850

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: 3792182; 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 2023, as part of the
Rio Grande Silvery Minnow Population Monitoring Program
(Any blanks in this database output indicate null data)

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

Rio Grande Silvery Minnow Population Monitoring May 2023

NEW MEXICO: SANDOVAL County, RIO GRANDE Drainage
Rio Grande, just downstream of Angostura Diversion Dam, Algodones.
Site Number: 1 River Mile: 209.9
UTM Easting: 363665 UTM Northing: 3916331 Zone: 13
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T.

RKD23-048

05 May 2023
USGS Quad: San Felipe Pueblo
Effort: 353.0 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	15
76	<i>Platygobio gracilis</i>	16
76	<i>Rhinichthys cataractae</i>	13
294	<i>Lepomis cyanellus</i>	6

NEW MEXICO: SANDOVAL County, RIO GRANDE Drainage
Rio Grande, at US HWY 550 bridge crossing, Bernalillo.
Site Number: 2 River Mile: 203.9
UTM Easting: 358457 UTM Northing: 3909887 Zone: 13
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T.

RKD23-049

05 May 2023
USGS Quad: Bernalillo
Effort: 391.6 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Platygobio gracilis</i>	5
76	<i>Rhinichthys cataractae</i>	6

NEW MEXICO: SANDOVAL County, RIO GRANDE Drainage
Rio Grande, ca. 4.0 mi downstream of US HWY 550 bridge crossing, Rio Rancho.
Site Number: 3 River Mile: 199.9
UTM Easting: 354728 UTM Northing: 3905587 Zone: 13
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T.

RKD23-050

05 May 2023
USGS Quad: Bernalillo
Effort: 310.1 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	6
76	<i>Platygobio gracilis</i>	7
76	<i>Rhinichthys cataractae</i>	5
93	<i>Ictalurus punctatus</i>	1

NEW MEXICO: BERNALILLO County, RIO GRANDE Drainage
Rio Grande, at Central Ave. bridge crossing (US HWY 66), Albuquerque.
Site Number: 4 River Mile: 183.4
UTM Easting: 346719 UTM Northing: 3884331 Zone: 13
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T.

RKD23-047

05 May 2023
USGS Quad: Albuquerque West
Effort: 441.1 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Platygobio gracilis</i>	1

Rio Grande Silvery Minnow Population Monitoring May 2023

NEW MEXICO: BERNALILLO County, RIO GRANDE Drainage **RKD23-046**
Rio Grande, at Rio Bravo Blvd. bridge crossing (NM State HWY 500), Albuquerque.
Site Number: 5 River Mile: 178.4 02 May 2023
UTM Easting: 347468 UTM Northing: 3877400 Zone: 13 USGS Quad: Albuquerque West
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T. Effort: 432.0 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Platygobio gracilis</i>	6
93	<i>Ictalurus punctatus</i>	2

NEW MEXICO: VALENCIA County, RIO GRANDE Drainage **RKD23-045**
Rio Grande, just upstream of NM State HWY 6 bridge crossing, Los Lunas.
Site Number: 6 River Mile: 161.7 03 May 2023
UTM Easting: 343149 UTM Northing: 3853187 Zone: 13 USGS Quad: Los Lunas
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T. Effort: 406.6 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	22
76	<i>Cyprinus carpio</i>	152
81	<i>Catostomus commersonii</i>	2
93	<i>Ictalurus punctatus</i>	2

NEW MEXICO: VALENCIA County, RIO GRANDE Drainage **RKD23-044**
Rio Grande, ca. 1.0 mi upstream of NM State HWY 309 bridge crossing, Belen.
Site Number: 7 River Mile: 150.8 03 May 2023
UTM Easting: 340105 UTM Northing: 3837722 Zone: 13 USGS Quad: Tome
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T. Effort: 281.0 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	10

NEW MEXICO: VALENCIA County, RIO GRANDE Drainage **RKD23-043**
Rio Grande, ca. 2.2 mi upstream of NM State HWY 346 bridge crossing, Jarales.
Site Number: 8 River Mile: 143.2 03 May 2023
UTM Easting: 338020 UTM Northing: 3827545 Zone: 13 USGS Quad: Veguita
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T. Effort: 273.7 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	93
76	<i>Cyprinus carpio</i>	1
212	<i>Gambusia affinis</i>	6

**Rio Grande Silvery Minnow Population Monitoring
May 2023**

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage

Rio Grande, at US HWY 60 bridge crossing, Bernardo.

Site Number: 9

River Mile: 130.6

UTM Easting: 334578

UTM Northing: 3809921

Zone: 13

Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T.

RKD23-042

03 May 2023

USGS Quad: Abeytas

Effort: 316.5 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	1
212	<i>Gambusia affinis</i>	1

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage

Rio Grande, ca. 3.7 mi downstream of US HWY 60 bridge crossing, Bernardo.

Site Number: 10

River Mile: 126.8

UTM Easting: 330946

UTM Northing: 3805307

Zone: 13

Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T.

RKD23-041

03 May 2023

USGS Quad: Abeytas

Effort: 294.3 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
	No Fish Collected	

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage

Rio Grande, ca. 1.2 mi upstream of San Acacia Diversion Dam, San Acacia.

Site Number: 11

River Mile: 117.3

UTM Easting: 328152

UTM Northing: 3792564

Zone: 13

Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T.

RKD23-040

02 May 2023

USGS Quad: La Joya

Effort: 445.0 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	2

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage

Rio Grande, just downstream of San Acacia Diversion Dam, San Acacia.

Site Number: 12

River Mile: 115.6

UTM Easting: 325960

UTM Northing: 3792183

Zone: 13

Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T.

RKD23-039

02 May 2023

USGS Quad: San Acacia

Effort: 414.2 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	9
76	<i>Cyprinus carpio</i>	2
76	<i>Platygobio gracilis</i>	1
93	<i>Ictalurus punctatus</i>	2
212	<i>Gambusia affinis</i>	2

**Rio Grande Silvery Minnow Population Monitoring
May 2023**

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD23-038**
Rio Grande, ca. 1.5 mi downstream of San Acacia Diversion Dam, San Acacia.
Site Number: 13 River Mile: 114.1 02 May 2023
UTM Easting: 325390 UTM Northing: 3790397 Zone: 13 USGS Quad: Lemitar
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T. Effort: 343.8 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Hybognathus amarus</i> *	1
93	<i>Ictalurus punctatus</i>	1

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

age-0	
age-1	1
age-2+	

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD23-037**
Rio Grande, ca. 0.5 mi upstream of Socorro Low Flow Conveyance Channel bridge crossing, Socorro.
Site Number: 14 River Mile: 99.6 02 May 2023
UTM Easting: 327231 UTM Northing: 3771432 Zone: 13 USGS Quad: Loma de las Canas
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T. Effort: 429.0 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	1
93	<i>Ictalurus punctatus</i>	2

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage **RKD23-036**
Rio Grande, ca. 4.5 mi upstream of US HWY 380 bridge crossing, San Antonio.
Site Number: 15 River Mile: 92.0 02 May 2023
UTM Easting: 328151 UTM Northing: 3761487 Zone: 13 USGS Quad: San Antonio
Collector(s): Dudley, R.K.; Farrington, M.A.; Camak, D.T. Effort: 511.7 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	2

**Rio Grande Silvery Minnow Population Monitoring
 May 2023**

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage
 Rio Grande, at US HWY 380 bridge crossing, San Antonio.
 Site Number: 16 River Mile: 87.8
 UTM Easting: 328907 UTM Northing: 3754926 Zone: 13
 Collector(s): Dudley, R.K.; Farrington, M.A.; DeArmon, E.S.

RKD23-035

01 May 2023
 USGS Quad: San Antonio
 Effort: 350.8 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	1
76	<i>Hybognathus amarus*</i>	3
76	<i>Platygobio gracilis</i>	3

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

age-0	
age-1	3
age-2+	

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage
 Rio Grande, east of Bosque del Apache NWR headquarters, San Antonio.
 Site Number: 17 River Mile: 79.0
 UTM Easting: 327219 UTM Northing: 3740906 Zone: 13
 Collector(s): Dudley, R.K.; Farrington, M.A.; DeArmon, E.S.

RKD23-034

01 May 2023
 USGS Quad: San Antonio SE
 Effort: 285.8 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	4

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage
 Rio Grande, at San Marcial Railroad bridge crossing, San Marcial.
 Site Number: 18 River Mile: 68.3
 UTM Easting: 315091 UTM Northing: 3728487 Zone: 13
 Collector(s): Dudley, R.K.; Farrington, M.A.; DeArmon, E.S.

RKD23-033

01 May 2023
 USGS Quad: San Marcial
 Effort: 450.2 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
76	<i>Cyprinella lutrensis</i>	3

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage
 Rio Grande, ca. 8.0 mi downstream of San Marcial Railroad bridge crossing, San Marcial.
 Site Number: 19 River Mile: 60.1
 UTM Easting: 309441 UTM Northing: 3718309 Zone: 13
 Collector(s): Dudley, R.K.; Farrington, M.A.; DeArmon, E.S.

RKD23-032

01 May 2023
 USGS Quad: Paraje Well
 Effort: 469.8 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
69	<i>Dorosoma cepedianum</i>	4

**Rio Grande Silvery Minnow Population Monitoring
May 2023**

NEW MEXICO: SOCORRO County, RIO GRANDE Drainage

RKD23-031

Rio Grande, ca. 10.0 mi downstream of San Marcial Railroad bridge crossing, San Marcial.

Site Number: 20

River Mile: 58.5

01 May 2023

UTM Easting: 307767

UTM Northing: 3716360

Zone: 13

USGS Quad: Paraje Well

Collector(s): Dudley, R.K.; Farrington, M.A.; DeArmon, E.S.

Effort: 396.5 sq. m

<u>Family</u>	<u>Species</u>	<u>Total</u>
69	<i>Dorosoma cepedianum</i>	1