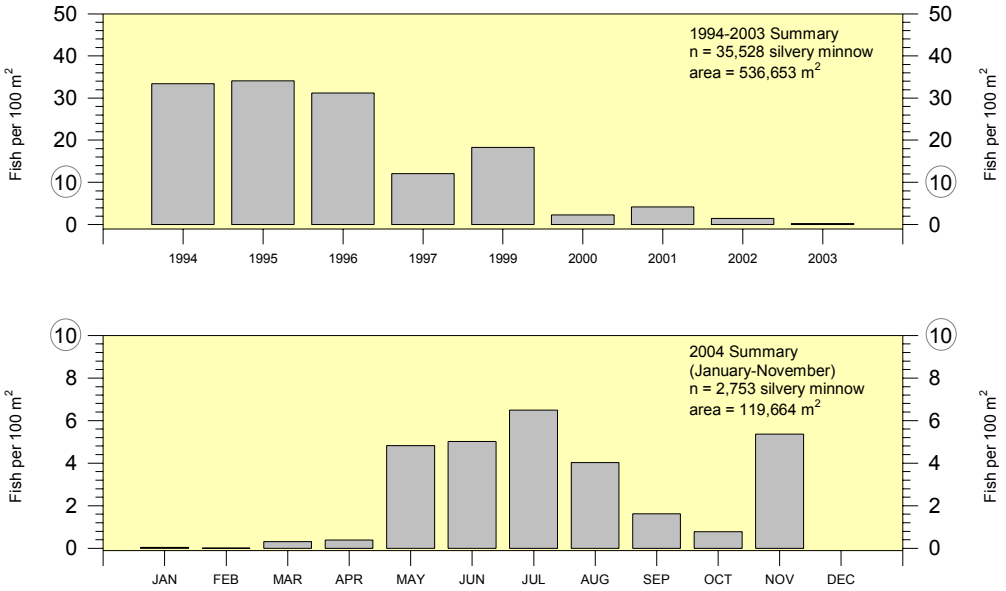
Summary of the Rio Grande silvery minnow Population Monitoring Program Results from November 2004

(22-24 November and 29-30 November 2004)

A Middle Rio Grande Endangered Species Act Collaborative Program Funded Research Project



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14 December 2004

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Summary of Overall November 2004 Population Monitoring Efforts

The eleventh sampling effort of the 2004 Rio Grande silvery minnow population monitoring program was conducted between 22-24 November and 29-30 November 2004 at 20 sites throughout the Middle Rio Grande. Five sites were located in the Angostura Reach, six sites in the Isleta Reach, and nine sites in the San Acacia Reach. A list of collection localities is appended (Table A-1).

Adult and juvenile fish were obtained by rapidly drawing a 3.1 m x 1.8 m small mesh (5 mm) seine through discrete mesohabitats. Fish were identified in the field, counted, and released at the site of capture. Rio Grande silvery minnow were also counted, identified to age-class, and released at the site of capture. No young-of-year fish (that could not be field identified) were collected during the November 2004 sampling. Figures illustrating catch rates (number of fish per 100 m^2 sampled) were prepared for the ten focal species, including Rio Grande silvery minnow, for the purpose of comparisons between reaches.

During November 2004, a total of 3,070 fish were taken in the 10,013 m^2 (surface area) of water sampled. Red shiner, *Cyprinella lutrensis*, was the most abundant taxon (N=1,674) and comprised about 55% of the total catch; this was a much lower percentage than in October 2004 (68%). Rio Grande silvery minnow, *Hybognathus amarus,* (N=538) was present in 17.2% of all seine hauls and was more abundant in specific mesohabitats such as backwaters and pools. A single seine haul in a backwater at Site #2 produced nearly half (N=254) of all Rio Grande silvery minnow collected during November. This seine haul changed the catch rate estimate considerably and so data are presented with (Figure 5) and without (Figure 6) this single data point. Fish were collected in 193 of the 332 seine hauls (58.1%) made during the November 2004 sampling effort yielding a cumulative catch rate of 30.7 fish per 100 m^2 sampled.

Summary of November 2004 Population Monitoring Effort by River Reach

Angostura Reach

Mesohabitats in the Angostura Reach were sampled for fish on 29-30 November 2004. Water levels were higher compared to October but it was still possible to access all portions of the study site including the deepest portions of the thalweg. The Angostura Diversion Dam sampling site produced the fewest numbers of fish of any of the Angostura Reach sites. A total of only two red shiner were collected in a single seine haul. Water clarity was high at this site (Secchi depth=36 cm) and the river bottom was visible in most areas. Aquatic vegetation and algae was visible and thick in shallow water habitats. Water temperature was quite cold (4.5°C), nearly 10°C cooler compared to October. This rapid drop in water temperature is typical of late autumn sampling and appears to result in the congregation of fishes into specific mesohabitats (e.g., debris piles or backwaters). Discharge increased slightly in the Angostura Reach during November with some of the highest flows occurring near the end of the month. Water temperatures recorded at the different sampling sites ranged from 4.3°C to 6.4°C and were about 10°C cooler compared with temperatures in October. Fish were occupying areas along the shoreline and in low or no velocity habitats often associated with debris. The most frequently collected taxon in the Angostura Reach during November was Rio Grande silvery minnow (N=322). This was largely because of a single seine haul in an iced-over backwater at Site #2 that produced 254 individuals. The majority of Rio Grande silvery minnow were between 40-60 mm SL. However, some Age-0 individuals were quite small (<35 mm SL). It is possible that many of the smallest individuals will have an increased rate of mortality compared to larger individuals during winter. The number of Rio Grande silvery minnow collected during November 2004 (N=254) in the Angostura Reach was markedly higher than during October 2004 (N=44); Rio Grande silvery minnow were the fourth-most abundant species during October 2004. The cold water temperatures likely concentrated fish into fewer but larger school which may explain, in part, the higher catch rates observed during November. Overall spawning and recruitment success of Rio Grande silvery minnow appears to be higher in 2004 compared to 2003.

Isleta Reach

The increased discharge during November was pronounced in the Isleta Reach where flows increased from <100 cfs to >1,000 cfs within several weeks. November discharge steadily increased during the month and resulted in the re-wetting of several side channels that had been dry for most of the summer of 2004. The water of the Rio Grande was being diverted at Isleta Diversion Dam leaving areas with minimal discharge throughout the summer but the end of irrigation season (October 31) resulted in a radically different flow environment within a short period of time. Water temperatures in the Isleta Reach generally ranged from about 5-10°C from morning (0900 h) to afternoon (1400 h). Water clarity was moderate (Secchi depth=10-15 cm) at most sampling sites because of low discharge and no input from sediment rich tributaries (e.g., Rios Salado or Puerco). The Isleta Reach had the lowest catch rate (25.6 fish/100 m^2) of any of the sampling reaches in the Middle Rio Grande and was about one-forth of that recorded during October. Overall ichthyofaunal catch rates in the Angostura Reach (26.6 fish/100 m^2) were similar to the Isleta Reach and had changed little since October (27.0 fish/100 m^2). The most commonly collected taxa were red shiner (N=270), fathead minnow (N=203), and young-of-year Rio Grande silvery minnow (N=127). Most of the Rio Grande silvery minnow collected utilized backwater or pool mesohabitats and were often present in larger schools.

San Acacia Reach

Population monitoring was conducted in the San Acacia Reach (9 sites) of the Middle Rio Grande on 22-23 November 2004. Discharge had increased steadily during the month, similar to the pattern observed in the Isleta Reach, and was about 1,000 cfs by the end of the month. The increased flow combined with low ambient temperatures resulted in about a 5°C drop in water temperatures during November compared to October. None of the sampling sites were dry but several of the sites that had dried completely in September (Sites #13-15) produced little or no fish. The water throughout the San Acacia Reach was relatively turbid and instream visibility was <5 cm at all sampling sites except for Site #10 (as measured by Secchi Disk). Increased water turbidity was likely a result of increased flow and movement of sediment from formerly dry side channel. Water temperatures ranged from 8.0-9.4°C during the day and were notably cooler compared to temperatures in September or October. The most commonly collected taxon during November 2004 in the San Acacia Reach was red shiner (N=1,225). Rio Grande silvery minnow individuals (N=89) were present in low velocity habitats and were most common (N=81) at the two upper-most sites in the San Acacia Reach. The San Acacia Reach catch rate (36.0 fish/100 m^2) was higher than the catch rate of either the Angostura and San Acacia reaches.

Conclusion

The four most numerically dominant taxa collected during the November 2004 monitoring effort were, in order of abundance, red shiner (N=1,674), Rio Grande silvery minnow (N=538), fathead minnow (N=332), and flathead chub (N=296). These taxa collectively comprised about 92% of the total catch of fish in the Middle Rio Grande study area. The abundance of Rio Grande silvery minnow during November 2004 was higher compared to September or October 2004. It is likely that the cold water temperatures observed during November (e.g., <5°C in some instances) resulted in the concentration of fishes into specific low or no velocity mesohabitats such as backwaters or pools. Higher numbers of Rio Grande silvery minnow are often observed during November compared to October and this pattern has held for the past three years (2002-2004). Although the abundance of Rio Grande silvery minnow was highest in the Angostura Reach, there were many individuals collected in the Isleta and San Acacia reaches. This possibly indicates that young from upper reaches emigrated to downstream reaches or that survivorship of young is higher in lower reaches compared to upper reaches. This late November sampling effort indicates that the overall population of Rio Grande silvery minnow has increased compared with last year. However, cold water temperatures may result in increased over-winter mortality of small young-of-year or recently stocked Rio Grande silvery minnow.

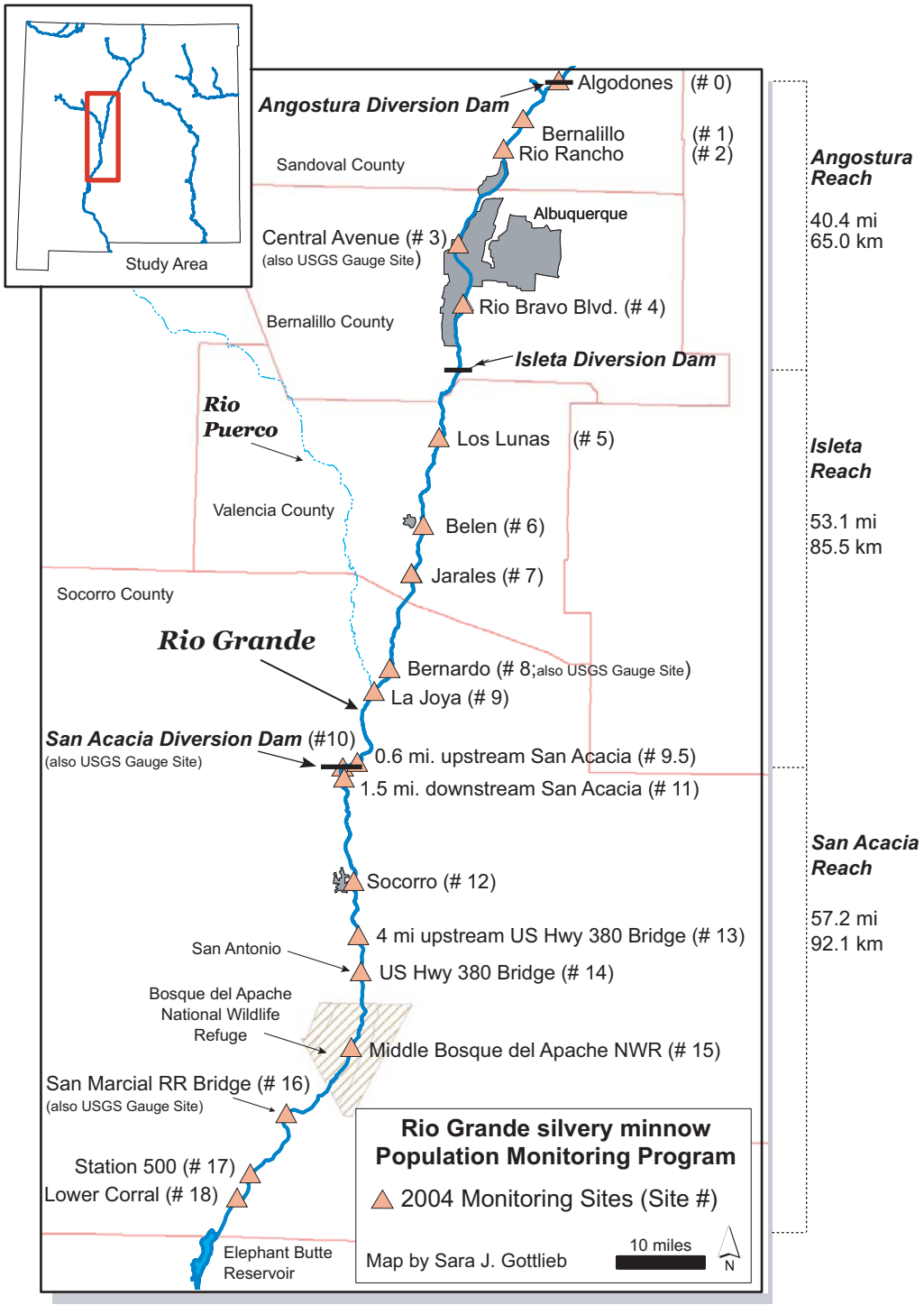

Figure 1. Map of the study area and sampling localities (numbered) for the 2004 Rio Grande silvery minnow population monitoring program. Sampling locality information that correspond with the numbered localities are provided in Appendix A (Table A-1).

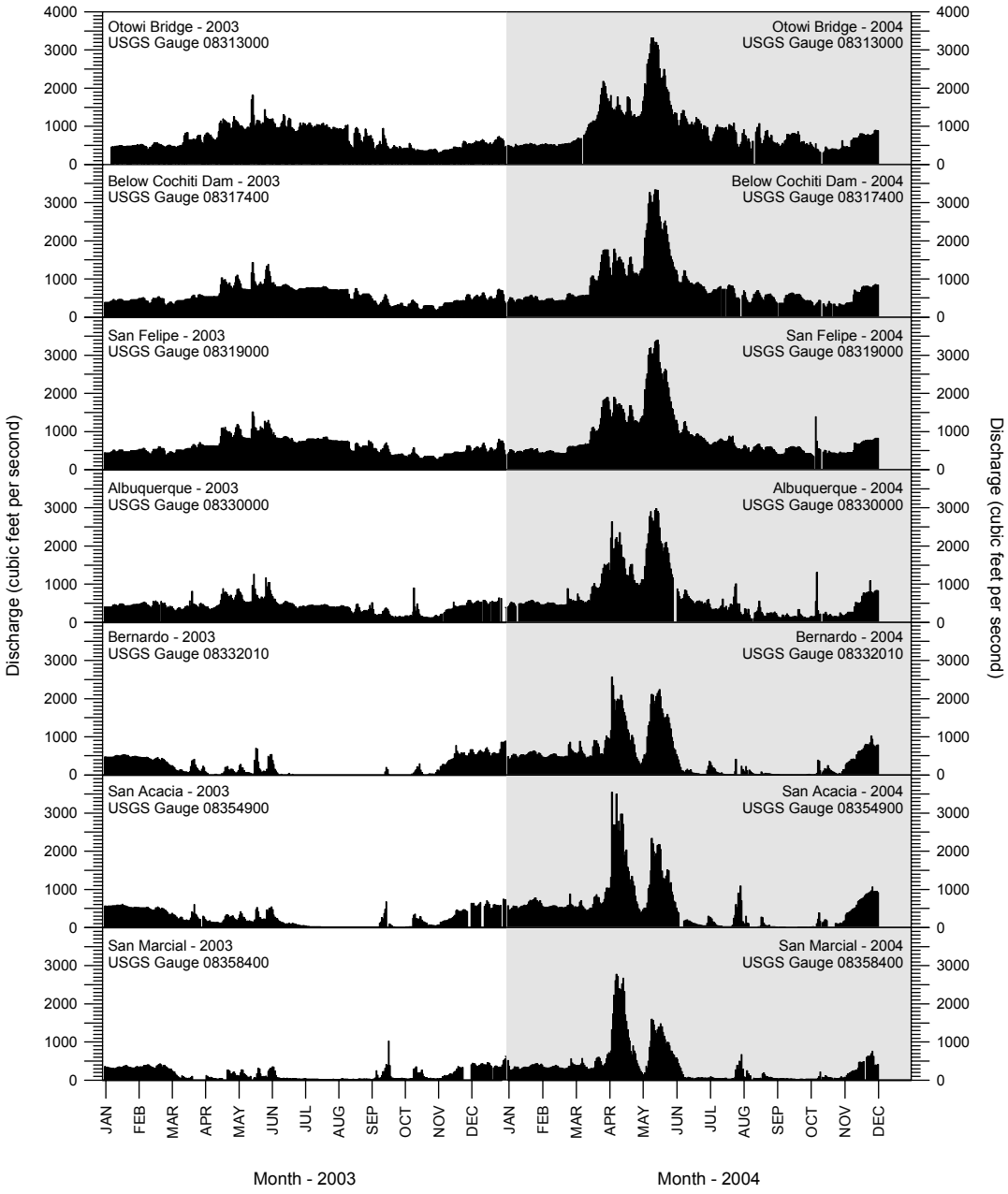

Figure 2. Discharge in the Rio Grande from January 2003 through November 2004 as recorded at seven U. S. Geological Survey (USGS) gauge stations. The Otowi Bridge gauge site is outside of the study area (ca. 25.5 river miles upstream of Cochiti Dam) and provided for reference. Discharge data are provisional and subject to change.

Table 1. Scientific and common names and species codes of fish collected in the Middle Rio Grande during the 1999-2003 Rio Grande silvery minnow population monitoring program.

Scientific Name	Common Name	Code
Order Clupeiformes		
Family Clupeidae	herrings	
Dorosoma cepedianum	gizzard shad	(GZS)
Order Cypriniformes		
Family Cyprinidae	carps and minnows	
Cyprinella lutrensis	red shiner [1]	(RDS)
Cyprinus carpio	common carp [1]	(CCA)
Gila pandora	Rio Grande chub	(RGC)
Hybognathus amarus	Rio Grande silvery minnow [1]	(RGM)
Pimephales promelas	fathead minnow [1]	(FHM)
Platygobio gracilis	flathead chub [1]	(FHC)
Rhinichthys cataractae	longnose dace [1]	(LND)
Family Catostomidae	suckers	
Carpiodes carpio	river carpsucker [1]	(RCS)
Catostomus commersoni	white sucker [1]	(WHS)
Ictiobus bubalus	smallmouth buffalo	(SMB)
Order Siluriformes		
Family Ictaluridae	bullhead catfishes	
Ameiurus melas	black bullhead	(BBH)
Ameiurus natalis	yellow bullhead	(YBH)
Ictalurus punctatus	channel catfish [1]	(CCT)
Pylodictis olivaris	flathead catfish	(FCT)
Order Cyprinodontiformes		
Family Poeciliidae	livebearers	
Gambusia affinis	western mosquitofish [1]	(MOS)
Order Perciformes		
Family Percichthyidae	temperate basses	
Morone chrysops	white bass	(WHB)

[1] focal taxa represent the most abundant species present in recent Middle Rio Grande collections and species illustrated in monthly plots of data.

Table 1. Scientific and common names and species codes of fish collected in the Middle Rio Grande during the 1999-2003 Rio Grande silvery minnow population monitoring program (continued).

Scientific Name	Common Name	Code
Order Perciformes		
Family Centrarchidae	sunfishes	
Lepomis cyanellus	green sunfish	(GNS)
Lepomis macrochirus	bluegill	(BGL)
Micropterus salmoides	largemouth bass	(LMB)
Pomoxis annularis	white crappie	(WCR)
Pomoxis nigromaculatus	black crappie	(BCR)
Family Percidae	perches	
Perca flavescens	yellow perch	(YWP)
Stizostedion vitreum	walleye	(WLE)

Table 2. Summary of the November 2004 Rio Grande silvery minnow population monitoring program results (species list is based on fish collected from 1999-2003).

SPECIES	RESIDENCE STATUS[1]	TOTAL NUMBER OF SPECIMENS	PERCENT (%) OF TOTAL	FREQUENCY OF OCCURRENCE[2]	% FREQUENCY OCCURRENCE[2]
HERRINGS					
gizzard shad	I	—	—	—	—
CARPS AND MINNOWS					
red shiner	N	1,674	54.53	19	95
common carp	I	11	0.36	7	35
Rio Grande silvery minnow	N	538	17.52	12	60
Rio Grande chub	N	—	—	—	—
fathead minnow	N	322	10.49	15	75
flathead chub	N	296	9.64	11	55
longnose dace	N	14	0.46	4	20
SUCKERS					
river carpsucker	N	33	1.07	9	45
white sucker	I	6	0.20	2	10
smallmouth buffalo	N	—	—	—	—
BULLHEAD CATFISHES					
black bullhead	I	—	—	—	—
yellow bullhead	I	—	—	—	—
channel catfish	I	67	2.18	9	45
flathead catfish	I	—	—	—	—
LIVEBEARERS					
western mosquitofish	I	108	3.52	16	80
TEMPERATE BASSES					
white bass	I	—	—	—	—
SUNFISHES					
green sunfish	I	—	—	—	—
bluegill	N	—	—	—	—
largemouth bass	I	1	0.03	1	5
white crappie	I	—	—	—	—
black crappie	I	—	—	—	—
PERCHES					
yellow perch	I	—	—	—	—
walleye	I	—	—	—	—
TOTAL		3,070			

[1] N = native; I = introduced
[2] Frequency and % frequency of occurrence are based on n=20 sample sites

Table 3. Summary of the monthly 2004 Rio Grande silvery minnow population monitoring program results (species list based on fish collected from 1999-2003).

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
HERRINGS													
gizzard shad	—	—	1	—	—	3	1	3	—	—	—		8
CARPS AND MINNOWS													
red shiner	1,700	2,565	2,645	2,941	2,249	4,688	2,608	2,659	4,373	3,436	1,674		31,538
common carp	2	4	9	—	99	238	28	13	7	7	11		418
Rio Grande silvery minnow	7	2	45	49	517	411	574	416	116	78	538		2,753
Rio Grande chub	—	—	—	—	—	—	—	—	—	—	—		—
fathead minnow	166	193	167	95	407	1,501	896	439	776	447	322		5,409
flathead chub	38	30	79	61	52	105	211	158	138	194	296		1,362
longnose dace	2	1	26	99	9	26	91	23	11	24	14		326
SUCKERS													
river carpsucker	19	15	84	11	252	856	280	167	59	42	33		1,818
white sucker	4	23	128	43	896	479	106	20	2	5	6		1,712
smallmouth buffalo	—	—	—	—	—	—	—	2	—	—	—		2
BULLHEAD CATFISHES													
black bullhead	—	3	—	—	—	—	—	1	—	—	—		4
yellow bullhead	—	—	—	—	—	1	10	12	3	1	—		27
channel catfish	49	119	127	42	16	14	156	163	62	60	67		875
flathead catfish													
LIVEBEARERS													
western mosquitofish	68	299	282	515	191	2,523	2,281	1,335	1,105	781	108		9,488
TEMPERATE BASSES													
white bass	—	—	—	—	—	—	—	—	—	—	—		—
SUNFISHES													
green sunfish	—	1	—	1	—	—	—	—	—	—	—		2
bluegill	—	—	—	3	1	—	—	1	1	—	—		6
largemouth bass	—	—	1	—	1	1	8	—	—	—	1		12
white crappie	3	1	—	5	1	1	—	—	—	—	—		11
black crappie													
PERCHES													
yellow perch	—	1	1	—	2	20	—	1	—	—	—		25
walleye	—	—	1	—	—	—	—	—	—	—	—		1
TOTAL	2,058	3,257	3,596	3,865	4,693	10867	7,250	5,413	6,653	5,075	3,070		55,797

Table 4. Summary of the monthly catch or Rio Grande silvery minnow, by site and reach, during the 2004 Rio Grande silvery minnow population monitoring program. Numerals in pararenthesis are the number of silvery minnow in that collection that were marked (subset of the total).

REACH Site Number Site Name	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
ANGOSTURA REACH													
0 Angostura Dam	—	—	—	—	—	—	234	100	8	8	—		350
1 Bernalillo	—	—	24	6	—	3	142(1)	77	28	28	60(1)		368
2 Rio Rancho	—	—	17	42(22)	425	218	74	176	29	7	261(11)		1,249
3 Central Ave (Abq)	—	—	3	—	—	12	1	7	1	1	—		25
4 Rio Bravo (Abq)	—	—	1	—	31	1	2	6	—	—	1		42
Angostura Reach Total	—	—	*45*	*48(22)*	*456*	*234*	*453(1)*	*366*	*66*	*44*	*322(12)*		*2,034*
ISLETA REACH													
5 Los Lunas	1	1	—	—	46	10	12	13	—	1	7		91
6 Belen	2	1	—	—	—	—	6	10	3	3	89		114
7 Jarales	1	—	—	—	—	—	36	1	5	—	15		58
8 US Hwy 60 Bernardo	—	—	—	—	—	6	—	—	—	—	—		6
9 South of Bernardo	1	—	—	—	6	10	51	6	7	—	—		81
9.5 North of San Acacia	—	—	—	—	—	51	3	1	—	—	16		71
Isleta Reach Total	*5*	*2*	—	—	*52*	*77*	*108*	*31*	*15*	*4*	*127*		*421*
SAN ACACIA REACH													
10 San Acacia Dam	—	—	—	—	—	24	4	—	6	18	38		90
11 S of San Acacia	1	—	—	1	—	4	1	4	29	5	43		88
12 Socorro	—	—	—	—	—	69	5	10	—	7	—		91
13 North of US Hwy 380	—	—	—	—	—	—	1	4	—	—	—		5
14 US Hwy 380	—	—	—	—	6	—	1	—	—	—	2		9
15 Bosque del Apache	1	—	—	—	2	1	—	—	—	—	1		5
16 San Marcial	—	—	—	—	—	—	—	1	—	—	—		1
17 South of San Marcial	—	—	—	—	1	—	—	—	—	—	—		1
18 South of San Marcial	—	—	—	—	—	2	1	—	—	—	5		8
San Acacia Reach Total	*2*	—	—	*1*	*9*	*100*	*13*	*19*	*35*	*30*	*89*		*298*
MONTHLY TOTALS	7	2	45	49(22)	517	411	574(1)	416	116	78	538(12)		2,753

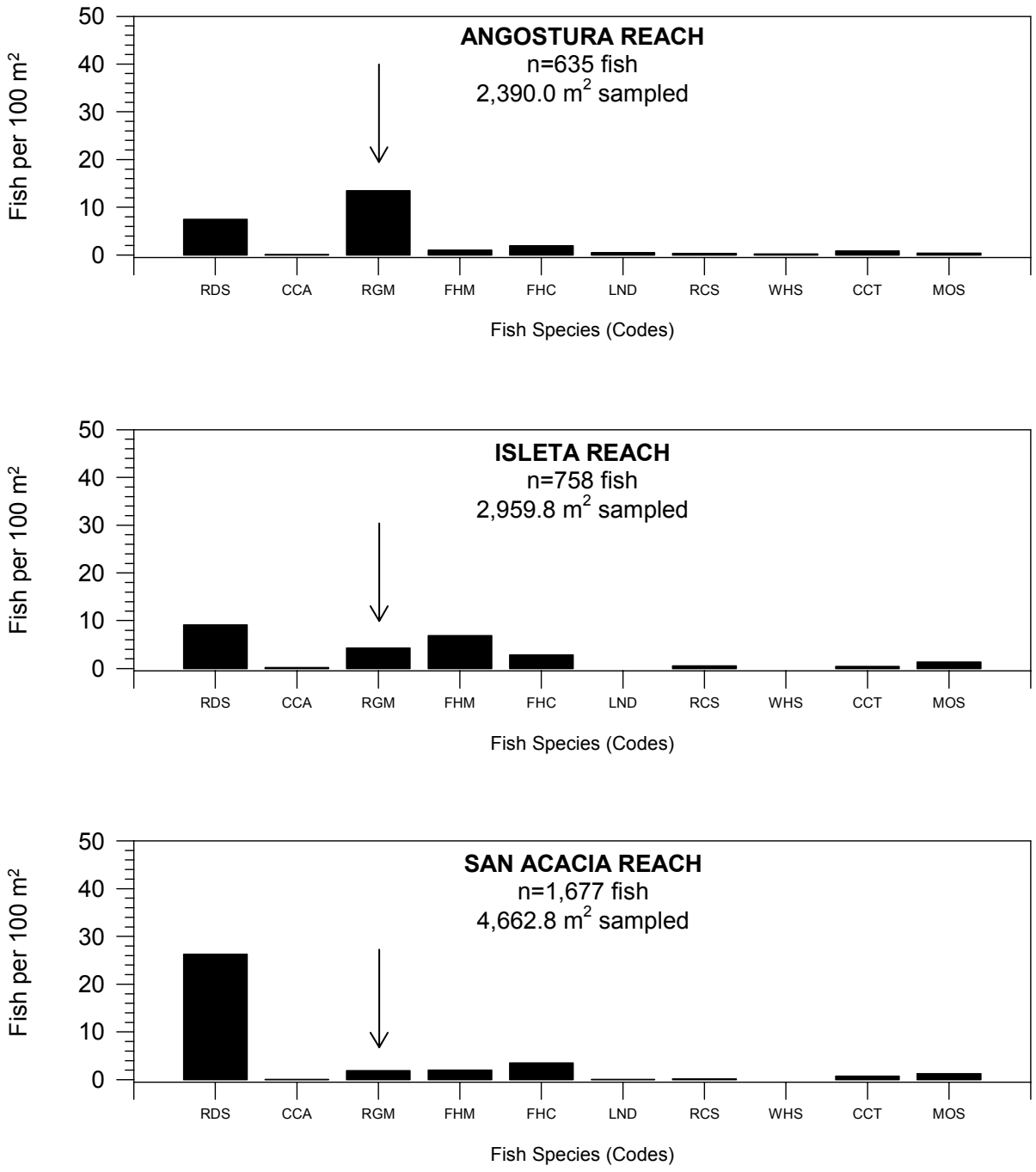

Figure 3. Catch rates, for the 10 focal species, by river reach during November 2004 at Rio Grande silvery minnow population monitoring program collection sites (see Table A-1 for fish species codes). An arrow indicates the Rio Grande silvery minnow (RGM) histogram bar.

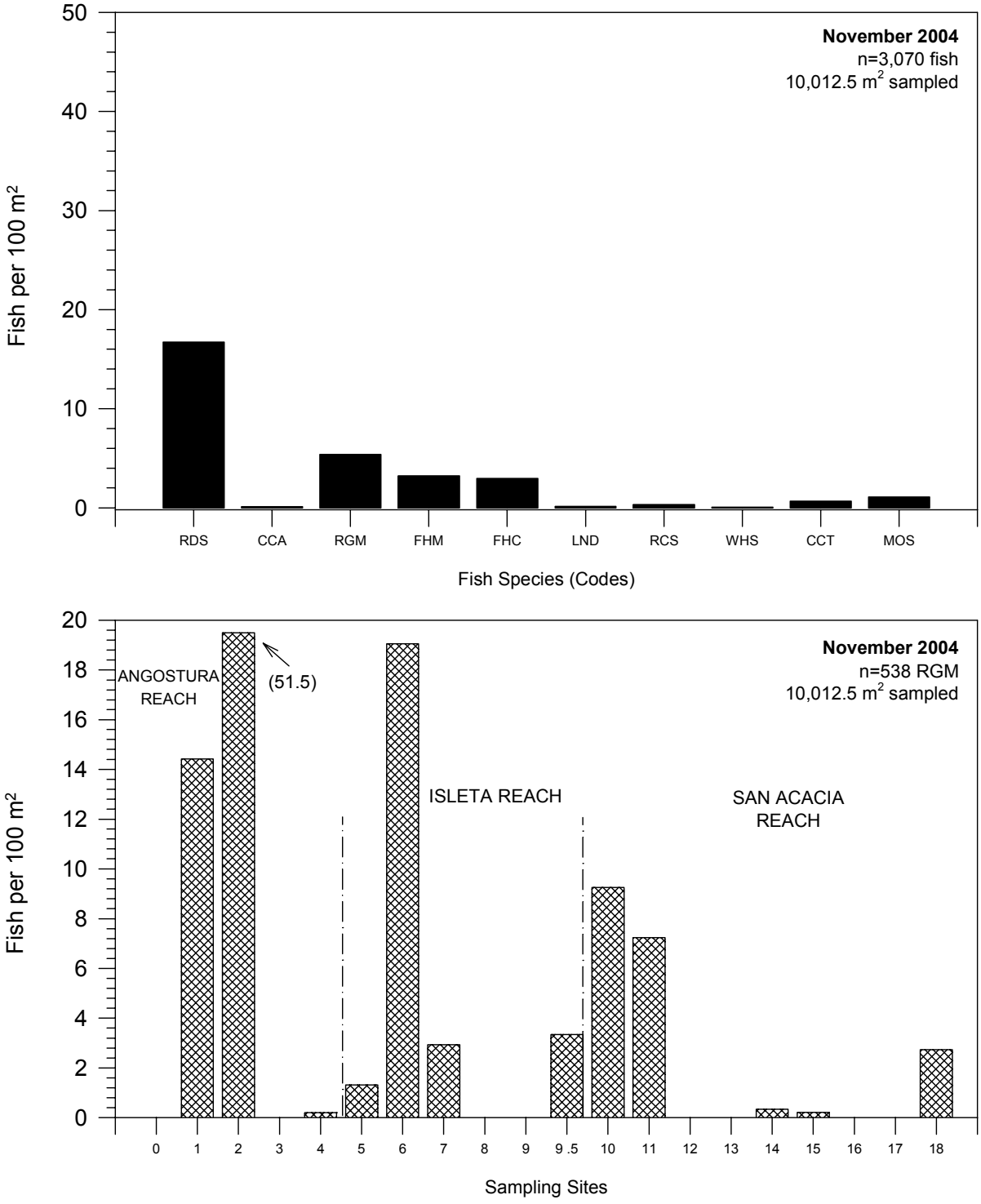

Figure 4. Catch rates for ten focal species (upper graph*), including Rio Grande silvery minnow, (RGM; lower graph*) during November 2004 at Rio Grande silvery minnow population monitoring program collection sites (see Table A-1 for fish species codes).

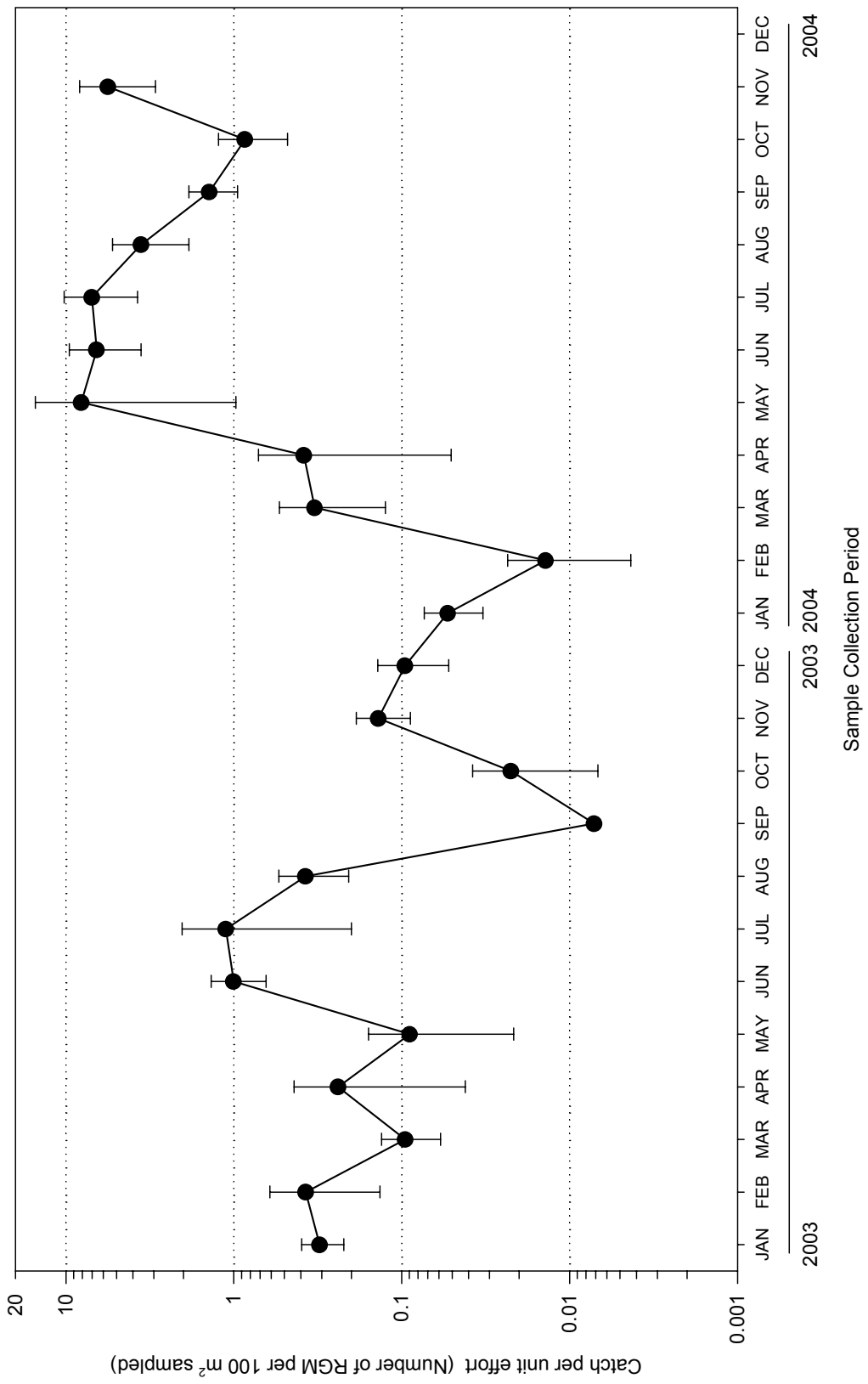

Figure 5. Month catch rates of Rio Grande silvery minnow during 2003 (January-December) and January-November 2004 at Rio Grande silvery minnow population monitoring program collection sites. Solid circles indicate monthly means (n=20 site per month) and capped-bars represent the standard error of the mean.

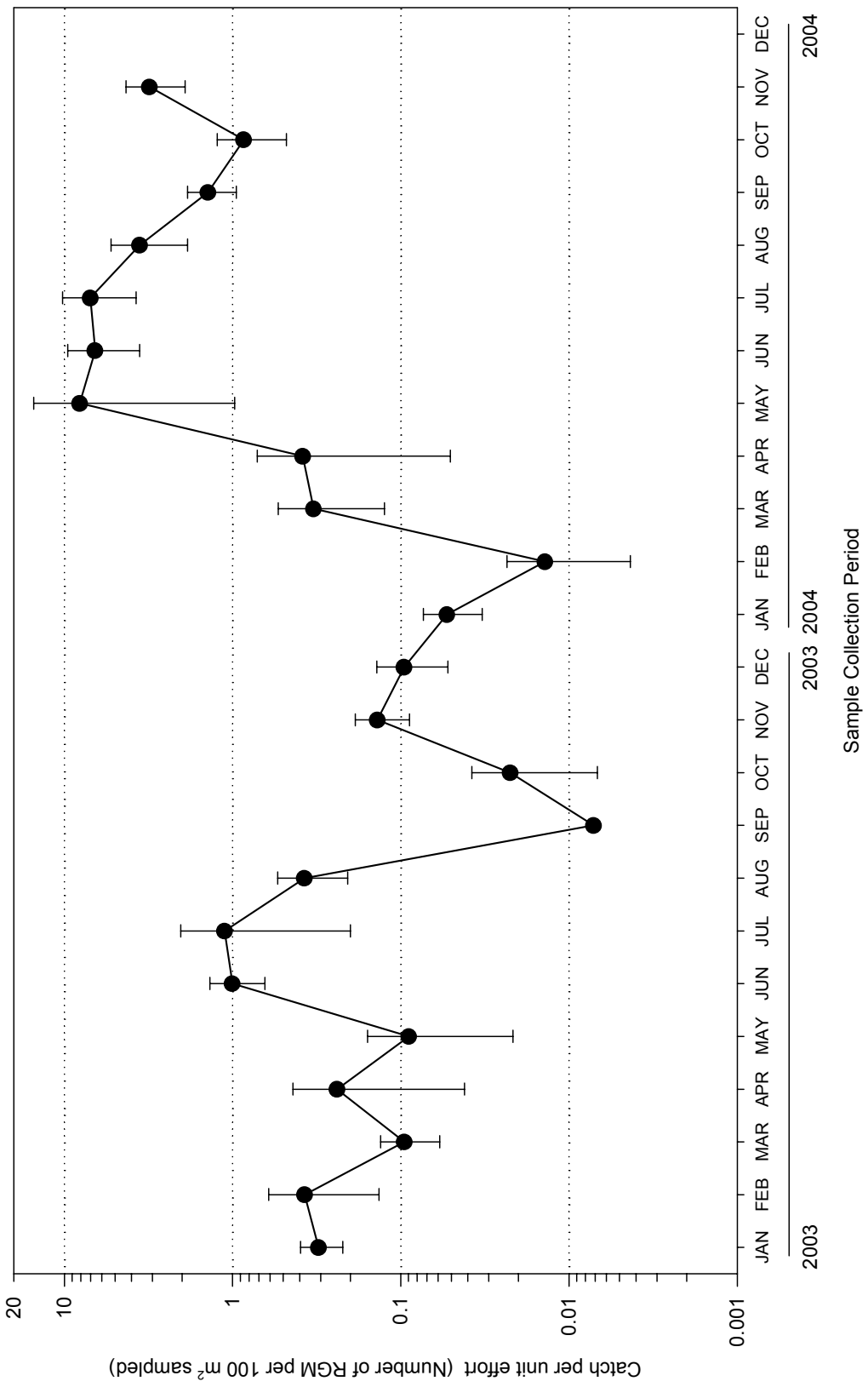

Figure 6. Month catch rates of Rio Grande silvery minnow during 2003 (January-December) and January-November 2004 at Rio Grande silvery minnow population monitoring program collection sites. Solid circles indicate monthly means (n=20 site per month) and capped-bars represent the standard error of the mean. *(Single backwater with 254 RGSM [Site #2, Nov] removed from data set).

APPENDIX A.

Collection localities of the 2004 Rio Grande silvery minnow population monitoring program.

Table A-1. Collection localities of the 2004 Rio Grande silvery minnow population monitoring program.

Site #	Site Locality

ANGOSTURA REACH SITES
SITE #

0 New Mexico, Sandoval County, Rio Grande, below Angostura Diversion Dam, Algodones.
River Mile 209.7 SAN FELIPE PUEBLO QUADRANGLE
3916006 N 363811 E

1 New Mexico, Sandoval County, Rio Grande, at US Highway 550 bridge crossing, (formerly NM State Highway 44 bridge crossing), Bernalillo.
River Mile 203.8 BERNALILLO QUADRANGLE
3909722 N 358543 E

2 New Mexico, Sandoval County, Rio Grande, ca. 4 miles downstream of US Highway 550 bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho.
River Mile 200.0 BERNALILLO QUADRANGLE
3905355 N 354772 E

3 New Mexico, Bernalillo County, Rio Grande, at Central Avenue (US Highway 66) bridge crossing, Albuquerque.
River Mile 183.4 ALBUQUERQUE WEST QUADRANGLE
3884094 N 346840 E

4 New Mexico, Bernalillo County, Rio Grande, at Rio Bravo Boulevard bridge crossing, Albuquerque.
River Mile 178.3 ALBUQUERQUE WEST QUADRANGLE
3877163 N 347554 E

ISLETA REACH SITES
SITE #

5 New Mexico, Valencia County, Rio Grande, at Los Lunas (NM State Highway 49) bridge crossing, Los Lunas.
River Mile 161.4 LOS LUNAS QUADRANGLE
3852531 N 342898 E

6 New Mexico, Valencia County, Rio Grande, ca. 1.0 miles upstream of NM State Highway 309/6 bridge crossing, Belen.
River Mile 151.5 TOME QUADRANGLE
3837061 N 339972 E

7 New Mexico, Valencia County, Rio Grande, ca. 2.2 miles upstream of NM State Highway 346 bridge crossing (near Transwestern Natural Gas Pipeline crossing), Jarales.
River Mile 143.2 VEGUITA QUADRANGLE
3827329 N 338136 E

Table A-1. Collection localities of the 2004 Rio Grande silvery minnow population monitoring program (continued).

Site #	Site Locality

ISLETA REACH SITES (continued)
SITE #

8 New Mexico, Socorro County, Rio Grande, at US Highway 60 bridge crossing, Bernardo.
River Mile 130.6 ABEYTAS QUADRANGLE
3809726 N 334604 E

9 New Mexico, Socorro County, Rio Grande, ca. 3.5 miles downstream of US Highway 60 bridge crossing, La Joya.
River Mile 127.0 ABEYTAS QUADRANGLE
3805229 N 331094 E

9.5 New Mexico, Socorro County, Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia.
River Mile 116.8 LA JOYA QUADRANGLE
3792603 N 327902 E

SAN ACACIA REACH SITES
SITE #

10 New Mexico, Socorro County, Rio Grande, directly below San Acacia Diversion Dam, San Acacia.
River Mile 116.2 SAN ACACIA QUADRANGLE
3791977 N 326162 E

11 New Mexico, Socorro County, Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia.
River Mile 114.6 LEMITAR QUADRANGLE
3790442 N 325263 E

12 New Mexico, Socorro County, Rio Grande, 0.5 miles upstream of the Low Flow Conveyance Channel bridge, east and upstream of Socorro Wastewater Treatment Plant, Socorro.
River Mile 99.5 LOMA DE LAS CANAS QUADRANGLE
3771043 N 327097 E

13 New Mexico, Socorro County, Rio Grande, ca. 4.0 miles upstream of US Highway 380 bridge crossing, San Antonio.
River Mile 91.7 SAN ANTONIO QUADRANGLE
3761283 N 328140 E

14 New Mexico, Socorro County, Rio Grande, at US Highway 380 bridge crossing, San Antonio.
River Mile 87.1 SAN ANTONIO QUADRANGLE
3754471 N 328914 E

Table A-1. Collection localities of the 2004 Rio Grande silvery minnow population monitoring program (continued).

Site #	Site Locality

SAN ACACIA REACH SITES (continued)
SITE #

15 New Mexico, Socorro County, Rio Grande, directly east of Bosque del Apache National Wildlife Refuge headquarters, San Antonio.
River Mile 79.1 SAN ANTONIO, SE QUADRANGLE
3740839 N 327055 E

16 New Mexico, Socorro County, Rio Grande, at the San Marcial railroad crossing, San Marcial.
River Mile 68.6 SAN MARCIAL QUADRANGLE
3728347 N 315284 E

17 New Mexico, Socorro County, Rio Grande, at its former confluence with the Low Flow Conveyance Channel and 16 miles downstream of the southern end of the Bosque del Apache National Wildlife Refuge, San Marcial.
River Mile 60.5 PARAJE WELL QUADRANGLE
3718178 N 309487 E

18 New Mexico, Socorro County, Rio Grande, ca. 19 miles downstream of the southern end of the Bosque del Apache National Wildlife Refuge, San Marcial.
River Mile 57.7 PARAJE WELL QUADRANGLE
3714740 N 307380 E

APPENDIX B.

Ichthyofaunal composition of the November 2004
Rio Grande silvery minnow population monitoring efforts

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, directly below Angostura Diversion Dam, Algodones. Site Number: 0
30 November 2004 **RKD04-218** River Mile: 209.7
UTM Easting: 363811 UTM Northing: 3916006 Zone: 13 Quad: San Felipe Pueblo
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 432.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	2

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, at US HWY 550 (formerly NM State HWY 44) bridge crossing, Bernalillo. Site Number: 1
30 November 2004 **RKD04-219** River Mile: 203.8
UTM Easting: 358543 UTM Northing: 3909722 Zone: 13 Quad: Bernalillo
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 416.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	17
76	*Cyprinus carpio*	2
76	*Hybognathus amarus**	60
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	2
76	*Rhinichthys cataractae*	11
212	*Gambusia affinis*	2
294	*Micropterus salmoides*	1

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

age-0	60

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, ca. 4.0 miles downstream of US HWY 550 (formerly NM State HWY 44) bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho.
Site Number: 2
River Mile: 200.0
30 November 2004 **RKD04-220**
UTM Easting: 354772 UTM Northing: 3905355 Zone: 13 Quad: Bernalillo
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro
Effort: 507.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	15
76	*Hybognathus amarus**	261
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	19
212	*Gambusia affinis*	2

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

age-0 261

New Mexico: Bernalillo Co., Rio Grande Drainage
Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque.
Site Number: 3
30 November 2004 **RKD04-217**
River Mile: 183.4
UTM Easting: 346840 UTM Northing: 3884094 Zone: 13 Quad: Albuquerque West
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro
Effort: 530.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	40
76	*Platygobio gracilis*	13
76	*Rhinichthys cataractae*	1
81	*Catostomus commersoni*	5
93	*Ictalurus punctatus*	2

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Bernalillo Co., Rio Grande Drainage
Rio Grande, at Rio Bravo Blvd. Bridge crossing (NM State HWY 500) crossing, Albuquerque. Site Number: 4
River Mile: 178.3
29 November 2004 **RKD04-216**
UTM Easting: 347554 UTM Northing: 3877163 Zone: 13 Quad: Albuquerque West
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 504.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	105
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	1
76	*Pimephales promelas*	23
76	*Platygobio gracilis*	13
76	*Rhinichthys cataractae*	1
81	*Carpiodes carpio*	9
81	*Catostomus commersoni*	1
93	*Ictalurus punctatus*	18
212	*Gambusia affinis*	6

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

age-0	1

New Mexico: Valencia Co., Rio Grande Drainage
Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas. Site Number: 5
29 November 2004 **RKD04-215** River Mile: 161.4
UTM Easting: 342898 UTM Northing: 3852531 Zone: 13 Quad: Los Lunas
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 532.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	5
76	*Hybognathus amarus**	7
76	*Pimephales promelas*	28
81	*Carpiodes carpio*	1

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

age-0	7

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Valencia Co., Rio Grande Drainage
Rio Grande, ca. 1.0 miles upstream of NM State HWY 309/6 bridge crossing, Belen. Site Number: 6
29 November 2004 **RKD04-214** River Mile: 151.5
UTM Easting: 339972 UTM Northing: 3837061 Zone: 13 Quad: Tome
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 467.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	119
76	*Cyprinus carpio*	3
76	*Hybognathus amarus**	89
76	*Pimephales promelas*	100
81	*Carpiodes carpio*	9
93	*Ictalurus punctatus*	3
212	*Gambusia affinis*	11

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

age-0	89

New Mexico: Valencia Co., Rio Grande Drainage
Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales. Site Number: 7
24 November 2004 **RKD04-213** River Mile: 143.2
UTM Easting: 338136 UTM Northing: 3827329 Zone: 13 Quad: Veguita
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 511.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	56
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	15
76	*Pimephales promelas*	46
81	*Carpiodes carpio*	1
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	20

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

age-0	15

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at US HWY 60 bridge crossing, Bernardo. Site Number: 8
24 November 2004 **RKD04-212** River Mile: 130.6
UTM Easting: 334604 UTM Northing: 3809726 Zone: 13 Quad: Abeytas
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 474.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	8
76	*Cyprinus carpio*	1
76	*Pimephales promelas*	11
81	*Carpiodes carpio*	1
212	*Gambusia affinis*	1

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, ca. 3.5 miles downstream of the US HWY 60 bridge crossing, Bernardo. Site Number: 9
24 November 2004 **RKD04-210** River Mile: 127.0
UTM Easting: 331094 UTM Northing: 3805229 Zone: 13 Quad: Abeytas
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 496.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	39
76	*Pimephales promelas*	7
76	*Platygobio gracilis*	83
81	*Carpiodes carpio*	1
93	*Ictalurus punctatus*	3
212	*Gambusia affinis*	6

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia — Site Number: 9.5
24 November 2004 **RKD04-211** — River Mile: 116.8
UTM Easting: 327902 UTM Northing: 3792603 Zone: 13 Quad: La Joya
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro — Effort: 478.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	43
76	*Hybognathus amarus**	16
76	*Pimephales promelas*	11
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	4
93	*Ictalurus punctatus*	5
212	*Gambusia affinis*	2

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

age-0	16

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, directly below San Acacia Diversion Dam, San Acacia. — Site Number: 10
23 November 2004 **RKD04-209** — River Mile: 116.2
UTM Easting: 326162 UTM Northing: 3791977 Zone: 13 Quad: San Acacia
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro — Effort: 410.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	170
76	*Cyprinus carpio*	1
76	*Hybognathus amarus**	38
76	*Pimephales promelas*	47
76	*Platygobio gracilis*	140
81	*Carpiodes carpio*	4
93	*Ictalurus punctatus*	15
212	*Gambusia affinis*	3

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

age-0	38

*** All data are provisional and should be verified by direct inspection of field data and specimens whenever possible***

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia. Site Number: 11
23 November 2004 **RKD04-208** River Mile: 114.6
UTM Easting: 325263 UTM Northing: 3790442 Zone: 13 Quad: Lemitar
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 594.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	228
76	*Hybognathus amarus**	43
76	*Pimephales promelas*	30
76	*Platygobio gracilis*	17
93	*Ictalurus punctatus*	9
212	*Gambusia affinis*	16

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

age-0	43

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, east of Socorro, 0.5 miles upstream of Socorro Low Flow Conveyance Site Number: 12
Channel bridge and east just upstream of Socorro Wastewater Treatment Plant, River Mile: 99.5
23 November 2004 **RKD04-207**
UTM Easting: 327097 UTM Northing: 3771043 Zone: 13 Quad: Loma de las Canas
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 617.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	189
76	*Pimephales promelas*	13
76	*Platygobio gracilis*	2
81	*Carpiodes carpio*	3
212	*Gambusia affinis*	14

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, ca. 4.0 miles upstream of U.S. 380 bridge crossing. Site Number: 13
23 November 2004 **RKD04-206** River Mile: 91.7
UTM Easting: 328140 UTM Northing: 3761283 Zone: 13 Quad: San Antonio
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 567.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1
212	*Gambusia affinis*	1

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at US HWY 380 bridge crossing, San Antonio. Site Number: 14
23 November 2004 **RKD04-205** River Mile: 87.1
UTM Easting: 328914 UTM Northing: 3754471 Zone: 13 Quad: San Antonio
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 597.8 m^2

FAMILY		N
76	*Hybognathus amarus**	2
76	*Pimephales promelas*	1
76	*Rhinichthys cataractae*	1
212	*Gambusia affinis*	1

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

age-0	2

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Site Number: 15
22 November 2004 **RKD04-204** River Mile: 79.1
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San Antonio SE
W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 483.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	4
76	*Hybognathus amarus**	1

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

age-0	1

*** All data are provisional and should be verified by direct inspection of field data and specimens whenever possible***

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, at San Marcial Railroad Bridge, San Marcial. Site Number: 16

22 November 2004 **RKD04-203** River Mile: 68.6

UTM Easting: 315284 UTM Northing: 3728347 Zone: 13 Quad: San Marcial

W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 539.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	142
76	*Pimephales promelas*	2
76	*Platygobio gracilis*	2
212	*Gambusia affinis*	7

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, at (former) confluence with the Low Flow Conveyance Channel, 16.0 miles downstream of the southern end of Bosque del Apache National Wildlife Refuge; ca. 8 miles downstream of the San Marcial Railroad Bridge crossing. Site Number: 17 River Mile: 60.5

22 November 2004 **RKD04-202**

UTM Easting: 309487 UTM Northing: 3718178 Zone: 13 Quad: Paraje Well

W.H. Brandenburg, M.A. Farrington, and L.E. Renfro Effort: 669.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	337
76	*Platygobio gracilis*	4
93	*Ictalurus punctatus*	11
212	*Gambusia affinis*	15

*** All data are provisional and should be verified by direct inspection of field data and specimens whenever possible***

Rio Grande silvery minnow Population Monitoring
November 2004

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 19 miles downstream of the southern end of Bosque del Apache National Wildlife Refuge — Site Number: 18 — River Mile: 57.7

22 November 2004 **RKD04-201**

UTM Easting: 307380 UTM Northing: 3714740 Zone: 13 Quad: Paraje Well

W.H. Brandenburg, M.A. Farrington, and L.E. Renfro — Effort: 183.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	154
76	*Cyprinus carpio*	2
76	*Hybognathus amarus**	5
76	*Pimephales promelas*	1
212	*Gambusia affinis*	1

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

age-0	5