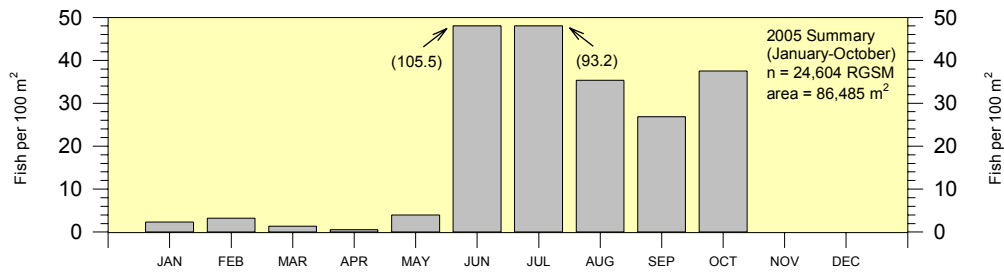
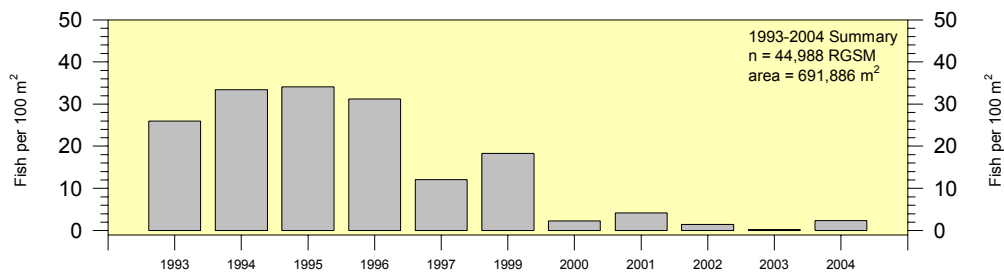


**SUMMARY OF THE RIO GRANDE SILVERY MINNOW
POPULATION MONITORING PROGRAM RESULTS FROM OCTOBER 2005**
(24-28 October 2005)

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



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21 November 2005

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prepared for:

MIDDLE RIO GRANDE ENDANGERED SPECIES ACT COLLABORATIVE PROGRAM

under USBR contract:

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21 November 2005

SUMMARY OF OVERALL OCTOBER 2005 POPULATION MONITORING EFFORTS

The ninth sampling effort of the 2005 Rio Grande silvery minnow population monitoring program was conducted between 24-28 October 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. Rio Grande silvery minnow were counted and identified to age-class. Other fishes were identified to species and enumerated, but age-class was not determined. Figures illustrating catch rates (number of fish per 100 m² sampled) were prepared for the ten focal species, including Rio Grande silvery minnow, for the purpose of comparisons between reaches.

During October 2005, a total of 5,429 fish were captured in the 10,404 m² (surface area) of water sampled. Rio Grande silvery minnow was the most abundant taxon (N=3,899) and comprised about 72% of the total catch. This was especially impressive considering that 16 species were present in seining collections. Rio Grande silvery minnow was present in 204 of 264 seine hauls with fish (ca. 77%) and was very abundant in specific mesohabitats such as backwaters and pools. The majority of Rio Grande silvery minnow were found in the middle to upper half of each sampling reach. Cumulative fish catch rate was 52.2 individuals per 100 m² sampled; substantially lower than it was in July (173.2 individuals per 100 m² sampled). The overall abundance of Rio Grande silvery minnow (N=3,899) was comprised of individuals, mostly from the Isleta and San Acacia reaches (N=3,744; ca. 95% of total).

SUMMARY OF OCTOBER 2005 POPULATION MONITORING EFFORT BY RIVER REACH

Angostura Reach

Sampling for fishes in the Angostura Reach took place during a period of low stable flows on 27 and 28 October. Discharge in the Rio Grande during October was fairly stable throughout the month although there were a few rainstorms that resulted in brief periods of elevated flows at the beginning of the month. Discharge throughout the Angostura Reach ranged only between about 300 and 600 cfs during the month with the exception of the first few days where flow peaked at >1,000 cfs. While the total discharge during May and June 2005 was higher than it had been in nearly ten years, the flows during October 2005 were comparable to what they were in October 2003 (a drought year). However, there was no river drying in the Angostura Reach. Water clarity was highest in the uppermost portion of the Angostura Reach but there was little difference in turbidity levels downstream of the confluence with the Jemez River. This is likely because decreased flows during October resulted in less input from turbid tributaries, like the Jemez River. Water temperatures recorded at the different sampling sites ranged from 13.8°C to 17.2°C. These temperatures were about 6°C lower than they had been in September. Several large backwaters and shoreline areas with debris provided suitable low velocity habitats for smaller life stages; many juvenile fish were collected in these habitats. Rio Grande silvery minnow (N=155) was the most frequently collected taxon in the Angostura Reach during October 2005. The second most common species was red shiner (N=142). Western mosquitofish (N=47) was the third most numerous species and was primarily found in pool and backwater habitats. Rio Grande silvery minnow was most numerous in the upper portion of the sampling reach. The highest numbers of Rio Grande silvery minnow were recorded from Rio Rancho (Site #2); other localities, with the exception of the Angostura locality (Site #0), produced comparably low numbers of this taxon. It is now apparent that the increased water temperatures and elevated flows of late June and July resulted in successful recruitment of Rio Grande silvery minnow and several of the other taxa. However, the abundance of Rio Grande silvery minnow steadily eroded in the Angostura Reach over the course of the summer and fall. Overall fish abundance in the Angostura Reach was much lower compared to either of the two downstream reaches.

Isleta Reach

Discharge in the Rio Grande was substantially higher during June and July of 2005 than it had been in the past several years. However, flows had rapidly dropped back down to pre-spring runoff conditions by August-October 2005. Mean daily discharge was generally 100-300 cfs and there were periods of very low or no flow in some portions of the reach during October 2005. Decreased flows resulted in the formation of isolated pools and a considerable reduction in the wetted area of the main river. Some fish (primarily juvenile phases) were stranded in off-channel habitats but overall densities of fish in the main channel were moderately high. Water temperatures in the Isleta Reach ranged from 12.0-16.0°C from morning (0900 h) to afternoon (1300 h); this was about a 10°C decrease compared with September 2005. Water clarity varied greatly throughout the reach (Secchi depth 6-15 cm); the lowest values were recorded in the southern portion of the reach while the highest values were recorded in the northern portion (upstream of the Rio Puerco confluence) of the reach. This difference was likely because of periodic increased discharge from intermittent tributaries (rios Salado and Puerco). The Isleta Reach had the highest catch rate (104.5 fish/100 m²) of any of the sampling reaches in the Middle Rio Grande. However, the density of fish in this reach in October dropped nearly in half compared to July 2005. Overall ichthyofaunal catch rates in the Angostura Reach (18.0 fish/100 m²) were lower compared to the Isleta Reach and had dropped by nearly three-fold between September and October.

San Acacia Reach

The monthly population monitoring efforts in the San Acacia Reach (9 sites) of the Middle Rio Grande were conducted between 24-26 October 2005. Water levels had decreased markedly since the beginning of July but didn't reach their lowest levels until the end of October. Discharge was very low in some areas but there was no evidence of river drying in southern portions of the reach (primarily areas in and upstream of Bosque del Apache National Wildlife Refuge) as there had been in September. The decreased flow combined with high ambient temperatures resulted in warm water temperatures in the San Acacia Reach in October 2005 (range=11.2-15.0°C), but temperatures were much lower than were recorded in September 2005 (range=17.7-28.1°C). The primary difference in water temperatures over the past three months was that morning temperatures were much lower in October compared with either August or September. Side channels and backwaters provided a variety of habitat conditions but the habitat was dominated by narrow main channel runs. The turbidity levels in the San Acacia Reach had decreased since July and most sampling sites had a Secchi depth reading of <5 cm. The most commonly collected taxon during October 2005 in the San Acacia Reach was Rio Grande silvery minnow (N=1,299). Rio Grande silvery minnow was present at all sampling sites but was most abundant in the upper portion of the reach; the age-class structure was dominated by young-of-year individuals. The San Acacia Reach catch rate (26.8 fish/100 m²) was much higher than the catch rate in the Angostura Reach but about one-third of the catch rate in the Isleta Reach.

Conclusion

Rio Grande silvery minnow (N=3,899) was widespread and relatively abundant in the Middle Rio Grande during October 2005. This species was nearly twice as abundant as the next most-abundant taxon (western mosquitofish, N=821). Other common taxa included red shiner (N=389), fathead minnow (N=107), and flathead chub (N=57). The abundance of Rio Grande silvery minnow during 2005, including October, indicates that the status of this species has improved markedly compared to fall of 2004. The increase in abundance of Rio Grande silvery in 2005 has been comparable to previous years with above average precipitation (e.g., mid 1990s). The combination of good water years in both 2004 and 2005 has produced and supported substantially more Rio Grande silvery minnow than in the past five years. The abundance and distribution of Rio Grande silvery minnow is now similar to what it was when this species was listed as endangered in 1994. However, its status within the Middle Rio Grande has markedly improved compared to when it was nearly extirpated only two years ago.

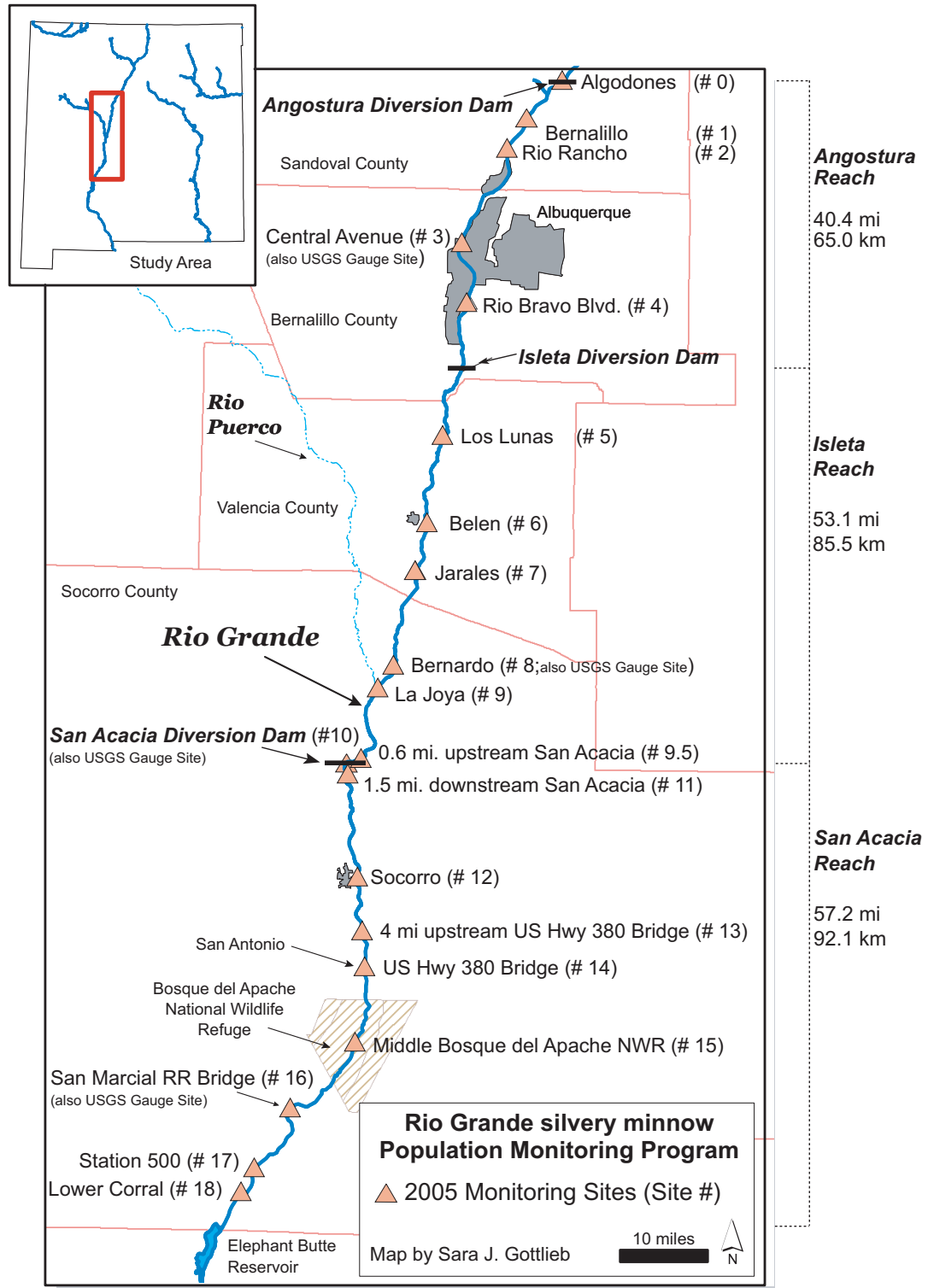


Figure 1. Map of the study area and sampling localities (numbered) for the 2005 Rio Grande silvery minnow population monitoring program. Sampling locality information that correspond with the numbered localities are provided in Appendix A (Table A-1).

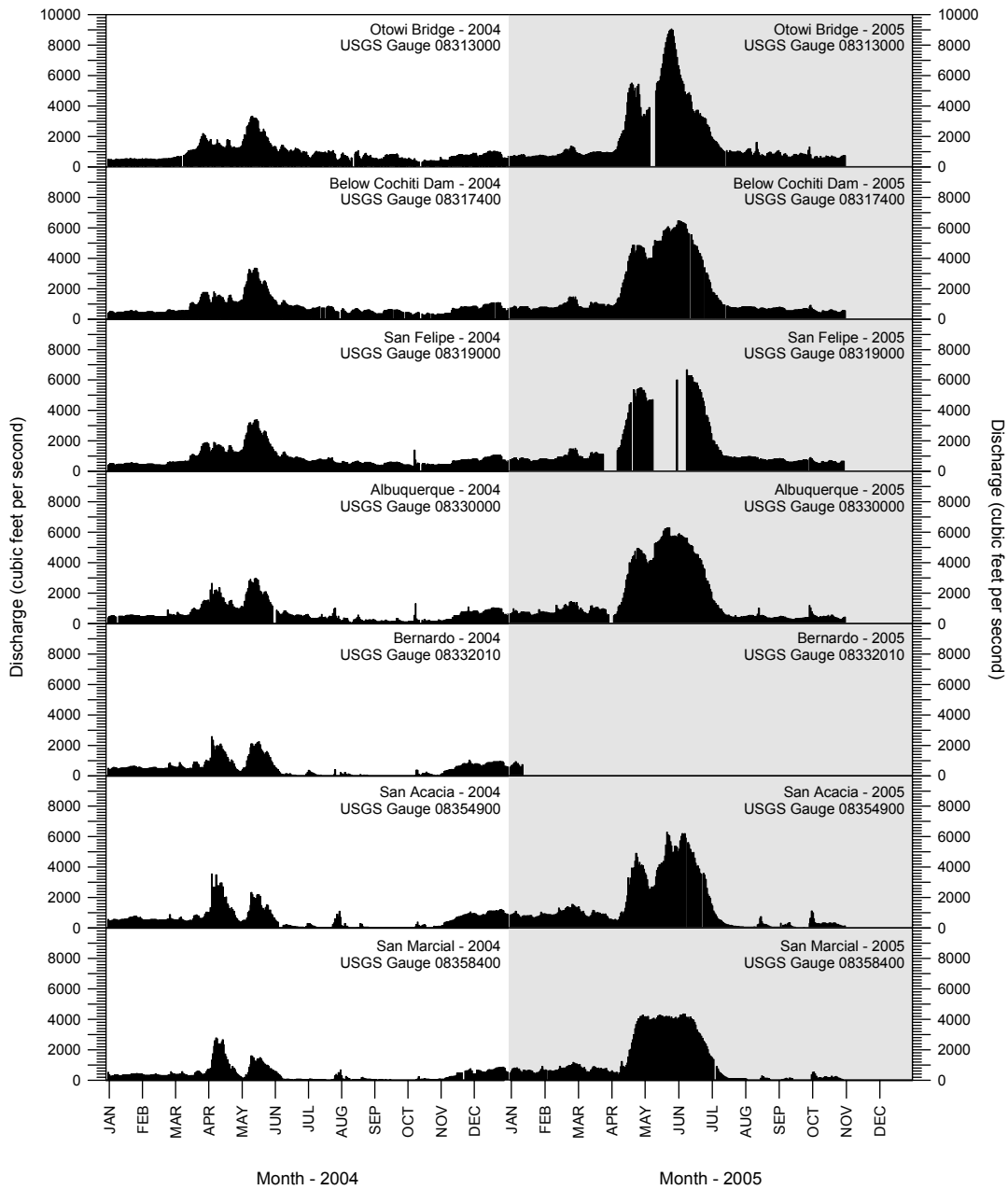


Figure 2. Discharge in the Rio Grande from January 2004 through October 2005 as recorded at seven U. S. Geological Survey (USGS) gauge stations. The Otowi Bridge gauge site is outside of the study area (ca. 25.5 river miles upstream of Cochiti Dam) and provided for reference. Discharge data are provisional and subject to change. *Note: Bernardo discharge data (USGS 08332010) became temporarily unavailable on 13 January 2005 and data collection is now discontinued at that gauge.

Table 1. Scientific and common names and species codes of fish collected in the Middle Rio Grande during the 1999-2004 Rio Grande silvery minnow population monitoring program.

Scientific Name	Common Name	Code
Order Clupeiformes		
Family Clupeidae	herrings	
<i>Dorosoma cepedianum</i>	gizzard shad	(GZS)
Order Cypriniformes		
Family Cyprinidae	carps and minnows	
<i>Cyprinella lutrensis</i>	red shiner ¹	(RDS)
<i>Cyprinus carpio</i>	common carp ¹	(CCA)
<i>Gila pandora</i>	Rio Grande chub	(RGC)
<i>Hybognathus amarus</i>	Rio Grande silvery minnow ¹	(RGM)
<i>Pimephales promelas</i>	fathead minnow ¹	(FHM)
<i>Pimephales vigilax</i>	bullhead minnow	(BHM)
<i>Platygobio gracilis</i>	flathead chub ¹	(FHC)
<i>Rhinichthys cataractae</i>	longnose dace ¹	(LND)
Family Catostomidae	suckers	
<i>Carpiodes carpio</i>	river carpsucker ¹	(RCS)
<i>Catostomus commersonii</i>	white sucker ¹	(WHS)
<i>Ictiobus bubalus</i>	smallmouth buffalo	(SMB)
Order Siluriformes		
Family Ictaluridae	North American catfishes	
<i>Ameiurus melas</i>	black bullhead	(BBH)
<i>Ameiurus natalis</i>	yellow bullhead	(YBH)
<i>Ictalurus punctatus</i>	channel catfish ¹	(CCT)
<i>Pylodictis olivaris</i>	flathead catfish	(FCT)
Order Salmoniformes		
Family Salmonidae	trouts and salmons	
<i>Salmo trutta</i>	brown trout	(BNT)
Order Cyprinodontiformes		
Family Poeciliidae	livebearers	
<i>Gambusia affinis</i>	western mosquitofish ¹	(MOS)

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 1999-2004 Rio Grande silvery minnow population monitoring program (continued).

Scientific Name	Common Name	Code
Order Perciformes		
Family Percichthyidae	temperate basses	
<i>Morone chrysops</i>	white bass	(WHB)
Order Perciformes		
Family Centrarchidae	sunfishes	
<i>Lepomis cyanellus</i>	green sunfish	(GNS)
<i>Lepomis macrochirus</i>	bluegill	(BGL)
<i>Micropterus salmoides</i>	largemouth bass	(LMB)
<i>Pomoxis annularis</i>	white crappie	(WCR)
<i>Pomoxis nigromaculatus</i>	black crappie	(BCR)
Family Percidae	perches	
<i>Perca flavescens</i>	yellow perch	(YWP)
<i>Sander vitreus</i>	walleye	(WLE)

Table 2. Summary of the October 2005 Rio Grande silvery minnow population monitoring program results (species list is based on fish collected from 1999-2004).

SPECIES	RESIDENCE STATUS ¹	TOTAL NUMBER OF SPECIMENS	PERCENT (%) OF TOTAL	FREQUENCY OF OCCURRENCE ²	% FREQUENCY OF OCCURRENCE ²
HERRINGS					
gizzard shad	I	—	0.00	—	—
CARPS AND MINNOWS					
red shiner	N	389	7.17	19	95
common carp	I	47	0.87	15	75
Rio Grande chub	N	—	0.00	—	—
Rio Grande silvery minnow	N	3,899	71.82	20	100
fathead minnow	N	107	1.97	16	80
bullhead minnow	I	3	0.06	2	10
flathead chub	N	57	1.05	10	50
longnose dace	N	32	0.59	5	25
SUCKERS					
river carpsucker	N	2	0.04	2	10
white sucker	I	2	0.04	2	10
smallmouth buffalo	N	—	0.00	—	—
BULLHEAD CATFISHES					
black bullhead	I	—	0.00	—	—
yellow bullhead	I	5	0.09	2	10
channel catfish	I	48	0.88	9	45
flathead catfish	I	6	0.11	2	10
TROUTS					
rainbow trout	I	—	—	—	—
brown trout	I	—	0.00	—	—
LIVEBEARERS					
western mosquitofish	I	821	15.12	17	85
TEMPERATE BASSES					
white bass	I	3	0.06	2	10
SUNFISHES					
green sunfish	I	—	0.00	—	—
bluegill	N	—	0.00	—	—
largemouth bass	I	6	0.11	2	10
white crappie	I	—	0.00	—	—
black crappie	I	—	0.00	—	—
PERCHES					
yellow perch	I	2	0.04	1	5
walleye	I	—	0.00	—	—
TOTAL		5,429			

¹ N = native; I = introduced

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

Table 3. Summary of the monthly 2005 Rio Grande silvery minnow population monitoring program results (species list based on fish collected from 1999-2004).

SPECIES	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	T O T A L
HERRINGS													
gizzard shad	—	—	—	—	1	3	373	123	4	—	—	—	504
CARPS AND MINNOWS													
red shiner	2,760	935	2,243	1,344	718	830	2,041	968	651	389	—	—	12,879
common carp	3	3	3	6	80	167	631	183	64	47	—	—	1,187
Rio Grande chub	—	—	—	—	—	—	—	—	—	—	—	—	—
Rio Grande silvery minnow	248	330	133	46	234	6,603	7,668	3,299	2,144	3,899	—	—	24,604
fathead minnow	356	144	171	53	67	762	1,085	383	214	107	—	—	3,342
bullhead minnow	—	1	4	—	—	—	1	—	—	3	—	—	9
flathead chub	112	187	181	181	136	217	147	104	91	57	—	—	1,413
longnose dace	1	14	20	83	54	107	34	77	36	32	—	—	458
SUCKERS													
river carpsucker	19	20	41	4	148	15	244	30	27	2	—	—	550
white sucker	16	59	43	30	1,311	262	69	19	7	2	—	—	1,818
smallmouth buffalo	—	—	—	—	—	51	110	1	—	—	—	—	162
BULLHEAD CATFISHES													
black bullhead	—	—	—	—	—	—	3	1	12	5	—	—	21
yellow bullhead	—	2	—	1	—	—	1	28	55	48	—	—	135
channel catfish	6	49	35	70	8	16	124	205	2	6	—	—	521
flathead catfish	—	—	—	—	—	—	—	1	—	—	—	—	1
TROUTS													
rainbow trout	—	—	—	—	—	—	1	—	—	—	—	—	1
brown trout	—	—	—	—	—	—	—	—	—	—	—	—	—
LIVEBEARERS													
western mosquitofish	64	146	60	62	109	235	1,685	1,656	1,273	821	—	—	6,111
TEMPERATE BASSES													
white bass	—	—	—	—	—	—	24	4	1	3	—	—	32
SUNFISHES													
green sunfish	—	—	—	—	—	—	—	—	—	—	—	—	—
bluegill	—	—	—	—	—	—	—	—	—	—	—	—	—
largemouth bass	—	1	1	—	—	2	10	3	6	6	—	—	29
white crappie	1	—	—	—	—	4	—	1	—	—	—	—	6
black crappie	—	—	—	—	—	—	—	—	—	—	—	—	—
PERCHES													
yellow perch	—	—	—	—	—	3	1	—	2	2	—	—	8
walleye	—	—	—	—	1	—	—	—	—	—	—	—	1
TOTAL	3,586	1,891	2,935	1,880	2,867	9,277	14,252	7,086	4,589	5,429	—	—	53,792

Table 4. Summary of the monthly catch of Rio Grande silvery minnow, by site and reach, during the 2005 Rio Grande silvery minnow population monitoring program. Numerals in parenthesis are the number of silvery minnow in a site collection that were marked (subset of the total).

REACH	J	F	M	A	M	J	J	A	S	O	N	D	T
Site Number	A	E	A	P	A	U	U	U	E	C	O	E	O
Site Name	N	B	R	R	Y	N	L	G	P	T	V	C	A
													L
ANGOSTURA REACH													
0 Angostura Dam	—	—	—	3	—	1	53	105	—	3			165
1 Bernalillo	20	68	36	5(1)	6(1)	146	295	121	95	19			811
2 Rio Rancho	147(4)	137(8)	25	7(1)	3(2)	578(1)	26	149	160	99			1,331
3 Central Ave (Abq)	7	64(17)	12	27	2	554	62	13	5	14			760
4 Rio Bravo (Abq)	4(1)	19(7)	15	—	—	325	147	10	25	20			565
Angostura Reach Total	178	288	88	42	11	1,604	583	398	285	278	—	—	3,632
ISLETA REACH													
5 Los Lunas	3	11	2	1	5	798	556	93	26	414			1,909
6 Belen	1	4	3	—	3	1,268	1,885	296	71	278			3,809
7 Jarales	30	—	—	—	—	1,059	417	559	781	1,218			4,064
8 US Hwy 60 Bernardo	8	1	1	—	35	390	430	71	49	317			1,302
9 South of Bernardo	5	2	1	—	—	207	148	225	79	128			795
10 North of San Acacia	1	—	—	—	—	2	88	122	7	90			310
Isleta Reach Total	48	18	7	1	43	3,724	3,524	1,366	1,013	15	—	—	12,189
SAN ACACIA REACH													
10 San Acacia Dam	3	—	16	2	—	304	1,729	60	69	75			2,258
11 S of San Acacia	13	15	14	1	—	73	1,093	27	30	40			1,306
12 Socorro	3	—	1	—	—	544	529	561	365	270			2,273
13 North of US Hwy 380	—	6	—	—	—	—	173	521	305	172			1,177
14 US Hwy 380	1	—	—	—	—	129	9	327	61	258			785
15 Bosque del Apache	2	—	—	—	2	54	13	25	12	424			532
16 San Marcial	—	—	1	—	177	104	12	0	3	15			312
17 South of San Marcial	—	—	—	—	1	10	2	3	1	21			38
18 South of San Marcial	—	3	6	—	—	57	1	11	—	24			102
San Acacia Reach Total	22	24	38	3	180	1,275	3,561	1,535	846	1,299	—	—	8,783
MONTHLY TOTALS													
	248	330	133	46	234	6,603	7,668	3,299	2,144	3,899	—	—	24,604
	J	F	M	A	M	J	J	A	S	O	N	D	T
	A	E	A	P	A	U	U	U	E	C	O	E	O
	N	B	R	R	Y	N	L	G	P	T	V	C	A
													L

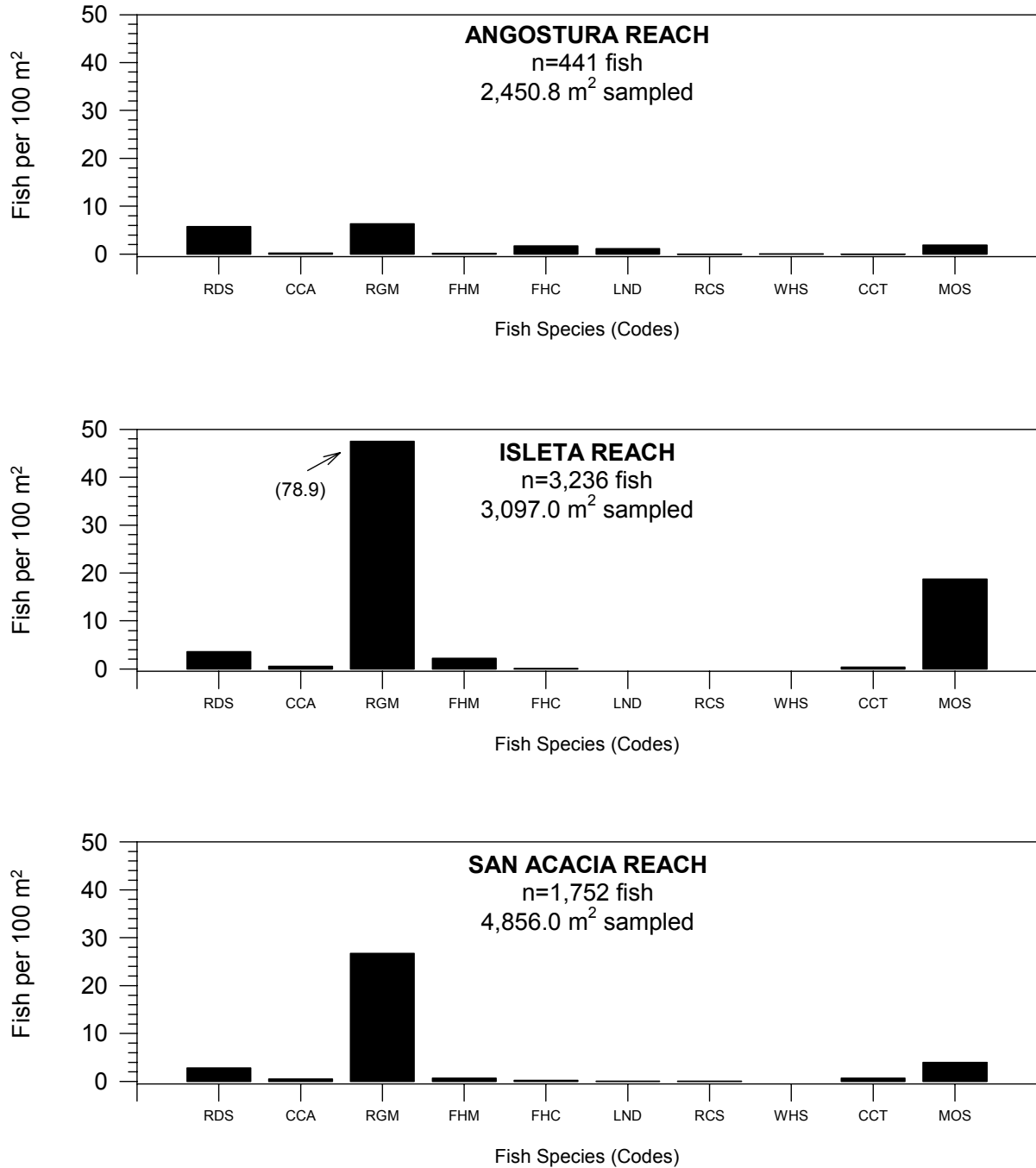


Figure 3. Catch rates, for the 10 focal species, by river reach during October 2005 at Rio Grande silvery minnow population monitoring program collection sites (see Table A-1 for fish species codes). An arrow indicates the Rio Grande silvery minnow (RGM) histogram bar.

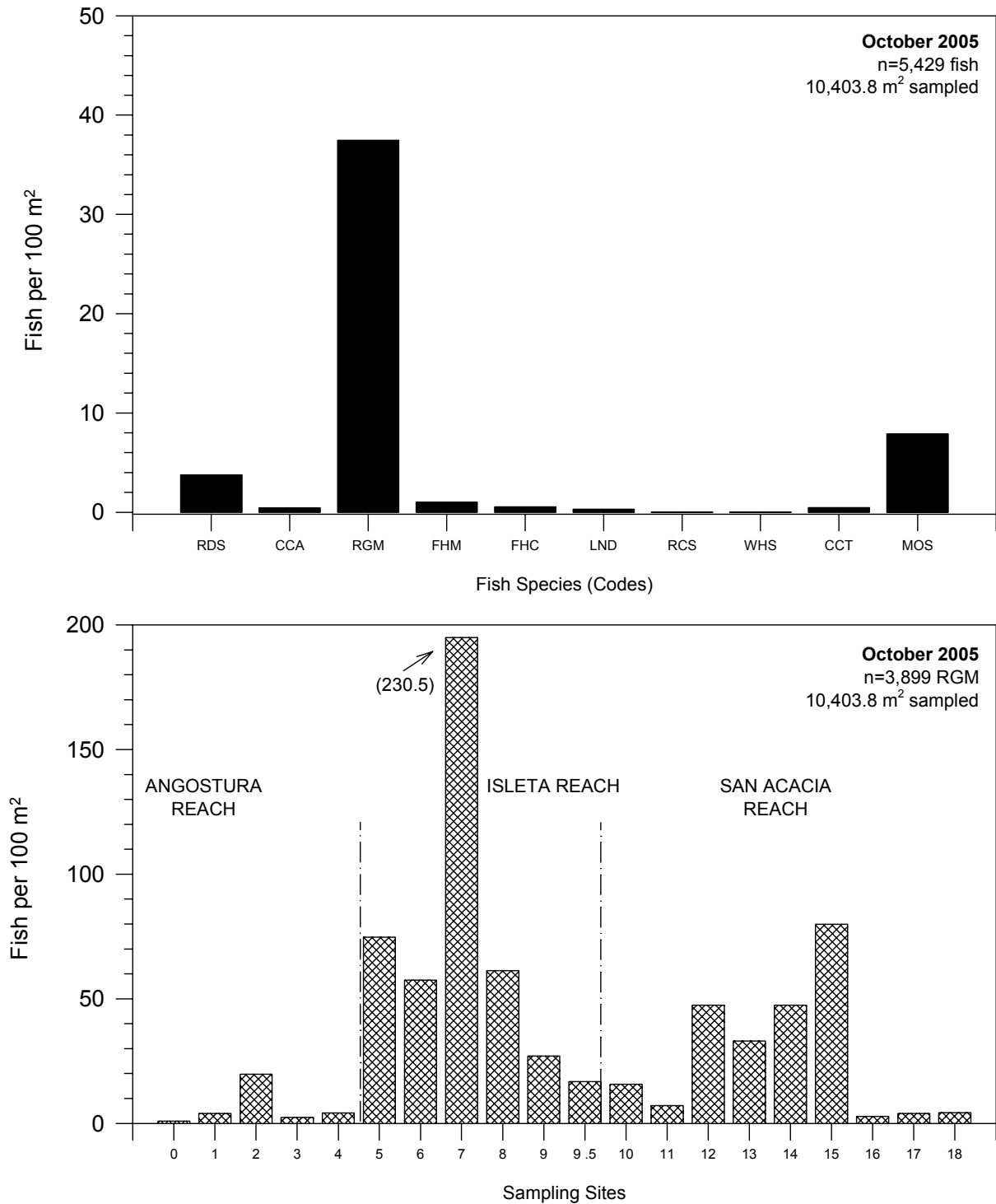


Figure 4. Catch rates for ten focal species (upper graph*), including Rio Grande silvery minnow, (RGM; lower graph*) during October 2005 at Rio Grande silvery minnow population monitoring program collection sites (see Table A-1 for fish species codes).

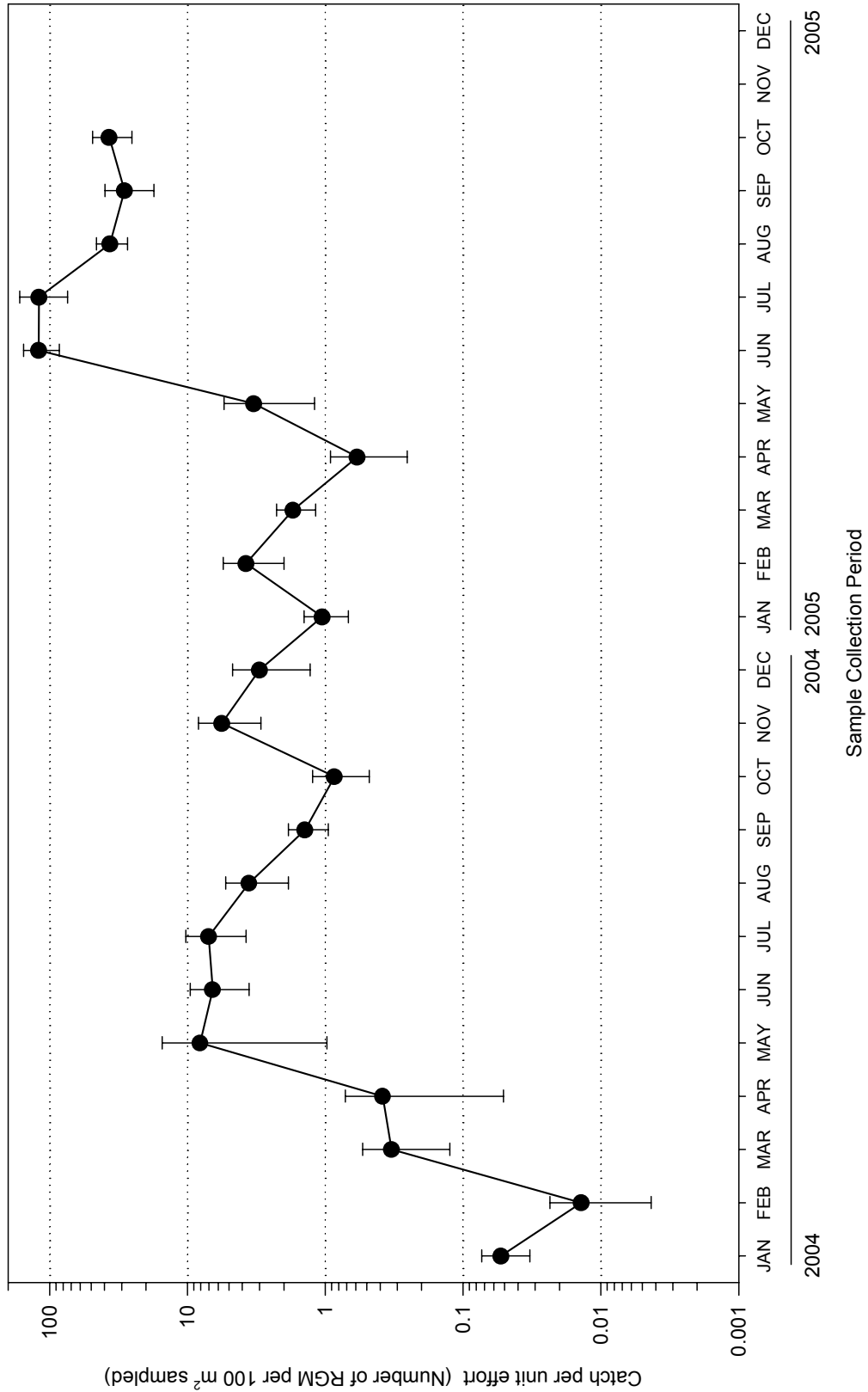


Figure 5. Month catch rates of Rio Grande silvery minnow during 2004 (January-December) and through October 2005 at Rio Grande silvery minnow population monitoring program collection sites. Solid circles indicate monthly means (n=20 site per month) and capped-bars represent the standard error of the mean.

APPENDIX A.

Collection localities of the 2005 Rio Grande silvery minnow population monitoring program.

Table A-1. Collection localities of the 2005 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 2005 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 2005 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. 10 miles downstream of the San Marcial Railroad Bridge crossing, San Marcial. River Mile 58.8 PARAJE WELL QUADRANGLE 3716150 N 307846 E

APPENDIX B.

Ichthyofaunal composition of the October 2005
Rio Grande silvery minnow population monitoring efforts

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

**Rio Grande silvery minnow Population Monitoring
October 2005**

New Mexico: Sandoval Co., Rio Grande Drainage

Rio Grande, directly below Angostura Diversion Dam, Algodones.

Site Number: 0

28 October 2005

RKD05-208

River Mile: 209.7

UTM Easting: 363811 UTM Northing: 3916006 Zone: 13 Quad: San Felipe Pueblo

R.K. Dudley, W.H. Brandenburg, M.A. Farrington, and F.R. Liccione

Effort: 373.3 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	3
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	3
76	<i>Rhinichthys cataractae</i>	7
81	<i>Catostomus commersoni</i>	1
212	<i>Gambusia affinis</i>	37
294	<i>Micropterus salmoides</i>	5
295	<i>Perca flavescens</i>	2

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

age-0: 3

**Rio Grande silvery minnow Population Monitoring
October 2005**

New Mexico: Sandoval Co., Rio Grande Drainage

Rio Grande, at US HWY 550 (formerly NM State HWY 44) bridge crossing, Bernalillo.
28 October 2005

RKD05-209

Site Number: 1

River Mile: 203.8

UTM Easting: 358543 UTM Northing: 3909722 Zone: 13 Quad: Bernalillo

R.K. Dudley, W.H. Brandenburg, M.A. Farrington, and F.R. Liccione

Effort: 482.0 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	51
76	<i>Cyprinus carpio</i>	2
76	<i>Hybognathus amarus*</i>	19
76	<i>Platygobio gracilis</i>	25
76	<i>Rhinichthys cataractae</i>	17
81	<i>Carpoides carpio</i>	1
81	<i>Catostomus commersoni</i>	1
212	<i>Gambusia affinis</i>	4
283	<i>Morone chrysops</i>	2
294	<i>Micropterus salmoides</i>	1

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

age-0: 19

**Rio Grande silvery minnow Population Monitoring
October 2005**

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

28 October 2005

RKD05-210

UTM Easting: 354772 UTM Northing: 3905355 Zone: 13 Quad: Bernalillo

R.K. Dudley, W.H. Brandenburg, M.A. Farrington, and F.R. Liccione

Effort: 503.0 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	68
76	<i>Cyprinus carpio</i>	2
76	<i>Hybognathus amarus*</i>	99
76	<i>Pimephales promelas</i>	3
76	<i>Platygobio gracilis</i>	5
76	<i>Rhinichthys cataractae</i>	1
212	<i>Gambusia affinis</i>	6

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

age-0: 92

age-1: 7

New Mexico: Bernalillo Co., Rio Grande Drainage

Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque.

Site Number: 3

27 October 2005

RKD05-206

River Mile: 183.4

UTM Easting: 346840 UTM Northing: 3884094 Zone: 13 Quad: Albuquerque West

R.K. Dudley, W.H. Brandenburg, L.E. Renfro and F.R. Liccione

Effort: 607.5 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	16
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	14
76	<i>Platygobio gracilis</i>	11
76	<i>Rhinichthys cataractae</i>	4
93	<i>Ictalurus punctatus</i>	1

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

age-0: 14

**Rio Grande silvery minnow Population Monitoring
October 2005**

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

27 October 2005

RKD05-205

UTM Easting: 347554 UTM Northing: 3877163 Zone: 13 Quad: Albuquerque West

R.K. Dudley, W.H. Brandenburg, L.E. Renfro and F.R. Liccione

Effort: 485.0 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	4
76	<i>Hybognathus amarus*</i>	20
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	2
283	<i>Morone chrysops</i>	1

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

age-0: 20

New Mexico: Valencia Co., Rio Grande Drainage

Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas.

Site Number: 5

27 October 2005

RKD05-204

River Mile: 161.4

UTM Easting: 342898 UTM Northing: 3852531 Zone: 13 Quad: Los Lunas

R.K. Dudley, W.H. Brandenburg, L.E. Renfro and F.R. Liccione

Effort: 554.3 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	31
76	<i>Hybognathus amarus*</i>	414
76	<i>Pimephales promelas</i>	10
212	<i>Gambusia affinis</i>	35

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

age-0: 414

**Rio Grande silvery minnow Population Monitoring
October 2005**

New Mexico: Valencia Co., Rio Grande Drainage

Rio Grande, ca. 1.0 miles upstream of NM State HWY 309/6 bridge crossing, Belen.
27 October 2005

RKD05-203

Site Number: 6
River Mile: 151.5

UTM Easting: 339972 UTM Northing: 3837061 Zone: 13 Quad: Tome

R.K. Dudley, W.H. Brandenburg, L.E. Renfro and F.R. Liccione

Effort: 484.3 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	7
76	<i>Cyprinus carpio</i>	4
76	<i>Hybognathus amarus*</i>	278
212	<i>Gambusia affinis</i>	2

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

age-0: 278

New Mexico: Valencia Co., Rio Grande Drainage

Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales.
27 October 2005

RKD05-202

Site Number: 7
River Mile: 143.2

UTM Easting: 338136 UTM Northing: 3827329 Zone: 13 Quad: Veguita

R.K. Dudley, W.H. Brandenburg, L.E. Renfro and F.R. Liccione

Effort: 528.5 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	40
76	<i>Hybognathus amarus*</i>	1218
76	<i>Pimephales promelas</i>	33
212	<i>Gambusia affinis</i>	465

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

age-0: 1218

**Rio Grande silvery minnow Population Monitoring
October 2005**

New Mexico: Socorro Co., Rio Grande Drainage

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

26 October 2005

RKD05-201

UTM Easting: 334604 UTM Northing: 3809726 Zone: 13 Quad: Abeytas

W.H. Brandenburg, M.A. Farrington, and L.E. Renfro

Site Number: 8

River Mile: 130.6

Effort: 517.3 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	27
76	<i>Cyprinus carpio</i>	9
76	<i>Hybognathus amarus*</i>	317
76	<i>Pimephales promelas</i>	8
76	<i>Platygobio gracilis</i>	1
93	<i>Ameiurus natalis</i>	1
93	<i>Ictalurus punctatus</i>	7
212	<i>Gambusia affinis</i>	16

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

age-0: 317

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 3.5 miles downstream of the US HWY 60 bridge crossing, Bernardo.

26 October 2005

RKD05-200

UTM Easting: 331094 UTM Northing: 3805229 Zone: 13 Quad: Abeytas

W.H. Brandenburg, M.A. Farrington, and L.E. Renfro

Site Number: 9

River Mile: 127.0

Effort: 473.0 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	6
76	<i>Cyprinus carpio</i>	3
76	<i>Hybognathus amarus*</i>	128
76	<i>Pimephales promelas</i>	8
76	<i>Platygobio gracilis</i>	1
93	<i>Ictalurus punctatus</i>	5
212	<i>Gambusia affinis</i>	59

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

age-0: 128

**Rio Grande silvery minnow Population Monitoring
October 2005**

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia
26 October 2005 **RKD05-199**

Site Number: 9.5

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: 539.8 m²

FAMILY		N
76	<i>Hybognathus amarus*</i>	90
76	<i>Pimephales promelas</i>	9
76	<i>Platygobio gracilis</i>	1
212	<i>Gambusia affinis</i>	3

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

age-0: 90

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, directly below San Acacia Diversion Dam, San Acacia.
26 October 2005 **RKD05-198**

Site Number: 10

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: 478.5 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	2
76	<i>Cyprinus carpio</i>	7
76	<i>Hybognathus amarus*</i>	75
76	<i>Pimephales promelas</i>	1
76	<i>Platygobio gracilis</i>	3
76	<i>Rhinichthys cataractae</i>	3
93	<i>Ameiurus natalis</i>	4
93	<i>Ictalurus punctatus</i>	2
212	<i>Gambusia affinis</i>	4

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

age-0: 72

age-1: 3

**Rio Grande silvery minnow Population Monitoring
October 2005**

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia.
25 October 2005

RKD05-197

Site Number: 11

River Mile: 114.6

UTM Easting: 325263 UTM Northing: 3790442 Zone: 13 Quad: Lemitar

R.K. Dudley, M.A. Farrington, and L.E. Renfro

Effort: 564.8 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	5
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	40
76	<i>Pimephales promelas</i>	6
76	<i>Platygobio gracilis</i>	6
93	<i>Ictalurus punctatus</i>	3

*** Hybognathus amarus by age class:**

age-0: 40

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, east of Socorro, 0.5 miles upstream of Socorro Low Flow Conveyance
Channel bridge and east just upstream of Socorro Wastewater Treatment Plant,
25 October 2005

RKD05-196

Site Number: 12

River Mile: 99.5

UTM Easting: 327097 UTM Northing: 3771043 Zone: 13 Quad: Loma de las Canas

R.K. Dudley, M.A. Farrington, and L.E. Renfro

Effort: 569.5 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	42
76	<i>Cyprinus carpio</i>	3
76	<i>Hybognathus amarus*</i>	270
76	<i>Pimephales promelas</i>	4
93	<i>Ictalurus punctatus</i>	7
212	<i>Gambusia affinis</i>	11

*** Hybognathus amarus by age class:**

age-0: 269

age-1: 1

**Rio Grande silvery minnow Population Monitoring
October 2005**

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 4.0 miles upstream of U.S. 380 bridge crossing.

Site Number: 13

25 October 2005

RKD05-195

River Mile: 91.7

UTM Easting: 328140 UTM Northing: 3761283 Zone: 13 Quad: San Antonio

R.K. Dudley, M.A. Farrington, and L.E. Renfro

Effort: 521.0 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	1
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	172
76	<i>Pimephales promelas</i>	1
212	<i>Gambusia affinis</i>	2

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

age-0: 172

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, at US HWY 380 bridge crossing, San Antonio.

Site Number: 14

25 October 2005

RKD05-194

River Mile: 87.1

UTM Easting: 328914 UTM Northing: 3754471 Zone: 13 Quad: San Antonio

R.K. Dudley, M.A. Farrington, and L.E. Renfro

Effort: 543.8 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	19
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	258
76	<i>Pimephales promelas</i>	5
76	<i>Platygobio gracilis</i>	2
212	<i>Gambusia affinis</i>	4

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

age-0: 258

**Rio Grande silvery minnow Population Monitoring
October 2005**

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, directly east of Bosque del Apache National Wildlife Refuge

Site Number: 15

24 October 2005

RKD05-193

River Mile: 79.1

UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San Antonio SE

R.K. Dudley, M.A. Farrington, and L.E. Renfro

Effort: 531.3 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	1
76	<i>Cyprinus carpio</i>	1
76	<i>Hybognathus amarus*</i>	424
76	<i>Pimephales promelas</i>	3
81	<i>Carpoides carpio</i>	1
212	<i>Gambusia affinis</i>	7

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

age-0: 424

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, at San Marcial Railroad Bridge, San Marcial.

Site Number: 16

24 October 2005

RKD05-192

River Mile: 68.6

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

R.K. Dudley, M.A. Farrington, and L.E. Renfro

Effort: 548.0 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	44
76	<i>Hybognathus amarus*</i>	15
76	<i>Pimephales promelas</i>	9
76	<i>Pimephales vigilax</i>	2
93	<i>Ictalurus punctatus</i>	1
212	<i>Gambusia affinis</i>	141

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

age-0: 14

age-1: 1

**Rio Grande silvery minnow Population Monitoring
October 2005**

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

24 October 2005

RKD05-191

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

R.K. Dudley, M.A. Farrington, and L.E. Renfro

Effort: 531.3 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	10
76	<i>Cyprinus carpio</i>	3
76	<i>Hybognathus amarus*</i>	21
76	<i>Pimephales promelas</i>	2
93	<i>Ictalurus punctatus</i>	19
93	<i>Pylodictis olivaris</i>	3
212	<i>Gambusia affinis</i>	9

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

age-0: 21

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 10 miles downstream of the San Marcial Railroad Bridge crossing.

Site Number: 18

24 October 2005

RKD05-190

UTM Easting: 307846 UTM Northing: 3716150 Zone: 13 Quad: Paraje Well

R.K. Dudley, M.A. Farrington, and L.E. Renfro

Effort: 568.0 m²

FAMILY		N
76	<i>Cyprinella lutrensis</i>	12
76	<i>Cyprinus carpio</i>	8
76	<i>Hybognathus amarus*</i>	24
76	<i>Pimephales promelas</i>	4
76	<i>Pimephales vigilax</i>	1
93	<i>Ictalurus punctatus</i>	3
93	<i>Pylodictis olivaris</i>	3
212	<i>Gambusia affinis</i>	16

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

age-0: 21

age-1: 3