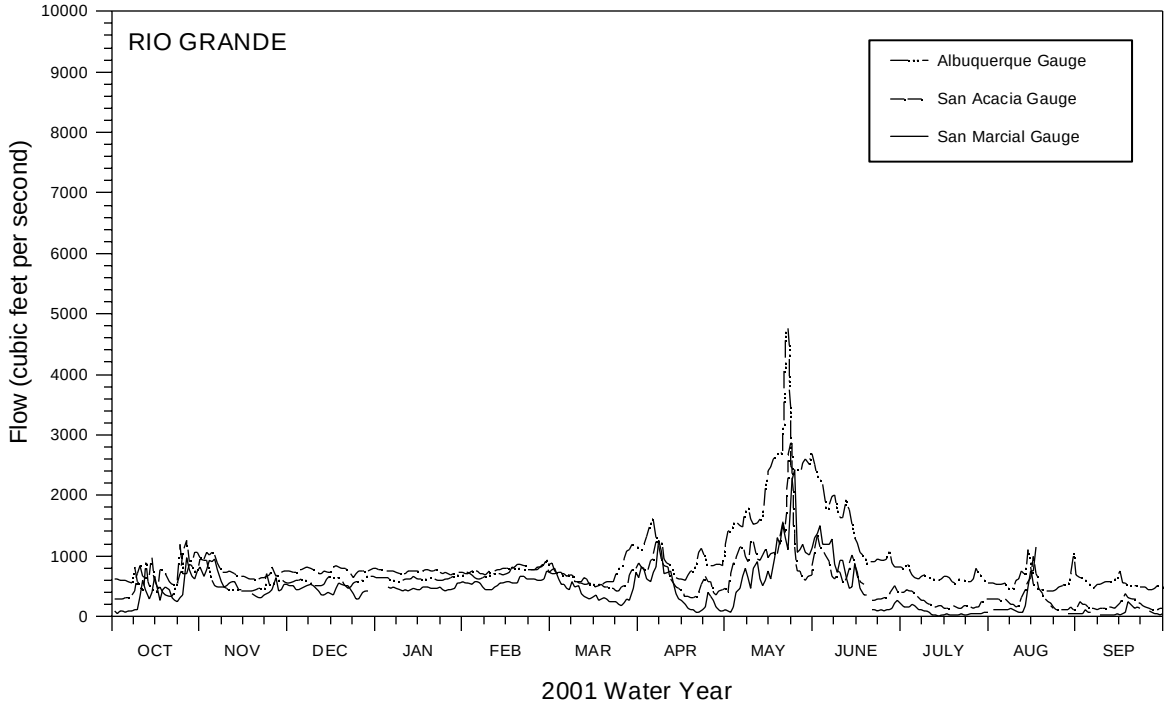
2001 POPULATION MONITORING OF RIO GRANDE SILVERY MINNOW

Final Report



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INTRODUCTION

Population information on Rio Grande silvery minnow and the associated Middle Rio Grande (Rio Grande between Velarde, New Mexico and Elephant Butte Reservoir) fish community has been gathered regularly since 1987. The first studies were conducted by Platania (1993a) from 1987-1992 to determine spatial and temporal changes in the ichthyofaunal community and to provide resolution of species-specific habitat use patterns. A key purpose of those preliminary studies was to supply additional information on the conservation status of Rio Grande silvery minnow. Quarterly sampling efforts during the summer and autumn of 1989 and 1990 revealed that densities of Rio Grande silvery minnow were extremely low. Based on previous samples, these low densities indicated a rapid decline of this species in its already greatly reduced range. The 90-95% reduction in the range of Rio Grande silvery minnow and threats to its continued persistence in the Middle Rio Grande were central to this species being listed as endangered by the U.S. Fish and Wildlife Service (U.S. Department of Interior, 1994).

From 1992 until present, the U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, New Mexico Department of Game and Fish, and U.S. Corps of Engineers have cooperated to fund numerous ichthyofaunal studies in the Middle Rio Grande. Among these studies was the long-term monitoring of the distribution and relative abundance of the Middle Rio Grande fish community at numerous sites between Angostura Diversion Dam and Elephant Butte Reservoir that was initiated in 1993. While Rio Grande silvery minnow was the primary focus of these efforts, these research activities were designed to provide information about the entire fish community.

The objective of the 2001 collecting activities was to monitor populations of Rio Grande silvery minnow and the associated fish community. Seasonal and spatial differences in population structure and species densities were examined to determine the ecological dynamics within this system. Annual changes in the distribution, abundance, and composition of all fish species were also assessed. Information obtained from this study will allow a more thorough understanding of the current conservation status and population dynamics of Rio Grande silvery minnow both of which are important components for the recovery of this species.

STUDY AREA

The headwaters of the Rio Grande are located in the San Juan Mountains of southern Colorado. The Rio Grande flows about 750 km through New Mexico. The Rio Chama is the only major perennial tributary of the Rio Grande in New Mexico and confluences with it near the town of Española. Snowmelt from southern Colorado and northern New Mexico provides the majority of water for the Rio Grande, but transmontane diversions from the San Juan River drainage (Colorado River basin) supplement flow. The highest flow in the Rio Grande generally occurs during spring snowmelt, while the lowest flow usually occurs in late summer and autumn. Low flow later in the year is due, in part, to the large diversions of water out of the river and into irrigation canals. Summer thunderstorms periodically augment low flow in discrete reaches, but do not ensure that the river channel will remain wetted. Precipitation in the region is low and averages <25 cm/year (Gold and Denis, 1985).

The Middle Rio Grande is defined as the reach between Velarde, New Mexico and Elephant Butte Reservoir (Figure 1). This reach changes considerably through its 364 km length. At high elevations, the Middle Rio Grande was a narrow, canyon-bound cold river with large substrata and a salmonid-dominated fish community. In contrast, downstream areas were 50-250 m wide, sand-bottomed, and supported a warmwater fish community. Our area of interest within the Middle Rio Grande was the current range of Rio Grande silvery minnow (i.e., below Cochiti Dam to the inflow of Elephant Butte Reservoir). The Cochiti Reach portion of the Rio Grande (between Cochiti Dam and

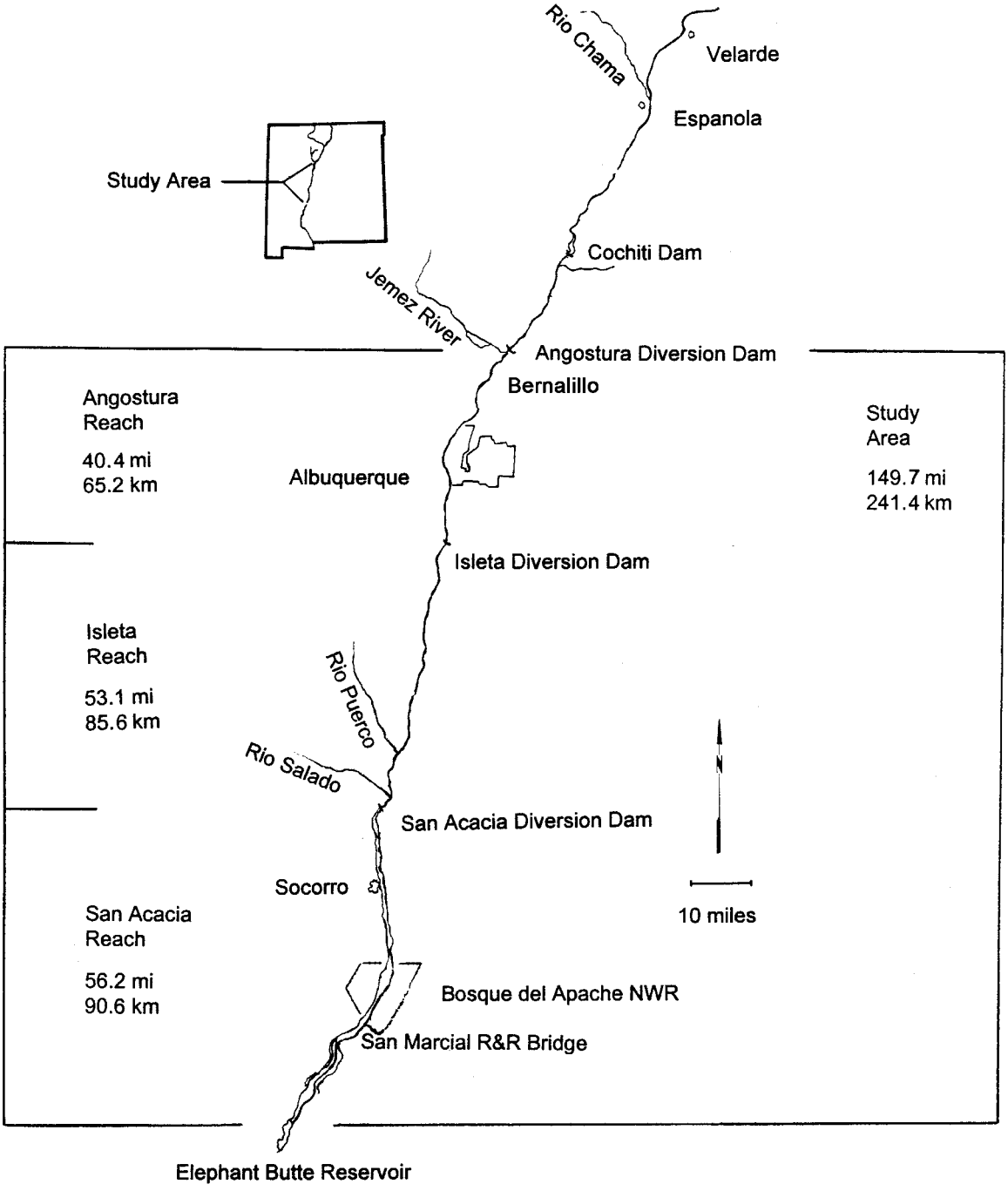

Figure 1. Map of the Middle Rio Grande and study area.

Angostura Diversion Dam) passes first through Cochiti Pueblo, then Santo Domingo Pueblo, and finally San Felipe Pueblo; access is currently limited within this entire reach. The last comprehensive ichthyofaunal surveys of the Rio Grande in the Cochiti Reach documented the presence and low abundance of Rio Grande silvery minnow on Santo Domingo and San Felipe pueblos (Platania, 1995) but no Rio Grande silvery minnow were present on Cochiti Pueblo (Platania, 1993b).

Flow in the Rio Grande is regulated by five mainstem reservoirs on the rios Chama and Grande and numerous smaller irrigation diversion dams throughout the drainage. The complex system of ditches, drains, and conveyance channels provide water for extensive irrigated agriculture in the Rio Grande Valley. Cochiti Reservoir, located 76 km above Albuquerque and operational in 1973, is the primary flood control reservoir and largely dictates flows in the mainstem of the Middle Rio Grande.

The section of river from Angostura Diversion Dam to Bernalillo was a transition zone where the river channel became more braided, the floodplain widened, and substrata was primarily sand and silt. From Bernalillo downstream to Albuquerque, the river channel often exceeded 100 m in width and lower velocity habitats were more common. Backwaters were more abundant in this reach than between Cochiti and Angostura diversion dams and substrata larger than sand was rare.

Downstream of Albuquerque, the Rio Grande was a wide and meandering river with a predominantly sand substrata, high suspended silt load, and a broad variety of mesohabitats. The mainstem channel was generally wide (100-200 m), <1 m deep, and had a current velocity of <1 m/s. From approximately the middle of Bosque del Apache National Wildlife Refuge to Elephant Butte Reservoir, the river channel was generally less than 50 m wide.

Diel and seasonal discharge varied greatly during this study (Figure 2). There was a general trend of lower flow at downstream locations (i.e., U.S. Geological Survey (USGS) San Acacia Gauge [#08354900] and USGS San Marcial Gauge [#08358400]) compared to upstream ones (i.e., USGS Albuquerque Gauge [#08330000]). In 2001, flow was continuous in the Angostura and Isleta reaches, but there was a period of low flow in the lower section of the San Acacia reach during late April. There was also a period typified by episodes of extremely low flow that persisted in the lower section of the San Acacia reach from late June until late October. Flows during the 2001 monitoring activities were generally moderate to low throughout the year with the notable exception of increased flow during May and June as a result of snowmelt.

METHODS

This study was structured to monitor populations of Rio Grande silvery minnow and the associated fish community at selected sites (see Table A-1, Appendix A) throughout the study area. The bimonthly sampling efforts during the study allowed for determination of general spatial and temporal changes in population structure and species densities. Sampling was conducted in February, April, June, August, October, and December of 2001 (Appendix B).

Reach names are taken from the diversion structure at the upstream boundary of that reach of river. The Angostura Reach (Angostura Diversion Dam to Isleta Diversion Dam) had five sampling localities and the Isleta Reach (Isleta Diversion Dam to San Acacia Diversion Dam) had six collecting sites. One site that was about 0.6 miles (1 km) upstream of San Acacia Diversion Dam was added as a sampling site in October 2001. There were nine sampling localities in the San Acacia Reach (San Acacia Diversion Dam to Elephant Butte Reservoir). No sampling was conducted in the Cochiti Reach as much of this area is under tribal control and access is not always available.

Fish were collected by rapidly drawing a two-person 3.1 m x 1.8 m small mesh (0.5 cm) seine through discrete mesohabitats (usually <15 m). Large fish (e.g., > 300 mm standard length, SL) were released at the site of capture. Retained fish were fixed in the field in 10% formalin and returned to the laboratory where they were sorted, identified to species, counted, measured (minimum and maximum size; mm SL), transferred to 70% ethyl alcohol, and catalogued into the Fish Division of the

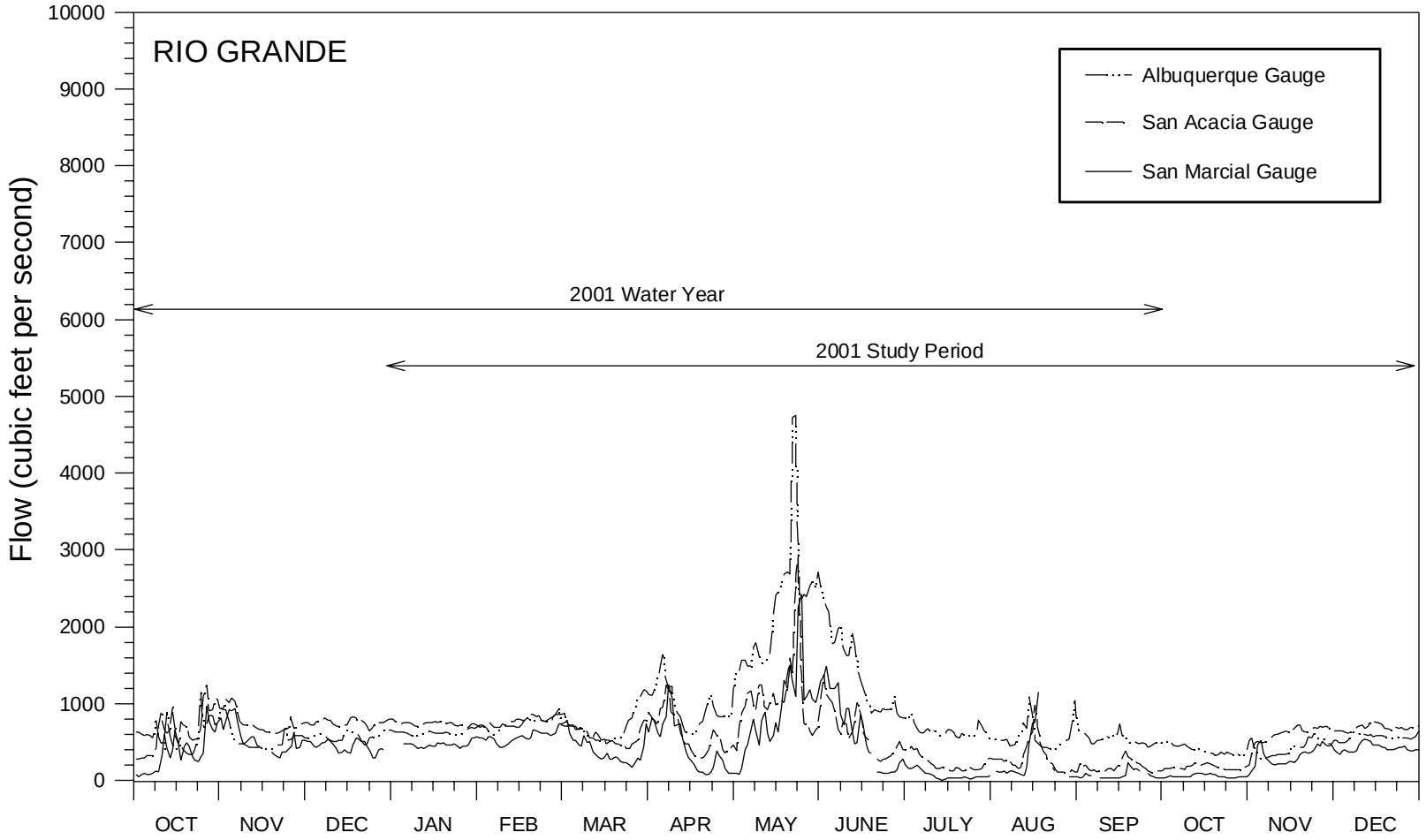

Figure 2. Hydrograph of the Rio Grande, NM at Albuquerque, San Acacia, and San Marcial for the 2001 water year and study period. *Note: Hydrological data are from the U.S. Geological Survey and are provisional.

Museum of Southwestern Biology (MSB) at the University of New Mexico. All Rio Grande silvery minnow were counted, identified to age-class, and released at the site of capture. Graphs of fish catch per unit effort are provided for the 10 focal species (the 10 most common taxa that occur throughout the study area) for each collection locality by sampling period (see Figures A-1 to A-7, Appendix A). Scientific and common names of fishes in this report generally follow Robins et al. (1991; Table 1). Common names, arranged in phylogenetic order, are used in tables and the report.

RESULTS

SUMMARY OF 2001 COLLECTING ACTIVITIES

Rio Grande silvery minnow

The number of Rio Grande silvery minnow collected within a particular study reach in 2001 varied both within and between seasons. Catch rate of Rio Grande silvery minnow also varied noticeably in and between sampling reaches (Figures 3 and 4). The lowest number of Rio Grande silvery minnow (n=27) were taken during April.

A total of 324 seine hauls were taken during the February 2001 sampling foray of which 20 (hauls) contained Rio Grande silvery minnow. That sampling effort yielded no Rio Grande silvery minnow from the Angostura Reach and none from any sites in the Isleta Reach downstream of Los Lunas. However, there were many Rio Grande silvery minnow (n=246) taken from a few backwater habitats at the Los Lunas site. There were low densities of Rio Grande silvery minnow taken in February from localities downstream of San Acacia Diversion Dam.

There were notably fewer Rio Grande silvery minnow collected in April (n=27) than in February (n=277). In April 2001, no Rio Grande silvery minnow were collected in the Angostura Reach and only two were captured in the Isleta Reach. The remainder of the Rio Grande silvery minnow were collected from sites within the San Acacia Reach.

The June monitoring trip yielded notably more Rio Grande silvery minnow (n=1,385) than the February or April sampling trips. Young-of-year Rio Grande silvery minnow were collected in all three reaches but were most abundant in the San Acacia Reach. Catch rates were highest at the site directly downstream of San Acacia Diversion Dam.

The largest collections of Rio Grande silvery minnow in the August sampling trip were made from sites in the upper-middle portion of the San Acacia Reach. The remainder of the sites in the San Acacia Reach produced a few individuals but there were no clear trends between catch rates at different sites. Low densities of Rio Grande silvery minnow were also recorded for both the Angostura and Isleta reaches.

The October sampling trip produced few Rio Grande silvery minnow (n=112). The upper sampling sites (i.e., Angostura and Isleta reaches) produced only a few individuals at selected sites. The catch rates of Rio Grande silvery minnow were low and no real differences could be discerned between sites within the San Acacia Reach.

Increased densities of Rio Grande silvery minnow were noted in the December 2001 sampling trip. The highest densities were found at the upper end of the Isleta Reach and the middle of the San Acacia Reach. Rio Grande silvery minnow were collected from every site sampled with the exception of the uppermost site in the Angostura Reach.

The Angostura Reach yielded the fewest silvery minnow (n=278) in 2001 (Figure 5), followed by the Isleta Reach (n=616), and San Acacia Reach (n=2,181). The catch rate and total number of Rio Grande silvery minnow collected in 2001 within the Angostura and Isleta reaches were higher than has been recorded over the past several years. Rio Grande silvery minnow were not collected in the Angostura Reach until June when young-of-year appeared in low-moderate densities following spring spawning. Patterns of catch rates in the Angostura and Isleta reaches were nearly identical except

Table 1. Scientific and common names and species codes of fish collected from the Middle Rio Grande for 2001.

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	(RDS)
Cyprinus carpio	common carp	(CCA)
Hybognathus amarus	Rio Grande silvery minnow	(RGM)
Pimephales promelas	fathead minnow	(FHM)
Platygobio gracilis	flathead chub	(FHC)
Rhinichthys cataractae	longnose dace	(LND)
Family Catostomidae	suckers	
Carpiodes carpio	river carpsucker	(RCS)
Catostomus commersoni	white sucker	(WHS)
Order Siluriformes		
Family Ictaluridae	bullhead catfishes	
Ameiurus melas	black bullhead	(BBH)
Ameiurus natalis	yellow bullhead	(YBH)
Ictalurus punctatus	channel catfish	(CCT)
Pylodictis olivaris	flathead catfish	(FCT)
Order Salmoniformes		
Family Salmonidae	trouts	
Salmo trutta	brown trout	(BNT)
Order Cyprinodontiformes		
Family Poeciliidae	livebearers	
Gambusia affinis	western mosquitofish	(MOS)

Table 1 (continued). Scientific and common names and species codes of fish collected from the Middle Rio Grande for 2001.

Scientific Name	Common Name	Code
Order Perciformes		
Family Percichthyidae	temperate basses	
Morone chrysops	white bass	(WHB)
Order Perciformes		
Family Centrarchidae	sunfishes	
Lepomis macrochirus	bluegill	(BGL)
Micropterus salmoides	largemouth bass	(LMB)
Pomoxis annularis	white crappie	(WCR)
Family Percidae	perches	
Perca flavescens	yellow perch	(YWP)

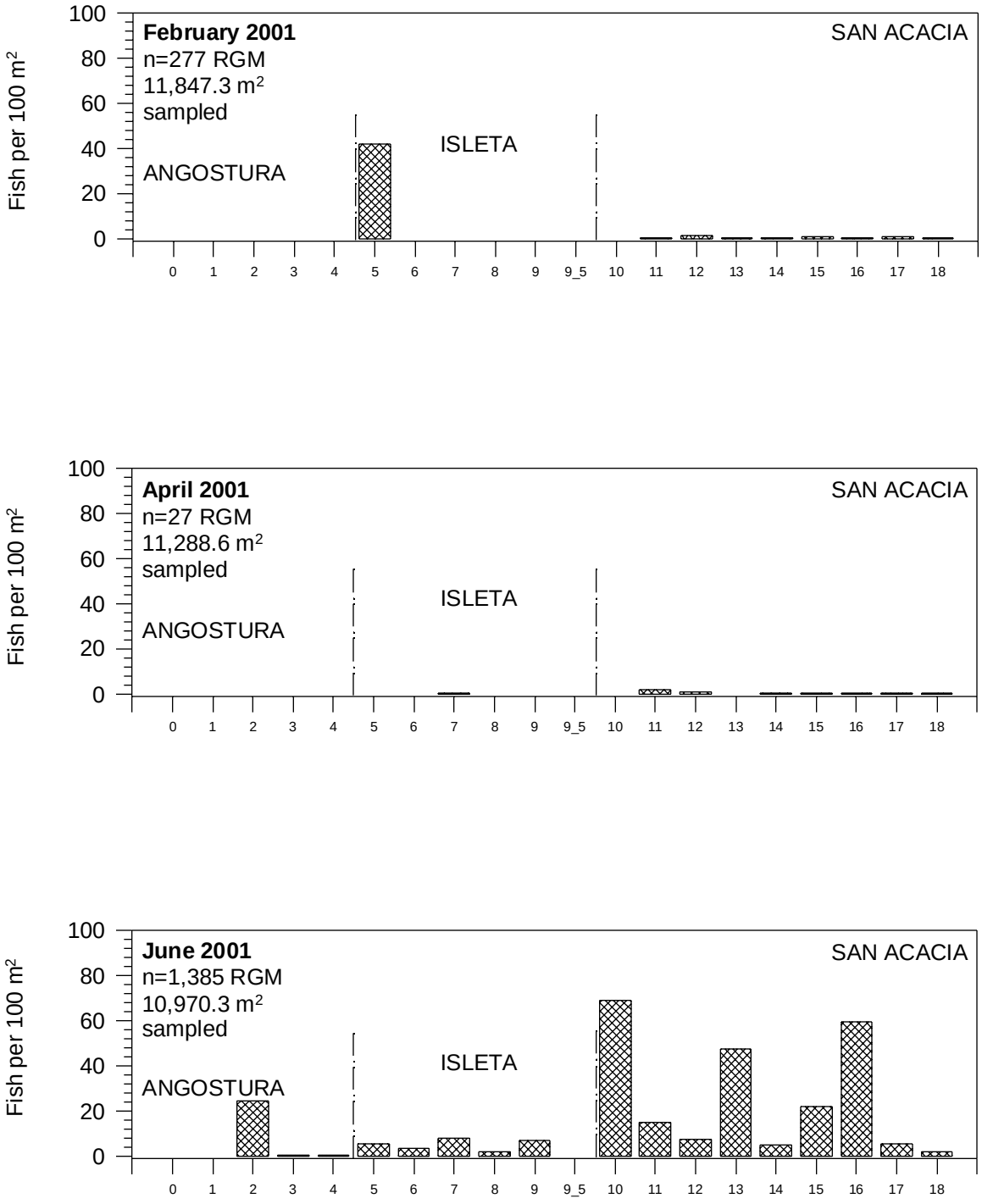

Figure 3. Rio Grande silvery minnow (RGM) catch rates (CPUE) for February, April, and June of 2001 for each collection locality in the Middle Rio Grande.

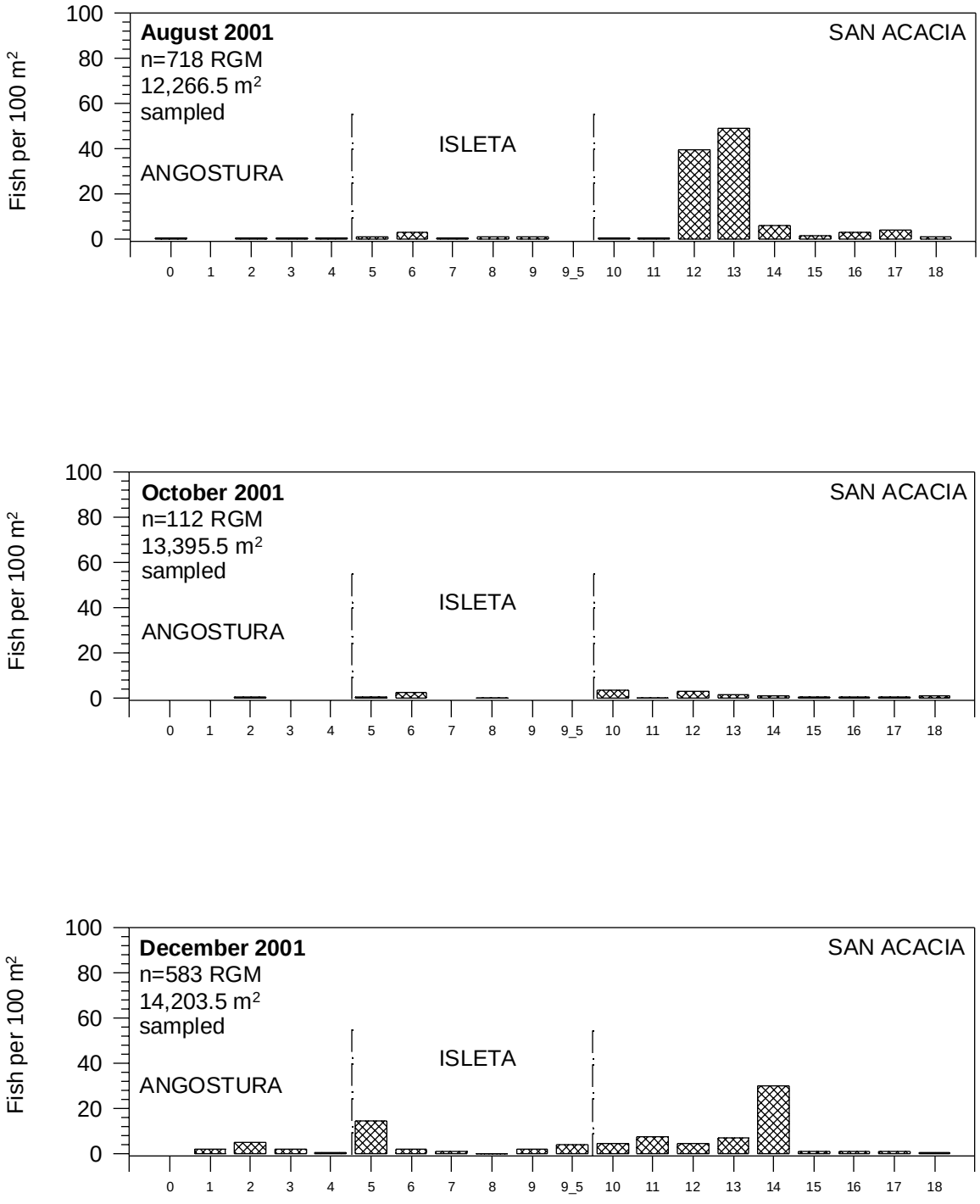

Figure 4. Rio Grande silvery minnow (RGM) catch rates (CPUE) for August, October, and December of 2001 for each collection locality in the Middle Rio Grande.

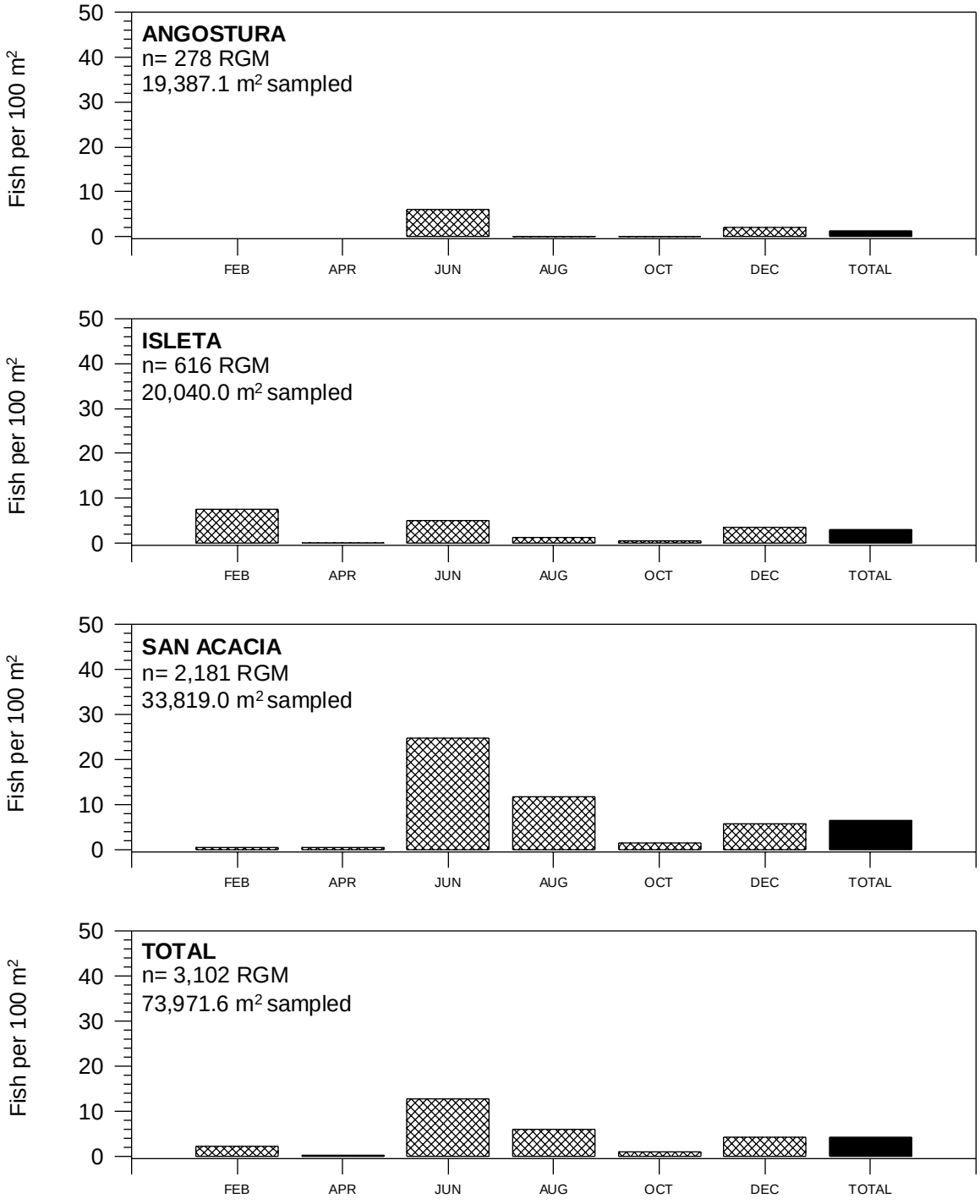

Figure 5. Rio Grande silvery minnow (RGM) catch rates (CPUE) by river reach for each sampling period of 2001 in the Middle Rio Grande.

that moderate numbers of Rio Grande silvery minnow were collected in February in the uppermost portion of the Isleta Reach.

The San Acacia Reach yielded moderate numbers of Rio Grande silvery minnow throughout the year with the highest catch rates occurring in June and August. The slight increase in catch rates during these periods was caused primarily by the appearance of moderate numbers of young-of-year Rio Grande silvery minnow. Catch rates were lower during April and October than during other times of the year.

Fish Community

The ichthyofaunal community in the Middle Rio Grande between Angostura Diversion Dam and Elephant Butte reservoir was numerically dominated by cyprinids (Table 2). The native ichthyofauna consisted of six species (red shiner, Rio Grande silvery minnow, fathead minnow, flathead chub, longnose dace, and river carpsucker) that were represented by sample numbers between 253 and 35,860. Longnose dace (n=253) was the least abundant native fish with flathead chub (n=699) being the second least collected native taxon. Red shiner was the most abundant native species (n=35,860) followed by fathead minnow (n=5,221), river carpsucker (n=3,852), and Rio Grande silvery minnow (n=3,102). Some of the more abundant introduced species were western mosquitofish (n=12,857), common carp (n=2,037), channel catfish (n=1,314), and white sucker (n=1,082). The remaining ten nonnative fish species were at notably lower abundances than the other nonnatives.

There were notable seasonal changes in the relative abundance of the ten focal species for 2001 (Figures 6 and 7). Densities of most species, with the exception of red shiner and channel catfish, increased in abundance from the April to the June sampling trips. Red shiner and western mosquitofish were the most abundant species encountered during the June collecting trip. Rio Grande silvery minnow densities increased dramatically from April to June but returned to pre-spawning levels by October. Densities of fathead minnow and common carp increased rapidly by June to become the third and forth most abundant taxa respectively. Densities for most species began to drop by October with the exception of red shiner and western mosquitofish whose relative abundance essentially remained unchanged. Catch rates in December dropped for nearly all taxa.

Besides temporal variation in the relative abundances in the fish community, there were also longitudinal differences in fish densities (Figure 8). Red shiner catch rates were highest in the Isleta Reach and lowest in the Angostura Reach. Longnose dace and white sucker exhibited a shared pattern of higher catch rates in the Angostura Reach compared to the Isleta or San Acacia reaches. Common carp, fathead minnow, river carpsucker, channel catfish, and western mosquitofish were most abundant in the Isleta Reach. Rio Grande silvery minnow was present in the San Acacia Reach at low-moderate densities, but less abundant in the Angostura and Isleta reaches. Densities of flathead chub did not differ noticeably between any of the river reaches.

Relative abundance of fish in 2001 fluctuated between sampling periods for each of the river reaches (Figure 9). An increase, of varying magnitudes, in the relative abundances of fish was discerned in June samples but declines were apparent by December. Notable increases in fish catch rate in the Angostura and San Acacia reaches occurred in June although the relative density of fish was higher in the San Acacia Reach. Isleta Reach fish catch rates were moderately high from February through October primarily because of the large numbers of red shiner and western mosquitofish that were collected throughout most of the year.

Catch rates of individual taxa in the study reaches varied extensively by sampling period (Figures 10 and 11). Fish catch rates in the Angostura Reach were moderate for most of the focal species except red shiner, white sucker, and western mosquitofish which were consistently higher. Rio Grande silvery minnow catch rates were low throughout 2001 but were notably higher than in 2000 when only a few individuals were captured. Relative abundances of common carp, fathead minnow,

Table 2. Summary of ichthyofaunal composition and collection data from the Middle Rio Grande for 2001.

SPECIES	RESIDENCE STATUS[1]	TOTAL NUMBER OF SPECIMENS	% OF TOTAL
HERRINGS			
gizzard shad	I	151	0.23
CARPS AND MINNOWS			
red shiner *	N	35,860	53.74
common carp *	I	2,037	3.05
Rio Grande silvery minnow *	N	3,102	4.65
fathead minnow *	N	5,221	7.82
flathead chub *	N	699	1.05
longnose dace *	N	253	0.38
SUCKERS			
river carpsucker *	N	3,852	5.77
white sucker *	I	1,082	1.62
BULLHEAD CATFISHES			
black bullhead	I	1	<0.01
yellow bullhead	I	42	0.06
channel catfish *	I	1,314	1.97
flathead catfish	I	1	<0.01
TROUTS			
brown trout	I	1	<0.01
LIVEBEARERS			
western mosquitofish *	I	12,857	19.27
TEMPERATE BASSES			
white bass	I	136	0.20
SUNFISHES			
bluegill	I	10	0.01
largemouth bass	I	25	0.04
white crappie	I	63	0.09
PERCHES			
yellow perch	I	22	0.03
TOTAL		66,729	100

N = native; I = nonnative

* indicates one of the 10 focal taxa used in all community composition figures

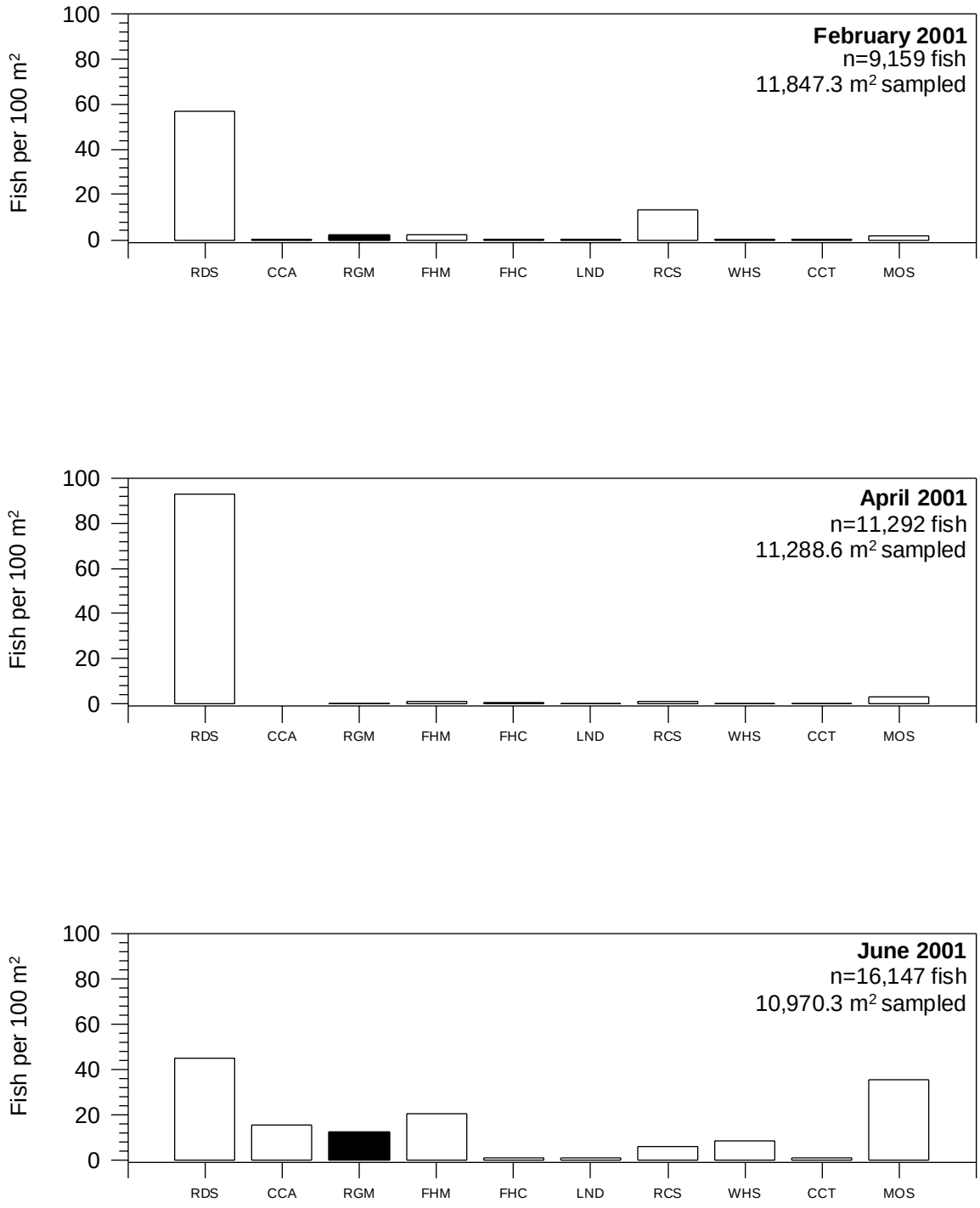

Figure 6. Fish catch rates (CPUE) in February, April, and June of 2001 for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande. Histogram bar for Rio Grande silvery (RGM) is black to highlight this species.

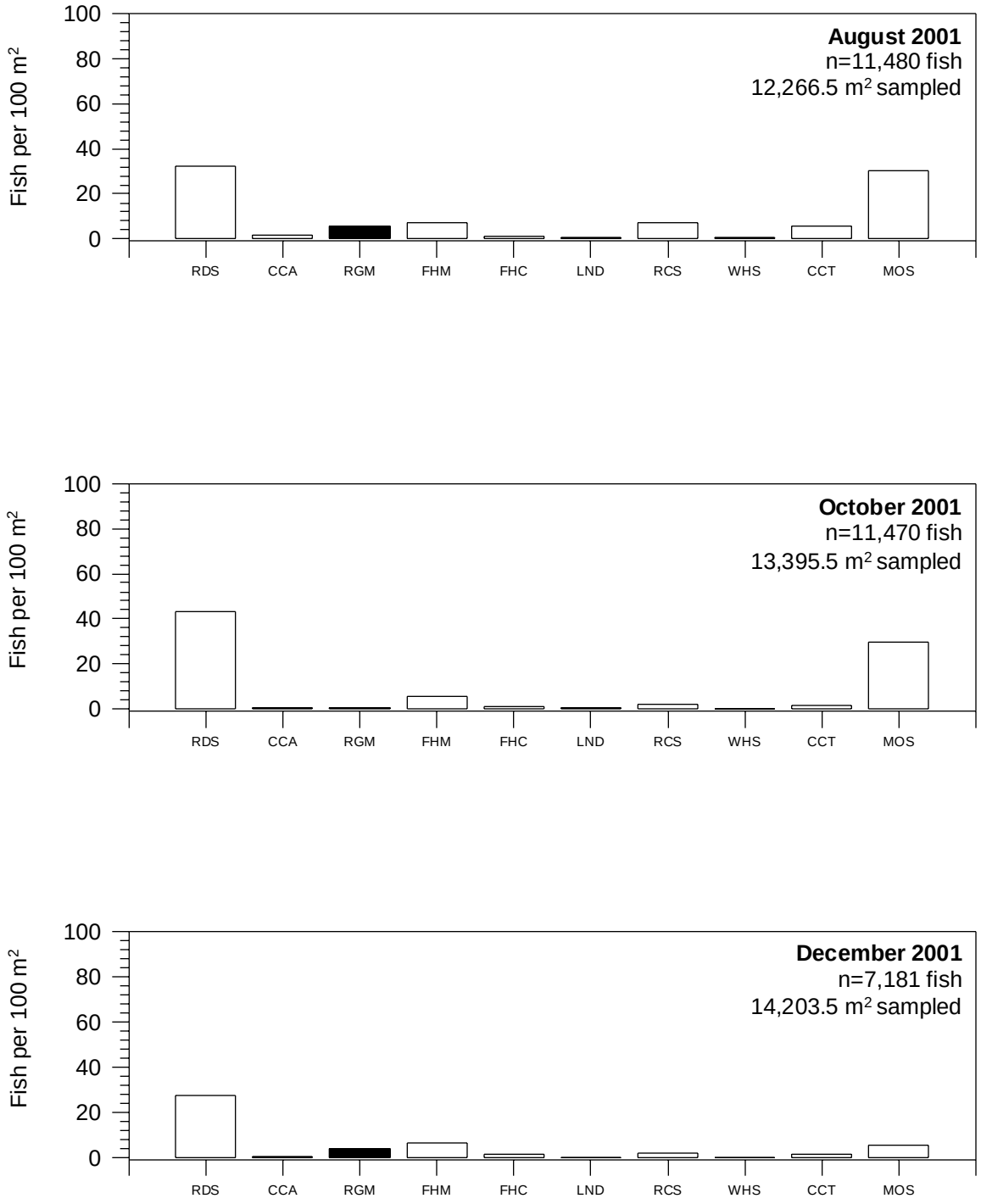

Figure 7. Fish catch rates (CPUE) in August, October, and December of 2001 for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande. Histogram bar for Rio Grande silvery (RGM) is black to highlight this species.

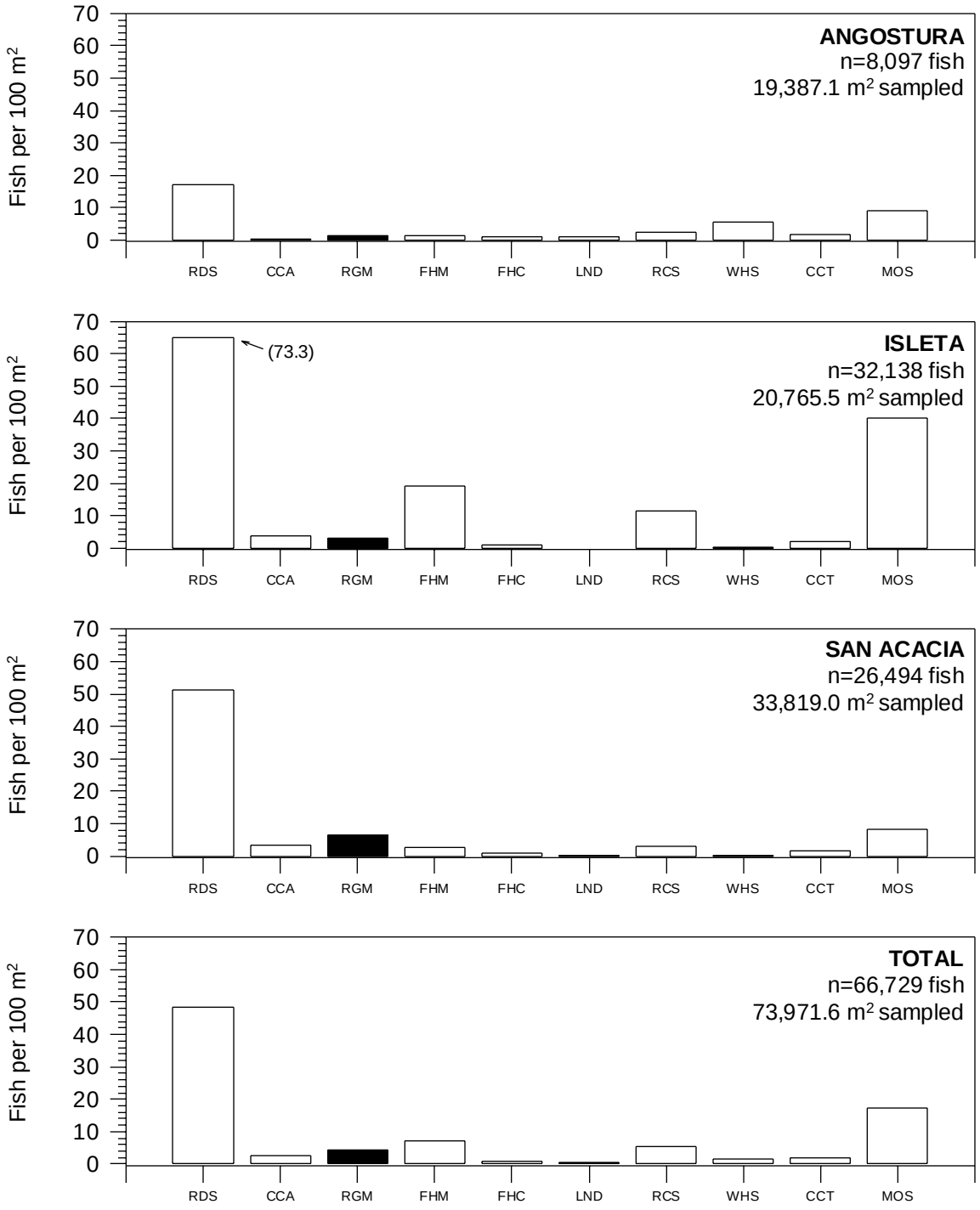

Figure 8. Fish catch rates (CPUE) by river reach for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande for 2001. Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

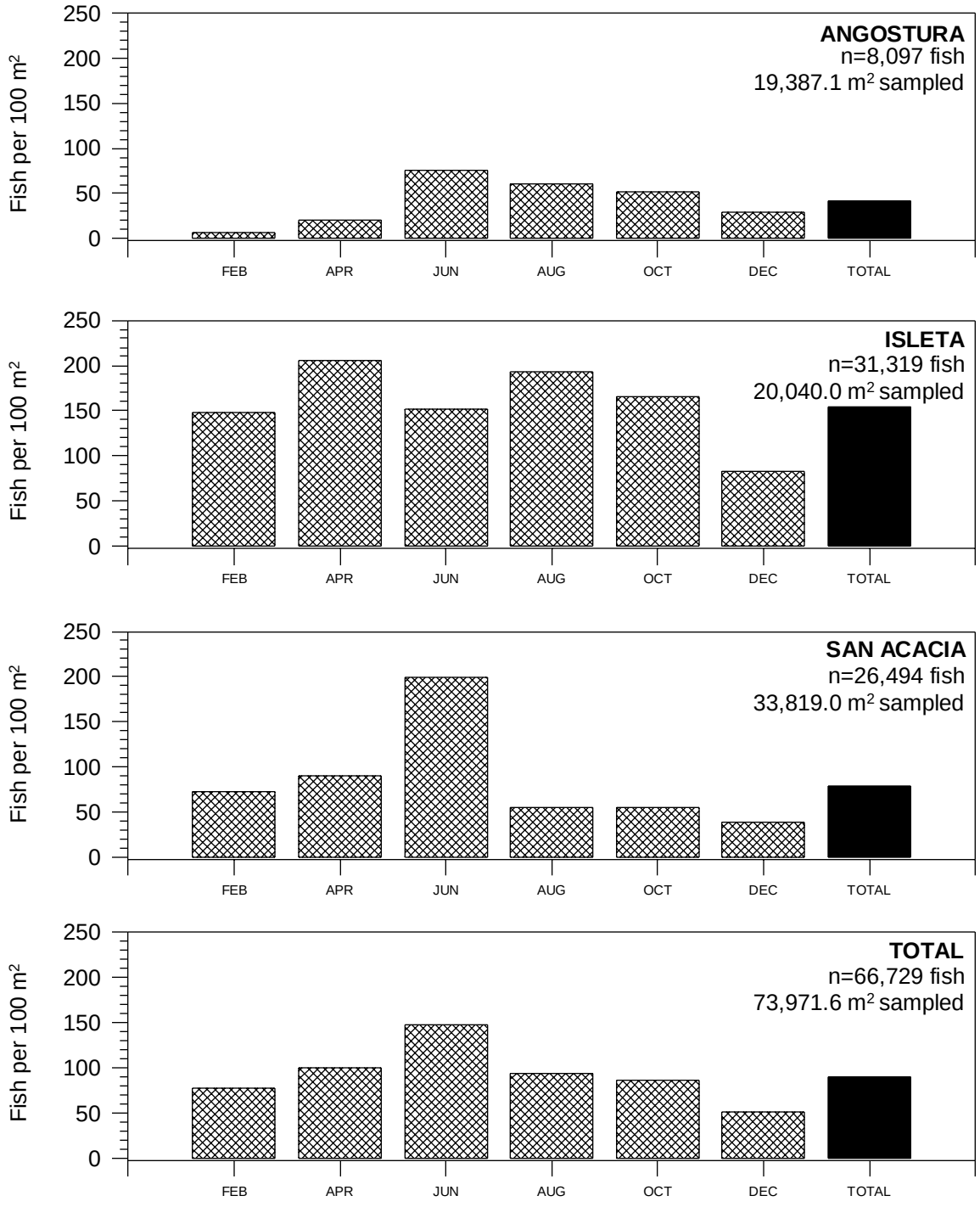

Figure 9. Fish catch rates (CPUE) by river reach for each sampling period in the Middle Rio Grande for 2001.

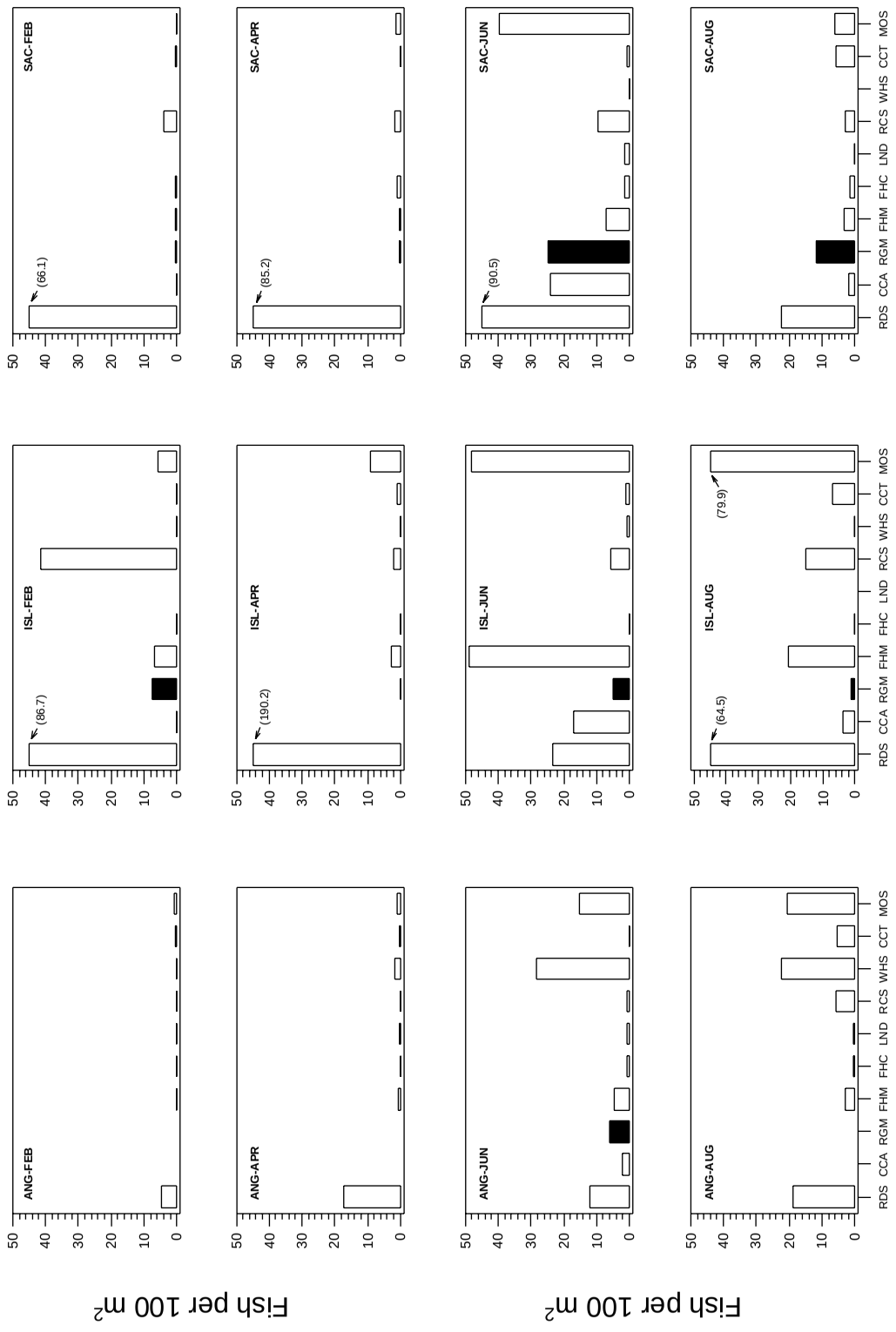

Figure 10. Fish catch rates (CPUE) by river reach for February, April, June, and August of 2001 for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande (ANG=Angostura, ISL=Isleata, and SAC=San Acacia). Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

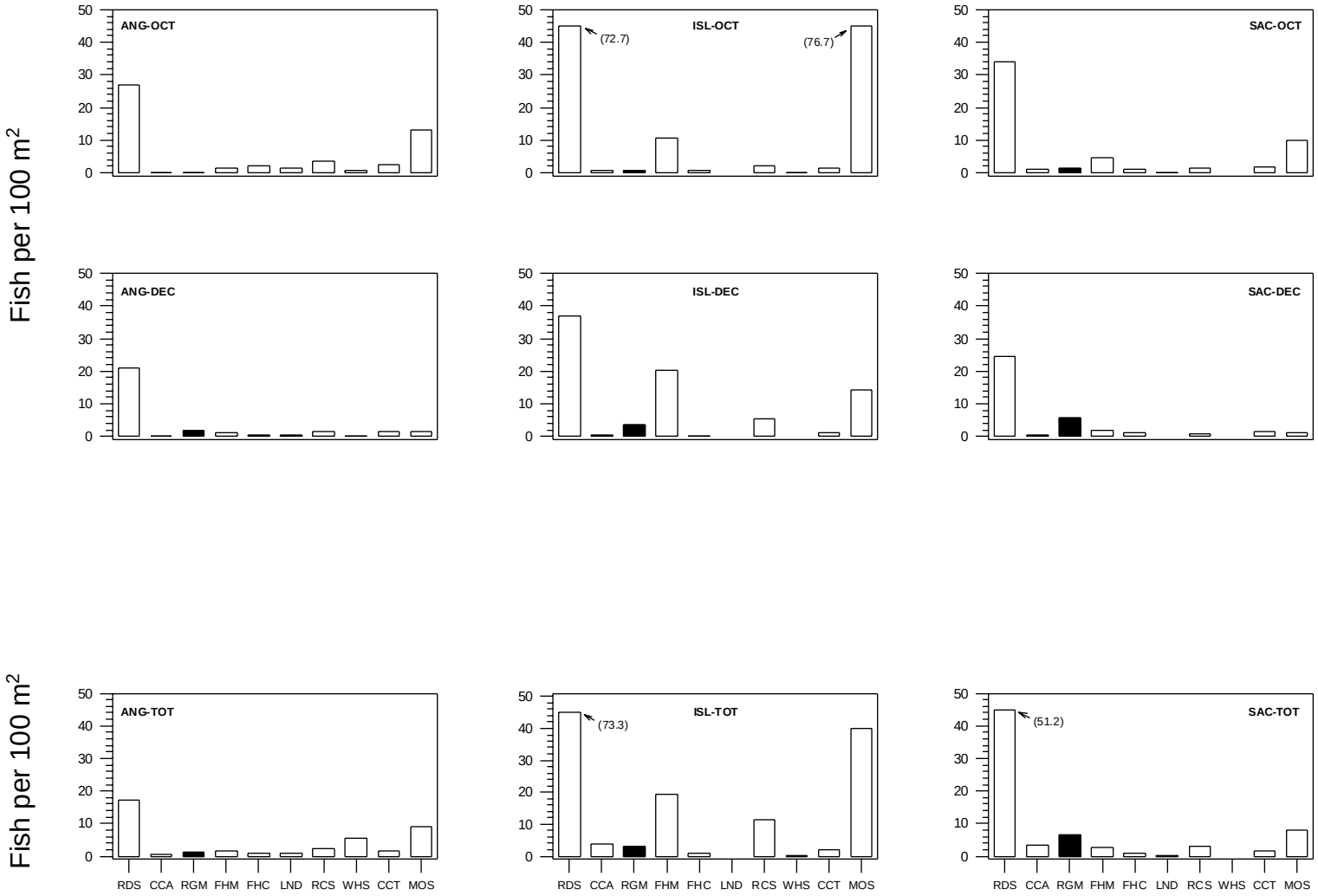

Figure 11. Fish catch rates (CPUE) by river reach for October, December, and annual total for 2001 for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande (ANG=Angostura, ISL=Isleata, and SAC=San Acacia). Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

white sucker, and western mosquitofish in the Angostura Reach increased during June but declined by October. River carpsucker, channel catfish, and western mosquitofish were most abundant during August and October but declined by December.

Fish catch rates in the Isleta Reach, like those in the Angostura Reach, also peaked from June through October. Fathead minnow and common carp were quite abundant by the June sampling foray. Rio Grande silvery minnow abundance in the Isleta Reach was low throughout the year but individuals were regularly collected. Peak densities for western mosquitofish occurred in August and October. Red shiner was collected at relatively high densities throughout the year. Channel catfish were most abundant in the August sampling foray.

The relative abundance of red shiner in the San Acacia Reach remained high from February through June but declined by August and remained lower in October and December. Rio Grande silvery minnow catch rates in the San Acacia Reach were notably higher than in the Angostura or Isleta reaches throughout the year. There was a peak in density in June following higher spring flows that triggered spawning in May. Numbers of Rio Grande silvery minnow were lower by October and December of 2001. Densities of other species (common carp, fathead minnow, river carpsucker, and western mosquitofish) also peaked in June 2001. The only species to increase its densities in August was channel catfish.

DISCUSSION

The annual reproductive effort of Rio Grande silvery minnow occurs during spring and is initiated, in part, by increases in stream discharge. The reproductive strategy of this species results in the production of large quantities of eggs that are released into the water column and dispersed downstream. Spring runoff (from high mountain snowmelt) combined with increasing water temperatures was likely the historical source of this reproductive stimulus. During years of sufficient snowpack, flow through the Middle Rio Grande peaked in the spring and often remained continuous throughout the remainder of the year.

However, dams and reservoirs now moderate the magnitude, amplitude, and duration of spring discharge. Water is also drawn from the river for agricultural purposes which can substantially reduce the total volume of water that would have normally flowed through the Rio Grande. This problem is further compounded in drought years when large quantities of water are removed from the Rio Grande for irrigation in the early spring often drying the river in certain areas or absorbing the peak flows that result in spawning.

Low precipitation in combination with river diversions resulted in a steady and extended period of low flow throughout 2000. Reduced spring flows in 2000 appeared to result in decreases in the spawning effort and success of Rio Grande silvery minnow. Spring flows during 2000 were greatly reduced in magnitude and duration because of the lack of snowpack. The lack of base flows during this period of the year when Rio Grande silvery minnow are physiologically ready to spawn appears to have greatly reduced their likelihood of reproductive success. It is possible that Rio Grande silvery minnow did not spawn because of the lack of a strong environmental cue, resorbed their eggs, or spawned eggs that were subjected to biotic or physical conditions that precluded their successful growth and survivorship. The lack of studies monitoring the reproductive effort of Rio Grande silvery minnow in 2000 prevents addressing the validity of any of these alternative hypotheses.

Additionally, there was a period of discontinuous flow during late July in the San Acacia Reach near San Marcial, NM that likely resulted in the loss of age-0 Rio Grande silvery minnow from those areas. The greatest densities of age-0 Rio Grande silvery minnow during 2000 were found in the lower portion of the San Acacia Reach (near San Marcial, NM) where discontinuous flow and lateral drying of the river channel were most pronounced. Although these river drying events were not

nearly of the magnitude of those seen in 1996 and 1999, their relative impact was magnified because of the extreme rarity of Rio Grande silvery minnow in 2000.

The 2001 population levels of Rio Grande silvery minnow, as determined from this monitoring effort, were higher than those recorded in 2000 throughout the Middle Rio Grande. While densities of Rio Grande silvery minnow were similar in February and April of 2000 and 2001, June catch rates of age-0 individuals were notably higher in 2001 than in 2000. This increase in abundance suggests that conditions were more suitable for spawning and successful recruitment in 2001 compared with 2000.

The primary difference in river conditions between these two years was the dramatic difference in the timing, magnitude, and duration of spring flows. In late March and early April of 2000 and 2001, flows increased to over 1,000 cfs briefly perhaps as a result of early season warming and snowmelt. However, water temperatures during these flow increases were low and it is likely that Rio Grande silvery minnow were not physiologically prepared to spawn at that time. Previous studies of the reproductive timing of Rio Grande silvery minnow suggest that early season spawning (i.e., late March-early April) results in a very small fraction of the total spawning effort. It appears that this species generally becomes more likely to spawn by May or early June when the rise in ambient temperatures results in increased snowmelt and higher river flows. Spring flows in 2000 never peaked during May or June because of the low amount of snowpack and the diversion of much of the water that was available in the river for agriculture. In contrast, spring flows during 2001 peaked to over 2,000 cfs during May and apparently provided a strong spawning stimulus for Rio Grande silvery minnow. Efforts to document the spawning periodicity and salvage the eggs of Rio Grande silvery minnow in 2001 demonstrated that over 98% of the reproductive effort arrived over a three day period in early May following a rise in river flows and water temperatures (Platania and Dudley, 2002).

Despite an apparently stronger spawning response by Rio Grande silvery minnow in 2001 than in recent years, the overall densities of this species in October and December were at levels that were only slightly higher than those recorded in 2000 and lower than those recorded in 1999. The primary difference between these years was that Rio Grande silvery minnow were more regularly collected at established sites in the Angostura and Isleta reaches in 2001 than in either 1999 or 2000. The strength of the these patterns will become more apparent by 2002.

The increased abundance of Rio Grande silvery minnow in upstream reaches of the Middle Rio Grande in 2001 either suggests that there was a stronger spawning response or that those eggs that were spawned hatched successfully and survived in their natal reach. A stronger spawning response in 2001 than in 2000 might have been triggered by increased flows during May-June and warm water temperatures. However, previous years (i.e., 1997, 1998, and 1999) with high sustained spring flows that often exceeded 3,500 cfs did not result in increased abundance of Rio Grande silvery minnow in upstream reaches. A strong spawning response would have been expected during these years but it is unclear if that's what actually occurred.

It is possible that recent higher spring flow years (1997, 1998, and 1999) triggered spawning but resulted in greater downstream displacement of the Rio Grande silvery minnow eggs and larvae than in the lower spring flows of 2001. Higher flows in the degraded channel of the Rio Grande likely result in a general decrease in habitat heterogeneity, an increase in mean water velocity, and a reduction in low velocity habitats. Empirical data from the Pecos River, NM have demonstrated that sustained high flow through a moderately narrow river channel will result in a relatively rapid and effective downstream displacement of drifting eggs and larvae (Dudley and Platania, 2000). The duration of spring high flows was also much longer in 1997, 1998, and 1999 than in 2001 which may have further contributed to increased displacement of developing Rio Grande silvery minnow. Although increased numbers of Rio Grande silvery minnow in the Angostura Reach in 2001 is encouraging, the continued presence of diversion dams, ditches, and levees which hinder natural river processes will likely continue to limit upstream populations.

Despite higher spring flows in 2001, there were still periods of river drying that occurred during the summer when flows were greatly reduced. Supplemental water was pumped from the Low Flow Conveyance Channel to keep the Rio Grande wet but there were several documented (Jude R. Smith [USFWS-Albuquerque] pers. comm.) and likely other undocumented, instances where flow became discontinuous. The first documented river drying event occurred on 14 July 2001 when about 2.5 miles (4.0 km) of the river channel dried just south of the San Marcial Railroad Bridge. A second drying event (26 July 2001) resulted in limited river drying just north of the Fort Craig Pumping Station. The final documented river drying event occurred on 10 September 2001 when a 5.6 mile (9.0 km) reach of the river from the middle to the southern portion of the Bosque del Apache National Wildlife Refuge dried. These stream drying events result in immediate losses of aquatic organisms despite their short duration. Impacts from previous stream drying events are reflected in the currently low population densities of Rio Grande silvery minnow in the San Acacia Reach.

Major factors in the decline in Rio Grande silvery minnow abundance in the Angostura Reach appear to be the fragmentation of their range and longitudinal displacement of their propagules (drifting eggs and larvae) below the instream barriers of Isleta Diversion Dam and San Acacia Diversion Dam. These channel-wide structures do not preclude downstream passage of fish or their reproductive products but do prevent fish movement upstream of the diversion dam structures. Given the reproductive ecology of this species, reach lengths, and diversion dam placement, the sequential decline and loss of this species from upstream to downstream was predicted (Platania and Altenbach, 1998). The fragmentation of this species range in the Middle Rio Grande as a result of Angostura, Isleta, and San Acacia diversion dams has been identified as an issue of paramount importance that requires resolution for recovery of Rio Grande silvery minnow (U.S. Fish and Wildlife Service, 1999).

The Isleta Reach is an intermediate reach, not only in geographic position but also in regards to flow. This reach does not maintain the volume or consistency of discharge as the Angostura Reach but, because of the numerous points of irrigation returns, has had an increased likelihood of maintaining some continuous flow compared to the San Acacia Reach. Issues regarding range fragmentation and downstream transport of silvery minnow propagules in the Angostura Reach are equally as important in the Isleta Reach. Declines in the Angostura Reach Rio Grande silvery minnow population will result in fewer eggs and larvae being transported into the Isleta Reach and will thereby negatively affect population levels in the latter reach. Likewise, fewer individuals in the Isleta and Angostura reaches will likely result in lower Rio Grande silvery minnow populations in the San Acacia Reach.

The barrier to upstream movement imposed by San Acacia Diversion Dam and downstream transport of silvery minnow eggs and larvae (especially those produced in the San Acacia Reach) into Elephant Butte Reservoir continue to adversely impact the San Acacia Reach population of this species. The effects of these problems accumulate over time and become especially critical during periods when densities of individuals are extremely low, as was seen in 2000. Efforts to maintain flow throughout the Middle Rio Grande in 2002 are of critical importance as substantial losses of Rio Grande silvery minnow from the San Acacia Reach could potentially result in the extirpation of this species from the wild.

The cumulative effects of years of river drying, downstream displacement, and habitat degradation continue to lead to the further decline of Rio Grande silvery minnow. While modest increases in densities of Rio Grande silvery minnow in 2001 are a good indication, the problems that led to the precipitous decline of this species have not been remedied. The removal of instream barriers that prevent Rio Grande silvery minnow from reaching upstream reaches, the need to maintain flow throughout downstream reaches, and restoration and reconnection of the historical floodplain are paramount issues that need to be resolved to assure the continued persistence of this species.

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Table A-1. Collection localities for 2001 population monitoring of Rio Grande silvery minnow.

Site #	Site Locality
	ANGOSTURA REACH SITES
0	New Mexico, Sandoval County, Rio Grande, directly below Angostura Diversion Dam, Angostura. River Mile 209.7 SAN FELIPE PUEBLO QUADRANGLE UTM Easting: 363811 UTM Northing: 3916006 Zone: 13
1	New Mexico, Sandoval County, Rio Grande, at NM State Highway 44 bridge crossing, Bernalillo. River Mile 203.8 BERNALILLO QUADRANGLE UTM Easting: 358543 UTM Northing: 3909722 Zone: 13
2	New Mexico, Sandoval County, Rio Grande, ca. 4.0 miles downstream of NM State Highway 44 bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho. River Mile 200.0 BERNALILLO QUADRANGLE UTM Easting: 354772 UTM Northing: 3905355 Zone: 13
3	New Mexico, Bernalillo County, Rio Grande, at Central Avenue bridge crossing (US Highway 66), Albuquerque. River Mile 183.4 ALBUQUERQUE WEST QUADRANGLE UTM Easting: 346840 UTM Northing: 3884094 Zone: 13
4	New Mexico, Bernalillo County, Rio Grande, at Rio Bravo Boulevard bridge crossing, (NM State Highway 500), Albuquerque. River Mile 178.3 ALBUQUERQUE WEST QUADRANGLE UTM Easting: 347554 UTM Northing: 3877163 Zone: 13
	ISLETA REACH SITES
5	New Mexico, Valencia County, Rio Grande at Los Lunas bridge crossing (NM State Highway 49), Los Lunas. River Mile 161.4 LOS LUNAS QUADRANGLE UTM Easting: 342898 UTM Northing: 3852531 Zone: 13
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 UTM Easting: 339972 UTM Northing: 3837061 Zone: 13

Table A-1 (continued.). Collection localities for 2001 population monitoring of Rio Grande silvery minnow.

Site #	Site Locality
	ISLETA REACH SITES
7	New Mexico, Valencia County, Rio Grande, ca. 2.2 miles upstream of NM State Highway 346 bridge crossing, Jarales. River Mile 143.2 VEGUITA QUADRANGLE UTM Easting: 338136 UTM Northing: 3827329 Zone: 13
8	New Mexico, Socorro County, Rio Grande, at US Highway 60 bridge crossing, Bernardo. River Mile 130.6 ABEYTAS QUADRANGLE UTM Easting: 334604 UTM Northing: 3809726 Zone: 13
9	New Mexico, Socorro County, Rio Grande, ca. 3.5 miles downstream of US Highway 60 bridge crossing, Bernardo. River Mile 127.0 ABEYTAS QUADRANGLE UTM Easting: 331094 UTM Northing: 3805229 Zone: 13
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 UTM Easting: 327902 UTM Northing: 3792603 Zone: 13
	SAN ACACIA REACH SITES
10	New Mexico, Socorro County, Rio Grande, directly below San Acacia Diversion Dam, San Acacia. River Mile 116.2 SAN ACACIA QUADRANGLE UTM Easting: 326162 UTM Northing: 3791977 Zone: 13
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 UTM Easting: 325263 UTM Northing: 3790442 Zone: 13
12	New Mexico, Socorro County, Rio Grande, east of Socorro, 0.5 miles upstream of the Socorro Low Flow Conveyance Channel bridge; east and upstream of Socorro Wastewater Treatment Plant, Socorro. River Mile 99.5 LOMA DE LAS CANAS QUADRANGLE UTM Easting: 327097 UTM Northing: 3771043 Zone: 13

Table A-1 (continued.). Collection localities for 2001 population monitoring of Rio Grande silvery minnow.

Site #	Site Locality

SAN ACACIA REACH SITES

13 New Mexico, Socorro County, Rio Grande, ca. 4.0 miles upstream of US Highway 380 bridge crossing.
River Mile 91.7 SAN ANTONIO QUADRANGLE
UTM Easting: 328140 UTM Northing: 3761283 Zone: 13

14 New Mexico, Socorro County, Rio Grande, at US Highway 380 bridge crossing, San Antonio.
River Mile 87.1 SAN ANTONIO QUADRANGLE
UTM Easting: 328914 UTM Northing: 3754471 Zone: 13

15 New Mexico, Socorro County, Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters.
River Mile 79.1 SAN ANTONIO, SE QUADRANGLE
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13

16 New Mexico, Socorro County, Rio Grande, at San Marcial Railroad bridge crossing, San Marcial.
River Mile 68.6 SAN MARCIAL QUADRANGLE
UTM Easting: 315284 UTM Northing: 3728347 Zone: 13

17 New Mexico, Socorro County, Rio Grande, at its former confluence with the Low Flow Conveyance Channel; 16 miles downstream of the southern end of the Bosque del Apache National Wildlife Refuge; ca. 8 miles downstream of San Marcial Railroad bridge crossing.
River Mile 60.5 PARAJE WELL QUADRANGLE
UTM Easting: 309487 UTM Northing: 3718178 Zone: 13

18 New Mexico, Socorro County, Rio Grande, ca. 19 miles downstream of the southern end of the Bosque del Apache National Wildlife Refuge.
River Mile 57.7 PARAJE WELL QUADRANGLE
UTM Easting: 307380 UTM Northing: 3714740 Zone: 13

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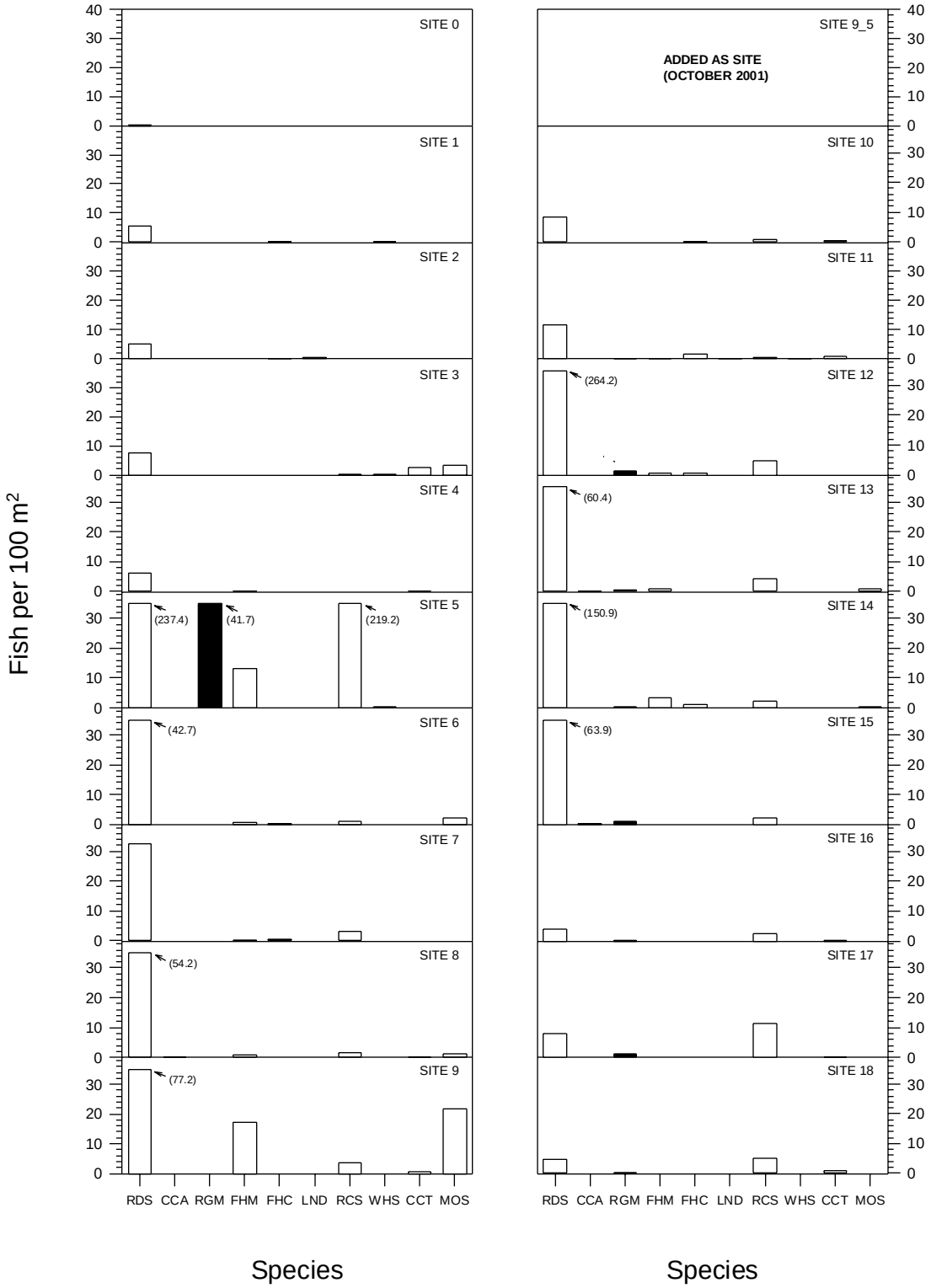

Figure A-1. Fish catch rates (CPUE) by collection locality for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande for February of 2001. Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

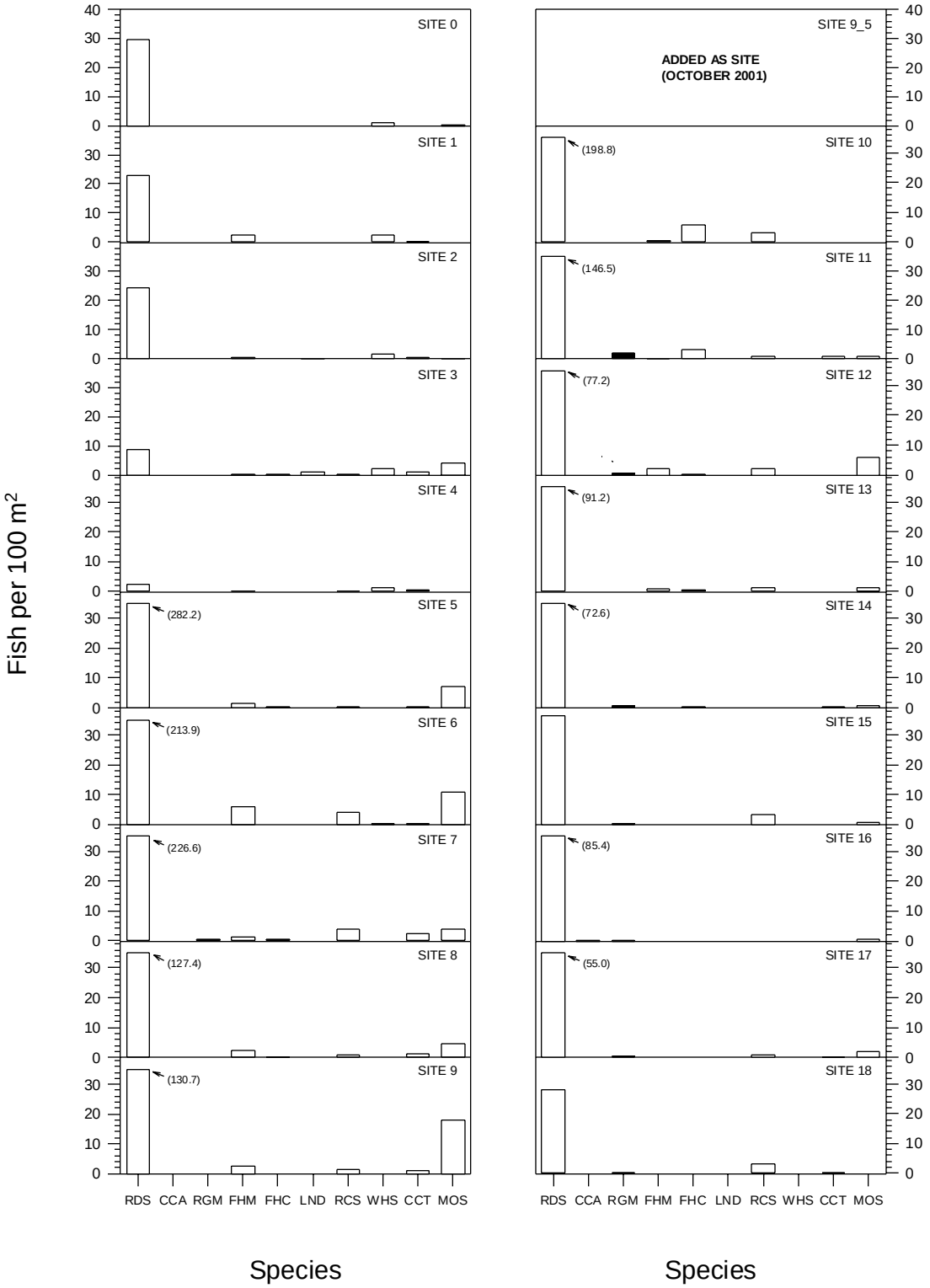

Figure A-2. Fish catch rates (CPUE) by collection locality for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande for April of 2001. Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

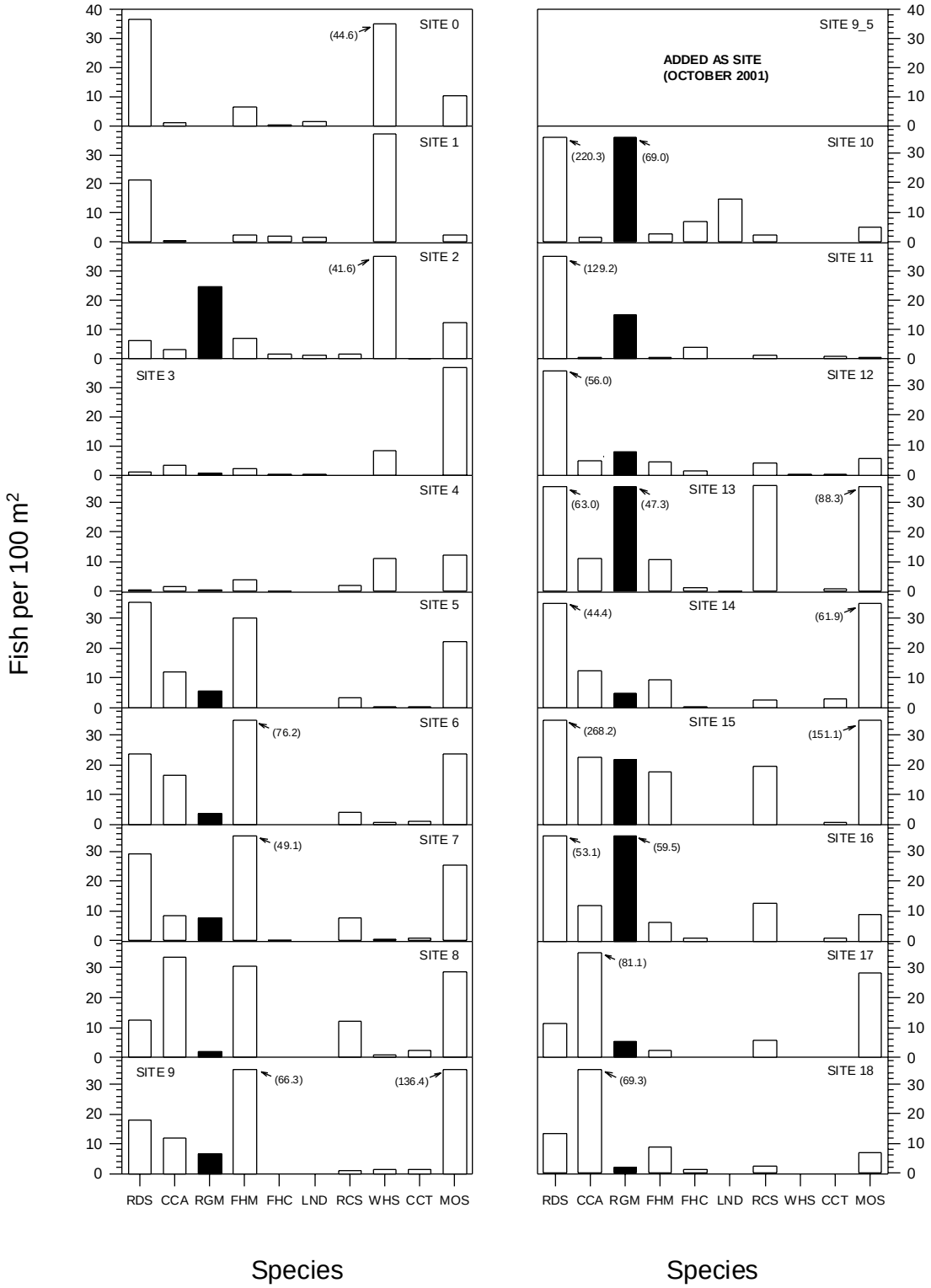

Figure A-3. Fish catch rates (CPUE) by collection locality for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande for June of 2001. Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

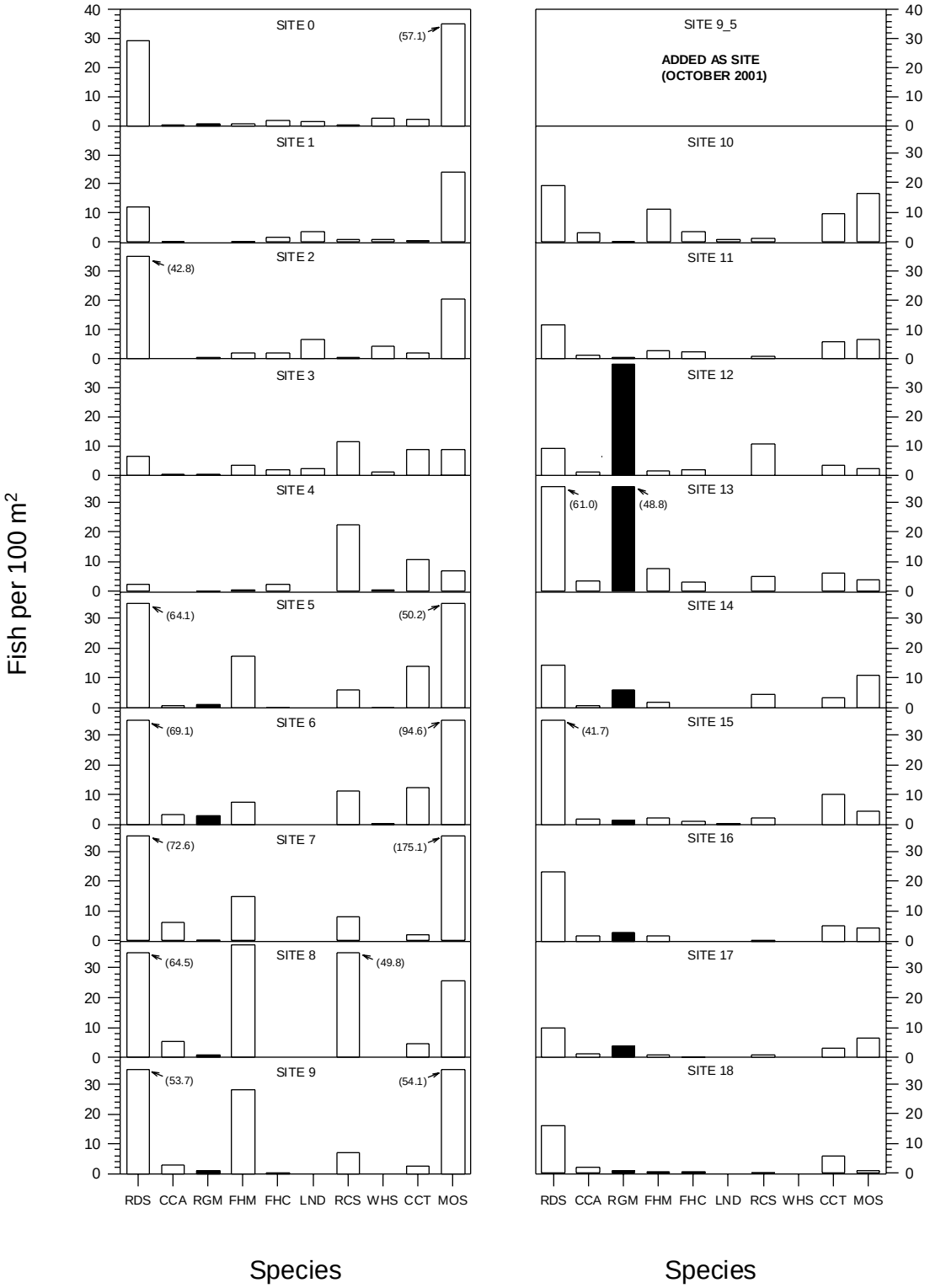

Figure A-4. Fish catch rates (CPUE) by collection locality for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande for August of 2001. Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

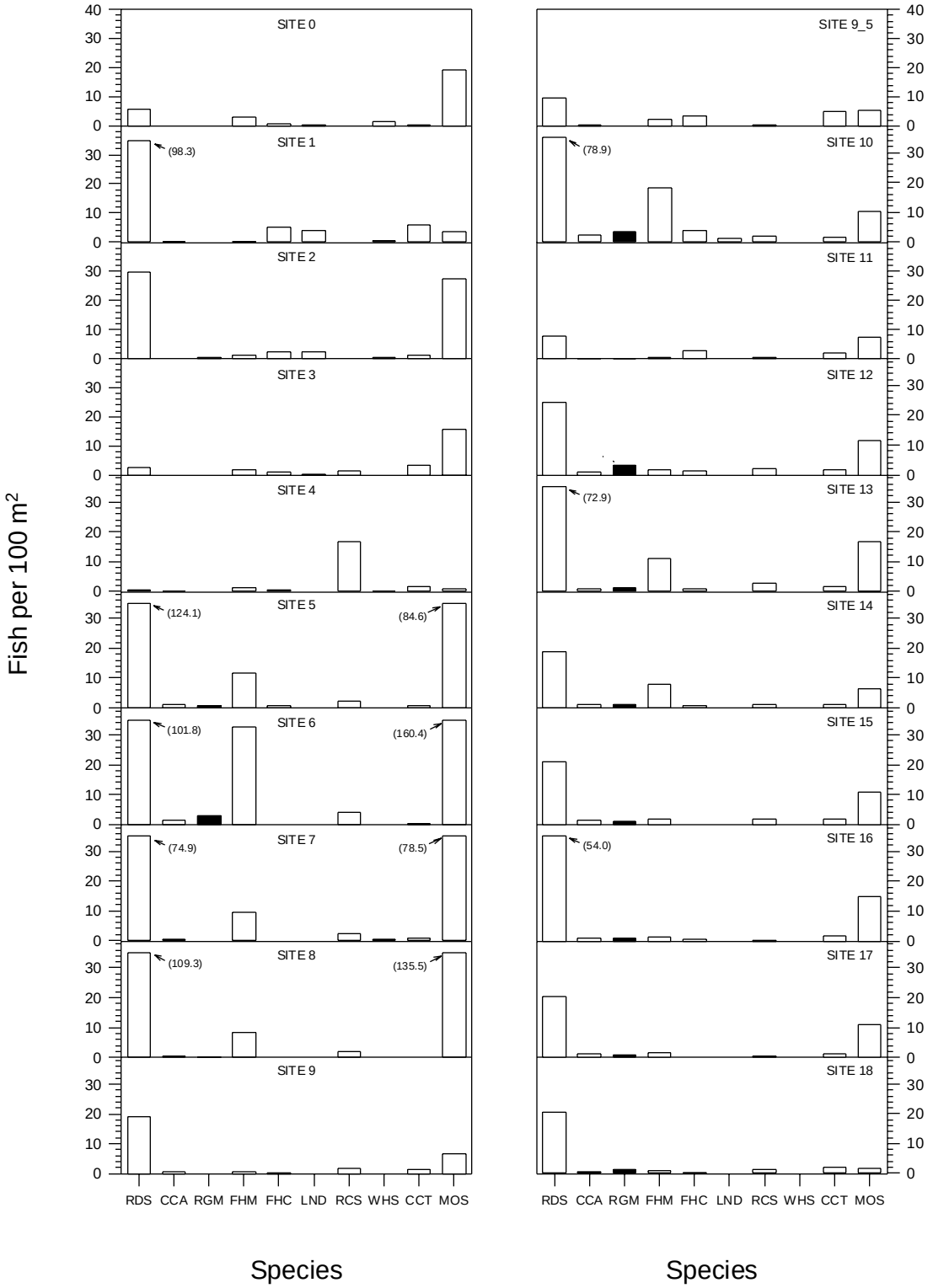

Figure A-5. Fish catch rates (CPUE) by collection locality for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande for October of 2001. Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

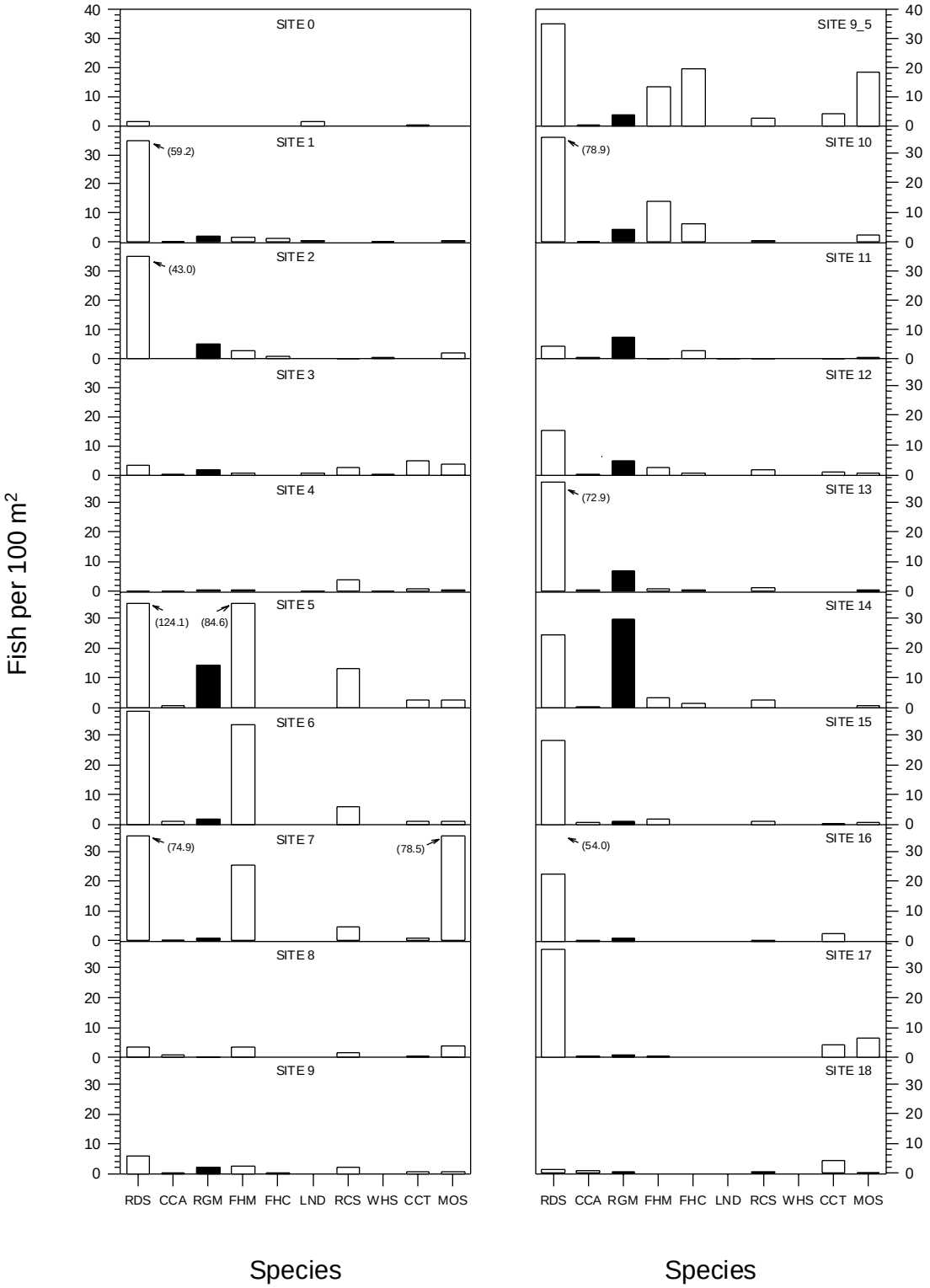

Figure A-6. Fish catch rates (CPUE) by collection locality for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande for December of 2001. Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

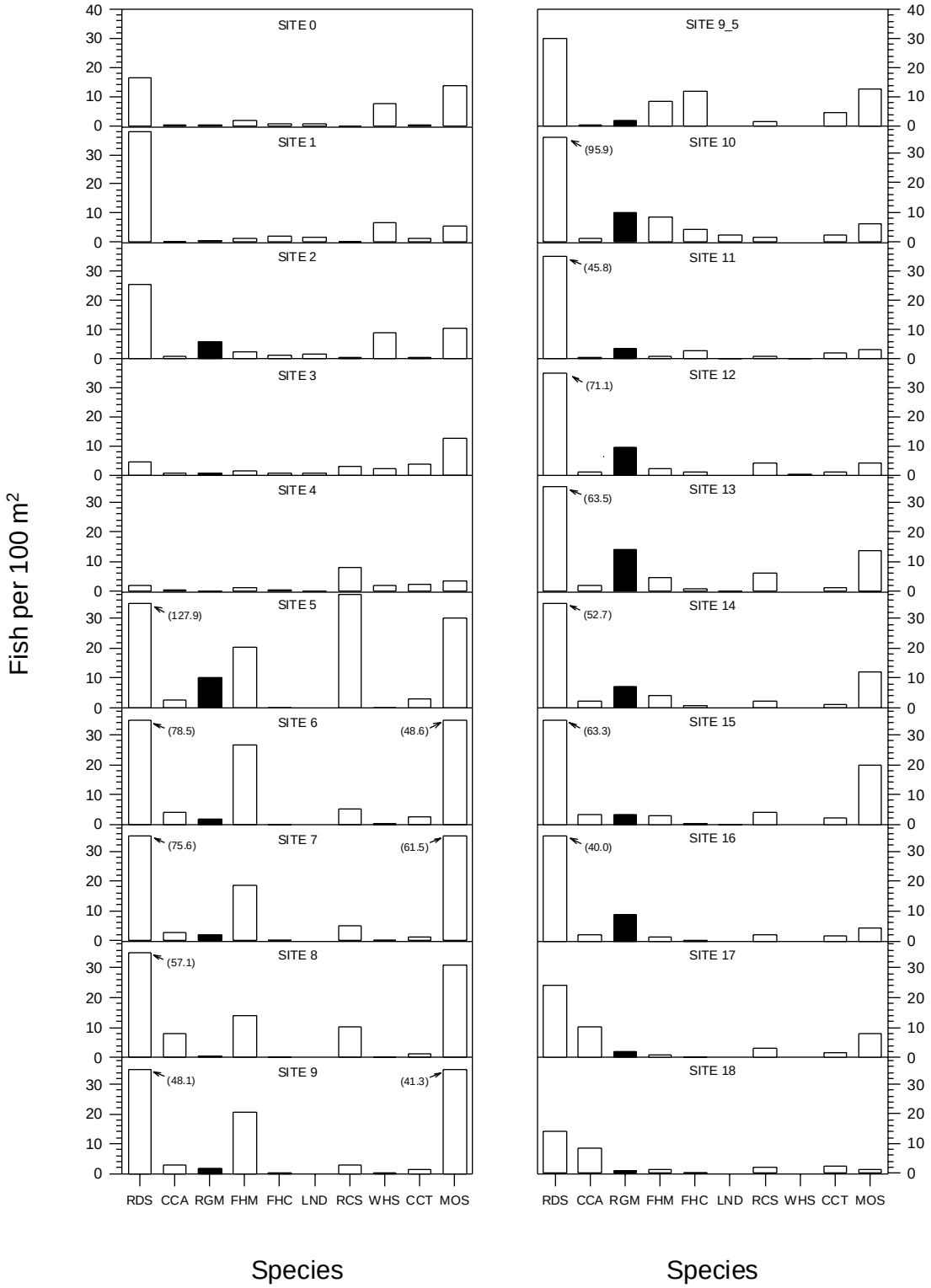

Figure A-7. Fish catch rates (CPUE) by collection locality for each focal species (see Table 1 for species abbreviations) in the Middle Rio Grande for all of 2001. Histogram bar for Rio Grande silvery minnow (RGM) is black to highlight this species.

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Appendix B.
Ichthyofaunal composition of the 2001 Rio Grande silvery minnow population monitoring collections

FEBRUARY

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, directly below Angostura Diversion Dam, Angostura. SITE NUMBER: 0
22 February 2001 **SPP01-034** RIVER MILE: 209.7
M.A. Farrington, D.E. Gibson, and W.H. Brandenburg EFFORT: 609.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, at NM State HWY 44 bridge crossing, Bernalillo. SITE NUMBER: 1
22 February 2001 **SPP01-035** RIVER MILE: 203.8
W.H. Brandenburg, M.A. Farrington, and D.E. Gibson EFFORT: 567.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	32
76	*Platygobio gracilis*	1
81	*Catostomus commersoni*	1
143	*Salmo trutta*	1

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, ca. 4.0 miles downstream of NM State HWY 44 bridge, at Rio Rancho Wastewater Treatment Plant, Rio Rancho. SITE NUMBER: 2
22 February 2001 **SPP01-036** RIVER MILE: 200.0
W.H. Brandenburg, M.A. Farrington, and D.E. Gibson EFFORT: 609.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	31
76	*Platygobio gracilis*	1
76	*Rhinichthys cataractae*	

New Mexico: Bernalillo Co., Rio Grande Drainage
Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque. SITE NUMBER: 3
23 February 2001 **SPP01-038** RIVER MILE: 183.4
R.K. Dudley, M.A. Farrington, and D.E. Gibson EFFORT: 494.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	38
81	*Carpiodes carpio*	1
81	*Catostomus commersoni*	1
93	*Ameiurus natalis*	1
93	*Ictalurus punctatus*	12
212	*Gambusia affinis*	17

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

New Mexico: Bernalillo Co., Rio Grande Drainage
Rio Grande, at Rio Bravo Blvd. bridge crossing (NM State HWY 500), Albuquerque. SITE NUMBER: 4
23 February 2001 **SPP01-037** RIVER MILE: 178.3
R.K. Dudley, M.A. Farrington, and D.E. Gibson EFFORT: 572.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	36
76	*Pimephales promelas*	1
93	*Ictalurus punctatus*	1

New Mexico: Valencia Co., Rio Grande Drainage
Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas. SITE NUMBER: 5
27 February 2001 **SPP01-044** RIVER MILE: 161.4
W.H. Brandenburg, D.E. Gibson, and M.A. Farrington EFFORT: 590.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1401
76	*Hybognathus amarus*	246
76	*Pimephales promelas*	77
81	*Carpiodes carpio*	1294
81	*Catostomus commersoni*	2

New Mexico: Valencia Co., Rio Grande Drainage
Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales. SITE NUMBER: 6
27 February 2001 **SPP01-045** RIVER MILE: 143.2
W.H. Brandenburg, D.E. Gibson, and M.A. Farrington EFFORT: 536.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	174
76	*Pimephales promelas*	2
76	*Platygobio gracilis*	3
81	*Carpiodes carpio*	16

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: 7
22 February 2001 **SPP01-032** RIVER MILE: 151.5
M.A. Farrington, D.E. Gibson, and W.H. Brandenburg EFFORT: 655.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	280
76	*Pimephales promelas*	4
76	*Platygobio gracilis*	2
81	*Carpiodes carpio*	5
212	*Gambusia affinis*	14

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

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 8
22 February 2001 **SPP01-033** RIVER MILE: 130.6
W.H. Brandenburg, D.E. Gibson, and M.A. Farrington EFFORT: 727.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	393
76	*Cyprinus carpio*	1
76	*Pimephales promelas*	7
81	*Carpiodes carpio*	11
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	9

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
27 February 2001 **SPP01-046** RIVER MILE: 127.0
W.H. Brandenburg, M.A. Farrington, and D.E. Gibson EFFORT: 742.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	593
76	*Pimephales promelas*	131
81	*Carpiodes carpio*	27
93	*Ictalurus punctatus*	4
212	*Gambusia affinis*	166

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, directly below San Acacia Diversion Dam, San Acacia. SITE NUMBER: 10
26 February 2001 **SPP01-043** RIVER MILE: 116.2
R.K. Dudley, W.H. Brandenburg, and M.A. Farrington EFFORT: 399.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	33
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	3
93	*Ictalurus punctatus*	2

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

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia. SITE NUMBER: 11
26 February 2001 **SPP01-042** RIVER MILE: 114.6
R.K. Dudley and W.H. Brandenburg EFFORT: 634.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	73
76	*Hybognathus amarus*	1
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	11
76	*Rhinichthys cataractae*	1
81	*Carpiodes carpio*	3
81	*Catostomus commersoni*	1
93	*Ictalurus punctatus*	4

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, east of Socorro, 0.5 miles upstream of Socorro Low Flow Conveyance Channel Bridge; east and just upstream of Socorro Wastewater Treatment Plant, Socorro. SITE NUMBER: 12
26 February 2001 **SPP01-041** RIVER MILE: 99.5
R.K. Dudley, W.H. Brandenburg, and M.A. Farrington EFFORT: 669.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1768
76	*Hybognathus amarus*	8
76	*Pimephales promelas*	5
76	*Platygobio gracilis*	5
81	*Carpiodes carpio*	32
294	*Pomoxis annularis*	1

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, ca. 4.0 miles upstream of the US HWY 380 bridge crossing. SITE NUMBER: 13
26 February 2001 **SPP01-040** RIVER MILE: 91.7
R.K. Dudley, W.H. Brandenburg, and M.A. Farrington EFFORT: 735.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	444
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	4
76	*Pimephales promelas*	5
81	*Carpiodes carpio*	30
212	*Gambusia affinis*	6

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

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at US HWY 380 bridge crossing, San Antonio. SITE NUMBER: 14
26 February 2001 **SPP01-039** RIVER MILE: 87.1
R.K. Dudley, W.H. Brandenburg, and M.A. Farrington EFFORT: 613.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	926
76	*Hybognathus amarus*	2
76	*Pimephales promelas*	20
76	*Platygobio gracilis*	6
81	*Carpiodes carpio*	13
212	*Gambusia affinis*	1

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters. SITE NUMBER: 15
21 February 2001 **SPP01-031** RIVER MILE: 79.1
R.K. Dudley, W.H. Brandenburg, and M.A. Farrington EFFORT: 649.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	414
76	*Cyprinus carpio*	2
76	*Hybognathus amarus*	6
81	*Carpiodes carpio*	13

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at San Marcial Railroad Bridge, San Marcial. SITE NUMBER: 16
21 February 2001 **SPP01-030** RIVER MILE: 68.6
R.K. Dudley, W.H. Brandenburg, and M.A. Farrington EFFORT: 732.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	30
76	*Hybognathus amarus*	2
81	*Carpiodes carpio*	18
93	*Ictalurus punctatus*	1

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

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, at (former) confluence with the low flow conveyance channel, 16.0 miles downstream of southern end of Bosque del Apache National Wildlife Refuge. SITE NUMBER: 17

21 February 2001 **SPP01-029** RIVER MILE: 60.5

R.K. Dudley, W.H. Brandenburg, and M.A. Farrington EFFORT: 662.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	52
76	*Hybognathus amarus*	7
81	*Carpiodes carpio*	75
93	*Ictalurus punctatus*	1
294	*Pomoxis annularis*	18

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 19.0 miles downstream of the southern end of Bosque del Apache National Wildlife Refuge SITE NUMBER: 18

21 February 2001 **SPP01-027** RIVER MILE: 57.7

R.K. Dudley, W.H. Brandenburg, and M.A. Farrington EFFORT: 602.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	29
76	*Hybognathus amarus*	1
81	*Carpiodes carpio*	30
93	*Ictalurus punctatus*	4

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

APRIL

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, directly below Angostura Diversion Dam, Angostura. SITE NUMBER: 0
25 April 2001 **SPP01-057** RIVER MILE: 209.7
R.K. Dudley and M.A. Farrington EFFORT: 626.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	186
81	*Catostomus commersoni*	6
212	*Gambusia affinis*	1

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, at NM State HWY 44 bridge crossing, Bernalillo. SITE NUMBER: 1
25 April 2001 **SPP01-058** RIVER MILE: 203.8
R.K. Dudley and M.A. Farrington EFFORT: 462.4 m^2

FAMILY		N
76	*Cyprinella lutrensis*	106
76	*Pimephales promelas*	11
81	*Catostomus commersoni*	12
93	*Ictalurus punctatus*	1

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, ca. 4.0 miles downstream of NM State HWY 44 bridge, at Rio Rancho Wastewater Treatment Plant, Rio Rancho. SITE NUMBER: 2
25 April 2001 **SPP01-059** RIVER MILE: 200.0
R.K. Dudley and M.A. Farrington EFFORT: 552.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	135
76	*Pimephales promelas*	2
76	*Rhinichthys cataractae*	1
81	*Catostomus commersoni*	9
93	*Ictalurus punctatus*	2
212	*Gambusia affinis*	1

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

New Mexico: Bernalillo Co., Rio Grande Drainage
Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque. SITE NUMBER: 3
25 April 2001 **SPP01-060** RIVER MILE: 183.4
R.K. Dudley and M.A. Farrington EFFORT: 563.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	50
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	1
76	*Rhinichthys cataractae*	5
81	*Carpiodes carpio*	1
81	*Catostomus commersoni*	12
93	*Ictalurus punctatus*	5
212	*Gambusia affinis*	23

New Mexico: Bernalillo Co., Rio Grande Drainage
Rio Grande, at Rio Bravo Blvd. bridge crossing (NM State HWY 500), Albuquerque. SITE NUMBER: 4
25 April 2001 **SPP01-061** RIVER MILE: 178.3
R.K. Dudley and M.A. Farrington EFFORT: 643.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	16
76	*Pimephales promelas*	1
81	*Carpiodes carpio*	1
81	*Catostomus commersoni*	9
93	*Ictalurus punctatus*	3

New Mexico: Valencia Co., Rio Grande Drainage
Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas. SITE NUMBER: 5
26 April 2001 **SPP01-062** RIVER MILE: 161.4
R.K. Dudley and M.A. Farrington EFFORT: 462.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1305
76	*Pimephales promelas*	7
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	2
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	33

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

New Mexico: Valencia Co., Rio Grande Drainage
Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales. SITE NUMBER: 6
26 April 2001 **SPP01-064** RIVER MILE: 143.2
R.K. Dudley and M.A. Farrington EFFORT: 453.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1027
76	*Hybognathus amarus*	2
76	*Pimephales promelas*	6
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	17
93	*Ictalurus punctatus*	10
212	*Gambusia affinis*	17

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: 7
26 April 2001 **SPP01-063** RIVER MILE: 151.5
R.K. Dudley and M.A. Farrington EFFORT: 570.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1321
76	*Pimephales promelas*	34
81	*Carpiodes carpio*	23
81	*Catostomus commersoni*	1
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	62

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, ca. 3.5 miles downstream of the US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 8
26 April 2001 **SPP01-065** RIVER MILE: 127.0
R.K. Dudley and M.A. Farrington EFFORT: 575.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	752
76	*Pimephales promelas*	15
81	*Carpiodes carpio*	8
93	*Ictalurus punctatus*	5
212	*Gambusia affinis*	104

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

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 9
26 April 2001 **SPP01-066** RIVER MILE: 130.6
R.K. Dudley and M.A. Farrington EFFORT: 609.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	776
76	*Pimephales promelas*	15
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	5
93	*Ictalurus punctatus*	7
212	*Gambusia affinis*	28

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, directly below San Acacia Diversion Dam, San Acacia. SITE NUMBER: 10
01 May 2001 **SPP01-076** RIVER MILE: 116.2
M.A. Farrington and D.E. Gibson EFFORT: 541.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1077
76	*Pimephales promelas*	2
76	*Platygobio gracilis*	32
81	*Carpiodes carpio*	16

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia. SITE NUMBER: 11
01 May 2001 **SPP01-075** RIVER MILE: 114.6
M.A. Farrington and D.E. Gibson EFFORT: 611.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	896
76	*Hybognathus amarus*	12
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	20
81	*Carpiodes carpio*	4
93	*Ictalurus punctatus*	4
212	*Gambusia affinis*	4

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

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, east of Socorro, 0.5 miles upstream of Socorro Low Flow Conveyance Channel Bridge; east and just upstream of Socorro Wastewater Treatment Plant, Socorro. SITE NUMBER: 12

01 May 2001 **SPP01-074** RIVER MILE: 99.5

M.A. Farrington and D.E. Gibson EFFORT: 665.5 m^2

FAMILY		N
69	*Dorosoma cepedianum*	1
76	*Cyprinella lutrensis*	514
76	*Hybognathus amarus*	4
76	*Pimephales promelas*	14
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	14
212	*Gambusia affinis*	39

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 4.0 miles upstream of the US HWY 380 bridge crossing. SITE NUMBER: 13

01 May 2001 **SPP01-073** RIVER MILE: 91.7

M.A. Farrington and D.E. Gibson EFFORT: 702.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	641
76	*Pimephales promelas*	7
76	*Platygobio gracilis*	4
81	*Carpiodes carpio*	9
212	*Gambusia affinis*	10

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, at US HWY 380 bridge crossing, San Antonio. SITE NUMBER: 14

01 May 2001 **SPP01-072** RIVER MILE: 87.1

M.A. Farrington and D.E. Gibson EFFORT: 552.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	401
76	*Hybognathus amarus*	3
76	*Platygobio gracilis*	2
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	4

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

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters. SITE NUMBER: 15

01 May 2001 **SPP01-071** RIVER MILE: 79.1

M.A. Farrington and D.E. Gibson EFFORT: 604.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	220
76	*Hybognathus amarus*	1
81	*Carpiodes carpio*	19
212	*Gambusia affinis*	3

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, at San Marcial Railroad Bridge, San Marcial. SITE NUMBER: 16

30 April 2001 **SPP01-070** RIVER MILE: 68.6

W.H. Brandenburg, M.A. Farrington, and D.E. Gibson EFFORT: 723.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	618
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	2
212	*Gambusia affinis*	5

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, at (former) confluence with the low flow conveyance channel, 16.0 miles downstream of southern end of Bosque del Apache National Wildlife Refuge. SITE NUMBER: 17

30 April 2001 **SPP01-069** RIVER MILE: 60.5

W.H. Brandenburg, M.A. Farrington, and D.E. Gibson EFFORT: 622.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	342
76	*Hybognathus amarus*	2
81	*Carpiodes carpio*	6
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	13

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

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 19.0 miles downstream of the southern end of Bosque del Apache National Wildlife Refuge — SITE NUMBER: 18

30 April 2001 **SPP01-067** — RIVER MILE: 57.7

W.H. Brandenburg, M.A. Farrington, and D.E. Gibson — EFFORT: 746.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	209
76	*Hybognathus amarus*	1
81	*Carpiodes carpio*	24
93	*Ictalurus punctatus*	1

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

JUNE

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, directly below Angostura Diversion Dam, Angostura. SITE NUMBER: 0
26 June 2001 **SPP01-078** RIVER MILE: 209.7
W.H. Brandenburg, M.A. Farrington, and T.M. Emberton EFFORT: 578.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	211
76	*Cyprinus carpio*	5
76	*Pimephales promelas*	38
76	*Platygobio gracilis*	1
76	*Rhinichthys cataractae*	8
81	*Catostomus commersoni*	258
212	*Gambusia affinis*	61
283	*Morone chrysops*	125
295	*Perca flavescens*	2

New Mexico: Sandoval Co., Rio Grande Drainage
Rio Grande, at NM State HWY 44 bridge crossing, Bernalillo. SITE NUMBER: 1
26 June 2001 **SPP01-079** RIVER MILE: 203.8
W.H. Brandenburg, M.A. Farrington, and T.M. Emberton EFFORT: 579.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	123
76	*Cyprinus carpio*	3
76	*Pimephales promelas*	15
76	*Platygobio gracilis*	12
76	*Rhinichthys cataractae*	10
81	*Catostomus commersoni*	215
212	*Gambusia affinis*	14
295	*Perca flavescens*	2

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

New Mexico: Sandoval Co., Rio Grande Drainage

Rio Grande, ca. 4.0 miles downstream of NM State HWY 44 bridge, at Rio Rancho Wastewater Treatment Plant, Rio Rancho. SITE NUMBER: 2

26 June 2001 **SPP01-080** RIVER MILE: 200.0

W.H. Brandenburg, M.A. Farrington, and T.M. Emberton EFFORT: 762.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	47
76	*Cyprinus carpio*	24
76	*Hybognathus amarus*	188
76	*Pimephales promelas*	54
76	*Platygobio gracilis*	12
76	*Rhinichthys cataractae*	9
81	*Carpiodes carpio*	11
81	*Catostomus commersoni*	317
93	*Ameiurus melas*	1
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	94
283	*Morone chrysops*	1
294	*Micropterus salmoides*	1
295	*Perca flavescens*	1

New Mexico: Bernalillo Co., Rio Grande Drainage

Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque. SITE NUMBER: 3

26 June 2001 **SPP01-081** RIVER MILE: 183.4

W.H. Brandenburg, M.A. Farrington, and T.M. Emberton EFFORT: 668.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	7
76	*Cyprinus carpio*	22
76	*Hybognathus amarus*	3
76	*Pimephales promelas*	13
76	*Platygobio gracilis*	1
76	*Rhinichthys cataractae*	1
81	*Catostomus commersoni*	56
212	*Gambusia affinis*	248
294	*Micropterus salmoides*	8

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

New Mexico: Bernalillo Co., Rio Grande Drainage
Rio Grande, at Rio Bravo Blvd. bridge crossing (NM State HWY 500), Albuquerque. SITE NUMBER: 4
27 June 2001 **SPP01-082** RIVER MILE: 178.3
M.A. Farrington, T.M. Emberton, and W.H. Brandenburg EFFORT: 625.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	2
76	*Cyprinus carpio*	11
76	*Hybognathus amarus*	2
76	*Pimephales promelas*	24
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	12
81	*Catostomus commersoni*	69
93	*Ameiurus natalis*	1
212	*Gambusia affinis*	75
283	*Morone chrysops*	1
294	*Micropterus salmoides*	3
295	*Perca flavescens*	1

New Mexico: Valencia Co., Rio Grande Drainage
Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas. SITE NUMBER: 5
27 June 2001 **SPP01-083** RIVER MILE: 161.4
M.A. Farrington, T.M. Emberton, and W.H. Brandenburg EFFORT: 731.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	258
76	*Cyprinus carpio*	88
76	*Hybognathus amarus*	41
76	*Pimephales promelas*	219
81	*Carpiodes carpio*	24
81	*Catostomus commersoni*	3
93	*Ameiurus natalis*	1
93	*Ictalurus punctatus*	3
212	*Gambusia affinis*	161
294	*Micropterus salmoides*	1

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

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
27 June 2001 **SPP01-085** RIVER MILE: 143.2
M.A. Farrington, W.H. Brandenburg, and T.M. Emberton EFFORT: 680.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	199
76	*Cyprinus carpio*	58
76	*Hybognathus amarus*	53
76	*Pimephales promelas*	334
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	52
81	*Catostomus commersoni*	2
93	*Ameiurus natalis*	12
93	*Ictalurus punctatus*	6
212	*Gambusia affinis*	174
294	*Micropterus salmoides*	2

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: 8
27 June 2001 **SPP01-084** RIVER MILE: 151.5
M.A. Farrington, W.H. Brandenburg, and T.M. Emberton EFFORT: 680.0 m^2

FAMILY		N
69	*Dorosoma cepedianum*	1
76	*Cyprinella lutrensis*	161
76	*Cyprinus carpio*	111
76	*Hybognathus amarus*	24
76	*Pimephales promelas*	518
81	*Carpiodes carpio*	28
81	*Catostomus commersoni*	4
93	*Ameiurus natalis*	8
93	*Ictalurus punctatus*	7
212	*Gambusia affinis*	161

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

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 9
28 June 2001 **SPP01-086** RIVER MILE: 130.6
W.H. Brandenburg, M.A. Farrington, and T.M. Emberton EFFORT: 831.8 m^2

FAMILY		N
69	*Dorosoma cepedianum*	2
76	*Cyprinella lutrensis*	104
76	*Cyprinus carpio*	279
76	*Hybognathus amarus*	17
76	*Pimephales promelas*	253
81	*Carpiodes carpio*	101
81	*Catostomus commersoni*	7
93	*Ameiurus natalis*	3
93	*Ictalurus punctatus*	18
212	*Gambusia affinis*	237

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
28 June 2001 **SPP01-087** RIVER MILE: 127.0
M.A. Farrington, W.H. Brandenburg, and T.M. Emberton EFFORT: 762.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	136
76	*Cyprinus carpio*	92
76	*Hybognathus amarus*	51
76	*Pimephales promelas*	505
81	*Carpiodes carpio*	7
81	*Catostomus commersoni*	9
93	*Ameiurus natalis*	3
93	*Ictalurus punctatus*	10
212	*Gambusia affinis*	1040
294	*Micropterus salmoides*	2
295	*Perca flavescens*	2

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

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, directly below San Acacia Diversion Dam, San Acacia. SITE NUMBER: 10
27 June 2001 **SPP01-088** RIVER MILE: 116.2
R.K. Dudley, C.C. McBride, and S.O. Campbell EFFORT: 352.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	776
76	*Cyprinus carpio*	6
76	*Hybognathus amarus*	243
76	*Pimephales promelas*	10
76	*Platygobio gracilis*	24
76	*Rhinichthys cataractae*	51
81	*Carpiodes carpio*	9
212	*Gambusia affinis*	17

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia. SITE NUMBER: 11
27 June 2001 **SPP01-089** RIVER MILE: 114.6
R.K. Dudley, C.C. McBride, and S.O. Campbell EFFORT: 423.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	547
76	*Cyprinus carpio*	2
76	*Hybognathus amarus*	64
76	*Pimephales promelas*	2
76	*Platygobio gracilis*	16
81	*Carpiodes carpio*	5
93	*Ictalurus punctatus*	4
212	*Gambusia affinis*	2
294	*Micropterus salmoides*	1

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

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, east of Socorro, 0.5 miles upstream of Socorro Low Flow Conveyance Channel Bridge; east and just upstream of Socorro Wastewater Treatment Plant, Socorro. SITE NUMBER: 12

27 June 2001 **SPP01-090** RIVER MILE: 99.5

R.K. Dudley, C.C. McBride, and S.O. Campbell EFFORT: 514.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	288
76	*Cyprinus carpio*	24
76	*Hybognathus amarus*	39
76	*Pimephales promelas*	23
76	*Platygobio gracilis*	6
81	*Carpiodes carpio*	21
81	*Catostomus commersoni*	1
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	29
294	*Micropterus salmoides*	1
295	*Perca flavescens*	1

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 4.0 miles upstream of the US HWY 380 bridge crossing. SITE NUMBER: 13

27 June 2001 **SPP01-091** RIVER MILE: 91.7

R.K. Dudley, C.C. McBride, and S.O. Campbell EFFORT: 439.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	277
76	*Cyprinus carpio*	49
76	*Hybognathus amarus*	208
76	*Pimephales promelas*	47
76	*Platygobio gracilis*	5
76	*Rhinichthys cataractae*	1
81	*Carpiodes carpio*	156
93	*Ictalurus punctatus*	3
212	*Gambusia affinis*	388
295	*Perca flavescens*	1

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

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at US HWY 380 bridge crossing, San Antonio. SITE NUMBER: 14
27 June 2001 **SPP01-092** RIVER MILE: 87.1
R.K. Dudley, C.C. McBride, and S.O. Campbell EFFORT: 496.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	220
76	*Cyprinus carpio*	62
76	*Hybognathus amarus*	25
76	*Pimephales promelas*	46
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	12
93	*Ictalurus punctatus*	14
212	*Gambusia affinis*	307
295	*Perca flavescens*	1

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters. SITE NUMBER: 15
26 June 2001 **SPP01-093** RIVER MILE: 79.1
R.K. Dudley, C.C. McBride, and S.O. Campbell EFFORT: 446.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1198
76	*Cyprinus carpio*	101
76	*Hybognathus amarus*	97
76	*Pimephales promelas*	78
81	*Carpiodes carpio*	87
93	*Ictalurus punctatus*	2
212	*Gambusia affinis*	675
294	*Micropterus salmoides*	1
294	*Pomoxis annularis*	1

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

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at San Marcial Railroad Bridge, San Marcial. SITE NUMBER: 16
26 June 2001 **SPP01-094** RIVER MILE: 68.6
R.K. Dudley, C.C. McBride, and S.O. Campbell EFFORT: 500.8 m^2

FAMILY		N
69	*Dorosoma cepedianum*	4
76	*Cyprinella lutrensis*	266
76	*Cyprinus carpio*	60
76	*Hybognathus amarus*	298
76	*Pimephales promelas*	30
76	*Platygobio gracilis*	5
81	*Carpiodes carpio*	63
93	*Ictalurus punctatus*	4
212	*Gambusia affinis*	45
295	*Perca flavescens*	1

New Mexico: Socorro Co., Rio Grande Drainage
Rio Grande, at (former) confluence with the low flow conveyance channel, 16.0 miles downstream of southern end of Bosque del Apache National Wildlife Refuge. SITE NUMBER: 17
26 June 2001 **SPP01-095** RIVER MILE: 60.5
R.K. Dudley, C.C. McBride, and S.O. Campbell EFFORT: 457.5 m^2

FAMILY		N
69	*Dorosoma cepedianum*	4
76	*Cyprinella lutrensis*	52
76	*Cyprinus carpio*	371
76	*Hybognathus amarus*	24
76	*Pimephales promelas*	11
81	*Carpiodes carpio*	26
212	*Gambusia affinis*	129
295	*Perca flavescens*	1

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

New Mexico: Socorro Co., Rio Grande Drainage

Rio Grande, ca. 19.0 miles downstream of the southern end of Bosque del Apache National Wildlife Refuge — SITE NUMBER: 18

26 June 2001 **SPP01-096** — RIVER MILE: 57.7

R.K. Dudley, C.C. McBride, and S.O. Campbell — EFFORT: 440.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	58
76	*Cyprinus carpio*	305
76	*Hybognathus amarus*	9
76	*Pimephales promelas*	39
76	*Platygobio gracilis*	6
81	*Carpiodes carpio*	11
212	*Gambusia affinis*	30
294	*Micropterus salmoides*	1
295	*Perca flavescens*	1

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

AUGUST

New Mexico: Co., Rio Grande Drainage
Rio Grande, directly below Angostura Diversion Dam, Angostura. SITE NUMBER: 0
28 August 2001 **SPP01-102** RIVER MILE: 209.7
R.K. Dudley, W.H. Brandenburg and C.C. McBride EFFORT: 557.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	163
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	3
76	*Pimephales promelas*	4
76	*Platygobio gracilis*	10
76	*Rhinichthys cataractae*	8
81	*Carpiodes carpio*	1
81	*Catostomus commersoni*	14
93	*Ictalurus punctatus*	11
212	*Gambusia affinis*	318
283	*Morone chrysops*	1

New Mexico: Co., Rio Grande Drainage
Rio Grande, at NM State HWY 44 bridge crossing, Bernalillo. SITE NUMBER: 1
28 August 2001 **SPP01-103** RIVER MILE: 203.8
R.K. Dudley, W.H. Brandenburg and C.C. McBride EFFORT: 641.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	77
76	*Cyprinus carpio*	2
76	*Pimephales promelas*	2
76	*Platygobio gracilis*	11
76	*Rhinichthys cataractae*	22
81	*Carpiodes carpio*	5
81	*Catostomus commersoni*	7
93	*Ictalurus punctatus*	3
212	*Gambusia affinis*	153

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

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 4.0 miles downstream of NM State HWY 44 bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho. SITE NUMBER: 2

28 August 2001 **SPP01-104** RIVER MILE: 200.0

R.K. Dudley, W.H. Brandenburg and C.C. McBride EFFORT: 645.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	276
76	*Hybognathus amarus*	2
76	*Pimephales promelas*	13
76	*Platygobio gracilis*	13
76	*Rhinichthys cataractae*	42
81	*Carpiodes carpio*	2
81	*Catostomus commersoni*	28
93	*Ameiurus natalis*	7
93	*Ictalurus punctatus*	12
212	*Gambusia affinis*	133

New Mexico: Co., Rio Grande Drainage

Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque. SITE NUMBER: 3

28 August 2001 **SPP01-105** RIVER MILE: 183.4

R.K. Dudley, W.H. Brandenburg and C.C. McBride EFFORT: 651.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	42
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	1
76	*Pimephales promelas*	22
76	*Platygobio gracilis*	12
76	*Rhinichthys cataractae*	14
81	*Carpiodes carpio*	74
81	*Catostomus commersoni*	6
93	*Ictalurus punctatus*	56
212	*Gambusia affinis*	56
294	*Pomoxis annularis*	1

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

New Mexico: Co., Rio Grande Drainage
Rio Grande, at Rio Bravo Blvd. bridge crossing (NM State HWY 500), Albuquerque. SITE NUMBER: 4
28 August 2001 **SPP01-106** RIVER MILE: 178.3
R.K. Dudley, W.H. Brandenburg and C.C. McBride EFFORT: 736.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	18
76	*Hybognathus amarus*	1
76	*Pimephales promelas*	4
76	*Platygobio gracilis*	16
81	*Carpiodes carpio*	165
81	*Catostomus commersoni*	4
93	*Ictalurus punctatus*	77
212	*Gambusia affinis*	51

New Mexico: Co., Rio Grande Drainage
Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas. SITE NUMBER: 5
30 August 2001 **SPP01-115** RIVER MILE: 161.4
M.A. Farrington, W.H. Brandenburg and C.C. McBride EFFORT: 665.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	427
76	*Cyprinus carpio*	6
76	*Hybognathus amarus*	7
76	*Pimephales promelas*	116
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	40
81	*Catostomus commersoni*	1
93	*Ictalurus punctatus*	92
212	*Gambusia affinis*	334

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 1.0 miles upstream of NM State HWY 309/6 bridge crossing, Belen. SITE NUMBER: 6
30 August 2001 **SPP01-114** RIVER MILE: 151.5
M.A. Farrington, W.H. Brandenburg and C.C. McBride EFFORT: 671.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	464
76	*Cyprinus carpio*	21
76	*Hybognathus amarus*	19
76	*Pimephales promelas*	51
81	*Carpiodes carpio*	75
81	*Catostomus commersoni*	1
93	*Ictalurus punctatus*	82
212	*Gambusia affinis*	635

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

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales. SITE NUMBER: 7

30 August 2001 **SPP01-113** RIVER MILE: 143.2

W.H. Brandenburg, M.A. Farrington and C.C. McBride EFFORT: 627.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	455
76	*Cyprinus carpio*	39
76	*Hybognathus amarus*	1
76	*Pimephales promelas*	92
81	*Carpiodes carpio*	50
93	*Ictalurus punctatus*	13
212	*Gambusia affinis*	1098
294	*Lepomis macrochirus*	7
294	*Micropterus salmoides*	1
294	*Pomoxis annularis*	1
295	*Perca flavescens*	8

New Mexico: Co., Rio Grande Drainage

Rio Grande, at US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 8

29 August 2001 **SPP01-111** RIVER MILE: 130.6

R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 562.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	363
76	*Cyprinus carpio*	31
76	*Hybognathus amarus*	5
76	*Pimephales promelas*	213
81	*Carpiodes carpio*	280
93	*Ictalurus punctatus*	26
212	*Gambusia affinis*	145

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

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 3.5 miles downstream of the US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 9

30 August 2001 **SPP01-112** RIVER MILE: 127.0

W.H. Brandenburg, M.A. Farrington and C.C. McBride EFFORT: 753.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	405
76	*Cyprinus carpio*	21
76	*Hybognathus amarus*	8
76	*Pimephales promelas*	211
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	54
93	*Ictalurus punctatus*	19
212	*Gambusia affinis*	408
294	*Micropterus salmoides*	2

New Mexico: Co., Rio Grande Drainage

Rio Grande, directly below San Acacia Diversion Dam, San Acacia. SITE NUMBER: 10

29 August 2001 **SPP01-110** RIVER MILE: 116.2

R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 575.0 m^2

FAMILY		N
69	*Dorosoma cepedianum*	1
76	*Cyprinella lutrensis*	109
76	*Cyprinus carpio*	18
76	*Hybognathus amarus*	1
76	*Pimephales promelas*	64
76	*Platygobio gracilis*	20
76	*Rhinichthys cataractae*	4
81	*Carpiodes carpio*	7
93	*Ameiurus natalis*	2
93	*Ictalurus punctatus*	54
212	*Gambusia affinis*	94

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

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia. SITE NUMBER: 11
29 August 2001 **SPP01-109** RIVER MILE: 114.6
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 665.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	77
76	*Cyprinus carpio*	8
76	*Hybognathus amarus*	2
76	*Pimephales promelas*	18
76	*Platygobio gracilis*	16
81	*Carpiodes carpio*	6
93	*Ictalurus punctatus*	40
212	*Gambusia affinis*	45

New Mexico: 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, Socorro. SITE NUMBER: 12
29 August 2001 **SPP01-108** RIVER MILE: 99.5
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 712.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	66
76	*Cyprinus carpio*	7
76	*Hybognathus amarus*	281
76	*Pimephales promelas*	10
76	*Platygobio gracilis*	12
81	*Carpiodes carpio*	76
93	*Ictalurus punctatus*	23
212	*Gambusia affinis*	14

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 4.0 miles upstream of the US HWY 380 bridge crossing. SITE NUMBER: 13
29 August 2001 **SPP01-107** RIVER MILE: 91.7
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 598.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	365
76	*Cyprinus carpio*	20
76	*Hybognathus amarus*	292
76	*Pimephales promelas*	46
76	*Platygobio gracilis*	18
81	*Carpiodes carpio*	30
93	*Ictalurus punctatus*	38
212	*Gambusia affinis*	24

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

New Mexico: Co., Rio Grande Drainage
Rio Grande, at US HWY 380 bridge crossing, San Antonio. SITE NUMBER: 14
27 August 2001 **SPP01-101** RIVER MILE: 87.1
R.K. Dudley, W.H. Brandenburg and J.P. Larson EFFORT: 707.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	102
76	*Cyprinus carpio*	6
76	*Hybognathus amarus*	41
76	*Pimephales promelas*	13
81	*Carpiodes carpio*	31
93	*Ictalurus punctatus*	23
212	*Gambusia affinis*	78

New Mexico: Co., Rio Grande Drainage
Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters. SITE NUMBER: 15
27 August 2001 **SPP01-100** RIVER MILE: 79.1
R.K. Dudley. W.H. Brandenburg, and J.P. Larson EFFORT: 667.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	278
76	*Cyprinus carpio*	11
76	*Hybognathus amarus*	9
76	*Pimephales promelas*	13
76	*Platygobio gracilis*	6
76	*Rhinichthys cataractae*	1
81	*Carpiodes carpio*	15
93	*Ictalurus punctatus*	66
212	*Gambusia affinis*	28

New Mexico: Co., Rio Grande Drainage
Rio Grande, at San Marcial Railroad Bridge, San Marcial. SITE NUMBER: 16
27 August 2001 **SPP01-099** RIVER MILE: 68.6
R.K. Dudley, W.H. Brandenburg and J.P. Larson EFFORT: 593.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	138
76	*Cyprinus carpio*	9
76	*Hybognathus amarus*	17
76	*Pimephales promelas*	9
81	*Carpiodes carpio*	1
93	*Ictalurus punctatus*	31
212	*Gambusia affinis*	26

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

New Mexico: 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. SITE NUMBER: 17

27 August 2001 **SPP01-098** RIVER MILE: 60.5

R.K. Dudley, W.H. Brandenburg and J.P. Larson EFFORT: 626.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	62
76	*Cyprinus carpio*	8
76	*Hybognathus amarus*	23
76	*Pimephales promelas*	6
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	4
93	*Ictalurus punctatus*	19
93	*Pylodictis olivaris*	1
212	*Gambusia affinis*	41

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 19 miles downstream of the southern end of Bosque del Apache National Wildlife Refuge. SITE NUMBER: 18

27 August 2001 **SPP01-097** RIVER MILE: 57.7

R.K. Dudley, W.H. Brandenburg and J.P. Larson EFFORT: 609.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	97
76	*Cyprinus carpio*	12
76	*Hybognathus amarus*	5
76	*Pimephales promelas*	3
76	*Platygobio gracilis*	2
81	*Carpiodes carpio*	1
93	*Ictalurus punctatus*	36
212	*Gambusia affinis*	5

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

OCTOBER

New Mexico: Co., Rio Grande Drainage
Rio Grande, directly below Angostura Diversion Dam, Angostura. SITE NUMBER: 0
11 October 2001 **SPP01-129** RIVER MILE: 209.7
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 709.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	39
76	*Pimephales promelas*	20
76	*Platygobio gracilis*	6
76	*Rhinichthys cataractae*	1
81	*Catostomus commersoni*	10
93	*Ameiurus natalis*	1
93	*Ictalurus punctatus*	2
212	*Gambusia affinis*	135
283	*Morone chrysops*	4
294	*Lepomis macrochirus*	1

New Mexico: Co., Rio Grande Drainage
Rio Grande, at NM State HWY 44 bridge crossing, Bernalillo. SITE NUMBER: 1
11 October 2001 **SPP01-130** RIVER MILE: 203.8
R.K. Dudley, M.A. Farrington and W.H. Brandenburg EFFORT: 690.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	679
76	*Cyprinus carpio*	2
76	*Pimephales promelas*	2
76	*Platygobio gracilis*	36
76	*Rhinichthys cataractae*	27
81	*Catostomus commersoni*	5
93	*Ameiurus natalis*	1
93	*Ictalurus punctatus*	42
212	*Gambusia affinis*	26
283	*Morone chrysops*	2
294	*Micropterus salmoides*	1
294	*Pomoxis annularis*	1

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

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 4.0 miles downstream of NM State HWY 44 bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho. SITE NUMBER: 2

11 October 2001 **SPP01-131** RIVER MILE: 200.0

R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 651.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	193
76	*Hybognathus amarus*	3
76	*Pimephales promelas*	7
76	*Platygobio gracilis*	14
76	*Rhinichthys cataractae*	16
81	*Catostomus commersoni*	3
93	*Ictalurus punctatus*	8
212	*Gambusia affinis*	179
294	*Pomoxis annularis*	3

New Mexico: Co., Rio Grande Drainage

Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque. SITE NUMBER: 3

11 October 2001 **SPP01-132** RIVER MILE: 183.4

R.K. Dudley and W.H. Brandenburg EFFORT: 715.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	17
76	*Pimephales promelas*	12
76	*Platygobio gracilis*	8
76	*Rhinichthys cataractae*	2
81	*Carpiodes carpio*	11
93	*Ictalurus punctatus*	24
212	*Gambusia affinis*	111

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

New Mexico: Co., Rio Grande Drainage
Rio Grande, at Rio Bravo Blvd. bridge crossing (NM State HWY 500), Albuquerque. SITE NUMBER: 4
12 October 2001 **SPP01-135** RIVER MILE: 178.3
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 690.0 m^2

FAMILY		N
69	*Dorosoma cepedianum*	2
76	*Cyprinella lutrensis*	2
76	*Cyprinus carpio*	1
76	*Pimephales promelas*	9
76	*Platygobio gracilis*	2
81	*Carpiodes carpio*	114
81	*Catostomus commersoni*	1
93	*Ictalurus punctatus*	12
212	*Gambusia affinis*	7

New Mexico: Co., Rio Grande Drainage
Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas. SITE NUMBER: 5
12 October 2001 **SPP01-134** RIVER MILE: 161.4
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 683.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	848
76	*Cyprinus carpio*	7
76	*Hybognathus amarus*	5
76	*Pimephales promelas*	79
76	*Platygobio gracilis*	4
81	*Carpiodes carpio*	15
93	*Ictalurus punctatus*	6
212	*Gambusia affinis*	578

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 1.0 miles upstream of NM State HWY 309/6 bridge crossing, Belen. SITE NUMBER: 6
12 October 2001 **SPP01-133** RIVER MILE: 151.5
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 612.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	624
76	*Cyprinus carpio*	9
76	*Hybognathus amarus*	17
76	*Pimephales promelas*	200
81	*Carpiodes carpio*	24
93	*Ictalurus punctatus*	2
212	*Gambusia affinis*	983

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

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales. SITE NUMBER: 7
10 October 2001 **SPP01-128** RIVER MILE: 143.2
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 590.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	442
76	*Cyprinus carpio*	3
76	*Pimephales promelas*	55
81	*Carpiodes carpio*	13
81	*Catostomus commersoni*	2
93	*Ictalurus punctatus*	5
212	*Gambusia affinis*	463

New Mexico: Co., Rio Grande Drainage
Rio Grande, at US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 8
10 October 2001 **SPP01-126** RIVER MILE: 130.6
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 595.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	651
76	*Cyprinus carpio*	2
76	*Hybognathus amarus*	1
76	*Pimephales promelas*	50
81	*Carpiodes carpio*	12
212	*Gambusia affinis*	807

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 3.5 miles downstream of the US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 9
10 October 2001 **SPP01-127** RIVER MILE: 127.0
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 705.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	135
76	*Cyprinus carpio*	3
76	*Pimephales promelas*	5
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	11
93	*Ictalurus punctatus*	8
212	*Gambusia affinis*	48
294	*Pomoxis annularis*	1

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

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia. SITE NUMBER: 9.5
10 October 2001 **SPP01-125** RIVER MILE: 116.8
R.K. Dudley and W.H. Brandenburg EFFORT: 610.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	59
76	*Cyprinus carpio*	1
76	*Pimephales promelas*	13
76	*Platygobio gracilis*	19
81	*Carpiodes carpio*	2
93	*Ictalurus punctatus*	30
212	*Gambusia affinis*	33

New Mexico: Co., Rio Grande Drainage
Rio Grande, directly below San Acacia Diversion Dam, San Acacia. SITE NUMBER: 10
10 October 2001 **SPP01-124** RIVER MILE: 116.2
R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 542.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	428
76	*Cyprinus carpio*	12
76	*Hybognathus amarus*	19
76	*Pimephales promelas*	99
76	*Platygobio gracilis*	22
76	*Rhinichthys cataractae*	7
81	*Carpiodes carpio*	11
93	*Ictalurus punctatus*	9
212	*Gambusia affinis*	55

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia. SITE NUMBER: 11
09 October 2001 **SPP01-123** RIVER MILE: 114.6
W.H. Brandenburg, M.A. Farrington and C.C. McBride EFFORT: 739.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	56
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	1
76	*Pimephales promelas*	3
76	*Platygobio gracilis*	19
81	*Carpiodes carpio*	3
93	*Ictalurus punctatus*	14
212	*Gambusia affinis*	55

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

New Mexico: 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, Socorro. SITE NUMBER: 12
09 October 2001 **SPP01-122** RIVER MILE: 99.5
M.A. Farrington, W.H. Brandenburg and C.C. McBride EFFORT: 744.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	182
76	*Cyprinus carpio*	6
76	*Hybognathus amarus*	23
76	*Pimephales promelas*	13
76	*Platygobio gracilis*	10
81	*Carpiodes carpio*	16
93	*Ictalurus punctatus*	12
212	*Gambusia affinis*	86

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 4.0 miles upstream of U.S. 380 bridge crossing. SITE NUMBER: 13
09 October 2001 **SPP01-121** RIVER MILE: 91.7
W.H. Brandenburg, M.A. Farrington and C.C. McBride EFFORT: 714.3 m^2

FAMILY		N
76	*Cyprinella lutrensis*	521
76	*Cyprinus carpio*	6
76	*Hybognathus amarus*	10
76	*Pimephales promelas*	80
76	*Platygobio gracilis*	6
81	*Carpiodes carpio*	20
93	*Ictalurus punctatus*	13
212	*Gambusia affinis*	119

New Mexico: Co., Rio Grande Drainage
Rio Grande, at US HWY 380 bridge crossing, San Antonio. SITE NUMBER: 14
09 October 2001 **SPP01-120** RIVER MILE: 87.1
M.A. Farrington, W.H. Brandenburg and C.C. McBride EFFORT: 691.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	131
76	*Cyprinus carpio*	9
76	*Hybognathus amarus*	7
76	*Pimephales promelas*	55
76	*Platygobio gracilis*	5
81	*Carpiodes carpio*	8
93	*Ictalurus punctatus*	9
212	*Gambusia affinis*	43

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

New Mexico: Co., Rio Grande Drainage

Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters. SITE NUMBER: 15

08 October 2001 **SPP01-119** RIVER MILE: 79.1

R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 730.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	154
76	*Cyprinus carpio*	10
76	*Hybognathus amarus*	6
76	*Pimephales promelas*	13
81	*Carpiodes carpio*	12
93	*Ictalurus punctatus*	14
212	*Gambusia affinis*	79

New Mexico: Co., Rio Grande Drainage

Rio Grande, at San Marcial Railroad Bridge, San Marcial. SITE NUMBER: 16

08 October 2001 **SPP01-118** RIVER MILE: 68.6

R.K. Dudley, M.A. Farrington and W.H. Brandenburg EFFORT: 605.5 m^2

FAMILY		N
69	*Dorosoma cepedianum*	1
76	*Cyprinella lutrensis*	327
76	*Cyprinus carpio*	5
76	*Hybognathus amarus*	5
76	*Pimephales promelas*	9
76	*Platygobio gracilis*	4
81	*Carpiodes carpio*	2
93	*Ictalurus punctatus*	10
212	*Gambusia affinis*	89

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

New Mexico: 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. SITE NUMBER: 17

08 October 2001 **SPP01-117** RIVER MILE: 60.5

R.K. Dudley, M.A. Farrington and W.H. Brandenburg EFFORT: 688.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	141
76	*Cyprinus carpio*	7
76	*Hybognathus amarus*	6
76	*Pimephales promelas*	11
81	*Carpiodes carpio*	3
93	*Ictalurus punctatus*	8
294	*Lepomis macrochirus*	1
212	*Gambusia affinis*	77

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 19 miles downstream of the southern end of Bosque del Apache National Wildlife Refuge. SITE NUMBER: 18

08 October 2001 **SPP01-116** RIVER MILE: 57.7

R.K. Dudley, W.H. Brandenburg and M.A. Farrington EFFORT: 685.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	140
76	*Cyprinus carpio*	4
76	*Hybognathus amarus*	9
76	*Pimephales promelas*	5
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	7
93	*Ictalurus punctatus*	14
212	*Gambusia affinis*	11

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

DECEMBER

New Mexico: Co., Rio Grande Drainage
Rio Grande, directly below Angostura Diversion Dam, Angostura. SITE NUMBER: 0
17 December 2001 **SPP01-171** RIVER MILE: 209.7
R.K. Dudley, W.H. Brandenburg, M.A. Farrington, T.F. Turner and J.P. Wares EFFORT: 609.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	9
76	*Rhinichthys cataractae*	8
93	*Ictalurus punctatus*	1

New Mexico: Co., Rio Grande Drainage
Rio Grande, at NM State HWY 44 bridge crossing, Bernalillo. SITE NUMBER: 1
17 December 2001 **SPP01-172** RIVER MILE: 203.8
R.K. Dudley, W.H. Brandenburg, M.A. Farrington, T.F. Turner and J.P. Wares EFFORT: 699.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	414
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	15
76	*Pimephales promelas*	11
76	*Platygobio gracilis*	8
76	*Rhinichthys cataractae*	4
81	*Catostomus commersoni*	1
212	*Gambusia affinis*	3

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 4.0 miles downstream of NM State HWY 44 bridge crossing, at Rio Rancho Wastewater Treatment Plant, Rio Rancho. SITE NUMBER: 2
17 December 2001 **SPP01-173** RIVER MILE: 200.0
R.K. Dudley, W.H. Brandenburg, M.A. Farrington, T.F. Turner and J.P. Wares EFFORT: 800.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	344
76	*Hybognathus amarus*	39
76	*Pimephales promelas*	23
76	*Platygobio gracilis*	8
81	*Carpiodes carpio*	1
81	*Catostomus commersoni*	2
212	*Gambusia affinis*	17
294	*Lepomis macrochirus*	1
294	*Pomoxis annularis*	1

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

New Mexico: Co., Rio Grande Drainage

Rio Grande, at Central Avenue bridge crossing (US HWY 66), Albuquerque. SITE NUMBER: 3

17 December 2001 **SPP01-174** RIVER MILE: 183.4

R.K. Dudley, W.H. Brandenburg, M.A. Farrington, T.F. Turner and J.P. Wares EFFORT: 836.5 m^2

FAMILY		N
69	*Dorosoma cepedianum*	3
76	*Cyprinella lutrensis*	26
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	16
76	*Pimephales promelas*	5
76	*Rhinichthys cataractae*	5
81	*Carpiodes carpio*	22
81	*Catostomus commersoni*	1
93	*Ictalurus punctatus*	42
212	*Gambusia affinis*	31
294	*Pomoxis annularis*	4

New Mexico: Co., Rio Grande Drainage

Rio Grande, at Rio Bravo Blvd. Bridge crossing (NM State HWY 500) crossing, Albuquerque. SITE NUMBER: 4

13 December 2001 **SPP01-170** RIVER MILE: 178.3

R.K. Dudley, W.H. Brandenburg, C.C. McBride, D. Alo and M.V. McPhee EFFORT: 824.0 m^2

FAMILY		N
76	*Cyprinella lutrensis*	1
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	5
76	*Pimephales promelas*	4
76	*Rhinichthys cataractae*	2
81	*Carpiodes carpio*	33
81	*Catostomus commersoni*	1
93	*Ictalurus punctatus*	6
212	*Gambusia affinis*	4
294	*Pomoxis annularis*	1

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

New Mexico: Co., Rio Grande Drainage

Rio Grande, at Los Lunas Bridge crossing (NM State HWY 49), Los Lunas. SITE NUMBER: 5

13 December 2001 **SPP01-169** RIVER MILE: 161.4

R.K. Dudley, W.H. Brandenburg, C.C. McBride, D. Alo and M.V. McPhee EFFORT: 606.5 m^2

FAMILY		N
69	*Dorosoma cepedianum*	4
76	*Cyprinella lutrensis*	544
76	*Cyprinus carpio*	4
76	*Hybognathus amarus*	87
76	*Pimephales promelas*	260
81	*Carpiodes carpio*	81
93	*Ictalurus punctatus*	17
212	*Gambusia affinis*	16
294	*Pomoxis annularis*	7

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 1.0 miles upstream of NM State HWY 309/6 bridge crossing, Belen. SITE NUMBER: 6

13 December 2001 **SPP01-168** RIVER MILE: 151.5

R.K. Dudley, W.H. Brandenburg, C.C. McBride, D. Alo and M.V. McPhee EFFORT: 633.3 m^2

FAMILY		N
69	*Dorosoma cepedianum*	1
76	*Cyprinella lutrensis*	251
76	*Cyprinus carpio*	7
76	*Hybognathus amarus*	12
76	*Pimephales promelas*	212
81	*Carpiodes carpio*	37
93	*Ictalurus punctatus*	5
212	*Gambusia affinis*	5
294	*Pomoxis annularis*	1

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

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales. SITE NUMBER: 7
13 December 2001 **SPP01-167** RIVER MILE: 143.2
R.K. Dudley, W.H. Brandenburg, C.C. McBride, D. Alo and M.V. McPhee EFFORT: 640.3 m^2

FAMILY		N
69	*Dorosoma cepedianum*	20
76	*Cyprinella lutrensis*	369
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	6
76	*Pimephales promelas*	162
81	*Carpiodes carpio*	30
93	*Ictalurus punctatus*	5
212	*Gambusia affinis*	416
294	*Pomoxis annularis*	3

New Mexico: Co., Rio Grande Drainage
Rio Grande, at US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 8
12 December 2001 **SPP01-166** RIVER MILE: 130.6
M.A. Farrington, C.C. McBride, W.H. Brandenburg, T.F. Turner and D. Alo EFFORT: 727.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	26
76	*Cyprinus carpio*	5
76	*Hybognathus amarus*	1
76	*Pimephales promelas*	25
81	*Carpiodes carpio*	11
93	*Ameiurus natalis*	1
93	*Ictalurus punctatus*	4
212	*Gambusia affinis*	29

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

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 3.5 miles downstream of the US HWY 60 bridge crossing, Bernardo. SITE NUMBER: 9

12 December 2001 **SPP01-165** RIVER MILE: 127.0

M.A. Farrington, C.C. McBride, W.H. Brandenburg, T.F. Turner and D. Alo EFFORT: 720.8 m^2

FAMILY		N
69	*Dorosoma cepedianum*	2
76	*Cyprinella lutrensis*	42
76	*Cyprinus carpio*	2
76	*Hybognathus amarus*	14
76	*Pimephales promelas*	18
76	*Platygobio gracilis*	1
81	*Carpiodes carpio*	16
93	*Ictalurus punctatus*	3
212	*Gambusia affinis*	5
294	*Pomoxis annularis*	1

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia. SITE NUMBER: 9.5

12 December 2001 **SPP01-164** RIVER MILE: 116.8

M.A. Farrington, C.C.McBride, W.H. Brandenburg, T.F. Turner and D. Alo EFFORT: 725.5 m^2

FAMILY		N
69	*Dorosoma cepedianum*	16
76	*Cyprinella lutrensis*	340
76	*Cyprinus carpio*	2
76	*Hybognathus amarus*	27
76	*Pimephales promelas*	97
76	*Platygobio gracilis*	141
81	*Carpiodes carpio*	18
93	*Ameiurus natalis*	1
93	*Ictalurus punctatus*	31
212	*Gambusia affinis*	135
294	*Pomoxis annularis*	11

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

New Mexico: Co., Rio Grande Drainage
Rio Grande, directly below San Acacia Diversion Dam, San Acacia. SITE NUMBER: 10
12 December 2001 **SPP01-163** RIVER MILE: 116.2
M.A. Farrington, C.C. McBride, W.H. Brandenburg, T.F. Turner and D. Alo EFFORT: 436.0 m^2

FAMILY		N
69	*Dorosoma cepedianum*	21
76	*Cyprinella lutrensis*	307
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	19
76	*Pimephales promelas*	60
76	*Platygobio gracilis*	26
81	*Carpiodes carpio*	2
212	*Gambusia affinis*	11
283	*Morone chrysops*	2

New Mexico: Co., Rio Grande Drainage
Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia. SITE NUMBER: 11
11 December 2001 **SPP01-162** RIVER MILE: 114.6
R.K. Dudley, M.A. Farrington and C.C. McBride EFFORT: 582.5 m^2

FAMILY		N
69	*Dorosoma cepedianum*	3
76	*Cyprinella lutrensis*	26
76	*Cyprinus carpio*	2
76	*Hybognathus amarus*	42
76	*Pimephales promelas*	1
76	*Platygobio gracilis*	16
76	*Rhinichthys cataractae*	1
81	*Carpiodes carpio*	1
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	2

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

New Mexico: 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, Socorro. SITE NUMBER: 12

11 December 2001 **SPP01-161** RIVER MILE: 99.5

R.K. Dudley, M.A. Farrington, C.C. McBride, T.F. Turner and M.V. McPhee EFFORT: 827.5 m^2

FAMILY		N
69	*Dorosoma cepedianum*	2
76	*Cyprinella lutrensis*	122
76	*Cyprinus carpio*	3
76	*Hybognathus amarus*	38
76	*Pimephales promelas*	21
76	*Platygobio gracilis*	4
81	*Carpiodes carpio*	14
93	*Ictalurus punctatus*	8
212	*Gambusia affinis*	4
294	*Pomoxis annularis*	1

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 4.0 miles upstream of U.S. 380 bridge crossing. SITE NUMBER: 13

11 December 2001 **SPP01-160** RIVER MILE: 91.7

R.K. Dudley, M.A. Farrington, C.C. McBride, T.F. Turner and M.V. McPhee EFFORT: 821.3 m^2

FAMILY		N
69	*Dorosoma cepedianum*	1
76	*Cyprinella lutrensis*	300
76	*Cyprinus carpio*	3
76	*Hybognathus amarus*	58
76	*Pimephales promelas*	8
76	*Platygobio gracilis*	5
81	*Carpiodes carpio*	9
212	*Gambusia affinis*	3

New Mexico: Co., Rio Grande Drainage

Rio Grande, at US HWY 380 bridge crossing, San Antonio. SITE NUMBER: 14

11 December 2001 **SPP01-159** RIVER MILE: 87.1

R.K. Dudley, M.A. Farrington, C.C. McBride, T.F. Turner and M.V. McPhee EFFORT: 591.5 m^2

FAMILY		N
76	*Cyprinella lutrensis*	144
76	*Cyprinus carpio*	1
76	*Hybognathus amarus*	176
76	*Pimephales promelas*	19
76	*Platygobio gracilis*	9
81	*Carpiodes carpio*	16
212	*Gambusia affinis*	4
294	*Pomoxis annularis*	1

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

New Mexico: Co., Rio Grande Drainage

Rio Grande, directly east of Bosque del Apache National Wildlife Refuge Headquarters. SITE NUMBER: 15

10 December 2001 **SPP01-158** RIVER MILE: 79.1

R.K. Dudley, W.H. Brandenburg, M.A. Farrington, T.F. Turner, and K.I. Siegfried EFFORT: 862.0 m^2

FAMILY		N
69	*Dorosoma cepedianum*	5
76	*Cyprinella lutrensis*	243
76	*Cyprinus carpio*	5
76	*Hybognathus amarus*	10
76	*Pimephales promelas*	14
81	*Carpiodes carpio*	9
93	*Ictalurus punctatus*	1
212	*Gambusia affinis*	5
294	*Pomoxis annularis*	4

New Mexico: Co., Rio Grande Drainage

Rio Grande, at San Marcial Railroad Bridge, San Marcial. SITE NUMBER: 16

10 December 2001 **SPP01-157** RIVER MILE: 68.6

R.K. Dudley, W.H. Brandenburg, M.A. Farrington, T.F. Turner, and K.I. Siegfried EFFORT: 656.8 m^2

FAMILY		N
76	*Cyprinella lutrensis*	147
76	*Cyprinus carpio*	2
76	*Hybognathus amarus*	7
81	*Carpiodes carpio*	1
93	*Ictalurus punctatus*	15

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

New Mexico: 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. SITE NUMBER: 17

10 December 2001 **SPP01-156** RIVER MILE: 60.5

R.K. Dudley, W.H. Brandenburg, M.A. Farrington, T.F. Turner, and K.I. Siegfried EFFORT: 751.8 m^2

FAMILY		N
69	*Dorosoma cepedianum*	56
76	*Cyprinella lutrensis*	271
76	*Cyprinus carpio*	3
76	*Hybognathus amarus*	7
76	*Pimephales promelas*	3
93	*Ictalurus punctatus*	31
212	*Gambusia affinis*	50
294	*Pomoxis annularis*	1

New Mexico: Co., Rio Grande Drainage

Rio Grande, ca. 19 miles downstream of the southern end of Bosque del Apache National Wildlife Refuge SITE NUMBER: 19

10 December 2001 **SPP01-155** RIVER MILE: 57.7

R.K. Dudley, W.H. Brandenburg, M.A. Farrington, T.F. Turner, and K.I. Siegfried EFFORT: 813.0 m^2

FAMILY		N
69	*Dorosoma cepedianum*	1
76	*Cyprinella lutrensis*	9
76	*Cyprinus carpio*	6
76	*Hybognathus amarus*	4
81	*Carpiodes carpio*	4
93	*Ictalurus punctatus*	35
212	*Gambusia affinis*	1

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