RIO GRANDE SILVERY MINNOW AUGMENTATION IN THE MIDDLE RIO GRANDE, NEW MEXICO

Annual Report 2006

Prepared For:
Middle Rio Grande Endangered Species Act Collaborative Program

Submitted To:
U.S. Bureau of Reclamation
555 Broadway NE, Suite 100
Albuquerque, NM 87102-2352

by

W. Jason Remshardt
U.S. Fish and Wildlife Service
New Mexico Fishery Resources Office
3800 Commons Avenue NE
Albuquerque, New Mexico 87109

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EXECUTIVE SUMMARY

- In response to declining distribution and abundance, New Mexico Fish and Wildlife Conservation Office have released nearly 1,000,000 hatchery-raised Rio Grande silvery minnow into the Rio Grande since 2002.

- In 2006, a total of 418,851 Rio Grande silvery minnow were released into the Middle Rio Grande, New Mexico. Along with favorable spring snowmelt flows for spawning and recruitment in 2004 and 2005, these efforts corresponded to increased catch rates of young-of-year Rio Grande silvery minnow initially in the Angostura Reach where augmentation began in 2002, and now in Isleta and San Acacia as augmentation efforts have expanded to the entire range of Rio Grande silvery minnow below Angostura Diversion Dam.

- There were a total of 8,375 Rio Grande silvery minnow collected between January and December 2006, including 298 positively identified as hatchery-released.

- Results indicate that hatchery raised individuals can be released to the wild with over 90% retention within 10 miles of original release sites and can experience survival of at least 1 year after release.

- In 2006, we continued augmention efforts throughout the current occupied range of Rio Grande silvery minnow, with releases in all three reaches.

- Lower recapture, survival, and growth rates in 2006 compared to 2003-2005 suggest that augmentation may be less effective at higher base Rio Grande silvery minnow densities.

INTRODUCTION

Official relocation efforts for Rio Grande silvery minnow (*Hybognathus amarus*) in the Middle Rio Grande have been conducted since 1996. An estimated 11,000 adult and juvenile Rio Grande silvery minnow were moved from isolated pools downstream of San Acacia Dam to upstream locations in Isleta and Angostura reaches in 1996. During May to June 2000, an estimated 204,000 larval and 414 adult Rio Grande silvery minnow were stocked by personnel from the Museum of Southwestern Biology near New Mexico Highway 6 Bridge in Los Lunas and U.S. Highway 550 Bridge in Bernalillo. Larval fish were the result of some of the first captive spawning attempts of wild adults. Survival and subsequent reproductive contribution of stocked fish were unknown and evaluations of translocations and other stocking attempts were needed to provide guidance for future management.

In June 2002, the New Mexico Fish and Wildlife Conservation Office (NMFWCO) began experimental augmentation and monitoring of Visible Implant Elastomer (VIE) tagged juvenile and adult Rio Grande silvery minnow in the Middle Rio Grande, New Mexico (MRGNM) (Remshardt and Davenport 2003, Remshardt 2006). Monitoring efforts focused on evaluation of experimental stocking success of Rio Grande silvery minnow reared in captive propagation facilities and released throughout the current range.

This annual report summarizes findings between January and December 2006. This effort reflects management needs identified in the Middle Rio Grande Endangered Species Program (Program), Item A.2.2 for Rio Grande silvery minnow as well as the Rio Grande Silvery Minnow Recovery Plan (RGSMRP; U.S. Fish and Wildlife Service 1999). These include development and refinement of augmentation protocols for use in the Middle Rio Grande (Task 8b) and annual monitoring of augmented populations as identified as a needed task (Task 8d) by the Program and RGSMRP.

The ultimate goal of augmentation is to re-establish self-sustaining populations of Rio Grande silvery minnow in the MRGNM and throughout its former range. Long-term benefits of this study are to: 1) augment populations within the MRGNM; and 2) evaluate stocking efforts and methods.

Specific objectives of augmentation and monitoring activities in 2006 were to:

1) Determine changes in condition, survival, and tag retention of stocked Rio Grande silvery minnow.

2) Determine temporal and spatial movement of stocked Rio Grande silvery minnow within and among reaches.

3) Identify and characterize river reaches where retention and survival of stocked Rio Grande silvery minnow are maximized.

4) Provide guidance for augmentation activities to maximize survival of Rio Grande silvery minnow.

METHODS

Study Area

This investigation was focused on the known occupied range of Rio Grande silvery minnow in the Middle Rio Grande, including the Angostura, Isleta, and San Acacia reaches (Figure 1, Table 1). Angostura Reach (61 km) extends from Angostura Diversion Dam (River Mile (RM) 209.7) to Isleta Diversion Dam (RM 169.3) and includes the cities of Bernalillo, Corrales, and Albuquerque. Isleta Reach (90 km) extends from Isleta Diversion Dam to San Acacia Diversion Dam. This reach includes the southern portion of Isleta Pueblo, cities of Bosque Farms, Valencia, Los Lunas, Belen, and smaller villages such as La Joya, and Bernardo, along with Sevilleta National Wildlife Refuge, all within Bernalillo, Valencia, and Socorro counties. The San Acacia Reach (roughly 76 km) extends from San Acacia Diversion Dam to the headwaters of Elephant Butte Reservoir (the exact location of the lower boundary varies depending upon reservoir water-surface elevation). This reach is relatively remote, including only the city of Socorro and villages of San Acacia, Lemitar, Escondida, and San Antonio along with Bosque del Apache National Wildlife Refuge, all within Socorro County.

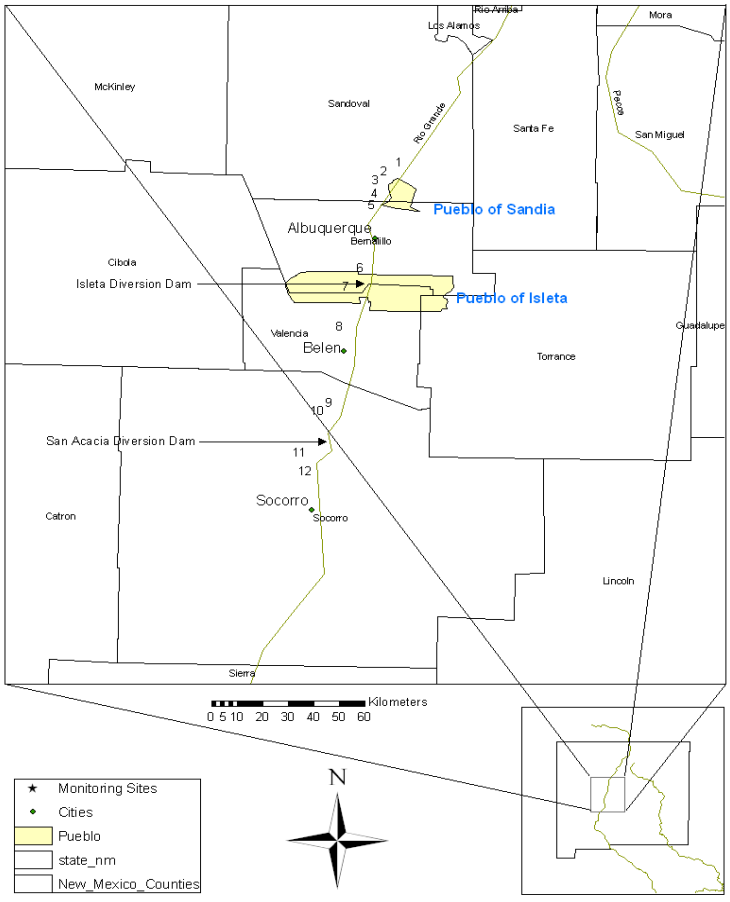

Figure 1. Map of study area for Rio Grande silvery minnow augmentation and monitoring.

Augmentation

In 2006, all released fish were propagated and/or reared at Dexter National Fish Hatchery and Technology Center (Dexter) or the City of Albuquerque's Rio Grande silvery minnow Rearing and Breeding Facility (Biopark). Released fish originated from two sources: 1) wild-captured eggs reared in hatchery; or 2) spawning of captive broodstock. Over 60% of released fish were marked using a Visible Implant Elastomer (VIE) tag in 2006. Fish released in different seasons or locations were marked with a different VIE color and/or body position.

In 2006, released fish originated from spawning of captive broodstock. Wild-captured eggs are the priority source for augmentation, but 2005 egg capture from the wild did not satisfy future production goals. Therefore, captive propagation at both facilities was initiated to meet 2006 release targets.

Several release sites were chosen within each reach based on access, habitat quality, and relative position to diversion structures. In addition to previous release sites used within the Angostura (U.S. 550 and Bridge Street), Isleta (Rio Puerco confluence) and San Acacia reaches (below San Acacia diversion dam); supplemental releases within the San Acacia Reach were added in fall 2006 near Socorro. Recapture information throughout 2006 allowed us to examine potential differences in survival, growth, and movement/site retention between reaches.

Condition, Survival, and Tag Retention

Livecars (n=2) (1.3m x 1.3m x 1.3m delta mesh seine material) were placed at a site within the Angostura Reach (River Mile 177.0) concurrent with the May 2006 release to test effects of 1) natural riverine conditions on immediate (28-day) post-augmentation survival, condition, and tag retention; and 2) differential survival according to source hatchery. Each livecar was constructed of small mesh (3 mm) to facilitate water flow but prevent escape of fish. Livecars were constructed with a 3mm mesh cover to prevent predation by birds and provide cover. Livecars were placed 20 m apart along the shoreline in 0.5-1.0 m deep, low-velocity (< 0.5m/sec) habitat, with tumbleweeds placed inside to provide additional cover. Livecars were placed at the site several days prior to study to establish algal growth. At each hatchery prior to release, fish were given one of four VIE tag colors assigned to their stocking location. One hundred fish from each hatchery were split into 4 groups of 25 and placed in livecars. These groups were assigned as Dexter-Green (DX-G), Biopark-Orange (BP-O), Dexter-Red (DX-R), and Biopark-Yellow (BP-Y). Each fish was weighed to the nearest 0.1 g and measured to the nearest mm as standard length (SL) and total length (TL). Evaluations occurred at the end of the 28-day study. All remaining fish were removed and examined for VIE mark color/location and survival. All live fish were immediately released.

In addition to fish placed in livecars, an equal numbers of fish were retained in aquaria at NMFWCO aquaria as control groups. Survival rates typically are over 95% for VIE tagged Rio Grande silvery minnow. Therefore, we defined the control groups are those not exposed to the natural riverine conditions. These fish were subjected to the same pre-augmentation conditions as instream cage individuals, including VIE marking, hauling, and handling. This control allowed examination of potential differences between effects of pre-augmentation activities and

post-augmentation riverine conditions on survival and tag retention. The fish held in aquaria were fed a spirulina flake diet daily. Similarly, a 28-day examination of aquaria fish was made to evaluate survival, condition, and tag retention.

Fulton's condition factor K(tl) was used to evaluate Rio Grande silvery minnow and was expressed as $K(tl) = [\text{weight (g)}/\text{total length (mm)}^3] \times 10^5$ (Anderson and Neumann 1996). No previously reported values exist for Rio Grande silvery minnow for comparison, so values are reported as a baseline and to compare within this study only. A three-way analysis of variance was used to test differences between fish total length and condition factor K(tl) between study (aquarium vs. cage), group (VIE color/hatchery), and period in study (day-0 vs. day-28). A Chi-square-test was used to test differences in cage survival between hatcheries.

Post-Augmentation Monitoring

Monitoring of stocked fish involved specific post-stocking surveys at 1-month intervals to determine survival, growth and movement. Monitoring sites were selected to document upstream and downstream movement from release site. These efforts were also used to collect secondary information on fish community structure. Fish were collected with a 3 m x 1.8 m, 3 mm mesh seine. Length of individual seine hauls were measured to the nearest 0.1 meter to estimate sampling effort, which was calculated by multiplying the distance of each seine haul by the width of the seine (3 m). Catch rates for all fish were calculated as number of fish per 100 m^2 sampled. All mesohabitat types were sampled within each site with a minimum of 30 seine hauls at each sampling location, except at high flows when safe wading was difficult or during intermittent conditions when seinable habitat was limited. Water quality parameters were measured (pH, conductivity, water temperature, air temperature, total dissolved solids, and salinity) at each monitoring site, before and after each visit. Standard and total lengths were measured from a minimum of 10 Rio Grande silvery minnow per site, including marked and unmarked individuals. All other fish captured were identified and enumerated for each individual seine haul in the field and subsequently released. Scientific and common names are arranged in phylogenetic order and follow Nelson et al. (2004), except where subspecies are noted. The use of subspecific epithets reflects the importance of geographical subdivisions in evolution.

Table 1. Rio Grande silvery minnow augmentation monitoring site descriptions, 2006.

Site #	Site Name	Description
Angostura Reach		
1	U.S. Highway 550 Bridge	New Mexico, Sandoval County, Rio Grande, RM 203.5
2	Sandia Bosque Line 14	New Mexico, Sandoval County, Rio Grande, Pueblo of Sandia, 1.5 miles downstream of U.S. 550 Bridge crossing, RM 202.0.
3	Sandia PNM Gasline	New Mexico, Sandoval County, Rio Grande, Pueblo of Sandia, 3.6 miles downstream of U.S. 550 Bridge crossing, RM 199.9.
4	Lomitas Negras	New Mexico, Sandoval County, Rio Grande, below Rio Ranch #3 Wastewater Treatment Plant Outfall, RM 198.3
5	Dixon Road	New Mexico, Sandoval County, Rio Grande, at Sandia Wasteway Outfall, RM 196.0
6	Atrisco Outfall	New Mexico, Bernalillo County, Rio Grande, Pueblo of Isleta, 1.9 miles upstream of Isleta Diversion Dam, RM 171.2.
Isleta Reach		
7	Alejandro Gate	New Mexico, Valencia County, Rio Grande, Pueblo of Isleta, 2.7 miles downstream of Isleta Diversion Dam, RM 166.6.
8	Tomé	New Mexico, Valencia County, Rio Grande, 12.6 miles downstream of Isleta Diversion Dam, RM 156.7
9	U.S. Highway 60 Bridge	New Mexico, Socorro County, Rio Grande, 14.1 miles upstream of San Acacia Diversion Dam, RM 130.6
10	Rio Puerco Confluence	New Mexico, Socorro County, Rio Grande, 10.4 miles upstream of San Acacia Diversion Dam, RM 126.5
San Acacia Reach		
11	San Acacia Diversion Dam	New Mexico, Socorro County, Rio Grande, 500 ft. downstream of San Acacia Diversion Dam, RM 116.1
12	Lemitar	New Mexico, Socorro County, Rio Grande, 8 miles downstream of San Acacia Diversion Dam, RM 108.0

Length-Frequency

Standard lengths of captured Rio Grande silvery minnow were compared by sampling trip to evaluate potential differences in growth rates. The Petersen method of length-frequency analysis was used to estimate age groups (Isaac 1990, Devries and Frie 1996). In this method, the frequency of individuals was plotted as a function of 2 mm standard length increments for each monthly monitoring sample. Age was then assigned to each individually measured fish. The known age of recaptured marked and measured Rio Grande silvery minnow was assigned to each individual. Linear regression was used to compare the potential differences between and among marked and unmarked fish by plotting standard length against estimated (or known) ages. The regression coefficient *ß*, or slope was also used as an estimate of instantaneous growth, or in this case monthly growth rate since each sample was spaced approximately one month apart. Student's *t* was used to test the hypothesis about equality of two population regression coefficients, or in this case, the equality of growth rates between and among marked and unmarked Rio Grande silvery minnow. The significance level for length-frequency regression analyses was set at $\alpha = 0.05$.

Survival

Estimates of initial (28-d) survival were obtained from in-stream cage study conducted in fall 2005 (Remshardt 2006) and spring 2006. These 1st month estimates were then combined with recapture rates from subsequent months to construct a survival table and compare relative survival of released fish. Estimates were only calculated during the period of recapture and from sites that had recaptures. Recapture rates take into account tag retention and apparent survival (survival and emigration). Emigration out of the reach of release is not separated from survival, but is estimated to be minimal (2.5%) based on previous recapture data (Remshardt 2006). Differences in monthly recapture rates were used to estimate change in densities and monthly survival. For comparison, monthly recapture estimates from all unmarked individuals was used to estimate unmarked monthly survival.

Movement

Recapture data were used to examine distances traveled and observed recaptures were summarized. In an effort to more accurately assess movement/dispersion of stocked fish, additional recapture information to date (through December 2006) from other researchers in the Middle Rio Grande was included (Appendix A). This additional information included monitoring activities (with permission) from Rio Grande silvery minnow salvage (NMFWCO), Rio Grande silvery minnow population monitoring (American Southwest Ichthyological Research Foundation), Rio Grande silvery minnow fish health collections (NM Ecological Services). These surveys represented collections throughout the current range downstream of Angostura Diversion Dam (RM 209.7) to the upstream portion of Elephant Butte Lake State Park (RM 57.7).

Fish Community

A summary table of fish collections for the study period (January 2006 to December 2006) was constructed with observations made for each species including status of the species (native or introduced), total number of individuals, relative percentage of each species, percent occurrence in individual seine hauls, and density (fish / 100 m^2). Observations were also made on total number of species, total effort, and uncommon species. Most fish names in this report are those in the American Fisheries Society's "A List of Common and Scientific Names of Fishes from the United States and Canada" (Nelson et al. 2004). Updates and use of subspecific names include additional citations.

Habitat Characteristics

Mesohabitats were classified using unique codes to identify their characteristics (Table 2.) Depth, velocity, and substrate descriptions were also noted for each seine haul to further characterize habitat associations (Table 3.) These classifications allowed for an examination of habitat availability and habitat associations by Rio Grande silvery minnow.

Table 2. Mesohabitat and feature definitions used for seine haul descriptions in Rio Grande silvery minnow monitoring.

Mesohabitats
Run – Habitat with direction of flow generally parallel with the adjacent shore. Dominant mesohabitat with varying depths and velocities.
Riffle – Habitat with flow direction generally parallel with the adjacent shore, shallow and with higher gradient than adjacent habitats.
Plunge – A turbulent pool created by water spilling over a feature such as riffle, dune, or debris pile.
Bank – Flowing habitat along a submerged feature similar to shoreline that is parallel to flow.
Confluence – Turbulent pool created at the junction of two flowing channels.
Pool – Habitat with flow direction generally parallel to adjacent shore, deeper and slower than adjacent habitats.
Backwater – Non-flowing habitat found at downstream end of abandoned channels.
Forewater – Non-flowing habitat found at abandoned inlets of high flow channels.
Embayment – Non-flowing habitat, usually associated with shorelines on one boundary and flowing habitats such as runs on the other boundary.
Isolated Pool – An abandoned, off-channel, remnant pool sometimes fed by subsurface flow.
Features
Shoreline – Interface between water and dry land without undercut, angle more than 90 degrees.
Debris Pile – Instream obstruction to flow, commonly formed by tumbleweeds, downed trees, or rootwads.
Eddy – turbulent zone within a mesohabitat, with upstream flow direction
Undercut – Shoreline with angle less than 90 degrees, creating overhead cover.

Table 3. Depth, velocity, and substrate categories used in habitat descriptions.

Depth (meters)
Low – less than 0.3 m, ankle deep
Medium – 0.3 to 0.6 m, knee deep
Deep – greater than 0.6 m
Velocity (meters per second)
0 – 0.0 m/sec, slackwater (no visible current)
Slow – 0.3 m/sec, low velocity
Medium – 0.3 to 0.6 m/sec, average velocity
Deep – greater than 0.6 m/sec, surface tension usually broken and audible
Substrate (dominant particle size in millimeters)
Silt – less than 0.02 mm
Sand – 0.02 to 2 mm
Gravel – 2 to 64 mm
Cobble – 64 to 256 mm
Boulder – greater than 256 mm
Vegetation – substrate covered in vegetation

RESULTS

Augmentation

In 2006, a total of 418,851 Rio Grande silvery minnow were released into the MRGNM (Table 4). This was an increase of 163,583 over 2005 releases. Releases in spring (Age-1 fish) and fall (Age-0 fish) 2006 continued the release strategy employed in fall 2005 by including all three reaches (Angostura, Isleta, and San Acacia) at selected sites which had a relatively low probability of intermittency and thus would provide the highest potential of contributing to the population.

Table 4. Rio Grande silvery minnow releases in 2006 administered by NMFWCO

VIE color	Body Location	Number Released	Release Site (RM)	Release Date
red	right, predorsal	24,405	Bridge Street (181.6)	18-April-2006
green	right, predorsal	22,905	U.S. 550 Bridge (203.5)	18-April-2006
orange	right, predorsal	30,117	San Acacia DD (116.1)	18-April-2006
yellow	right, predorsal	30,893	Rio Puerco (126.5)	18-April-2006
red	left, predorsal	43,841	Bridge Street (181.6)	21-September-2006
green	left, predorsal	44,388	U.S. 550 Bridge (203.5)	21-September-2006
orange	left, predorsal	30,349	San Acacia DD (116.1)	16-October-2006
yellow	left, predorsal	30,385	Rio Puerco (126.5)	21-September-2006
-	-	51,158	San Marcial (68.6)	13-October-2006
-	-	2,500	San Marcial (68.6)	3-November-2006
-	-	107,910	San Marcial (68.6)	21-November-2006
TOTAL		**418,851**		

Condition, Survival, and Tag Retention

At day-0, TL of fish ranged from 31.0 mm to 64.0 mm and there was a significant interaction between study (aquarium vs. cage) and group (VIE color/hatchery) ($F_{3,229} = 5.00$, $P = 0.0022$). There was no difference in TL between hatchery source ($F_{1,229} = 0.92$, $P = 0.3388$). At day-0, condition factor ranged from 0.21 to 1.72. Biopark fish had significantly higher mean condition factor than Dexter ($F_{1,229} = 10.71$, $P = 0.0012$).

At day-28, TL of fish ranged from 33.7 mm to 55.3 mm and there were no overall significant length differences. There was no difference in TL between hatchery sources. Between day-0 and day-28, TL showed no overall significant change. At day-28, condition factor ranged from 0.35 to 2.00. Between day-0 and day-28 there was a significant interaction between time, study (cage/aquaria), and group (VIE color) ($F_{3,309} = 4.15$, $P = 0.0066$), and results are described accordingly. Between day-0 and day-28, mean condition factor significantly increased in each of the aquaria (control) groups, and in one (Yellow, Biopark) of the cage groups (Table 5).

Table 5. Change in condition factor during post-release study of Rio Grande silvery minnow.* indicates significant difference.

	Aquaria (control)				Cage (river)			
	DX-G	BP-O	DX-R	BP-Y	DX-G	BP-O	DX-R	BP-Y
ΔKtl	0.2752	0.6140	0.6842	0.8900	0.0845	.0656	-.0090	0.1342
P	0.0074*	<0.0001*	<0.0001*	<0.0001*	0.2364	0.3744	0.8871	0.0326*

Overall survival (including individuals with tag loss) on day-28 was 68.3% for cage fish. Mean survival of fish that retained VIE tags on day-28 was 61.5% for cage fish. During initial weight and measurement collection for the control fish, excessive anesthetization resulted in high mortality and lowered results for controls. Survival rates for aquarium fish therefore was not reported due to excessive mortality from anesthesia and would not have represented the control group as defined.

Habitat conditions at the site were consistent throughout the study. Discharge estimates from the nearest U.S. Geological Survey gage located 6.4 miles upstream (Rio Grande at Albuquerque, station 08330000), ranged between 494 and 602 cfs (Figure 2). Because of the placement of the study site, at no time during the study were the livecars in danger of being flooded or drying at the reported discharges. There was no significant difference in pooled cage survival between hatchery source ($\chi^2 = 0.48$, df = 1, P = 0.49). Of remaining live fish, overall tag retention was 88.9%.

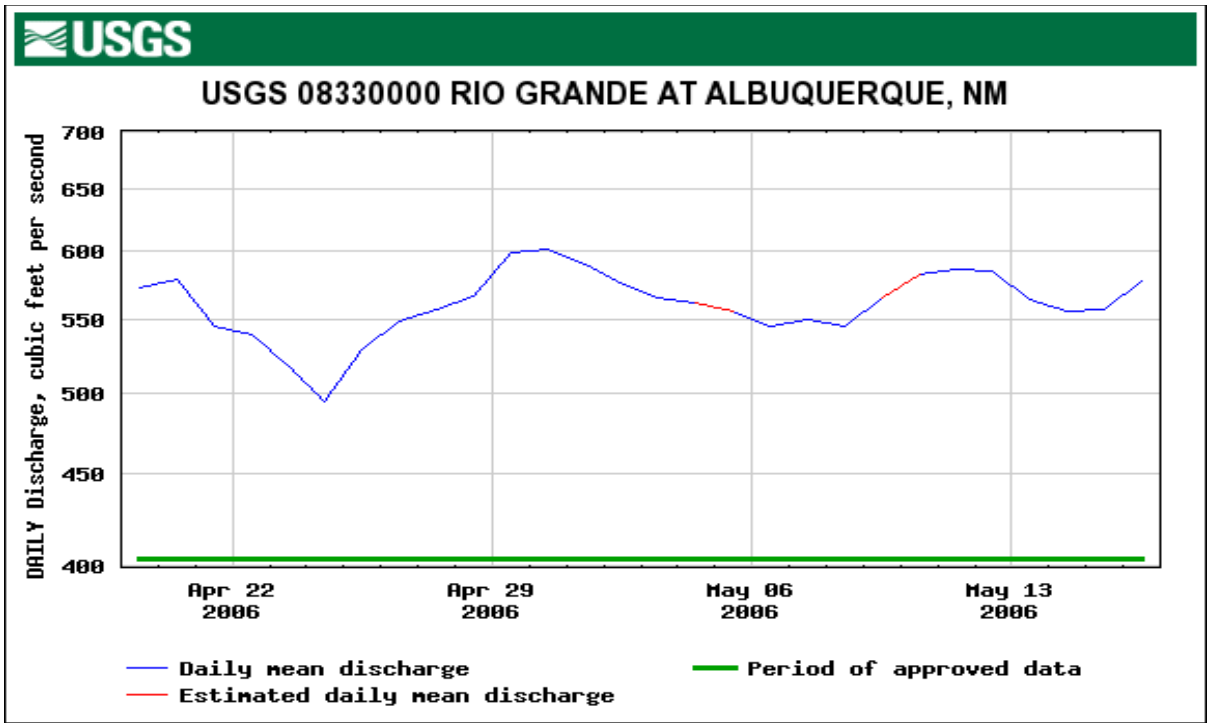

Figure 2. Discharge estimates from the Rio Grande at Albuquerque gage during the instream cage experiment.

Post-Augmentation Monitoring

There were a total of 8,375 Rio Grande silvery minnow collected between January and December 2006 (Table 6), including 298 positively identified as previously released individuals (Table 7). Recapture rates (0.05 – 0.15%), while low, have been consistent during augmentation monitoring. Results for riverwide density and survival estimates extrapolated from recapture rates for VIE marked fish should therefore be taken with caution.

Rio Grande silvery minnow represented 31.0% of all fish captured, were collected in 17.8% of all seine hauls with an overall catch rate of 8.10 individuals/100 m^2 (Table 6). Of 298 marked individuals recaptured, 72% (n=216) were recaptures in October-December following the fall 2006 releases. Over the sampling period, catch rates varied for Rio Grande silvery minnow, with the largest collection of 3,098 individuals occurring in April 2006. Marked individuals were captured in every month. Catch rates varied among sites, with the highest number of marked Rio Grande silvery minnow recaptures (N = 49) occurring at RM 126.5 (Rio Puerco confluence) in the lower Isleta Reach. The largest collections (N = 2,661) of adult unmarked Rio Grande silvery minnow were at RM 196.0 (Below Isleta diversion dam), with the largest young of year collections (N = 1,000) at RM 196.0 (Below Isleta diversion dam)

Table 6. Status, numbers, percent of total, percent occurrence, and density for all species collected at all sites combined in 2006 in Rio Grande, New Mexico. For status, N=native and I=introduced. Subspecific names include citations below.

Species	Status	N	% of Total	Percent Occurrence	Density (fish/100m^2)
gizzard shad *Dorosoma cepedianum*	I	1	<0.1	<0.1	<0.01
threadfin shad *Dorosoma petenense*	I	2	<0.1	0.1	<0.01
red shiner *Cyprinella lutrensis lutrensis*	N	8,751	32.5	18.6	8.47
common carp *Cyprinus carpio*	I	455	1.7	2.6	0.44
Rio Grande silvery minnow *Hybognathus amarus*	N	8,375	31.1	17.8	8.10
fathead minnow *Pimephales promelas*	N	1,399	5.2	7.9	1.35
bullhead minnow *Pimephales vigilax*	I	66	0.2	0.3	0.06
flathead chub *Platygobio gracilis gulonella*[a]	N	1,384	5.1	11.5	1.34
longnose dace *Rhinichthys cataractae cataractae*[b]	N	560	2.1	5.1	0.54
river carpsucker *Carpiodes carpio elongatus*[c]	N	980	3.6	3.3	0.95
white sucker *Catostomus commersoni*	I	2,894	10.8	5.7	2.80
black bullhead *Ameiurus melas*	I	2	<0.1	0.1	<0.01
yellow bullhead *Ameiurus natalis*	I	22	0.1	0.3	0.02
channel catfish *Ictalurus punctatus*	I	953	3.5	9.1	0.92
western mosquitofish *Gambusia affinis*	I	976	3.6	4.5	0.94
white bass *Morone chrysops*	I	13	<0.1	0.2	0.01
green sunfish *Lepomis cyanellus*	I	9	<0.1	0.2	0.01
bluegill *Lepomis macrochirus speciosus*[d]	N	15	0.1	0.3	0.01
largemouth bass *Micropterus salmoides*	I	17	0.1	0.3	0.02
white crappie *Pomoxis annularis*	I	16	0.1	0.2	0.02
yellow perch *Perca flavescens*	I	9	<0.1	0.2	0.01
bigscale logperch *Percina macrolepida*	I	1	<0.1	<0.1	<0.01
walleye *Sander vitreus*	I	14	0.1	0.3	0.01
TOTAL		26,914	100.0	46.92	26.03

[a] Olund and Cross (1961)
[b] Jenkins and Burkhead (1993)
[c] Trautman (1981)
[d] Hubbs and Lagler (1958), Avise and Smith (1974)

Table 7. Number of marked Rio Grande silvery minnow recaptured by site between January and December 2006, identified by release season-year (total marked released).

Site	River Mile	RGSM recaptures by release period			
		Spring 05 (73,185)	Fall 05 (182,032)	Spring 06 (108,320)	Fall 06 (148,963)
U.S. 550 Bridge	203.8	0	0	14	22
Sandia Line 14	202.0	0	4	6	16
Sandia PNM Gasline	199.9	0	3	12	21
Lomitas Negras	198.3	0	0	7	22
Dixon Road	195.5	1	1	0	25
Atrisco Outfall	171.2	0	0	0	0
Alejandro Gate	166.6	1	0	0	0
Tome	156.7	0	0	0	0
U.S. 60 Bridge	130.6	0	3	0	0
Rio Puerco Confl.	126.5	0	8	2	39
Below SADD	116.1	0	2	7	37
Lemitar	108.0	0	10	1	34
2006	-	2	31	49	216
Previous (< 2006)		50	97	-	-
Total		**52**	**128**	**49**	**216**
Percent Recapture		**0.07%**	**0.07%**	**0.05%**	**0.15%**

Length-Frequency

There were 955 unmarked and 246 marked Rio Grande silvery minnow in the length-frequency dataset captured between January and December 2006. Monthly growth rate for unmarked Rio Grande silvery minnow was 2.25 mm/month. Monthly growth rate for marked Rio Grande silvery minnow was 0.79 mm/month and was significantly different ($P < 0.05$) from unmarked fish ($F=2232.2$, 1203 df) (Figure 3). There were no differences between growth rates of the fall (September –November, N = 193) versus spring (April, N = 53) releases.

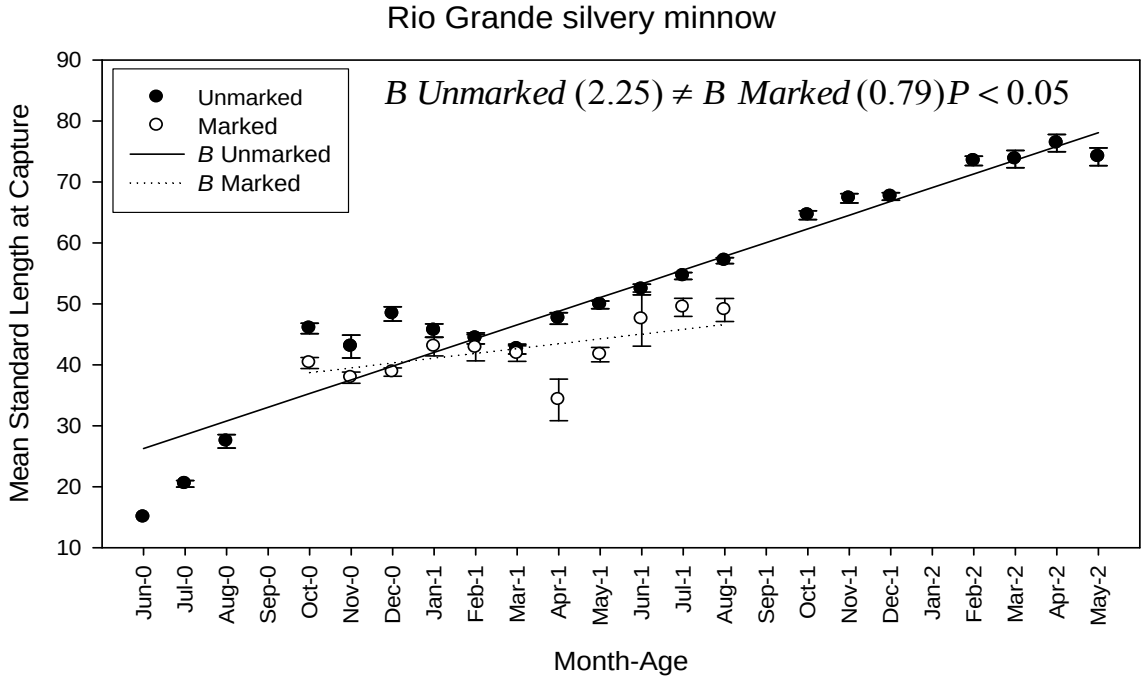

Figure 3. Comparison of Rio Grande silvery minnow standard lengths at recapture between unmarked (wild) and marked. Numbers associated with months indicate age of fish (e.g., May-1 represents age 1 fish captured in May)

Upon examination of length-frequency data by month, there appeared to be a minimum of two age classes of Rio Grande silvery minnow at any one time, generally represented by ages 1 and 2 individuals between January and June and ages 0 and 1 between July and December (Figures 4-5). A strong 2005 year-class was well represented throughout 2006. Recruitment was documented in all three reaches with highest age-0 catch rates in the Isleta Reach. The largest RGSM observed in 2006 (75 mm SL) was at Lemitar in November (n=1) and below San Acacia diversion dam (n=1) in December.

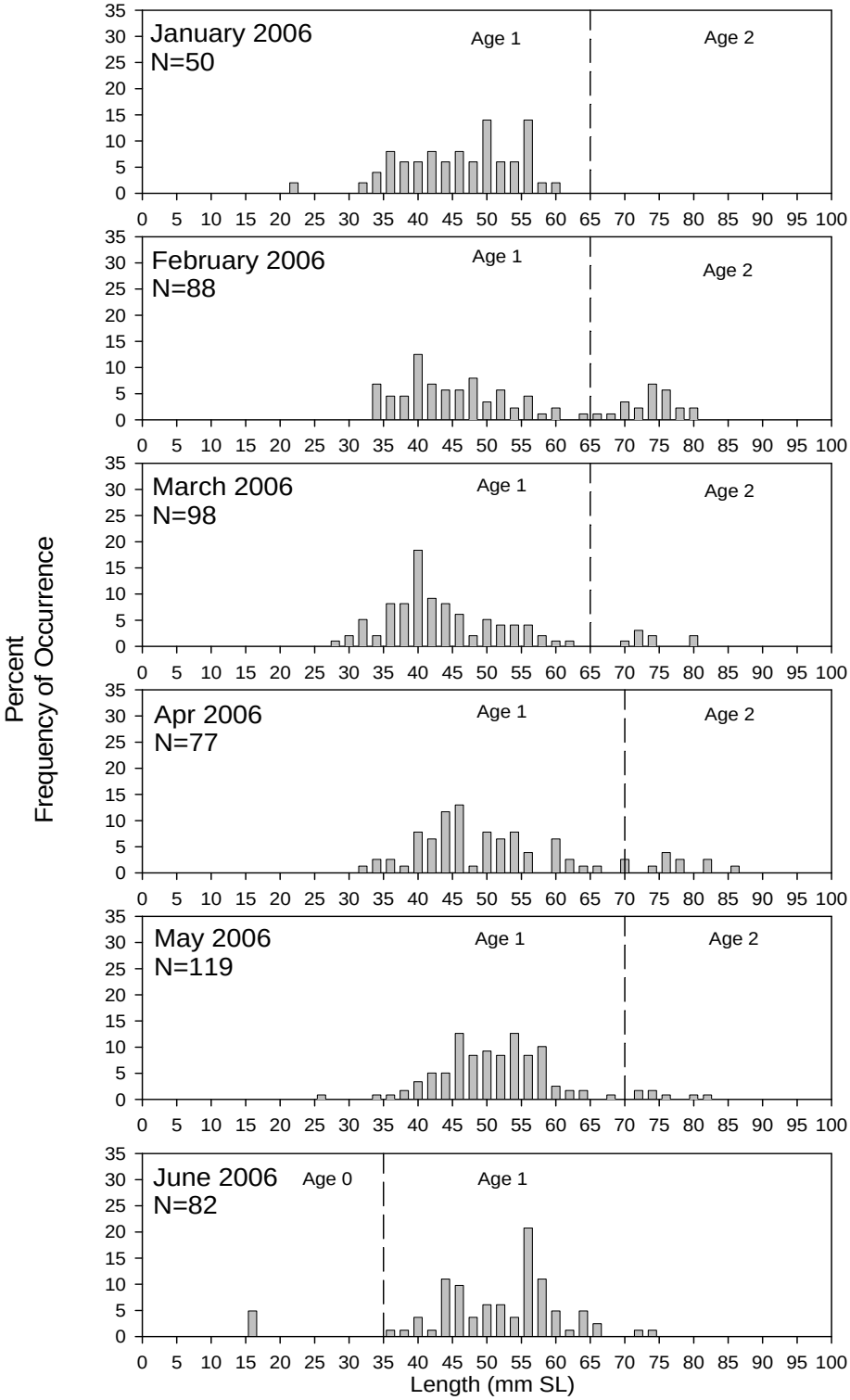

Figure 4. Length-frequency histograms of unmarked Rio Grande silvery minnow captured between January and June 2006. Dashed lines represent estimated breaks between year classes.

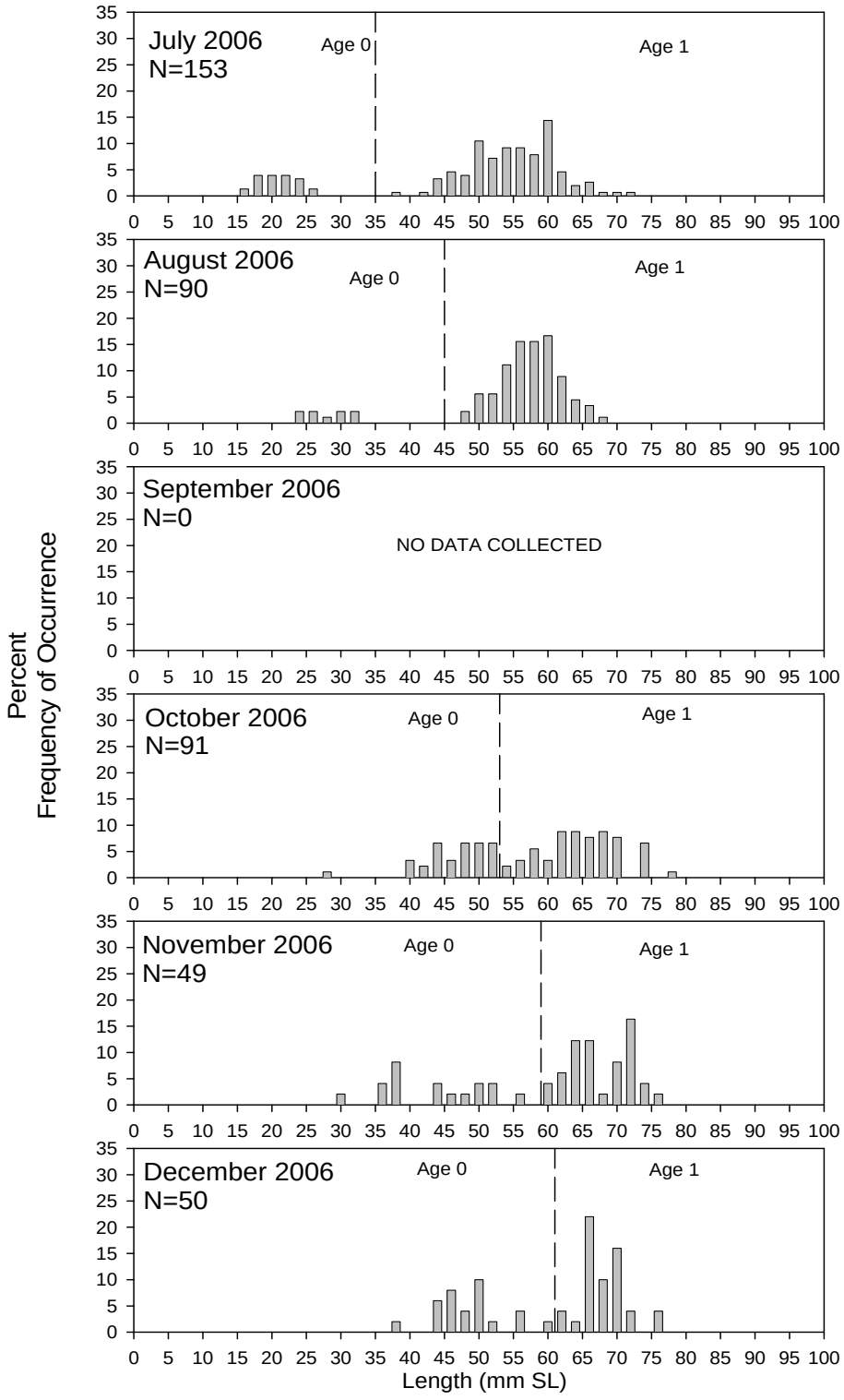

Figure 5. Length-frequency histograms of unmarked Rio Grande silvery minnow captured between July and December 2006. Dashed lines represent estimated breaks between year classes.

Survival

Survival estimates from the cage study were combined with recapture rates from monthly monitoring to construct a survival table and compare relative survival of released fish. As reported earlier (Instream Cage Study) 28-d cage survival was estimated at 71.5% for the spring releases. These results are conservative as they do not include those fish that may have lost their VIE tag but were still alive and/or migrated out of the sampling area. Both factors (tag retention > 95%, emigration < 5%) would be expected to have little effect on results but would increase survival estimates. Similarly, fall release 28-d survival was estimated at 68.3%. The monthly survival estimate from VIE marked individuals released in November 2005 was 64.0%. Between November and the following July, that represents and expected survival rate of 1.8%. For the April 2006 release, a linear regression model estimated varied survival by month (25.1%-57.2%). Life tables (Tables 8-9) were constructed to model survival and estimate numbers. Estimated 3-month and 6-month survival rates for the November 2005 release were 18.0% and 5.0%. Similar rates for the April 2006 release were not possible to estimate based on a lower recapture rates (apparent survival) past 2-months after release.

Table 8. Life table of VIE marked Rio Grande silvery minnow released November 2005.

Month	Begin	Survival Rate (estimate = p)	End	RGSM / 100 m^2
November	**161,835**	0.683 (cage)	110,533	1.4594
December	110,533	0.6375 (density)	70,465	0.9304
January	70,465	0.6375 (density)	44,921	0.5932
February	44,921	0.6375 (density)	28,637	0.3782
March	28,637	0.6375 (density)	18,256	0.2411
April	18,256	0.6375 (density)	11,638	0.1537
May	11,638	0.6375 (density)	7,419	0.0980
June	7,419	0.6375 (density)	4,730	0.0625
July	4,730	0.6375 (density)	3,015	0.0398

density (r^2 = 0.75), Log10
* Total released November 2005

Table 9. Life table of VIE marked Rio Grande silvery minnow released April 2006.

Month	Begin	Survival Rate (estimate = p)	End	Density / 100 m^2
April	**108,320***	0.715 (cage)	77,449	0.4963
May	77,489	0.572 (density)	44,288	0.2838
June	44,288	0.251 (density)	11,127	0.0713

Density (r^2=0.98), Linear
*Total released April 2006

Movement

Examination of recapture data in 2006 indicated that fish movement was generally downstream following release and over 90% of recaptures were within 10 miles downstream of the release site (Figure 6). Eighty percent of recaptures occurred less than 100 days after release. Maximum distance traveled from release to recapture was 103.5 miles (US 550 Bridge) downstream across Isleta and San Acacia diversion dams to near Socorro, 148 days after release.

Upstream movement was minimal, but some individuals were documented upstream from release locations, including one recapture 23.4 miles upstream of the release site (US 60 Bridge) 256 days after release. Upstream movement was also documented for the first time from fish released at 550 Bridge in Sandoval County (Appendix A).

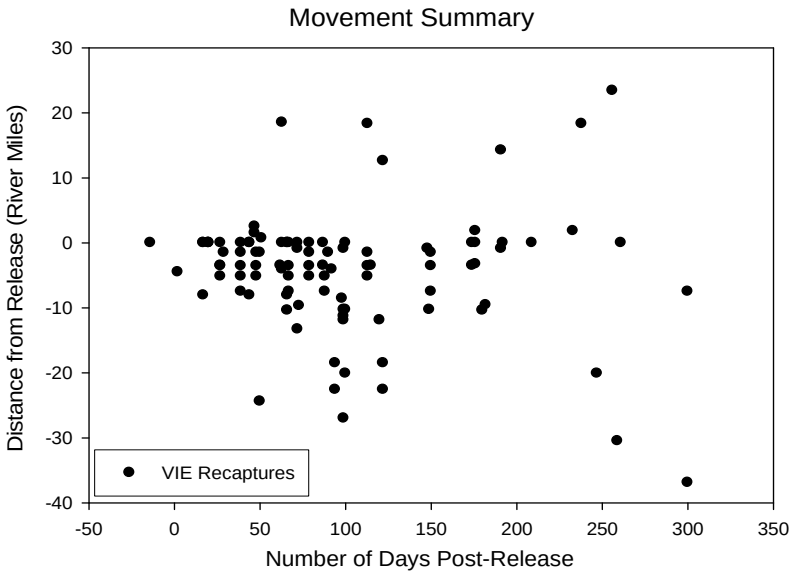

Figure 6. Movement summary for released Rio Grande silvery minnow 2006

Fish Community

From January to December 2006, 3,888 seine hauls totaling 103,371 m^2 were conducted. In these samples, 26,914 individuals representing 23 species were collected (Table 6). Native cyprinids such as red shiner (*Cyprinella lutrensis lutrensis*) (Matthews 1987), Rio Grande silvery minnow, fathead minnow (*Pimephales promelas*), flathead chub (*Platygobio gracilis gulonella*) (Olund and Cross 1961), and longnose dace (*Rhinichthys cataractae cataractae*) (Jenkins and Burkhead 1993) represented 71.0% of all individuals collected. Red shiner, the numerically most dominant species of the fish community, accounted for 33.0% of all fish collected. Of interest was the presence of two apparently recently introduced species, bullhead minnow (*Pimephales vigilax*) and bigscale logperch (*Percina macrolepida*) (Davenport and Remshardt 2008).

Habitat Characteristics

A wide variety of habitats were sampled in order to accurately represent the range of habitat availability in the Rio Grande. No distinctions in habitat associations between marked and unmarked Rio Grande silvery minnow were observed. Summaries therefore reflect Rio Grande silvery minnow collections as a whole. Mesohabitats that were associated (higher proportion than found in all samples) with Rio Grande silvery minnow collections included low velocity habitats such as pools, backwaters, isolated pools, and embayments (Figure 7). Rio Grande

silvery minnow were associated with mesohabitats that included features such as shorelines, debris piles, eddy shorelines, and vegetation (Figure 8).

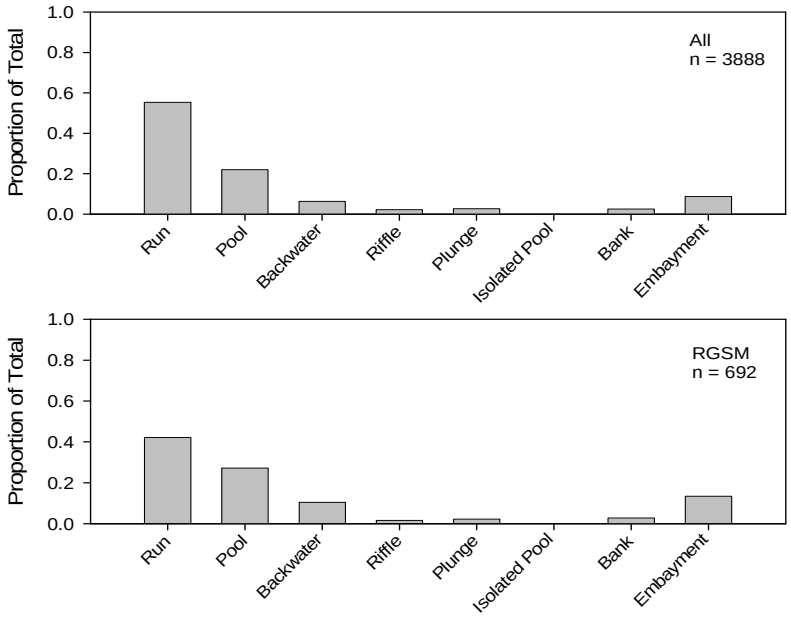

Figure 7. Proportion of total mesohabitat types associated with all (top) and RGSM samples (bottom).

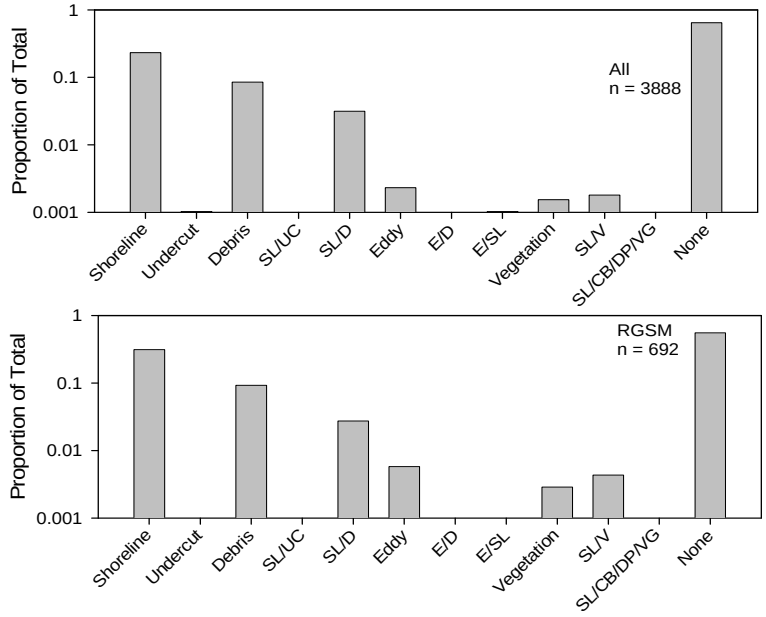

Figure 8. Proportion of total features associated with all (top) and RGSM (bottom) samples. Abbreviations for combinations of features are shoreline (SL), Undercut (UC), Debris (D), Eddy (E), and Vegetation (V). Proportion of total in log scale for comparison.

The overall distribution of substrate types reflected the dominance of sand in the Rio Grande (Figure 9). Sand dominated all sites but was found in smaller proportion of Rio Grande silvery minnow collections (60%) than available (50%). In comparison, Rio Grande silvery minnow were associated with silt substrate (40%) more than available (27%).

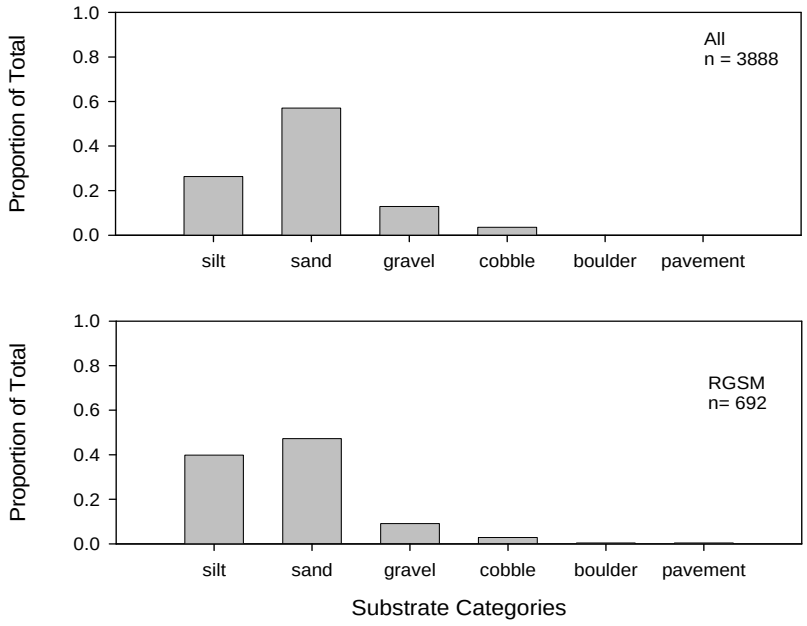

Figure 9. Proportion of total substrate observations in all samples and in samples with Rio Grande silvery minnow between January 2006 and December 2006.

DISCUSSION

Augmentation efforts between January and December 2006 concluded the fifth year in the Middle Rio Grande, New Mexico. Since 2002, 981,736 Rio Grande silvery minnow have been released. Cumulative effects of these releases resulted in increased numbers of Rio Grande silvery minnow collected throughout the occupied range. Standard population monitoring conducted throughout the current range of the species indicated similar results (Dudley and Platania 2005).

There appeared to be annual variation in length at age, likely caused by differences in habitat conditions or population density between 2006 and previous years. Between 2003 and 2005, there was a slight decrease of 5-10 mm/month of average standard lengths of age 0 individuals. This corresponded to increased catch rates, indicating that there may be density-dependant growth effects, especially at the highest densities which would increase competition for resources.

In 2006, growth rates for unmarked fish were dissimilar to those observed in 2004-2005 (Remshardt 2006). In 2004-2005, growth rates for VIE marked fish were higher (2.2 mm/month) than for unmarked fish (2.0 mm/month). Smaller sample sizes and narrower range of dates for recapture in 2006 may explain some of this difference. No VIE fish were recaptured

in September or October 2006 that could be attributed to earlier stockings (i.e., previous fall or spring). Typically, higher growth rates are observed in late summer when conditions (warmer temperatures and higher productivity) are most favorable. Also of interest in 2006 was the fact that marked fish were approximately 5mm smaller during each sampling period. This result was also unique to the 2006 dataset and not previously observed. Possible reasons for these changes include reduced fitness of hatchery fish compared to wild fish, especially when compared to overall catch rates for Rio Grande silvery minnow. By October 2003, catch rates were near their lowest levels recorded from population monitoring (Dudley, et al. 2004). This corresponded with the expansion of the augmentation program and the relative percentage of marked to unmarked adult fish in the wild was at its highest. Favorable conditions in 2005 resulted in increased catch rates that carried over to 2006. The effectiveness of augmentation at these higher base population levels might be reduced and explain different results observed in 2006. Future trends in growth and survival should be monitored closely for comparison.

Survival estimates from the instream cage experiment and recapture rates showed similar survival rates between marked individuals and previously reported rates for wild fish in 2004-2005 (0.647) (Remshardt 2006). Similar survival rates can be expected in future augmentation efforts for Rio Grande silvery minnow under similar conditions. Future analyses could include verification of the survival estimates by combining the movement data with habitat availability. Expected densities (recapture rates) could be computed based on river surface-area estimates and mesohabitat use models.

Similar results on recapture rates and survival estimates have been reported for an augmentation program for the Colorado pikeminnow (*Ptychocheilus lucius*) from the San Juan River (Ryden 2008). Between 2002 and 2007, over 1,200,000 age-0 hatchery-raised Colorado pikeminnow have been stocked into the San Juan River, with 507 recaptures during adult monitoring trips (0.04%). Survival estimates from fall stockings were also similar for Colorado pikeminnow after 12 months (0.31%) compared with Rio Grande silvery minnow after 8 month (1.8%). These are of course different species in different systems with different monitoring methods; nonetheless, it represents a comparison for similarly scaled augmentation programs.

Higher survival rates and extended recapture information further suggests fall stockings are more beneficial than spring stockings. In addition, stocking in fall allows for several months of dispersal and mixing with the wild population and adjustment to environmental cues needed for spawning. The primary goal for augmentation is to increase the successful spawning population, not just to increase the numbers of fish in the river. A spring fish stocking may increase numbers of fish in the river at spawning time, but their subsequent lower survival and timing for a successful spawn is likely less than individuals that have properly acclimated to natural riverine conditions.

Movement information from this study builds on similar results collected in 2002 by Platania et al. (2003). Recapture rates at or downstream of release sites were higher (95% compared to 77%) but still indicated that released fish exhibited some downstream dispersal. Recaptures from this study and others in 2006 (Appendix A) indicate maximum distance traveled of 36.9 miles downstream while Platania et al. (2003) recorded maximum downstream dispersal of 15.6

miles. Similarly, recapture rates of marked fish were negatively correlated with distance from respective release site (Platania et al. 2003).

Total number of species (n=23) collected represented an increase of two species over previous years, with the addition of bullhead minnow and bigscale logperch. These two species were collected exclusively in the San Acacia reach. Rio Grande silvery minnow population monitoring (Dudley and Platania 2007) and Elephant Butte Reservoir monitoring (Davenport and Remshardt 2008) previously documented their presence. With the exception of red shiner, catch rates of most species decreased in 2006 compared to previous years (Remshardt 2006). These changes in species densities were likely a result of the lowered spring discharges in 2006 which favors non-fluvial species such as red shiner to the exclusion of fluvial species such as Rio Grande silvery minnow (Remshardt et al. 2003). It is tolerant of intermittent flow, and is opportunistic in reproductive behavior, using highly variable sites for egg deposition throughout spring and summer (Cross et al. 1985). The combination of spring flows not favorable for Rio Grande silvery minnow and intermittent summer flows allowed a resurgence of red shiner.

Genetic monitoring suggests released fish are contributing to increased genetic diversity, especially in the Angostura Reach (Turner and Osborne 2006). Unknown contributions from second and third generation released individuals downstream have undoubtedly been negatively affected by intermittency.

We began releasing Rio Grande silvery minnow in lower reaches (Isleta and San Acacia) in fall of 2005. In 2006, we were able to complete initial evaluation from these other releases for potential differences in survival and site retention. There appeared to be similar recapture probabilities in these lower reaches as in Angostura Reach. Releases from the Angostura Reach near Bernalillo continued to produce the most recaptures indicating release habitats near this site were highly favorable for survival.

Status and distribution of Rio Grande silvery minnow in Cochiti Reach must be further documented to accurately assess status of the species. Cochiti Reach has not been sampled since 1994 (Platania 1995). Rio Grande silvery minnow may still be present in Cochiti Reach, although likely reduced in abundance compared with historic collections. Within Cochiti Reach, Rio Grande silvery minnow were last collected on Cochiti Pueblo in 1988 (Platania 1993), and on Santo Domingo and San Felipe Pueblos in 1994 (Platania 1995). Sampling would require permission from and cooperation with Cochiti, Santo Domingo, and San Felipe Pueblos. Surveys since 1992 indicate that populations in Angostura, Isleta, and San Acacia reaches continued to decline through 2003, with increases noted in 2005 and 2006 in response to favorable hydrological conditions and augmentation.

Egg dispersal models predicted that the vast majority of reproductive effort would be transported hundreds of kilometers downstream during typical spawning conditions in the Rio Grande (Dudley 2004). This fact coupled with the frequency of surface flow intermittency in downstream reaches suggest that long-term persistence of Rio Grande silvery minnow in the Middle Rio Grande, New Mexico will likely depend, in part, on continued augmentation.

RECOMMENDATIONS

From research and monitoring conducted since 2002, we have continued to modify our recommendations for stocking Rio Grande silvery minnow based on annual results. Items 1-3 are same as previous year's recommendations, with items 4-6 updated with results from 2006.

1. Release fish in October/November, minimum 40 mm SL.

2. Release fish during daylight hours.

3. Only fish from augmentation program should be released. (i.e., no salvage transport to upstream reaches).

4. Target specific areas for release, expecting > 90% of surviving individuals to disperse downstream no more than 10 -15 miles.

5. Target preferred densities at spawning (May-June) expecting monthly survival rates of 65%, with annual survival rates of 0.5%.

6. Prescribe stocking densities based on base population densities, expecting higher success at lower base densities and lower success at higher base densities

As a direct result of this project, nearly 1,000,000 Rio Grande silvery minnow have been released into Rio Grande since 2002. These efforts continued in 2007 and from this information we will continue to provide best stocking guidance to aide in the conservation of Rio Grande silvery minnow. Secondary information is also being collected on survival, growth, and retention of released fish. Direct and indirect information indicates that hatchery raised individuals can be released with excellent retention (97.5%) in original release reach, can expect survival of up to 2 years after release at lower base densities (Remshardt 2006) and ultimately can contribute to future spawning efforts.

With 2007 data, we will be focusing on increasing initial survival through the use of soft-release methods. With the implementation of a soft-release strategy in the future, we are hoping to increase survival rates of stocked fish to near 90% for the first month. Soft-release methods will include holding the fish in livecars for up to 24-h at the release site to allow recovery from the stressors of handling and hauling. All this work will assist future conservation while providing active management strategies for the Middle Rio Grande and potential re-establishment sites.

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Appendix A.
Recapture information of Rio Grande silvery minnow in 2006 from augmentation monitoring and other researchers. * calculated as the minimum unidirectional distance between release and recapture points within the river channel. + (with no RM) indicates privileged information but represents upstream movement.

Field #	N	Recapture Date	Release Date	Days Post-Release	River Mile release	River Mile recapture	Distance Traveled (RM)*
Purple Right Anal, 12 April 2005							
WJR06-388	1	2/6/2006	4/12/2005	300	203.5	196.0	-7.5
Blue Left Anal, 13 April 2005							
WJR06-395	1	2/7/2006	4/13/2005	300	203.5	166.6	-36.9
Orange Right Dorsal, 12 September 2005							
RKD06-038	1	2/16/2006	11/8/2005	100	203.5	183.4	-20.1
ES-Salvage	1	4/5/2006	11/8/2005	148	203.5	100.0	-103.5
RKD06-142	1	7/13/2006	11/8/2005	247	203.5	183.4	-20.1
WJR06-464	1	7/25/2006	11/8/2005	259	203.5	173.0	-30.5
WJR06-468	1	7/27/2006	11/8/2005	261	203.5	203.5	0
White Left Dorsal, 7 November 2005							
RKD06-071	1	4/4/2006	11/7/2005	148	108.0-100.4	114.6	6.6
Purple Left Dorsal, 7 November 2005							
WJR06-378	3	1/9/2006	11/7/2005	63	130.6	126.5	-4.1
WJR06-379	3	1/9/2006	11/7/2005	63	130.6	130.6	0.0
RKD06-011	1	1/18/2006	11/7/2005	72	130.6	130.6	0.0
WJR06-393	5	2/7/2006	11/7/2005	92	130.6	126.5	-4.1
WJR06-396	2	2/9/2006	11/7/2005	94	130.6	108.0	-22.6
RKD06-055	1	3/9/2006	11/7/2005	122	130.6	143.2	12.6
WJR06-411	2	3/9/2006	11/7/2005	122	130.6	108.0	-22.6
Pink Left Dorsal, 7 November 2005							
RKD06-010	1	1/18/2006	11/7/2005	72	100.4	87.1	-13.3
RKD06-011	9	1/18/2006	11/7/2005	72	100.4	99.5	-0.9
RKD06-028	1	2/14/2006	11/7/2005	99	100.4	99.5	-0.9
RKD06-070	1	4/4/2006	11/7/2005	148	100.4	99.5	-0.9
RKD06-095	1	5/17/2006	11/7/2005	191	100.4	99.5	-0.9
RKD06-096	1	5/17/2006	11/7/2005	191	100.4	114.6	14.2
Blue Left Dorsal, 7 November 2005							
RKD06-014	1	1/19/2006	11/7/2005	73	130.6-126.5	116.8	-9.7
WJR06-396	1	2/9/2006	11/7/2005	94	130.6-126.5	108.0	-18.5
RKD06-028	1	2/14/2006	11/7/2005	99	130.6-126.5	99.5	-27
RKD06-029	1	2/14/2006	11/7/2005	99	130.6-126.5	114.6	-11.9
RKD06-030	1	2/15/2006	11/7/2005	100	130.6-126.5	116.2	-10.3
RKD06-050	1	3/7/2006	11/7/2005	120	130.6-126.5	114.6	-11.9
WJR06-411	3	3/9/2006	11/7/2005	122	130.6-126.5	108.0	-18.5
RKD06-072	1	4/5/2006	11/7/2005	149	130.6-126.5	116.2	-10.3
WJR06-425	2	5/6/2006	11/7/2005	180	130.6-126.5	116.1	-10.4
ES-Salvage	1	7/21/2006	11/7/2005	256	130.6-126.5	154.0	23.4

Field #	N	Recapture Date	Release Date	Days Post-Release	rm release	rm recapture	Distance Traveled (RM)*
Purple Right Dorsal, 8 November 2005							
WJR06-440	1	6/5/2006	11/8/2005	209	203.5-189.0	201.0	0
Pink Right Dorsal, 8 November 2005							
WJR06-453	1	7/4/2006	11/8/2005	238	181.6	199.9	18.3
WJR06-391	2	2/6/2006	11/8/2005	90	203.5	202.0	-1.5
RKD06-038	1	2/15/2006	11/8/2005	99	203.5	183.4	-10.3
WJR06-416	1	4/7/2006	11/8/2005	150	203.5	196.0	-7.5
WJR06-419	1	4/7/2006	11/8/2005	150	203.5	202.0	-1.5
WJR06-420	2	4/7/2006	11/8/2005	150	203.5	199.9	-3.6
RKD06-104	1	5/19/2006	11/8/2005	192	203.5	203.5	0
WJR06-442	1	6/6/2006	11/8/2005	210	203.5	108.0	-95.5
Red Right Dorsal, 18 April 2006							
WJR06-464	1	7/25/2006	4/18/2006	98	181.6	173.0	-8.6
WJR06-478	1	8/9/2006	4/18/2006	113	181.6	199.9	18.3
Green Right Dorsal, 18 April 2006							
RKD06-088	3	5/15/2006	4/18/2006	27	203.5	200.0	-3.5
WJR06-432	3	5/15/2006	4/18/2006	27	203.5	198.3	-5.2
WJR06-433	13	5/15/2006	4/18/2006	27	203.5	203.5	0
WJR06-435	2	5/15/2006	4/18/2006	27	203.5	199.9	-3.6
WJR06-438	1	6/5/2006	4/18/2006	48	203.5	198.3	-5.2
WJR06-440	2	6/5/2006	4/18/2006	48	203.5	202.0	-1.5
WJR06-441	3	6/5/2006	4/18/2006	48	203.5	199.9	-3.6
RKD06-126	3	6/19/2006	4/18/2006	62	203.5	200.0	-3.5
WJR06-453	1	7/6/2006	4/18/2006	79	203.5	199.9	-3.6
WJR06-454	1	7/6/2006	4/18/2006	79	203.5	202.0	-1.5
WJR06-455	1	7/6/2006	4/18/2006	79	203.5	203.5	0
WJR06-456	1	7/6/2006	4/18/2006	79	203.5	198.3	-5.2
RKD06-146	2	7/14/2006	4/18/2006	87	203.5	203.5	0
RKD06-147	2	7/14/2006	4/18/2006	87	203.5	200.0	-3.5
WJR06-466	1	7/26/2006	4/18/2006	99	203.5	192.2	-11.3
WJR06-468	8	7/27/2006	4/18/2006	100	203.5	203.5	0
WJR06-478	5	8/9/2006	4/18/2006	113	203.5	199.9	-3.6
WJR06-479	3	8/9/2006	4/18/2006	113	203.5	202.0	-1.5
WJR06-481	2	8/9/2006	4/18/2006	113	203.5	198.3	-5.2
RKD06-168	4	8/11/2006	4/18/2006	115	203.5	200.0	-3.5
RKD06-192	36	10/9/2006	4/18/2006	174	203.5	203.5	0
RKD06-192	2	10/9/2006	4/18/2006	174	203.5	200.0	-3.5
DFH07-01	1	10/11/2006	4/18/2006	176	203.5	203.5	0
Orange Right Dorsal, 18 April 2006							
WJR06-425	7	5/8/2006	4/18/2006	20	116.1	116.1	0
RKD06-096	1	5/17/2006	4/18/2006	29	116.1	114.6	-1.5
WJR06-442	1	6/6/2006	4/18/2006	49	116.1	108.0	-8.1

Field #	N	Recapture Date	Release Date	Days Post-Release	rm release	rm recapture	Distance Traveled (RM)*
Yellow Right Dorsal, 18 April 2006							
RKD06-071	1	4/4/2006	4/18/2006	-14	126.5	126.5	0
WJR06-426	2	5/8/2006	4/18/2006	20	126.5	126.5	0
Red Left Dorsal, 21 September 2006							
RKD06-209	9	10/11/2006	4/18/2006	176	181.6	178.3	-3.3
RKD06-210	3	10/11/2006	4/18/2006	176	181.6	183.4	1.8
WJR06-495	4	10/17/2006	4/18/2006	182	181.6	172.0	-9.6
RKD06-308	4	12/7/2006	4/18/2006	233	181.6	183.4	1.8
Green Left Dorsal, 21 September 2006							
SRD06-060	74	10/11/2006	9/21/2006	20	203.5	203.5	0
WJR06-501	8	10/30/2006	9/21/2006	39	203.5	196.0	-7.5
WJR06-502	12	10/30/2006	9/21/2006	39	203.5	198.3	-5.2
WJR06-503	19	10/30/2006	9/21/2006	39	203.5	203.5	0
WJR06-504	16	10/30/2006	9/21/2006	39	203.5	202.0	-1.5
WJR06-505	10	10/30/2006	9/21/2006	39	203.5	199.9	-3.6
SAGRF-3	12	11/7/2006	9/21/2006	47	203.5	+	+
SAISLAND	3	11/7/2006	9/21/2006	47	203.5	+	+
WJR06-513	11	11/27/2006	9/21/2006	67	203.5	199.9	-3.6
WJR06-515	3	11/27/2006	9/21/2006	67	203.5	203.5	0
WJR06-516	9	11/27/2006	9/21/2006	67	203.5	198.3	-5.2
WJR06-518	6	11/27/2006	9/21/2006	67	203.5	196.0	-7.5
WJR06-526	11	12/18/2006	9/21/2006	88	203.5	196.0	-7.5
WJR06-527	1	12/18/2006	9/21/2006	88	203.5	198.3	-5.2
Orange Left Dorsal, 16 October 2006							
WJR06-510	1	11/2/2006	10/16/2006	17	116.1	108.0	-8.1
WJR06-511	13	11/2/2006	10/16/2006	17	116.1	116.1	0
WJR06-522	17	11/29/2006	10/16/2006	44	116.1	108.0	-8.1
WJR06-523	8	11/29/2006	10/16/2006	44	116.1	116.1	0
RKD06-297	1	12/5/2006	10/16/2006	50	116.1	91.7	-24.4
RKD06-299	3	12/5/2006	10/16/2006	50	116.1	114.6	-1.5
WJR06-534	16	12/21/2006	10/16/2006	66	116.1	108.0	-8.1
WJR06-535	12	12/21/2006	10/16/2006	66	116.1	116.1	0
Yellow Left Dorsal, 16 October 2006							
WJR06-496	1	10/18/2006	10/16/2006	2	126.5	122.0	-4.5
WJR06-512	10	11/2/2006	10/16/2006	17	126.5	126.5	0
WJR06-524	17	11/29/2006	10/16/2006	44	126.5	126.5	0
RKD06-301	3	12/6/2006	10/16/2006	51	126.5	116.8	-9.7
WJR06-535	4	12/21/2006	10/16/2006	66	126.5	116.1	-10.4
WJR06-536	12	12/21/2006	10/16/2006	66	126.5	126.5	0

ES Fish Health
ES RGSM Salvage
ASIRF Pop Monitoring
Tribal Assistance
NMFWCO Monitoring

Appendix B.
Ichthyofaunal composition of 2006 Rio Grande silvery minnow augmentation monitoring surveys

Rio Grande silvery minnow Augmentation Monitoring 2006

All fish were released unless noted *(#)

Lemitar

9 January 2006 WJR06-376 30 seine hauls Effort: 534.9 m^2

Personnel: W. Jason Remshardt, Steve Davenport, Leanna Torres

Family	Species	N
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	72
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	5
Poeciliidae	*Gambusia affinis*	2

Below San Acacia Diversion Dam

9 January 2006 WJR06-377 30 seine hauls Effort: 604.8 m^2

Personnel: W. Jason Remshardt, Steve Davenport, Leanna Torres

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	1
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	11
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	2
Ictaluridae	*Ictalurus punctatus*	4

Rio Puerco Confluence

9 January 2006 WJR06-378 30 seine hauls Effort: 502.2 m^2

Personnel: W. Jason Remshardt, Steve Davenport, Leanna Torres

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	12
Cyprinidae	*Hybognathus amarus*	56
Cyprinidae	*Pimephales promelas*	3
Catostomidae	*Carpiodes carpio*	2
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	7

U.S. 60 Bridge

9 January 2006 WJR06-379 30 seine hauls Effort: 706.5 m^2

Personnel: W. Jason Remshardt, Steve Davenport, Leanna Torres

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	2
Cyprinidae	*Hybognathus amarus*	481
Cyprinidae	*Platygobio gracilis*	1
Ictaluridae	*Ictalurus punctatus*	3
Poeciliidae	*Gambusia affinis*	1
Moronidae	*Morone chrysops*	1

Dixon Road

10 January 2006 WJR06-380 30 seine hauls Effort: 659.4 m^2

Personnel: W. Jason Remshardt, Leanna Torres, S. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	3

Lomitas Negras

10 January 2006 WJR06-381 30 seine hauls Effort: 608.7 m^2

Personnel: W. Jason Remshardt, Leanna Torres, S. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	4
Cyprinidae	*Hybognathus amarus*	2
Catostomidae	*Carpiodes carpio*	2
Poeciliidae	*Gambusia affinis*	5
Centrarchidae	*Micropterus salmoides*	1

Sandia Line 14

10 January 2006 WJR06-383 30 seine hauls Effort: 587.1 m^2

Personnel: W. Jason Remshardt, Leanna Torres, S. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Hybognathus amarus*	5

Sandia PNM Gasline

10 January 2006 WJR06-384 30 seine hauls Effort: 725.4 m^2

Personnel: W. Jason Remshardt, Leanna Torres, S. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	6
Cyprinidae	*Hybognathus amarus*	1
Cyprinidae	*Pimephales promelas*	1

Tome

11 January 2006 WJR06-385 30 seine hauls Effort: 532.2 m^2

Personnel: W. Jason Remshardt, Leanna Torres, D. Weston Furr

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	18
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	109
Cyprinidae	*Pimephales promelas*	2
Poeciliidae	*Gambusia affinis*	3

Alejandro Gate

11 January 2006 WJR06-386 30 seine hauls Effort: 499.8 m^2

Personnel: W. Jason Remshardt, Leanna Torres, D. Weston Furr

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	14
Cyprinidae	*Hybognathus amarus*	2
Cyprinidae	*Platygobio gracilis*	2
Catostomidae	*Carpiodes carpio*	1
Poeciliidae	*Gambusia affinis*	39

Atrisco Outfall

11 January 2006 WJR06-387 30 seine hauls Effort: 669.0 m^2

Personnel: W. Jason Remshardt, Leanna Torres, D. Weston Furr

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	4
Poeciliidae	*Gambusia affinis*	6

Dixon Road

6 February 2006 WJR06-388 30 seine hauls Effort: 877.1 m^2

Personnel: W. Jason Remshardt, SJB, MM

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	2
Cyprinidae	*Hybognathus amarus*	223
Cyprinidae	*Platygobio gracilis*	4

Lomitas Negras

6 February 2006 WJR06-389 30 seine hauls Effort: 731.1 m^2

Personnel: W. Jason Remshardt, SJB, MM

Family	Species	N
Catostomidae	*Catostomus commersoni*	1
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	43
Centrarchidae	*Lepomis macrochirus*	1
Centrarchidae	*Micropterus salmoides*	1

U.S. 550 Bridge

6 February 2006 WJR06-390 30 seine hauls Effort: 886.2 m^2

Personnel: W. Jason Remshardt, SJB, MM

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	1

Sandia Line 14

6 February 2006 WJR06-391 30 seine hauls Effort: 850.4 m^2

Personnel: W. Jason Remshardt, SJB, MM

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	143
Cyprinidae	*Hybognathus amarus*	202
Cyprinidae	*Pimephales promelas*	2
Cyprinidae	*Platygobio gracilis*	1
Catostomidae	*Catostomus commersoni*	2
Poeciliidae	*Gambusia affinis*	3
Centrarchidae	*Lepomis macrochirus*	1
Percidae	*Perca flavescens*	2

PNM Gasline

6 February 2006 WJR06-392 30 seine hauls Effort: 821.7 m^2

Personnel: W. Jason Remshardt, SJB, MM

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	1
Catostomidae	*Catostomus commersoni*	1

Rio Puerco Confluence

7 February 2006 WJR06-393 30 seine hauls Effort: 794.1 m^2

Personnel: W. Jason Remshardt, Steve Davenport, Leanna Torres

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	4
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	747
Cyprinidae	*Pimephales promelas*	6
Cyprinidae	*Platygobio gracilis*	1
Catostomidae	*Carpiodes carpio*	4
Poeciliidae	*Gambusia affinis*	2
Moronidae	*Morone chrysops*	6
Centrarchidae	*Pomoxis annularis*	5

Atrisco Outfall

7 February 2006 WJR06-394 30 seine hauls Effort: 658.5 m^2

Personnel: W. Jason Remshardt, Steve Davenport, Leanna Torres, D. Chris Kitcheyan, Isleta Pueblo

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	6
Cyprinidae	*Hybognathus amarus*	3
Cyprinidae	*Platygobio gracilis*	1
Poeciliidae	*Gambusia affinis*	1

Alejandro Gate

7 February 2006 WJR06-395 30 seine hauls Effort: 648.0 m^2

Personnel: W. Jason Remshardt, Steve Davenport, Leanna Torres, D. Chris Kitcheyan, Isleta Pueblo

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	10
Cyprinidae	*Hybognathus amarus*	4
Cyprinidae	*Pimephales promelas*	3
Cyprinidae	*Platygobio gracilis*	2
Poeciliidae	*Gambusia affinis*	11

Lemitar

9 February 2006 WJR06-396 30 seine hauls Effort: 698.1 m^2

Personnel: W. Jason Remshardt, Leanna Torres, Cody Robertson

Family	Species	N
Cyprinidae	*Hybognathus amarus*	15
Cyprinidae	*Platygobio gracilis*	4
Ictaluridae	*Ictalurus punctatus*	1

Below San Acacia Diversion Dam

9 February 2006 WJR06-397 30 seine hauls Effort: 736.7 m^2

Personnel: W. Jason Remshardt, Leanna Torres, Cody Robertson

Family	Species	N
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	3
Ictaluridae	*Ictalurus punctatus*	1
Moronidae	*Morone chrysops*	1

US 60 Bridge

9 February 2006 WJR06-398 30 seine hauls Effort: 687.9 m^2

Personnel: W. Jason Remshardt, Leanna Torres, Cody Robertson

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	9
Cyprinidae	*Hybognathus amarus*	11
Poeciliidae	*Gambusia affinis*	2

Tome

9 February 2006 WJR06-399 30 seine hauls Effort: 658.8 m^2

Personnel: W. Jason Remshardt, Leanna Torres, Cody Robertson

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	4
Cyprinidae	*Hybognathus amarus*	319
Cyprinidae	*Pimephales promelas*	11
Poeciliidae	*Gambusia affinis*	6

Atrisco Outfall

6 March 2006 WJR06-400 30 seine hauls Effort: 980.1 m^2

Personnel: W. Jason Remshardt, Isleta Pueblo

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	131
Cyprinidae	*Hybognathus amarus*	2
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	4
Poeciliidae	*Gambusia affinis*	7
Centrarchidae	*Lepomis macrochirus*	1

Below Isleta Diversion Dam

6 March 2006 WJR06-401 30 seine hauls Effort: 789.3 m^2

Personnel: W. Jason Remshardt, B. Thompson, Isleta Pueblo

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	11
Cyprinidae	*Hybognathus amarus*	259
Cyprinidae	*Pimephales promelas*	1
Catostomidae	*Catostomus commersoni*	3
Ictaluridae	*Ameiurus melas*	1

Alejandro Gate

6 March 2006 WJR06-402 30 seine hauls Effort: 967.2 m^2

Personnel: W. Jason Remshardt, B. Thompson, Lente

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	41
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	7
Cyprinidae	*Platygobio gracilis*	1
Catostomidae	*Catostomus commersoni*	1

Dixon Road

7 March 2006 WJR06-403 30 seine hauls Effort: 804.9 m^2

Personnel: W. Jason Remshardt, SRB, LTT, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	1
Cyprinidae	*Hybognathus amarus*	1
Cyprinidae	*Platygobio gracilis*	14
Cyprinidae	*Rhinichthys cataractae*	4
Catostomidae	*Catostomus commersoni*	2

Lomitas Negras

7 March 2006 WJR06-404 30 seine hauls Effort: 831.0 m^2

Personnel: W. Jason Remshardt, SRB, LTT, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	7
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Platygobio gracilis*	4
Catostomidae	*Carpiodes carpio*	5

U.S. 550 Bridge

7 March 2006 WJR06-405 30 seine hauls Effort: 585.0 m^2

Personnel: W. Jason Remshardt, SRB, LTT, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	5
Cyprinidae	*Hybognathus amarus*	44
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	14
Cyprinidae	*Rhinichthys cataractae*	6
Catostomidae	*Catostomus commersoni*	1

Sandia Line 14

7 March 2006 WJR06-406 30 seine hauls Effort: 816.9 m^2

Personnel: W. Jason Remshardt, SRB, LTT

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	17
Cyprinidae	*Hybognathus amarus*	141
Cyprinidae	*Pimephales promelas*	8
Cyprinidae	*Platygobio gracilis*	1
Catostomidae	*Catostomus commersoni*	6
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	13
Centrarchidae	*Lepomis cyanellus*	1
Centrarchidae	*Lepomis macrochirus*	1
Centrarchidae	*Pomoxis annularis*	3
Percidae	*Perca flavescens*	1

Sandia PNM Gasline

7 March 2006 WJR06-407 30 seine hauls Effort: 786.3 m^2

Personnel: W. Jason Remshardt, SRB, LTT

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	1
Cyprinidae	*Pimephales promelas*	1

Tome´

9 March 2006 WJR06-408 30 seine hauls Effort: 867.0 m^2

Personnel: W. Jason Remshardt, SRB, LTT

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	1
Cyprinidae	*Hybognathus amarus*	39
Cyprinidae	*Pimephales promelas*	2

U.S. 60 Bridge

9 March 2006 WJR06-409 30 seine hauls Effort: 743.1 m^2

Personnel: W. Jason Remshardt, SRB, LTT

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	7
Cyprinidae	*Hybognathus amarus*	59
Cyprinidae	*Pimephales promelas*	1
Ictaluridae	*Ictalurus punctatus*	2

Rio Puerco

9 March 2006 WJR06-410 30 seine hauls Effort: 835.8 m^2

Personnel: W. Jason Remshardt, LTT, LMR

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	10
Cyprinidae	*Hybognathus amarus*	41
Cyprinidae	*Pimephales promelas*	2
Centrarchidae	*Micropterus salmoides*	1
Centrarchidae	*Pomoxis annularis*	1

Lemitar

9 March 2006 WJR06-411 30 seine hauls Effort: 650.1 m^2

Personnel: W. Jason Remshardt, LTT, LMR

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	2
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	352
Cyprinidae	*Platygobio gracilis*	4
Ictaluridae	*Ictalurus punctatus*	1

Below San Acacia Diversion Dam

4 April 2006 WJR06-412 30 seine hauls Effort: 584.7 m^2

Personnel: W. J. Remshardt, C.M. Robertson, L.T. Torres

Family	Species	N
Clupeidae	*Dorosoma cepedianum*	1
Cyprinidae	*Cyprinella lutrensis*	12
Cyprinidae	*Hybognathus amarus*	35
Cyprinidae	*Pimephales promelas*	1
Catostomidae	*Carpiodes carpio*	2
Ictaluridae	*Ictalurus punctatus*	6

Atrisco Outfall

4 April 2006 WJR06-413 30 seine hauls Effort: 584.1 m^2

Personnel: W. Jason Remshardt, LTT, Lente, Jojola

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	10
Cyprinidae	*Rhinichthys cataractae*	1
Ictaluridae	*Ictalurus punctatus*	2
Poeciliidae	*Gambusia affinis*	2

Below Isleta Diversion Dam

4 April 2006 WJR06-414 30 seine hauls Effort: 684.0 m^2

Personnel: W. Jason Remshardt, LTT, Lente, Jojola

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	23
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	2519
Cyprinidae	*Pimephales promelas*	4
Ictaluridae	*Ictalurus punctatus*	1
Centrarchidae	*Lepomis macrochirus*	1

Alejandro Gate

4 April 2006 WJR06-415 30 seine hauls Effort: 712.5 m^2

Personnel: W. Jason Remshardt, LTT, Jesse, Green

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	73
Cyprinidae	*Hybognathus amarus*	52
Catostomidae	*Carpiodes carpio*	3
Poeciliidae	*Gambusia affinis*	1

Dixon Road

7 April 2006 WJR06-416 30 seine hauls Effort: 591.3 m^2

Personnel: W. Jason Remshardt, LTT, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	5
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	56
Cyprinidae	*Pimephales promelas*	2
Cyprinidae	*Rhinichthys cataractae*	1
Catostomidae	*Carpiodes carpio*	3

Lomitas Negras

7 April 2006 WJR06-417 30 seine hauls Effort: 728.7 m^2

Personnel: W. Jason Remshardt, LTT, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	20
Poeciliidae	*Gambusia affinis*	24
Centrarchidae	*Lepomis macrochirus*	2
Centrarchidae	*Micropterus salmoides*	1

U.S. 550 Bridge

7 April 2006 WJR06-418 30 seine hauls Effort: 699.0 m^2

Personnel: W. Jason Remshardt, Leanna Torres, S. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	7
Cyprinidae	*Hybognathus amarus*	8
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	4
Cyprinidae	*Rhinichthys cataractae*	20
Catostomidae	*Catostomus commersoni*	5
Centrarchidae	*Lepomis cyanellus*	1

Sandia Line 14

7 April 2006 WJR06-419 30 seine hauls Effort: 561.6 m^2

Personnel: W. Jason Remshardt, Leanna Torres, S. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	17
Cyprinidae	*Hybognathus amarus*	182
Cyprinidae	*Pimephales promelas*	8
Cyprinidae	*Rhinichthys cataractae*	2
Catostomidae	*Catostomus commersoni*	1
Poeciliidae	*Gambusia affinis*	16
Centrarchidae	*Pomoxis annularis*	1

Sandia PNM/Gasline

7 April 2006 WJR06-420 30 seine hauls Effort: 734.7 m^2

Personnel: W. Jason Remshardt, Leanna Torres, S. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	19
Cyprinidae	*Hybognathus amarus*	281
Cyprinidae	*Pimephales promelas*	5
Cyprinidae	*Rhinichthys cataractae*	1
Poeciliidae	*Gambusia affinis*	4
Centrarchidae	*Lepomis cyanellus*	4
Centrarchidae	*Pomoxis annularis*	1

Lemitar

8 May 2006 WJR06-424 30 seine hauls Effort: 768.3 m^2

Personnel: W. Jason Remshardt, Cody Robertson, Leanna Torres

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	4
Cyprinidae	*Hybognathus amarus*	23
Cyprinidae	*Platygobio gracilis*	3
Ictaluridae	*Ictalurus punctatus*	2

San Acacia

8 May 2006 WJR06-425 30 seine hauls Effort: 734.4 m^2

Personnel: W. Jason Remshardt, Leanna Torres, Cody Robertson

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	25
Cyprinidae	*Hybognathus amarus*	216
Cyprinidae	*Pimephales promelas*	4
Cyprinidae	*Platygobio gracilis*	13
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	5
Moronidae	*Morone chrysops*	3

Rio Puerco

8 May 2006 WJR06-426 30 seine hauls Effort: 870.0 m^2

Personnel: W. Jason Remshardt, Leanna Torres, Cody Robertson

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	74
Cyprinidae	*Hybognathus amarus*	5
Cyprinidae	*Pimephales promelas*	4
Cyprinidae	*Platygobio gracilis*	1
Catostomidae	*Catostomus commersoni*	1
Ictaluridae	*Ictalurus punctatus*	4

Hwy 60 Bridge

8 May 2006 WJR06-427 30 seine hauls Effort: 714.6 m^2

Personnel: W. Jason Remshardt, Leanna Torres, Cody Robertson

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	25
Cyprinidae	*Hybognathus amarus*	13
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	5

Atrisco Outfall

9 May 2006 WJR06-428 30 seine hauls Effort: 953.1 m^2

Personnel: W. Jason Remshardt, Leanna Torres, C. Green, J.Jojola

Family	Species	N
Cyprinidae	*Cyprinus lutrensis*	7
Catostomidae	*Catostomus commersoni*	1
Centrarchidae	*Micropterus salmoides*	1

Alejandro Gate

9 May 2006 WJR06-429 30 seine hauls Effort: 1120.8 m^2

Personnel: W. Jason Remshardt, Leanna Torres, C. Green, J.Jojola

Family	Species	N
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Cyprinella lutrensis*	72
Cyprinidae	*Hybognathus amarus*	171
Catostomidae	*Carpiodes carpio*	1
Centrarchidae	*Lepomis cyanellus*	1
Centrarchidae	*Pomoxis annularis*	1

Tome´

9 May 2006 WJR06-430 30 seine hauls Effort: 818.4 m^2

Personnel: W. Jason Remshardt, Leanna Torres, J.Jojola

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	104
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	71
Cyprinidae	*Pimephales promelas*	2
Ictaluridae	*Ictalurus punctatus*	1

Dixon Road

9 May 2006 WJR06-431 30 seine hauls Effort: 834.0 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	7
Cyprinidae	*Hybognathus amarus*	10
Cyprinidae	*Pimephales promelas*	5
Cyprinidae	*Platygobio gracilis*	24
Cyprinidae	*Rhinichthys cataractae*	1
Catostomidae	*Catostomus commersoni*	13
Ictaluridae	*Ictalurus punctatus*	1

Lomitas Negras

15 May 2006 WJR06-432 30 seine hauls Effort: 829.2 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	5
Cyprinidae	*Hybognathus amarus*	34
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	1
Cyprinidae	*Rhinichthys cataractae*	4
Catostomidae	*Catostomus commersoni*	18
Centrarchidae	*Lepomis macrochirus*	1
Poeciliidae	*Gambusia affinis*	101

Hwy 550 Bridge

15 May 2006 WJR06-433 30 seine hauls Effort: 801.9 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	34
Cyprinidae	*Hybognathus amarus*	28
Cyprinidae	*Platygobio gracilis*	8
Cyprinidae	*Rhinichthys cataractae*	30
Catostomidae	*Catostomus commersoni*	11

Sandia 14

15 May 2006 WJR06-434 30 seine hauls Effort: 693.0 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	14
Cyprinidae	*Hybognathus amarus*	5
Cyprinidae	*Pimephales promelas*	2
Cyprinidae	*Rhinichthys cataractae*	4
Centrarchidae	*Lepomis macrochirus*	1
Poeciliidae	*Gambusia affinis*	7

Sandia PNM Gasline

15 May 2006 WJR06-435 30 seine hauls Effort: 885.9 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Hybognathus amarus*	22
Cyprinidae	*Platygobio gracilis*	1
Catostomidae	*Catostomus commersoni*	1
Ictaluridae	*Ictalurus punctatus*	2
Poeciliidae	*Gambusia affinis*	1

Below Isleta Diversion Dam

9 May 2006 WJR06-436 30 seine hauls Effort: 842.7 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	1
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	125
Cyprinidae	*Platygobio gracilis*	5
Catostomidae	*Catostomus commersoni*	2
Ictaluridae	*Ictalurus punctatus*	1
Centrarchidae	*Lepomis cyanellus*	1

Dixon Road

5 June 2006 WJR06-437 30 seine hauls Effort: 772.2 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	9
Cyprinidae	*Hybognathus amarus*	9
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	2
Cyprinidae	*Rhinichthys cataractae*	1
Catostomidae	*Catostomus commersoni*	776
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	10
Percidae	*Sander vitreum*	1

Lomitas Negras

5 June 2006 WJR06-438 30 seine hauls Effort: 889.2 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin, MT Edelen

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	10
Cyprinidae	*Hybognathus amarus*	9
Cyprinidae	*Platygobio gracilis*	1
Cyprinidae	*Rhinichthys cataractae*	1
Catostomidae	*Carpiodes carpio*	2
Catostomidae	*Catostomus commersoni*	475
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	22
Percidae	*Sander vitreum*	1

U.S. 550 Bridge

5 June 2006 WJR06-439 30 seine hauls Effort: 595.8 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin, M. Tessa Edelen

Family	Species	N
Cyprinidae	*Hybognathus amarus*	5
Cyprinidae	*Platygobio gracilis*	5
Cyprinidae	*Rhinichthys cataractae*	24
Catostomidae	*Catostomus commersoni*	793

Sandia Line

5 June 2006 WJR06-440 30 seine hauls Effort: 895.2 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	18
Cyprinidae	*Hybognathus amarus*	18
Cyprinidae	*Pimephales promelas*	33
Cyprinidae	*Platygobio gracilis*	6
Cyprinidae	*Rhinichthys cataractae*	1
Catostomidae	*Catostomus commersoni*	247
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	28
Centrarchidae	*Lepomis macrochirus*	1
Centrarchidae	*Pomoxis annularis*	2
Percidae	*Sander vitreum*	5

Sandia PNM Gasline

5 June 2006 WJR06-441 30 seine hauls Effort: 772.5 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	2
Cyprinidae	*Hybognathus amarus*	26
Cyprinidae	*Pimephales promelas*	3
Cyprinidae	*Platygobio gracilis*	2
Cyprinidae	*Rhinichthys cataractae*	2
Catostomidae	*Catostomus commersoni*	212
Ictaluridae	*Ictalurus punctatus*	1
Percidae	*Sander vitreum*	1

Lemitar

5 June 2006 WJR06-442 30 seine hauls Effort: 832.2 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Morales, S. Bulgrin

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	2
Cyprinidae	*Hybognathus amarus*	116
Cyprinidae	*Pimephales promelas*	39
Cyprinidae	*Platygobio gracilis*	20
Cyprinidae	*Rhinichthys cataractae*	18
Catostomidae	*Carpiodes carpio*	157
Catostomidae	*Catostomus commersoni*	1
Poeciliidae	*Gambusia affinis*	1

Below San Acacia Diversion Dam

6 June 2006 WJR06-443 30 seine hauls Effort: 618.6 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	23
Cyprinidae	*Cyprinus carpio*	15
Cyprinidae	*Hybognathus amarus*	80
Cyprinidae	*Pimephales promelas*	25
Cyprinidae	*Platygobio gracilis*	81
Cyprinidae	*Rhinichthys cataractae*	17
Catostomidae	*Carpiodes carpio*	9
Catostomidae	*Catostomus commersoni*	3
Ictaluridae	*Ameiurus melas*	1
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	1
Percidae	*Perca flavescens*	1
Percidae	*Sander vitreum*	1

Rio Puerco Confluence

6 June 2006 WJR06-444 30 seine hauls Effort: 772.2 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	20
Cyprinidae	*Cyprinus carpio*	147
Cyprinidae	*Hybognathus amarus*	161
Cyprinidae	*Pimephales promelas*	52
Cyprinidae	*Platygobio gracilis*	27
Cyprinidae	*Rhinichthys cataractae*	1
Catostomidae	*Carpiodes carpio*	88
Catostomidae	*Catostomus commersoni*	16
Ictaluridae	*Ictalurus punctatus*	2
Poeciliidae	*Gambusia affinis*	40
Percidae	*Perca flavescens*	3

U.S. 60 Bridge

7 June 2006 WJR06-445 30 seine hauls Effort: 677.7 m^2

Personnel: Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	18
Cyprinidae	*Cyprinus carpio*	129
Cyprinidae	*Hybognathus amarus*	7
Cyprinidae	*Pimephales promelas*	118
Cyprinidae	*Platygobio gracilis*	32
Catostomidae	*Carpiodes carpio*	195
Percidae	*Sander vitreum*	4

Tome´

7 June 2006 WJR06-446 30 seine hauls Effort: 774.9 m^2

Personnel: Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	8
Cyprinidae	*Cyprinus carpio*	55
Cyprinidae	*Hybognathus amarus*	57
Cyprinidae	*Pimephales promelas*	99
Cyprinidae	*Platygobio gracilis*	19
Catostomidae	*Carpiodes carpio*	26

Atrisco Outfall

8 June 2006 WJR06-447 30 seine hauls Effort: 685.8 m^2

Personnel: W. Jason Remshardt, Leanna Torres, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	4
Cyprinidae	*Pimephales promelas*	31
Catostomidae	*Carpiodes carpio*	142
Catostomidae	*Catostomus commersoni*	1

Lemitar

5 July 2006 WJR06-448 12 seine hauls Effort: 246.9 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Clupeidae	*Dorosoma cepedianum*	1
Cyprinidae	*Cyprinella lutrensis*	169
Cyprinidae	*Hybognathus amarus*	13
Cyprinidae	*Pimephales promelas*	69
Cyprinidae	*Platygobio gracilis*	10
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	7
Poeciliidae	*Gambusia affinis*	1

Below San Acacia Diversion Dam

5 July 2006 WJR06-449 30 seine hauls Effort: 624.0 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Clupeidae	*Dorosoma cepedianum*	1
Cyprinidae	*Cyprinella lutrensis*	70
Cyprinidae	*Cyprinus carpio*	17
Cyprinidae	*Hybognathus amarus*	8
Cyprinidae	*Pimephales promelas*	16
Cyprinidae	*Pimephales vigilax*	65
Cyprinidae	*Platygobio gracilis*	21
Cyprinidae	*Rhinichthys cataractae*	24
Catostomidae	*Catostomus commersoni*	14
Ictaluridae	*Ictalurus punctatus*	20
Poeciliidae	*Gambusia affinis*	3
Percidae	*Perca flavescens*	1

Rio Puerco Confluence

5 July 2006 WJR06-450 30 seine hauls Effort: 670.5 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	598
Cyprinidae	*Cyprinus carpio*	38
Cyprinidae	*Hybognathus amarus*	11
Cyprinidae	*Pimephales promelas*	93
Cyprinidae	*Platygobio gracilis*	2
Catostomidae	*Carpiodes carpio*	18
Catostomidae	*Catostomus commersoni*	2
Ictaluridae	*Ameiurus natalis*	1
Ictaluridae	*Ictalurus punctatus*	60
Poeciliidae	*Gambusia affinis*	41

U.S. 60 Bridge

5 July 2006 WJR06-451 30 seine hauls Effort: 783.0 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	651
Cyprinidae	*Cyprinus carpio*	15
Cyprinidae	*Hybognathus amarus*	9
Cyprinidae	*Pimephales promelas*	87
Cyprinidae	*Pimephales vigilax*	2
Cyprinidae	*Platygobio gracilis*	4
Catostomidae	*Carpiodes carpio*	44
Ictaluridae	*Ictalurus punctatus*	103
Poeciliidae	*Gambusia affinis*	17
Percidae	*Sander vitreum*	1

Dixon Road

6 July 2006 WJR06-452 30 seine hauls Effort: 916.2 m^2

Personnel: W. Jason Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	26
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	9
Cyprinidae	*Pimephales promelas*	72
Cyprinidae	*Platygobio gracilis*	1
Cyprinidae	*Rhinichthys cataractae*	43
Catostomidae	*Carpiodes carpio*	1
Catostomidae	*Catostomus commersoni*	77
Ictaluridae	*Ameiurus natalis*	2
Ictaluridae	*Ictalurus punctatus*	2
Poeciliidae	*Gambusia affinis*	3
Percidae	*Micropterus salmoides*	1

Sandia PNM Gasline

6 July 2006 WJR06-453 30 seine hauls Effort: 780.6 m^2

Personnel: Leanna Torres, M. Tessa Edelen, James P. Sandoval, S.J. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	4
Cyprinidae	*Cyprinus carpio*	4
Cyprinidae	*Hybognathus amarus*	26
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	1
Cyprinidae	*Rhinichthys cataractae*	6
Catostomidae	*Catostomus commersoni*	20
Poeciliidae	*Gambusia affinis*	10

Sandia Line 14

6 July 2006 WJR06-454 30 seine hauls Effort: 785.7 m^2

Personnel: Leanna Torres, M. Tessa Edelen, James P. Sandoval, S.J. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	38
Cyprinidae	*Cyprinus carpio*	7
Cyprinidae	*Hybognathus amarus*	96
Cyprinidae	*Pimephales promelas*	38
Cyprinidae	*Platygobio gracilis*	9
Cyprinidae	*Rhinichthys cataractae*	39
Catostomidae	*Catostomus commersoni*	102
Ictaluridae	*Ameiurus natalis*	276
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	197
Centrarchidae	*Lepomis macrochirus*	2
Centrarchidae	*Pomoxis annularis*	1
Percidae	*Perca flavescens*	3
Percidae	*Sander vitreum*	1

U.S. 550 Bridge

6 July 2006 WJR06-455 30 seine hauls Effort: 614.1 m^2

Personnel: Leanna Torres, M. Tessa Edelen, James P. Sandoval, S.J. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	2
Cyprinidae	*Hybognathus amarus*	28
Cyprinidae	*Platygobio gracilis*	7
Cyprinidae	*Rhinichthys cataractae*	49
Catostomidae	*Catostomus commersoni*	33
Ictaluridae	*Ictalurus punctatus*	2
Poeciliidae	*Gambusia affinis*	11

Lomitas Negras

6 July 2006 WJR06-456 25 seine hauls Effort: 638.1 m^2

Personnel: Leanna Torres, M. Tessa Edelen, James P. Sandoval, S.J. Bulgrin, M. Morales, A. Elwood

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	15
Cyprinidae	*Cyprinus carpio*	2
Cyprinidae	*Hybognathus amarus*	36
Cyprinidae	*Pimephales promelas*	24
Cyprinidae	*Platygobio gracilis*	9
Cyprinidae	*Rhinichthys cataractae*	29
Catostomidae	*Carpiodes carpio*	1
Catostomidae	*Catostomus commersoni*	75
Ictaluridae	*Ictalurus punctatus*	2
Poeciliidae	*Gambusia affinis*	43

Atrisco Outfall

7 July 2006 WJR06-457 30 seine hauls Effort: 644.4 m^2

Personnel: Leanna Torres, M. Tessa Edelen, James P. Sandoval, B. Thompson

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	26
Cyprinidae	*Cyprinus carpio*	2
Cyprinidae	*Hybognathus amarus*	3
Cyprinidae	*Pimephales promelas*	50
Cyprinidae	*Platygobio gracilis*	3
Cyprinidae	*Rhinichthys cataractae*	1
Catostomidae	*Carpiodes carpio*	170
Catostomidae	*Catostomus commersoni*	4
Ictaluridae	*Ameiurus natalis*	1
Ictaluridae	*Ictalurus punctatus*	66
Poeciliidae	*Gambusia affinis*	28
Percidae	*Perca flavescens*	1

Below Isleta Diversion Dam

7 July 2006 WJR06-458 30 seine hauls Effort: 879.0 m^2

Personnel: Leanna Torres, M. Tessa Edelen, James P. Sandoval, B. Thompson

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	13
Cyprinidae	*Cyprinus carpio*	2
Cyprinidae	*Hybognathus amarus*	12
Cyprinidae	*Pimephales promelas*	45
Cyprinidae	*Platygobio gracilis*	2
Catostomidae	*Carpiodes carpio*	2
Catostomidae	*Catostomus commersoni*	2
Ictaluridae	*Ictalurus punctatus*	23
Poeciliidae	*Gambusia affinis*	2

Tome´

7 July 2006 WJR06-458B 30 seine hauls Effort: 891.0 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	10
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	36
Cyprinidae	*Pimephales promelas*	84
Catostomidae	*Carpiodes carpio*	46
Ictaluridae	*Ictalurus punctatus*	17
Poeciliidae	*Gambusia affinis*	2

Alejandro Gate

7 July 2006 WJR06-459 30 seine hauls Effort: 726.0 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	19
Cyprinidae	*Cyprinus carpio*	2
Cyprinidae	*Hybognathus amarus*	21
Cyprinidae	*Pimephales promelas*	21
Cyprinidae	*Rhinichthys cataractae*	1
Catostomidae	*Carpiodes carpio*	1
Catostomidae	*Catostomus commersoni*	3
Ictaluridae	*Ameiurus natalis*	9
Ictaluridae	*Ictalurus punctatus*	19
Poeciliidae	*Gambusia affinis*	6
Centrarchidae	*Micropterus salmoides*	1

Lemitar

7 August 2006 WJR06-469 30 seine hauls Effort: 801.9 m^2

Personnel: W.J. Remshardt, Leanna Torres, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	34
Cyprinidae	*Hybognathus amarus*	9
Cyprinidae	*Pimephales promelas*	19
Cyprinidae	*Platygobio gracilis*	31
Ictaluridae	*Ictalurus punctatus*	17

Below San Acacia Diversion Dam

7 August 2006 WJR06-470 10 seine hauls Effort: 216.3 m^2

Personnel: W.J. Remshardt, Leanna Torres, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	2
Cyprinidae	*Hybognathus amarus*	14
Cyprinidae	*Platygobio gracilis*	3
Cyprinidae	*Rhinichthys cataractae*	4
Catostomidae	*Carpiodes carpio*	4
Ictaluridae	*Ictalurus punctatus*	12

Rio Puerco Confluence

7 August 2006 WJR06-471 30 seine hauls Effort: 623.7 m^2

Personnel: W.J. Remshardt, Leanna Torres, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	4
Cyprinidae	*Hybognathus amarus*	1
Cyprinidae	*Pimephales promelas*	1
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	9

U.S. 60 Bridge

7 August 2006 WJR06-472 30 seine hauls Effort: 765.3 m^2

Personnel: W.J. Remshardt, Leanna Torres, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	10
Cyprinidae	*Hybognathus amarus*	4
Ictaluridae	*Ictalurus punctatus*	4
Poeciliidae	*Gambusia affinis*	6

Atrisco Outfall

8 August 2006 WJR06-473 30 seine hauls Effort: 731.4 m^2

Personnel: W.J. Remshardt, Leanna Torres, James P. Sandoval, J. Jojola, K. Lente

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	29
Cyprinidae	*Hybognathus amarus*	2
Cyprinidae	*Platygobio gracilis*	5
Cyprinidae	*Rhinichthys cataractae*	7
Catostomidae	*Carpiodes carpio*	3
Catostomidae	*Catostomus commersoni*	13
Ictaluridae	*Ameiurus natalis*	2
Ictaluridae	*Ictalurus punctatus*	110
Poeciliidae	*Gambusia affinis*	11

Below Isleta Diversion Dam

8 August 2006 WJR06-474 30 seine hauls Effort: 726.0 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Tessa Edelen, James P. Sandoval, J. Jojola, K. Lente

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	58
Cyprinidae	*Hybognathus amarus*	2
Cyprinidae	*Pimephales promelas*	6
Cyprinidae	*Platygobio gracilis*	1
Ictaluridae	*Ictalurus punctatus*	73
Poeciliidae	*Gambusia affinis*	6
Centrarchidae	*Pomoxis annularis*	1

Alejandro Gate

8 August 2006 WJR06-475 30 seine hauls Effort: 796.2 m^2

Personnel: W.J. Remshardt, Leanna Torres, James P. Sandoval, J. Jojola, K. Lente

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	147
Cyprinidae	*Hybognathus amarus*	4
Cyprinidae	*Pimephales promelas*	41
Cyprinidae	*Platygobio gracilis*	4
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	41
Poeciliidae	*Gambusia affinis*	1

Tome´

8 August 2006 WJR06-476 30 seine hauls Effort: 890.7 m^2

Personnel: W.J. Remshardt, Leanna Torres, James P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	3
Cyprinidae	*Hybognathus amarus*	15
Cyprinidae	*Pimephales promelas*	4
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	12
Poeciliidae	*Gambusia affinis*	1

Dixon Road

9 August 2006 WJR06-477 30 seine hauls Effort: 786.0 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	12
Cyprinidae	*Hybognathus amarus*	6
Cyprinidae	*Pimephales promelas*	30
Cyprinidae	*Platygobio gracilis*	21
Cyprinidae	*Rhinichthys cataractae*	15
Catostomidae	*Catostomus commersoni*	2
Ictaluridae	*Ictalurus punctatus*	20
Poeciliidae	*Gambusia affinis*	2

Sandia PNM Gasline

9 August 2006 WJR06-478 30 seine hauls Effort: 690.6 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales, A. Elwood

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	12
Cyprinidae	*Hybognathus amarus*	54
Cyprinidae	*Pimephales promelas*	6
Cyprinidae	*Platygobio gracilis*	17
Cyprinidae	*Rhinichthys cataractae*	28
Catostomidae	*Catostomus commersoni*	6
Ictaluridae	*Ictalurus punctatus*	32
Poeciliidae	*Gambusia affinis*	24

Sandia Line 14

9 August 2006 WJR06-479 30 seine hauls Effort: 912.6 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales, A. Elwood

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	43
Cyprinidae	*Hybognathus amarus*	17
Cyprinidae	*Pimephales promelas*	10
Cyprinidae	*Platygobio gracilis*	16
Cyprinidae	*Rhinichthys cataractae*	26
Catostomidae	*Carpiodes carpio*	1
Catostomidae	*Catostomus commersoni*	3
Ictaluridae	*Ictalurus punctatus*	24
Poeciliidae	*Gambusia affinis*	13
Centrarchidae	*Lepomis macrochirus*	3

U.S. 550 Bridge

9 August 2006 WJR06-480 30 seine hauls Effort: 690.6 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	2
Cyprinidae	*Hybognathus amarus*	32
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	33
Cyprinidae	*Rhinichthys cataractae*	77
Catostomidae	*Catostomus commersoni*	1
Ictaluridae	*Ictalurus punctatus*	9

Lomitas Negras

9 August 2006 WJR06-481 30 seine hauls Effort: 765.3 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	11
Cyprinidae	*Hybognathus amarus*	27
Cyprinidae	*Pimephales promelas*	10
Cyprinidae	*Platygobio gracilis*	32
Cyprinidae	*Rhinichthys cataractae*	22
Catostomidae	*Carpiodes carpio*	1
Catostomidae	*Catostomus commersoni*	1
Ictaluridae	*Ictalurus punctatus*	4
Poeciliidae	*Gambusia affinis*	4

Dixon Road

30 October 2006 WJR06-501 30 seine hauls Effort: 921.3 m^2

Personnel: W.J. Remshardt, Leanna Torres, S.J. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	29
Cyprinidae	*Hybognathus amarus*	10
Cyprinidae	*Pimephales promelas*	5
Cyprinidae	*Platygobio gracilis*	35
Catostomidae	*Catostomus commersoni*	1
Ictaluridae	*Ictalurus punctatus*	5
Poeciliidae	*Gambusia affinis*	24

Lomitas Negras

30 October 2006 WJR06-502 30 seine hauls Effort: 834.0 m^2

Personnel: W.J. Remshardt, Leanna Torres, S.J. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	9
Cyprinidae	*Cyprinus carpio*	2
Cyprinidae	*Hybognathus amarus*	19
Cyprinidae	*Pimephales promelas*	22
Cyprinidae	*Platygobio gracilis*	7
Cyprinidae	*Rhinichthys cataractae*	3
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	136
Centrarchidae	*Lepomis macrochirus*	1

U.S. 550 Bridge

30 October 2006 WJR06-503 30 seine hauls Effort: 744.0 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales, A. Elwood

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	21
Cyprinidae	*Hybognathus amarus*	22
Cyprinidae	*Pimephales promelas*	2
Cyprinidae	*Platygobio gracilis*	69
Cyprinidae	*Rhinichthys cataractae*	24
Catostomidae	*Catostomus commersoni*	1
Ictaluridae	*Ictalurus punctatus*	1

Sandia Line 14

30 October 2006 WJR06-504 30 seine hauls Effort: 934.8 m^2

Personnel: W.J. Remshardt, Leanna Torres, S.J. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	29
Cyprinidae	*Hybognathus amarus*	23
Cyprinidae	*Pimephales promelas*	10
Cyprinidae	*Platygobio gracilis*	159
Cyprinidae	*Rhinichthys cataractae*	11
Catostomidae	*Catostomus commersoni*	1
Ictaluridae	*Ameiurus natalis*	3
Ictaluridae	*Ictalurus punctatus*	19
Poeciliidae	*Gambusia affinis*	16

Sandia PNM Gasline

30 October 2006 WJR06-505 30 seine hauls Effort: 741.3 m^2

Personnel: W.J. Remshardt, Leanna Torres, S.J. Bulgrin, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	42
Cyprinidae	*Hybognathus amarus*	18
Cyprinidae	*Pimephales promelas*	6
Cyprinidae	*Platygobio gracilis*	28
Cyprinidae	*Rhinichthys cataractae*	3
Ictaluridae	*Ictalurus punctatus*	11
Poeciliidae	*Gambusia affinis*	5

Atrisco Outfall

31 October 2006 WJR06-506 30 seine hauls Effort: 948.0 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	25
Cyprinidae	*Pimephales promelas*	7
Cyprinidae	*Platygobio gracilis*	9
Cyprinidae	*Rhinichthys cataractae*	4
Catostomidae	*Catostomus commersoni*	3
Ictaluridae	*Ictalurus punctatus*	9
Poeciliidae	*Gambusia affinis*	7
Centrarchidae	*Morone chrysops*	1

Alejandro Gate

31 October 2006 WJR06-507 30 seine hauls Effort: 851.1 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	161
Cyprinidae	*Hybognathus amarus*	21
Cyprinidae	*Pimephales promelas*	34
Cyprinidae	*Platygobio gracilis*	7
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	4
Poeciliidae	*Gambusia affinis*	21

U.S. 60 Bridge

31 October 2006 WJR06-508 30 seine hauls Effort: 829.2 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	1497
Cyprinidae	*Cyprinus carpio*	4
Cyprinidae	*Hybognathus amarus*	9
Cyprinidae	*Pimephales promelas*	44
Cyprinidae	*Platygobio gracilis*	4
Catostomidae	*Carpiodes carpio*	3
Ictaluridae	*Ictalurus punctatus*	33
Poeciliidae	*Gambusia affinis*	5

Tome´

31 October 2006 WJR06-509 30 seine hauls Effort: 741.3 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	20
Cyprinidae	*Hybognathus amarus*	10
Cyprinidae	*Pimephales promelas*	3
Catostomidae	*Carpiodes carpio*	3
Poeciliidae	*Gambusia affinis*	1

Lemitar

2 November 2006 WJR06-510 30 seine hauls Effort: 1024.5 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	75
Cyprinidae	*Hybognathus amarus*	3
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	23
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	18

Sandia PNM Gasline

2 November 2006 WJR06-511 30 seine hauls Effort: 733.5 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	37
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	16
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	23
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	2

Rio Puerco Confluence

2 November 2006 WJR06-512 30 seine hauls Effort: 753.0 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	574
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	30
Cyprinidae	*Pimephales promelas*	8
Catostomidae	*Carpiodes carpio*	6
Ictaluridae	*Ictalurus punctatus*	37
Poeciliidae	*Gambusia affinis*	10

Sandia PNM Gasline

27 November 2006 WJR06-513 30 seine hauls Effort: 1017.9 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	70
Cyprinidae	*Hybognathus amarus*	13
Cyprinidae	*Pimephales promelas*	5
Cyprinidae	*Platygobio gracilis*	124
Cyprinidae	*Rhinichthys cataractae*	1
Poeciliidae	*Gambusia affinis*	2

Sandia Line 14

27 November 2006 WJR06-514 30 seine hauls Effort: 887.1 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	3
Cyprinidae	*Platygobio gracilis*	5
Cyprinidae	*Rhinichthys cataractae*	1
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	5

U.S. 550 Bridge

27 November 2006 WJR06-515 30 seine hauls Effort: 1294.2 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	2
Cyprinidae	*Hybognathus amarus*	3
Cyprinidae	*Platygobio gracilis*	7
Cyprinidae	*Rhinichthys cataractae*	2
Catostomidae	*Catostomus commersoni*	1

Lomitas Negras

27 November 2006 WJR06-516 30 seine hauls Effort: 778.5 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	4
Cyprinidae	*Hybognathus amarus*	15
Cyprinidae	*Platygobio gracilis*	12
Poeciliidae	*Gambusia affinis*	5
Centrarchidae	*Lepomis cyanellus*	1
Centrarchidae	*Lepomis macrochirus*	1
Centrarchidae	*Micropterus salmoides*	8
Centrarchidae	*Pomoxis annularis*	1

Sandia PNM Gasline

27 November 2006 WJR06-518 30 seine hauls Effort: 1228.5 m^2

Personnel: W.J. Remshardt, Leanna Torres, M. Morales

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	40
Cyprinidae	*Hybognathus amarus*	9
Cyprinidae	*Pimephales promelas*	8
Cyprinidae	*Platygobio gracilis*	48
Cyprinidae	*Rhinichthys cataractae*	2
Ictaluridae	*Ictalurus punctatus*	3
Poeciliidae	*Gambusia affinis*	15

Atrisco Outfall

28 November 2006 WJR06-519 30 seine hauls Effort: 1021.8 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	16
Cyprinidae	*Platygobio gracilis*	5
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	4

Alejandro Gate

28 November 2006 WJR06-520 30 seine hauls Effort: 1085.7 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	115
Cyprinidae	*Hybognathus amarus*	16
Cyprinidae	*Pimephales promelas*	22
Cyprinidae	*Platygobio gracilis*	20
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	6
Poeciliidae	*Gambusia affinis*	28
Moronidae	*Morone chrysops*	1

Tome´

28 November 2006 WJR06-521 30 seine hauls Effort: 1006.2 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Hybognathus amarus*	4
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	1

Sandia PNM Gasline

29 November 2006 WJR06-522 30 seine hauls Effort: 1015.8 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	131
Cyprinidae	*Hybognathus amarus*	21
Cyprinidae	*Platygobio gracilis*	30
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	2

Below San Acacia Diversion Dam

29 November 2006 WJR06-523 30 seine hauls Effort: 1164.6 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	78
Cyprinidae	*Hybognathus amarus*	17
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	30
Ictaluridae	*Ameiurus natalis*	3
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	1

Rio Puerco Confluence

29 November 2006 WJR06-524 30 seine hauls Effort: 861.3 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	494
Cyprinidae	*Hybognathus amarus*	19
Cyprinidae	*Pimephales promelas*	7
Cyprinidae	*Platygobio gracilis*	2
Catostomidae	*Carpiodes carpio*	6
Ictaluridae	*Ictalurus punctatus*	27

U.S. 60 Bridge

29 November 2006 WJR06-525 30 seine hauls Effort: 880.8 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	519
Cyprinidae	*Cyprinus carpio*	2
Cyprinidae	*Hybognathus amarus*	4
Cyprinidae	*Pimephales promelas*	2
Catostomidae	*Carpiodes carpio*	2
Ictaluridae	*Ictalurus punctatus*	9
Poeciliidae	*Gambusia affinis*	1

Dixon Road

18 December 2006 WJR06-526 30 seine hauls Effort: 1140.9 m^2

Personnel: Leanna Torres, J.P. Sandoval, S.J. Bulgrin, M. Osborne

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	18
Cyprinidae	*Hybognathus amarus*	17
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	12
Catostomidae	*Catostomus commersoni*	1
Poeciliidae	*Gambusia affinis*	11

Lomitas Negras

18 December 2006 WJR06-527 30 seine hauls Effort: 1064.1 m^2

Personnel: Leanna Torres, J.P. Sandoval, S.J. Bulgrin, M. Osborne

Family	Species	N
Cyprinidae	*Hybognathus amarus*	1
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	5
Catostomidae	*Catostomus commersoni*	4
Poeciliidae	*Gambusia affinis*	4

U.S. 550 Bridge

18 December 2006 WJR06-528 30 seine hauls Effort: 1256.7 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	1
Cyprinidae	*Platygobio gracilis*	1

Sandia Line 14

18 December 2006 WJR06-529 30 seine hauls Effort: 949.2 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Platygobio gracilis*	6

Sandia PNM Gasline

18 December 2006 WJR06-530 30 seine hauls Effort: 851.1 m^2

Personnel: W.J. Remshardt, Leanna Torres, J.P. Sandoval

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	8
Cyprinidae	*Hybognathus amarus*	
Cyprinidae	*Pimephales promelas*	
Cyprinidae	*Platygobio gracilis*	21
Cyprinidae	*Rhinichthys cataractae*	2
Ictaluridae	*Ameiurus natalis*	1
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	

Tome´

19 December 2006 WJR06-531 30 seine hauls Effort: 1071.3 m^2

Personnel: W.J. Remshardt, S.R. Davenport, J.P. Sandoval, M. Osborne

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	8
Cyprinidae	*Cyprinus carpio*	1
Cyprinidae	*Hybognathus amarus*	16
Cyprinidae	*Pimephales promelas*	2
Cyprinidae	*Platygobio gracilis*	1
Cyprinidae	*Rhinichthys cataractae*	1
Catostomidae	*Carpiodes carpio*	1
Ictaluridae	*Ictalurus punctatus*	1
Poeciliidae	*Gambusia affinis*	4

Atrisco Outfall

19 December 2006 WJR06-532 30 seine hauls Effort: 861.3 m^2

Personnel: W.J. Remshardt, S.R. Davenport, J.P. Sandoval, M. Osborne

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	3
Cyprinidae	*Platygobio gracilis*	4
Poeciliidae	*Gambusia affinis*	3
Centrarchidae	*Micropterus salmoides*	1

Alejandro Gate

19 December 2006 WJR06-533 30 seine hauls Effort: 646.5 m^2

Personnel: W.J. Remshardt, S.R. Davenport, J.P. Sandoval, M. Osborne

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	43
Cyprinidae	*Hybognathus amarus*	7
Cyprinidae	*Pimephales promelas*	10
Cyprinidae	*Platygobio gracilis*	3
Poeciliidae	*Gambusia affinis*	10

Lemitar

21 December 2006 WJR06-534 30 seine hauls Effort: 1007.7 m^2

Personnel: W.J. Remshardt, S.R. Davenport, J.P. Sandoval, C.W. Hoagstrom – Weber State University

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	30
Cyprinidae	*Hybognathus amarus*	22
Cyprinidae	*Pimephales promelas*	3
Cyprinidae	*Platygobio gracilis*	29
Ictaluridae	*Ictalurus punctatus*	4

Below San Acacia Diversion Dam

21 December 2006 WJR06-535 30 seine hauls Effort: 822.3 m^2

Personnel: W.J. Remshardt, S.R. Davenport, J.P. Sandoval, C.W. Hoagstrom – Weber State University

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	201
Cyprinidae	*Hybognathus amarus*	22
Cyprinidae	*Pimephales promelas*	2
Cyprinidae	*Platygobio gracilis*	86
Cyprinidae	*Rhinichthys cataractae*	1
Ictaluridae	*Ictalurus punctatus*	3

Rio Puerco Confluence

21 December 2006 WJR06-536 30 seine hauls Effort: 805.8 m^2

Personnel: W.J. Remshardt, S.R. Davenport, J.P. Sandoval, C.W. Hoagstrom – Weber State University

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	663
Cyprinidae	*Hybognathus amarus*	15
Cyprinidae	*Pimephales promelas*	1
Cyprinidae	*Platygobio gracilis*	11
Catostomidae	*Carpiodes carpio*	9
Ictaluridae	*Ictalurus punctatus*	5

U.S. 60 Bridge

21 December 2006 WJR06-537 30 seine hauls Effort: 591.0 m^2

Personnel: W.J. Remshardt, S.R. Davenport, J.P. Sandoval, C.W. Hoagstrom – Weber State University

Family	Species	N
Cyprinidae	*Cyprinella lutrensis*	673
Cyprinidae	*Cyprinus carpio*	2
Cyprinidae	*Hybognathus amarus*	4
Cyprinidae	*Pimephales promelas*	7
Cyprinidae	*Platygobio gracilis*	3
Catostomidae	*Carpiodes carpio*	4
Poeciliidae	*Gambusia affinis*	3

Appendix C.
Water quality measurements by collection number. For detailed site information, cross-reference with Appendix B. Some measurements may include outliers.

Collno = collection number; Temp = water temperature (C); DO = dissolved oxygen (mg/l); SpC = specific conductance (ms/cm); TDS = total dissolved solids (mg/l); Sal = salinity (ppt).

Collno	Temp	DO	SpC	TDS	Sal	pH
WJR06-376	5.02	14.18	572	0.371	0.28	8.78
WJR06-377	5.69	13.69	629	0.409	0.31	8.68
WJR06-378	6.49	14.07	349	0.351	0.26	9.17
WJR06-379	7.22	13.11	346	0.340	0.26	9.13
WJR06-380	1.46	15.62	209	0.247	0.18	8.63
WJR06-381	3.17	14.87	236	0.263	0.19	8.72
WJR06-382	2.29	15.94	277	0.229	0.17	8.37
WJR06-383	2.99	15.73	207	0.232	0.17	8.34
WJR06-384	3.59	15.11	210	0.231	0.17	8.28
WJR06-385	1.69	14.61	266	0.311	0.23	7.96
WJR06-386	4.28	14.23	283	0.305	0.23	7.90
WJR06-387	4.99	14.56	421	0.274	0.20	7.99
WJR06-388	2.76	15.11	365	0.238	0.18	7.50
WJR06-389	4.84	14.52	399	0.261	0.20	8.48
WJR06-390	4.37	15.06	357	0.232	0.17	8.27
WJR06-391	5.18	14.33	363	0.235	0.17	8.65
WJR06-392	5.54	14.74	357	0.231	0.17	8.66
WJR06-393	4.71	14.10	560	0.364	0.27	8.32
WJR06-394	7.39	13.83	430	0.280	0.21	8.59
WJR06-395	8.03	13.48	465	0.302	0.23	8.64
WJR06-396	5.00	13.75	611	0.398	0.30	8.36
WJR06-397	5.06	14.10	671	0.437	0.32	8.53
WJR06-398	6.11	13.60	551	0.361	0.27	8.64
WJR06-399	7.72	13.18	500	0.325	0.24	8.46
WJR06-400	9.83	12.57	427	0.278	0.21	8.24
WJR06-401	10.99	12.62	456	0.316	0.22	8.09
WJR06-402	14.36	12.08	463	0.300	0.23	8.07
WJR06-403	8.69	13.19	368	0.239	0.18	8.58
WJR06-404	9.79	12.44	387	0.252	0.19	8.77
WJR06-405	9.11	13.67	377	0.245	0.18	8.60
WJR06-406	9.76	14.41	387	0.251	0.19	8.87
WJR06-407	10.12	14.03	385	0.250	0.19	8.83
WJR06-408	6.52	15.69	481	0.313	0.23	8.23
WJR06-409	7.67	.	522	0.339	0.25	8.50
WJR06-410	7.79	14.27	543	0.353	0.26	8.81
WJR06-411	8.82	15.62	639	0.415	0.31	8.60
WJR06-412	9.36	13.08	624	0.406	0.31	8.54
WJR06-413	12.72	7.30	378	0.242	0.19	.
WJR06-414	13.43	7.18	412	0.263	0.21	.
WJR06-415	18.39	6.82	429	0.275	0.22	.
WJR06-416	8.75	7.80	295	0.189	0.14	7.99
WJR06-417	10.69	7.56	317	0.203	0.16	8.15
WJR06-418	11.24	7.60	296	0.165	0.14	8.13
WJR06-419	12.73	7.49	296	0.189	0.14	8.33
WJR06-420	14.20	7.76	296	0.189	0.14	8.38
WJR06-424	19.29	.	552	0.404	0.30	7.81
WJR06-425	19.23	.	544	0.397	0.30	8.41

CollNo	Temp	DO	SpC	TDS	Sal	pH
WJR06-426	23.28	.	523	0.340	0.25	8.56
WJR06-427	26.33	.	477	0.309	0.23	8.65
WJR06-428	17.32	9.92	364	0.237	0.18	8.47
WJR06-429	23.20	40.63	396	0.264	0.19	8.30
WJR06-430	26.68	9.10	410	0.267	0.20	8.62
WJR06-431	16.62	.	262	0.203	0.50	8.37
WJR06-432	16.86	11.80	287	0.221	0.16	8.41
WJR06-433	16.35	9.54	259	0.202	0.15	8.23
WJR06-434	17.36	7.78	269	0.205	0.15	8.37
WJR06-435	18.57	6.26	275	0.204	0.15	8.34
WJR06-436	17.72	8.84	423	0.499	0.21	8.32
WJR06-437	20.29	8.42	287	0.206	0.15	8.41
WJR06-438	20.55	.	314	0.223	0.16	8.42
WJR06-439	20.28	.	313	0.204	0.15	8.34
WJR06-440	21.53	7.85	308	0.233	0.15	8.41
WJR06-441	22.61	.	302	0.205	0.15	8.39
WJR06-442	25.51	.	516	0.332	0.25	8.63
WJR06-443	24.74	.	484	0.315	0.23	8.58
WJR06-444	28.95	.	435	0.263	0.19	8.60
WJR06-445	24.95	.	402	0.261	0.19	8.36
WJR06-446	26.23	.	408	0.259	0.19	8.43
WJR06-447	20.75	.	313	0.221	0.16	8.25
WJR06-448	24.51	6.37	563	0.369	0.27	8.23
WJR06-449	24.38	6.60	549	0.361	0.27	8.20
WJR06-450	25.66	6.75	495	0.318	0.23	8.39
WJR06-451	27.18	6.92	475	0.297	0.22	8.52
WJR06-452	21.84	6.46	295	0.205	0.15	8.23
WJR06-453	20.34	6.31	483	0.345	0.26	8.17
WJR06-454	20.62	6.73	569	0.406	0.21	8.21
WJR06-455	22.13	6.91	349	0.241	0.18	8.23
WJR06-456	22.51	6.23	433	0.296	0.22	8.02
WJR06-457	21.64	6.05	592	0.411	0.31	8.06
WJR06-458	22.12	6.01	579	0.399	0.30	7.88
WJR06-458B	24.60	5.42	350	0.229	0.17	8.05
WJR06-459	24.54	6.15	496	0.325	0.24	7.96
WJR06-469	23.75	6.04	706	0.467	0.35	8.04
WJR06-470	23.37	6.09	.	0.645	0.47	8.07
WJR06-471	24.41	5.26	928	0.603	0.46	8.27
WJR06-472	25.91	5.22	515	0.330	0.24	8.23
WJR06-473	23.56	.	578	0.387	0.29	8.12
WJR06-474	23.88	.	567	0.376	0.28	7.89
WJR06-475	25.34	4.02	580	0.375	0.28	7.89
WJR06-476	27.81	5.50	633	0.390	0.29	7.98
WJR06-477	23.97	6.18	323	0.212	0.18	8.20
WJR06-478	23.53	6.50	334	0.236	0.17	8.15
WJR06-479	24.88	6.89	364	0.239	0.17	8.48
WJR06-480	25.30	6.87	356	0.231	0.17	8.50
WJR06-481	26.67	6.30	396	0.250	0.19	8.44
WJR06-501	10.81	10.20	217	0.194	0.14	8.58

CollNo	Temp	DO	SpC	TDS	Sal	pH
WJR06-502	11.79	9.18	338	0.220	0.16	8.49
WJR06-503	12.08	9.51	288	0.188	0.14	8.45
WJR06-504	12.38	9.27	294	0.191	0.15	8.61
WJR06-505	12.44	9.77	296	0.193	0.14	8.67
WJR06-506	10.17	10.32	330	0.215	0.16	8.40
WJR06-507	12.12	9.15	414	0.269	0.20	8.34
WJR06-508	12.65	9.27	402	0.261	0.19	8.53
WJR06-509	14.19	8.61	379	0.246	0.18	8.58
WJR06-510	10.40	9.39	478	0.310	0.23	8.15
WJR06-511	11.65	9.11	548	0.407	0.31	8.27
WJR06-512	12.55	9.12	420	0.273	0.20	8.35
WJR06-513	5.55	12.83	284	0.184	0.14	8.85
WJR06-514	5.91	11.91	284	0.185	0.14	8.76
WJR06-515	6.63	11.53	255	0.182	0.13	8.66
WJR06-516	7.48	11.60	303	0.197	0.15	8.70
WJR06-518	9.38	10.18	331	0.216	0.16	8.77
WJR06-519	7.39	10.74	326	0.211	0.16	9.27
WJR06-520	8.83	9.80	349	0.227	0.17	9.66
WJR06-521	8.99	10.45	360	0.234	0.17	8.87
WJR06-522	7.25	10.23	460	0.299	0.22	9.28
WJR06-523	8.06	9.90	687	0.446	0.34	9.14
WJR06-524	7.25	10.32	391	0.255	0.19	9.76
WJR06-525	6.92	10.20	380	0.246	0.18	9.46
WJR06-526	4.15	13.60	309	0.201	0.15	7.37
WJR06-527	4.69	13.06	182	0.237	0.18	7.86
WJR06-528	3.69	14.84	313	0.204	0.15	8.75
WJR06-529	4.18	13.72	317	0.207	0.15	8.51
WJR06-530	4.35	13.59	316	0.206	0.15	8.30
WJR06-531	5.19	12.71	384	0.250	0.19	7.59
WJR06-532	3.91	12.94	353	0.229	0.17	8.11
WJR06-533	4.43	12.59	370	0.241	0.18	8.15
WJR06-534	3.41	13.90	447	0.309	0.23	7.37
WJR06-535	5.02	12.81	697	0.453	0.34	8.32
WJR06-536	7.04	11.57	557	0.362	0.27	8.33
WJR06-537	5.37	12.33	403	0.262	0.19	8.35