SWCA
ENVIRONMENTAL CONSULTANTS

MIDDLE RIO GRANDE RIVERINE HABITAT RESTORATION FISHERIES MONITORING SPRING 2008 REPORT

Prepared for

NEW MEXICO INTERSTATE STREAM COMMISSION, ALBUQUERQUE OFFICE

Prepared by

SWCA ENVIRONMENTAL CONSULTANTS

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Middle Rio Grande
Riverine Habitat Restoration Fisheries Monitoring
Spring 2008 Final Report

Prepared for

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EXECUTIVE SUMMARY

The New Mexico Interstate Stream Commission has employed a number of habitat restoration techniques in the Albuquerque Reach of the Middle Rio Grande (MRG) to provide improved habitat for egg retention, spawning, recruitment and other life stages of the Rio Grande silvery minnow (*Hybognathus amarus*; silvery minnow). Restoration sites within the Albuquerque Reach are intended to provide floodplain habitat that inundates at low to high spring runoff. Fisheries monitoring was conducted in spring 2008 to document silvery minnow presence on habitat restoration sites as well as on naturally occurring floodplain sites. Information collected during this monitoring effort documents the occupancy of reproductively mature silvery minnow and the presence of their eggs on both habitat restoration sites and naturally occurring floodplain.

Fisheries monitoring occurred May 12–June 11, 2008 at five habitat restoration sites within the Albuquerque Reach and at one naturally occurring floodplain site in the Isleta Reach of the MRG. Fish were collected with D-frame fyke nets, and eggs and larval fish were collected with D-frame kick nets from all monitoring sites. Movement from the main channel onto the floodplain was studied at two sites by placing paired fyke nets positioned to capture fish swimming onto and off of the sites. Silvery minnow captures were standardized by dividing the number of fish captured by the time each net was soaked on each day (catch per unit effort [CPUE] = fish/hour). In addition, silvery minnow eggs were collected from the main channel using Moore Egg Collectors (Altenbach et al. 2000) set for 15–60 min on each sampling date.

A total of 9,545 silvery minnow were collected during monitoring. More silvery minnow were collected moving onto floodplain/backwater sites than were collected moving out of the sites. Statistical analysis indicates that silvery minnow CPUE was similar among all but one habitat restoration site sampled during monitoring. The habitat restoration site with the lowest mean CPUE had the highest average velocity suggesting that silvery minnow occupancy is influenced by this parameter.

Floodplain and main channel egg collections showed silvery minnow spawning to be most pronounced from May 12–June 1, with peak activity occurring from May 25–28. More silvery minnow eggs (340) were collected from floodplain sites than from the main channel (38). Mean CPUE and floodplain egg collections were highest on May 26 (the day after the highest observed discharge during spring runoff) at both habitat restoration and naturally occurring sites. Collectively, these data suggest that silvery minnow are actively spawning on habitat restoration and natural floodplain sites.

Silvery minnow were documented as gravid throughout monitoring. The percentages of silvery minnow classified as gravid and spent females were inversely related during the sampling period; during the first week of monitoring 33% of silvery minnow were classified as gravid and 1% were classified as spent, while during the last week of monitoring 10% were classified as gravid and 43% were classified as spent. This relationship suggests that the majority of silvery minnow spawned during spring runoff.

Paired length and weight data were collected from 3,237 silvery minnow and suggest that two age groups were present during spawning. Females were significantly heavier than male silvery minnow, and the largest female observed weighed 15.5 g with a standard length of 92 mm.

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Cover Photo

Photo of gravid 87-mm SL Rio Grande silvery minnow (*Hybognathus amarus*) by Michael Hatch, SWCA.

1.0 INTRODUCTION

The New Mexico Interstate Stream Commission (NMISC) has employed a number of habitat restoration techniques in the MRG to reconnect portions of the floodplain with the main channel during periods of moderate and high flows to benefit the Rio Grande silvery minnow (*Hybognathus amarus*; silvery minnow). The restoration work has been conducted to satisfy federal requirements under the Biological Opinion Reasonable Prudent Alternative Element S that, in coordination with the U.S. Fish and Wildlife Service (USFWS), agencies "shall…conduct habitat/ecosystem restoration projects in the Middle Rio Grande to increase backwaters and oxbows, widen the river channel, and/or lower river banks to produce shallow water habitats, overbank flooding, and regeneration of stands of willows and cottonwood to benefit the silvery minnow, the flycatcher, or their habitats" (USFWS 2003:95–96).

Fisheries information collected by SWCA Environmental Consultants (SWCA) on behalf of the NMISC indicates that silvery minnow occupy these habitats and may spawn on these areas during spring runoff (SWCA 2008a, 2008b). Multiple life stages of silvery minnow have been found on inundated habitat restoration sites created by the NMISC during spring runoff (SWCA 2008a, 2008b). The 2008 spring fisheries monitoring was conducted to document silvery minnow presence on habitat restoration sites and naturally occurring off-channel floodplain sites. Information collected during this monitoring effort documents the occupancy of reproductively mature silvery minnow and the presence of their eggs on both habitat restoration sites and naturally occurring floodplain habitats.

1.1 PROJECT GOALS AND OBJECTIVES

Fisheries monitoring was conducted in spring 2008 to determine if constructed habitat restoration sites are being utilized by silvery minnow during runoff. Additionally, a naturally occurring off-channel floodplain site that was known to be occupied by relatively large numbers of silvery minnow in 2005 was selected for monitoring to assess silvery minnow utilization during spring runoff. Lastly, efforts were made to collect silvery minnow eggs and larval fish to determine if silvery minnow are spawning on these off-channel low-velocity habitats.

2.0 HABITAT RESTORATION SITE MONITORING

2.1 SITE DESCRIPTION AND BACKGROUND

Four NMISC habitat restoration sites and one additional proposed NMISC restoration site (Old Atrisco Diversion) were selected for fisheries monitoring within the Albuquerque Reach of the MRG (Figure 2.1). Sites were selected that represented a diversity of habitat techniques and were expected to be inundated during the anticipated spring runoff. Table 2.1 lists NMISC habitat restoration sites names, site names used for this report, fyke net identification numbers, and the number of days and dates each fyke net was fished; Appendix A contains detailed maps of each site with fyke net and water quality locations.

Table 2.1. Albuquerque Reach Sites Selected for NMISC 2008 Fisheries Monitoring

HR Site	Site Name[a]	Fyke Net Configuration	Fyke Net Identification Number	Number of Days Sampled	Sample Dates
Phase II I40-1ch	Central Wasteway	Single "In"	206	24	5/13–5/26; 5/28–6/2; 6/8–6/11
		Single "Out"	403	21	5/16–5/26; 5/28–6/2; 6/8–6/11
		Single	408	2	5/25–5/26
		Single	409	12	5/25–5/26; 5/28–6/2; 6/8–6/11
		Single	412	9	5/28–6/2; 6/8–6/10
Phase II I40-2b	Central Bridge	Single	404	9	5/16–5/24
		Single	405	20	5/17–5/26; 5/28–6/2; 6/8–6/11
		Single	413	11	5/16; 5/28–6/2; 6/8–6/11
		Single	414	2	5/25–5/26
Phase II I40-4b	Tingley Lakes	Single	406	9	5/16–5/20; 5/22–5/25
		Single	407	4	5/16–5/19
		Single	415	11	5/16–5/19; 5/26; 5/28–6/2; 6/8–6/11
		Single	416	13	5/21; 5/25–5/26; 5/28–6/2; 6/8–6/11
Phase II SDC-5b	SDC East	Single	410	7	5/28;6/2; 6-8–6/11
		Single	411	7	5/28;6/2; 6-8–6/11
Old Atrisco Diversion	Atrisco	Single "Out"	401	9	5/16–5/26
		Single "In"	402	11	5/16–5/21

[a] Site names are those used in this report.

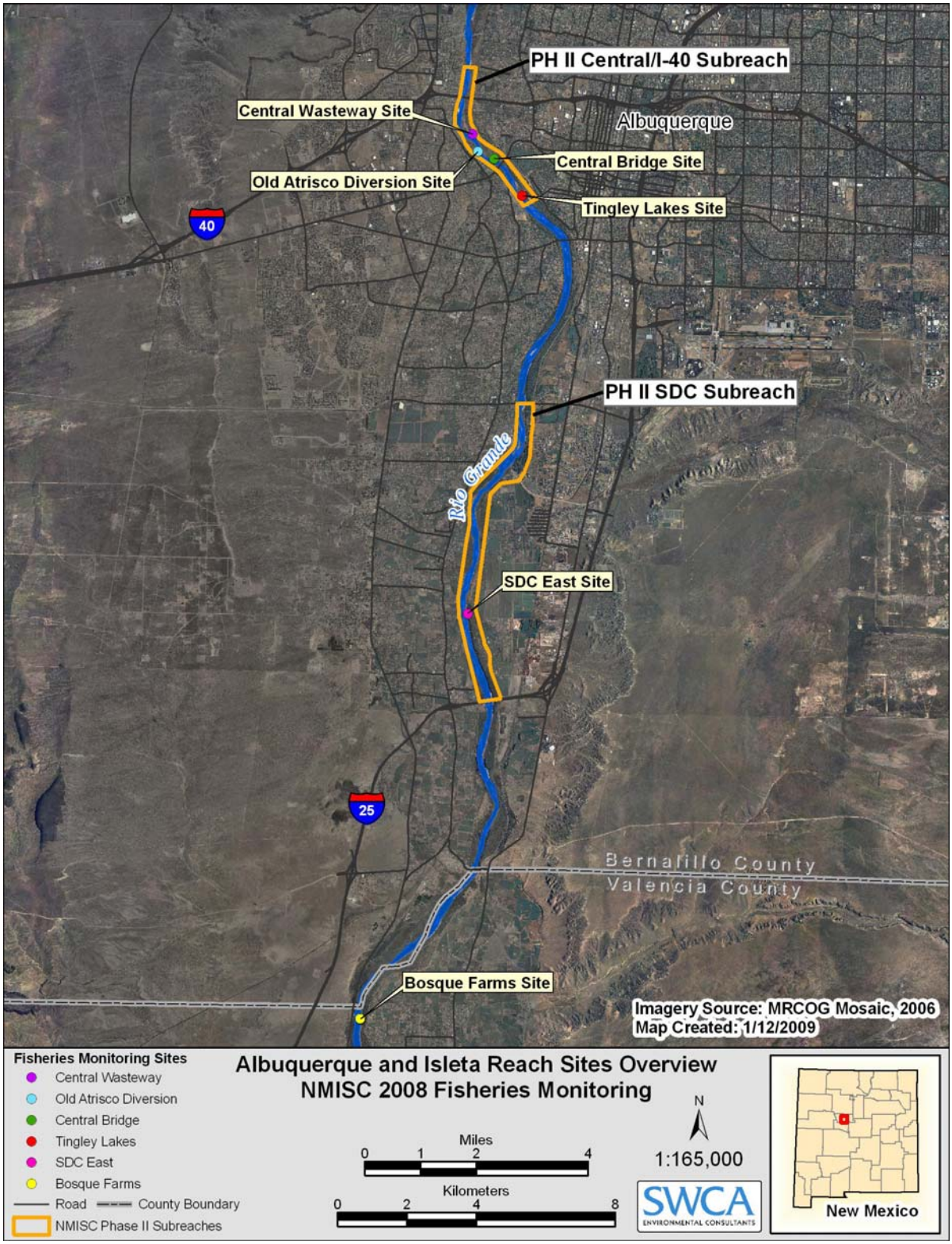

Figure 2.1. Overview map of Albuquerque and Isleta reach sites selected for spring 2008 monitoring.

2.1.1 Central Wasteway Site (Phase II I40-1ch)

The Central Wasteway site (I40-1ch) is located north of the Central Avenue Weed Rack Wasteway along the east bank of the Rio Grande (Appendix A, Figure A1). The site is an existing ephemeral side channel that was modified by removing vegetation and sediment along an existing channel to elevations that allow water to enter at flows of 2,000 cubic feet per second (cfs) and greater into a backwater/floodplain area. This site was selected to monitor movement of silvery minnow into the reconnected floodplain/backwater from the main channel during spring runoff. Movement was assessed at two sites located at the downstream end of the constructed ephemeral channel that ends at a small backwater inlet next to a constructed bank line modification. This area was selected because portions of the bank that were not modified resulted in a constricted area that could be adequately blocked with fyke net wings. Three additional areas were fished at the north end of the site to assess silvery minnow occupancy within the site.

2.1.2 Atrisco Site (Old Atrisco Diversion)

The Atrisco site is currently an inactive irrigation diversion structure located on the west side of the river between Central and Interstate 40 (I-40) (Appendix A, Figure A2). Plans for the return channel (southern portion of the site) are to create a high-flow backwater and low-flow refugial habitat. Currently the southern end of the site inundates at 2,000 cfs. The Atrisco site was selected to observe utilization and movement from the main channel by silvery minnow prior to the construction of the proposed NMISC modifications. Two sites were fished at the south end of the site just upstream of main channel flow in an area that could be completely blocked by fyke net wings.

2.1.3 Central Bridge Site (Phase II I40-2b)

The Central Bridge site is a large bar modification on the east side of the Rio Grande just north of Central Avenue that was modified with a constructed ephemeral channel, embayment, bank line lowering, and vegetation removal (Appendix A, Figure A3). The bank line modification and embayment were cut to a 600–700 cfs river level and is approximately 3–5 m (10–15 feet) wide. The main feature of the site is a constructed channel. The channel was constructed by removing material from the east side of the bar, sloping from north to south, so that inundation would occur at 3,500 cfs at the north end of the site and 2,500 cfs at the south end. This site was selected for monitoring to assess silvery minnow occupancy of the channel and bar modification during spring runoff. Three sites were fished at the south end of the embayment, and one area was fished at the south end of the channel.

2.1.4 Tingley Lakes Site (Phase II I40-4b)

The Tingley Lakes site is a bar modification that includes a scallop that was lowered to inundate at 1,400 cfs at the inflow area on the northeastern section of the bar (Appendix A, Figure A4). The remaining modification of the bar was constructed to inundate at 3,500 cfs, with a 7 m (20 feet) bank line cut to a 600–700 cfs river level. In addition, a channel intended to inundate at 3,500 cfs was cut from the southwest corner of the scallop to the northern section of the bank line, where a natural channel had previously existed. This site was selected to assess silvery

minnow occupancy of the scallop at the north end of site and along the bank line modification. Two fyke nets were fished on the scallop at the northeastern section of the bar, and two were fished along the bank line cut.

2.1.5 South Diversion Channel East Site (Phase II SDC-5b)

The South Diversion Channel (SDC) East site is a bar modification that was constructed on the east bank of the Rio Grande and spans 300 m (984 feet) (Appendix A, Figure A5). The bank line of the bar was cut back 5 m (15 feet) and was lowered to inundate at approximately 1,000 cfs. The channel to the east of the bank line was cut to be inundated at 3,500 cfs and is sloped in a downstream direction. Vegetation was cleared and grubbed from the entire bar. The area of this site selected for monitoring was anticipated to inundate at flows > 3,500 cfs. Two fyke nets were fished at the south end of the site.

2.2 METHODS

The sampling methods described in this document provide a general overview of field techniques used during monitoring. A sampling and analysis plan (SAP) that details the project methodologies was prepared prior to the onset of monitoring and can be referred to for additional information related to site selection, fyke net setup, egg and larval fish collections, and the daily sampling approach used by monitoring crews (SWCA 2008c).

2.2.1 Fisheries Monitoring

Scouting surveys were conducted April 25–May 12, 2008 to determine if silvery minnow were occupying the selected monitoring sites and if spawning was occurring. Fish and eggs were collected with seines and Moore Egg Collectors (MECs). The presence of mature silvery minnow and their eggs was used as an indicator of spawning and to determine when fisheries monitoring should begin.

Fisheries monitoring was conducted May 12–June 11, 2008. No monitoring occurred May 27 or June 3–7, 2008. Individual fyke nets were deployed at sites singly and paired to capture fish "entering" and "exiting" the flooded restoration sites. Paired fyke nets were set up at the Atrisco site and the downstream end of the Central Wasteway site. Appendix A shows locations of fyke nets, water quality collection locations, and egg transects for each restoration site monitored.

Fish were collected at habitat restoration sites with D-frame fyke nets (0.5 × 0.5 m [1.6 × 1.6 feet]; 6.4-mm mesh size) that were attached to metal posts (1.8-m [6-foot] t-posts). Fyke nets were assigned a unique number by attaching a pre-numbered aluminum tree tag to each net. Fyke nets were set overnight from May 17–26, 2008. On May 26 the incidental take limit for silvery minnow as set forth by SWCA's federal collectors permit was exceeded. To reduce the likelihood that additional take would occur, fyke nets were set for 3–5 hours May 28–June 11. Sampling effort was recorded in terms of the time that a fyke net was fishing. A Trimble GeoXT handheld global positioning system (GPS) unit with sub-meter accuracy was used to record spatial characteristics of fyke net sampling locations.

All post-larval fish collected were identified to species in the field, using taxonomic keys from Sublette et al. (1990); phylogenetic classification followed Nelson et al. (2004). Species counts were maintained for all collections, and all live fish were released back to the site of capture.

Data from the U.S. Geological Survey (USGS) stage gage located at the Central Avenue Bridge (#08330000) was used as a record of river discharge over the sampling period (Figure 2.2). A digital camera was used for all photo documentation (Appendix B). A relational database (Microsoft Access) and a spreadsheet database (Microsoft Excel) were developed for the storage, analysis, and retrieval of fish survey data.

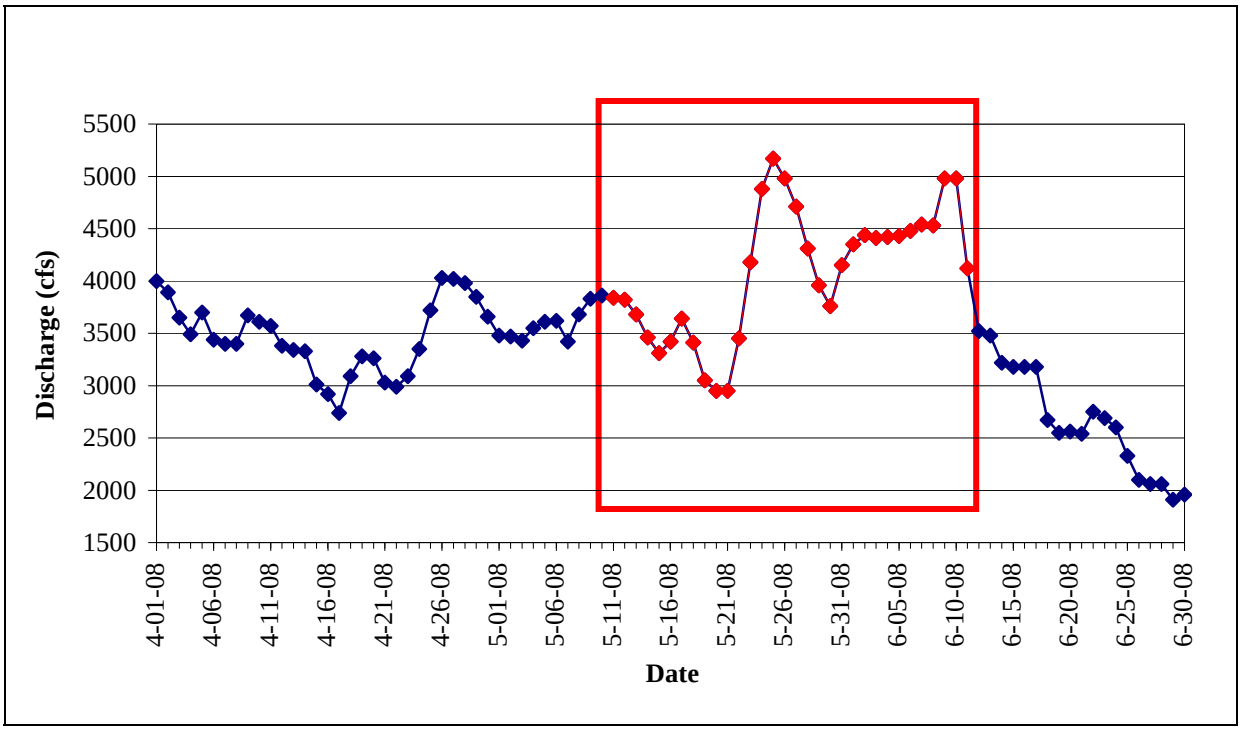

Figure 2.2. Average daily discharge in the Rio Grande at the USGS Central Avenue Bridge Gage; monitoring period is boxed and highlighted red.

2.2.2 DATA ANALYSIS

Silvery minnow catch per unit effort (CPUE) was calculated for fyke net samples by dividing the total number of fish captured by the total number of hours each fyke net was fished on each day (Quinn and Deriso 1999). Standardization of fyke net captures (assumes no periodic effect on captures) is expressed as fish per hour and is the index used to assess variation in species abundance among sites throughout the monitoring period.

Non-parametric statistical tests were conducted to assess if CPUE varied among sites and sampling dates. A Kruskal-Wallis single-factor analysis of variance by rank was used to test for CPUE differences among restoration sites and among sampling dates (Zar 1999). Non-parametric Wilcoxon rank-sum pairwise multiple comparisons using the Bonferroni adjustment method (Zar 1999; Dalgaard 2002) was used to assess mean differences in CPUE between restoration sites. Non-parametric statistical analysis assumes random assignment of net locations and was chosen because the presence of zero values for individual net sites prevented normalization of the CPUE data through transformation. Data collected prior to May 16 were not included in the analysis due to lack of suitable replication.

Additional analysis was conducted to test for differences between Central Wasteway fyke net sites 206 and 403 and between Atrisco fyke nets 401 and 402. These pairs of nets were placed to capture fish entering and exiting the floodplain sites and were used to estimate CPUE of silvery minnow swimming onto or off of the floodplain. A two-sample Wilcoxon rank-sum test (Zar 1999) was used to test for CPUE differences between paired observations of silvery minnow

collected in nets entering or exiting floodplain sites (May 16–24 at the Atrisco site and May 16–June 11 at the Central Wasteway site).

2.3 RESULTS

2.3.1 SCOUTING SURVEYS

During scouting surveys, the first silvery minnow was collected from the Central Wasteway site on April 3, and the first silvery minnow egg was collected from the Central Bridge site on May 9.

2.3.2 SILVERY MINNOW OCCUPANCY BY HYDROGRAPH AND DATE

Silvery minnow CPUE varied throughout monitoring. Mean CPUE was significantly different among dates at habitat restoration sites ($X^2_{0.05,20}$ = 38.0423, p = 0.008) (Figure 2.3). The highest mean CPUE value was observed on May 26 when discharge was at 4,980 cfs. At habitat restoration sites, mean CPUE was relatively constant from May 16–23, when main channel discharge ranged from 2,900–3,600 cfs.

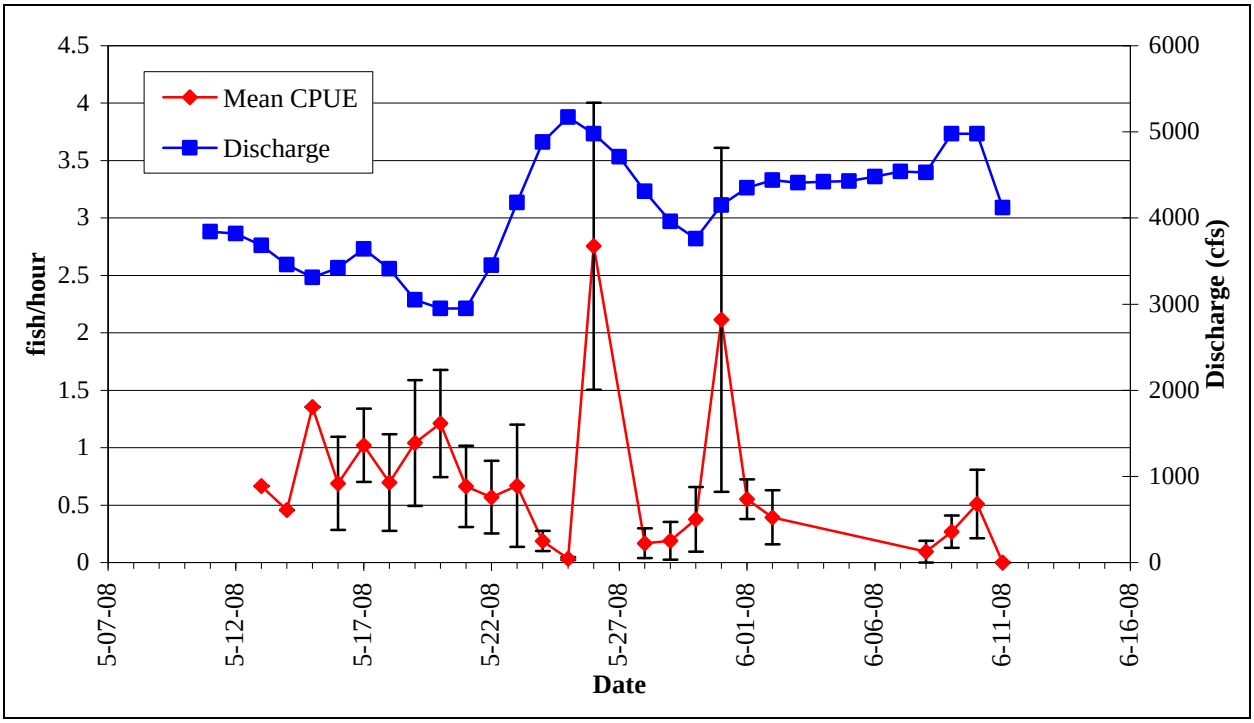

Figure 2.3. Arithmetic mean CPUE (fish/hour) values for silvery minnow collected from Albuquerque Reach sites and average daily discharge (cfs) at USGS Central Avenue Bridge Gage. Error bars represent one standard error.

2.3.3 Silvery Minnow Occupancy of NMISC Habitat Restoration Sites

A total of 2,180 silvery minnow were collected from habitat restoration sites during monitoring (Table 2.2). Estimated CPUE values were highly variable among habitat restoration sites ($X^2_{0.05,4}$ = 17.5894, p = 0.001). Maximum CPUE values observed at habitat restoration sites occurred on May 26 at the Central Bridge site (13.32 fish/hour) and on May 31 at the Central Wasteway site (11.92 fish/hour). Appendix C summarizes daily CPUE for individual net sites at habitat restoration sites.

Within individual habitat restoration sites, silvery minnow catches and the resulting CPUE values varied throughout monitoring (Appendix C). Silvery minnow were collected from all fyke nets at the Central Wasteway site except net 412. At the Central Bridge site, catches were relatively constant between dates at individual nets and ranged from 0–5 silvery minnow on all days, except on May 26 when 369 silvery minnow were collected from fyke net 414. At the Tingley Lakes site, the highest and most variable catches were at fyke nets 406 and 415, which were located on the scallop treatment at the north end of the site. Catches on the bank line modification at this site (nets 407 and 416) were relatively constant throughout monitoring. At the SDC East site, the highest CPUE values were observed on May 26; no silvery minnow were collected from this site at main channel discharges below 4,400 cfs.

Table 2.2. Total Number and Mean CPUE of Silvery Minnow Collected from Habitat Restoration Sites

NMISC Restoration Site	Spring 2008 Fisheries Monitoring Name	HR Site	Number of Rio Grande Silvery Minnow	Mean CPUE* (fish/hour)
I40-1ch	Central Wasteway	NMISC Site	713	0.64 (0–11.92)
I40-2b	Central Bridge	NMISC Site	392	0.39 (0–13.32)
I40-4b	Tingley Lakes	NMISC Site	484	0.92 (0–5.54)
SDC-5b	SDC East	NMISC Site	132	0.79 (0–5.53)
Old Atrisco Diversion	Atrisco	Proposed NMISC Site	459	0.97 (0–4.57)

*Range of CPUE values are given in parenthesis.

2.3.4 Pairwise Comparisons of Silvery Minnow CPUE at NMISC Habitat Restoration Sites

Pairwise comparisons indicate that silvery minnow CPUE was similar between all sites except between the Central Bridge site and the Central Wasteway and Tingley Lakes sites (Table 2.3). CPUE was on average lower at the Central Bridge site than at the Central Wasteway and Tingley Lakes sites.

Table 2.3. Pairwise Comparisons of CPUE between NMISC Habitat Restoration Sites

Comparison	p Value
Atrisco vs. Central Bridge	0.078
Atrisco vs. Central Wasteway	1.000
Atrisco vs. SDC East	1.000
Atrisco vs. Tingley Lakes	1.000
Central Bridge vs. Central Wasteway	0.014
Central Bridge vs. SDC East	1.000
Central Bridge vs. Tingley Lakes	0.008
Central Wasteway vs. SDC East	1.000
Central Wasteway vs. Tingley Lakes	0.801
SDC East vs. Tingley Lakes	1.000

Note: p values are Bonferroni adjusted p values.

2.3.5 SILVERY MINNOW MOVEMENT

No statistical difference was found between CPUE values of silvery minnow entering and exiting the Central Wasteway site ($W_{0.05(2)21,21}$ = 278.5, p = 0.1405); however, mean CPUE values were higher for silvery minnow collected entering the site (mean entering = 1.29 fish/hour) than silvery minnow exiting the site (mean exiting = 0.37 fish/hour) (Figure 2.4). CPUE was higher for silvery minnow entering the Atrisco site ($W_{0.05(2)9,9}$ = 74.5, p = 0.002) than for silvery minnow exiting the site (Figure 2.5). The highest Atrisco site CPUE value was observed on May 19 when the average daily discharge was 3,050 cfs. The last silvery minnow captured was moving out of the Atrisco site on May 24 when main channel discharge was 4,880 cfs. The highest CPUE value observed at the Central Wasteway site occurred May 31 when the average daily discharge was 4,150 cfs.

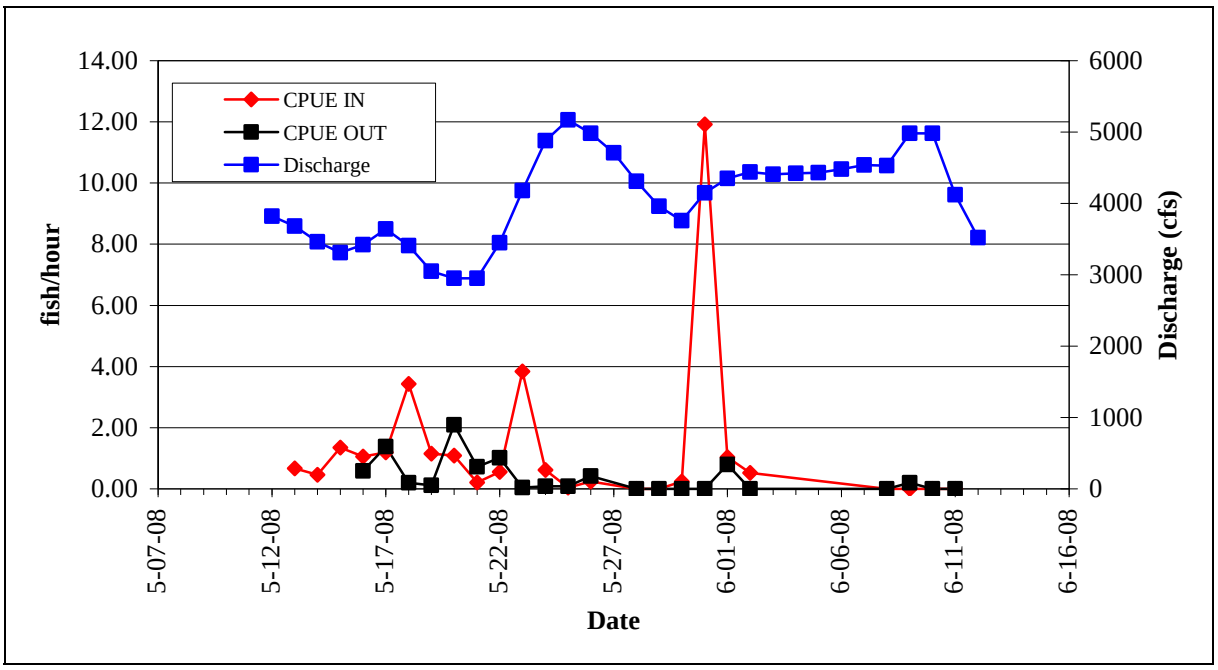

Figure 2.4. CPUE values collected from the nets positioned to capture fish entering (In) and exiting (Out) the Central Wasteway site. Paired observations were collected May 16–June 11, 2008. Average daily discharge (cfs) was estimated at USGS Central Avenue Bridge Gage.

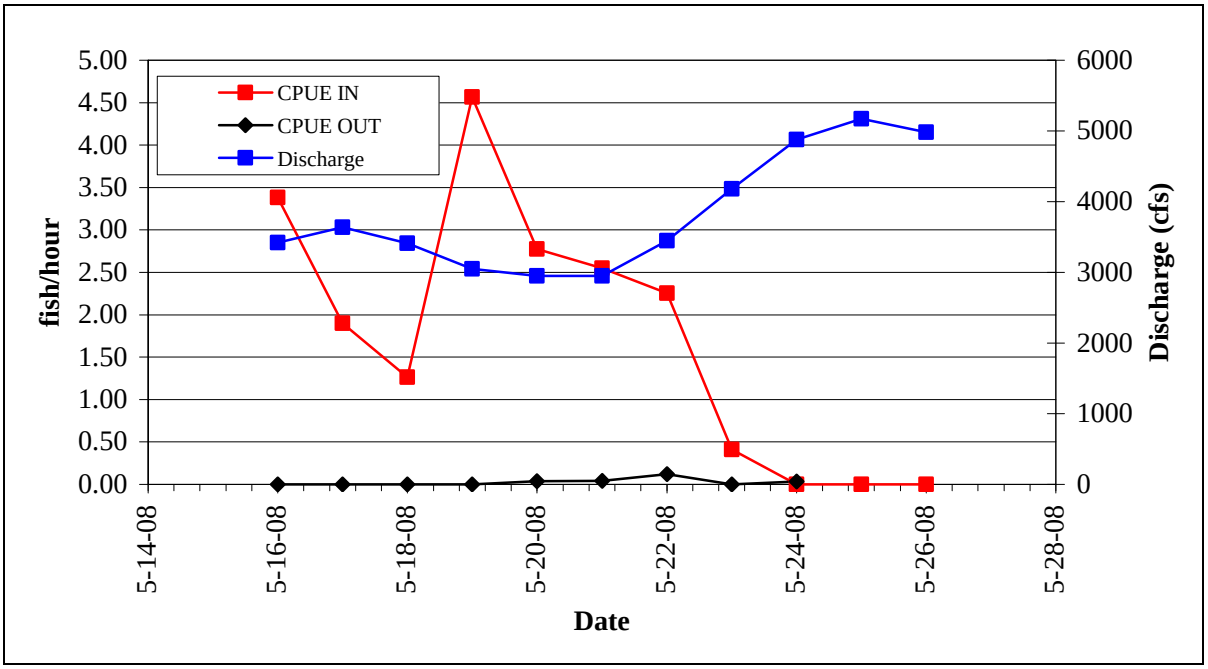

Figure 2.5. CPUE values collected from nets positioned to capture fish entering (In) and exiting (Out) the Atrisco site. Paired observations were collected May 16–24, 2008. Average daily discharge (cfs) was estimated at USGS Central Avenue Bridge Gage.

2.3.6 COMMUNITY COMPOSITION

Daily community collections for monitoring sites are tabulated in Appendix D. Fish totaling 3,528 from nine species were collected during monitoring (Table 2.4). Silvery minnow and red shiner (*Cyprinella lutrensis*) were the most commonly collected species, comprising 62% and 34% of the total catch, respectively.

Table 2.4. Total Number Captured, and Relative Abundance for Fish Community Collections at Albuquerque Reach Sites

Common Name	Scientific Name	Total	Percent
Rio Grande silvery minnow	*Hybognathus amarus*	2,180	61.79
Red shiner	*Cyprinella lutrensis*	1,205	34.16
Fathead minnow	*Pimephales promelas*	54	1.53
Flathead chub	*Platygobio gracilis*	28	0.79
Channel catfish	*Ictalurus punctatus*	21	0.60
Western mosquitofish	*Gambusia affinis*	13	0.37
White sucker	*Catostomus commersonii*	12	0.34
Common carp	*Cyprinus carpio*	9	0.26
River carpsucker	*Carpiodes carpio*	3	0.09
Yellow bullhead	*Ameiurus natalis*	2	0.06
Green sunfish	*Lepomis cyanellus*	1	0.03
Totals		**3,528**	**100**

3.0 BOSQUE FARMS MONITORING

3.1 SITE DESCRIPTION AND BACKGROUND

The Bosque Farms site is located south of the Isleta Pueblo Indian reservation in the Isleta Reach of the MRG, approximately 75 m (246 feet) downstream of USGS Gage #08331160 (Appendix A, Figure A.6). This location was monitored to evaluate silvery minnow habitat occupancy during spring runoff. The site was selected because it was occupied by silvery minnow during spring runoff in 2005 and it had a variable topography that would allow for differing levels of inundation during the anticipated 2008 spring runoff flows. No naturally occurring sites were available in the Albuquerque Reach because very limited floodplain habitat occurs at the predicted runoff discharges and silvery minnow presence on these habitats has not been documented.

When available, silvery minnow may use floodplain habitats to spawn. Monitoring of habitat restoration sites within the Isleta Reach has provided some non-conclusive evidence of floodplain spawning by the silvery minnow (Porter and Dean 2005; Beck and Fluder 2006). At the Bosque Farms site, a fyke net system was designed to gather more definitive spawning information for silvery minnow. The system did not work as anticipated; however, data collected during monitoring provide information for silvery minnow floodplain occupancy and spawning during spring runoff and are presented here as such.

3.2 METHODS

3.2.1 FISHERIES MONITORING

To experimentally test for silvery minnow spawning on floodplain sites, Bosque Farms fyke nets 202, 203, 204, and 205 were configured into an enclosure containing the same number of entrances and exits by overlapping wings and attaching them to t-posts (the SAP [SWCA 2008c] contains detailed schematics of enclosure setups). The enclosure was intended to control for the number of reproductively mature silvery minnow entering and exiting the site and to prevent eggs from drifting into the site from the main channel. It was assumed that any eggs found in the enclosure would be a product of silvery minnow spawning on that site. After two days of monitoring, the enclosures were abandoned due to the inability to effectively maintain closure. Instead, individual fyke nets were deployed at multiple locations within the site to observe silvery minnow occupancy during spring runoff. Appendix A illustrates the spatial location of individual fyke net locations selected for monitoring.

Methods used for fisheries monitoring of individual fyke nets were identical to those described for habitat restoration sites (see Section 2.2). Silvery minnow abundance was estimated by weighing batches at Bosque Farms fyke nets 210 and 211 on May 26, because of an exceptionally high catch and to avoid stress-caused mortality. The total number of silvery minnow collected at these two Bosque Farms net sites was calculated by dividing the sum of batch weights by the average silvery minnow weight. Table 3.1 includes Bosque Farms fyke net identification numbers and the number of days and dates each fyke net was fished.

Table 3.1. Bosque Farms Net Sites selected for NMISC 2008 Fisheries Monitoring

Site Name	Fyke Net Configuration	Fyke Net Identification Number	Number of Days Sampled	Sample Dates
Bosque Farms site	Enclosure	202	3	5/13–5/15
	Enclosure	203	3	5/13–5/15
	Enclosure	204	3	5/13–5/15
	Enclosure	205	3	5/13–5/15
	Single	201	13	5/12–5/20; 5/24–5/25; 5/30–6/1
	Single	207	13	5/17–5/19; 5/24–5/26; 5/30–6/1; 6/8–6/11
	Single	208	9	5/16–5/20; 5/24–5/25; 5/30–6/1
	Single	209	17	5/16–5/20; 5/24–5/26; 5/28–6/2; 6/8–6/11
	Single	210	1	5/26
	Single	211	10	5/26; 5/28–6/2; 6/8–6/11

Data from the USGS river gage located at Bosque Farms in the Isleta Reach (#08331160) was used for discharge during the sampling period (Figure 3.1). This USGS gage is not accurately calibrated for discharges above 1,000 cfs, but serves as a relative assessment of discharge for this site.

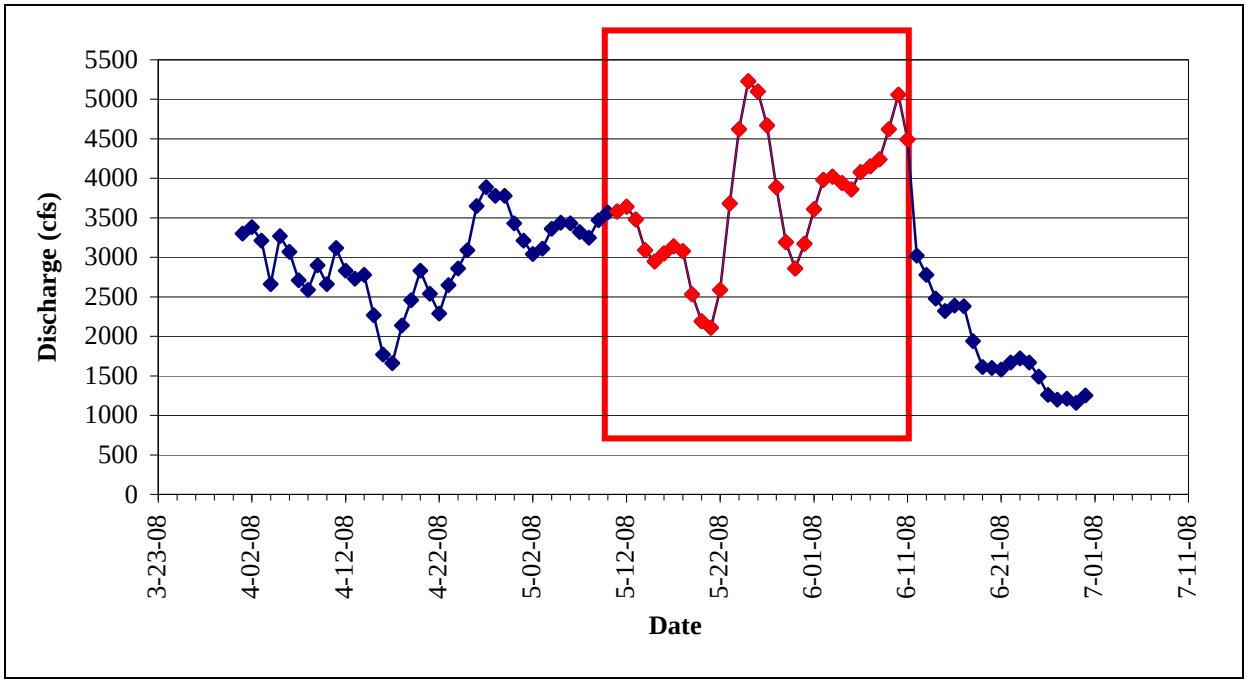

Figure 3.1. Average daily discharge (cfs) in the Rio Grande at the USGS Bosque Farms Gage; monitoring period is shown in red.

3.2.2 Data Analysis

Silvery minnow CPUE was calculated for fyke net samples by dividing the total number of fish captured by the total number of hours each fyke net was fished on each day (Quinn and Deriso 1999). Standardization of fyke net captures (assumes no periodic effect on captures) is expressed as fish per hour and is the index used to assess variation in species abundance among fyke net sites and throughout the monitoring period.

Non-parametric statistical tests were conducted to assess if CPUE varied among fyke net locations and among sampling dates. A Kruskal-Wallis single-factor analysis of variance by rank was used to test for CPUE differences among fyke nets and among dates (Zar 1999). Non-parametric Wilcoxon rank-sum pairwise multiple comparisons using the Bonferroni adjustment method were used to assess mean differences in CPUE between Bosque Farms fyke net sites 210, 207, 208, 209, and 211 (Zar 1999; Dalgaard 2002). These sites were selected for the comparisons because they were not part of the enclosure setup (i.e., lack of independence between samples) and they were fished on multiple days (i.e., n >2 for these sites). Non-parametric statistical analysis assumes random assignment of net locations and was chosen because the presence of zero values for individual net sites prevented normalization of the CPUE data through transformation. Data collected prior to May 16 were not included in the analysis, and data collected from Bosque Farms sites on May 28 and 29 and June 2 were not included in the Kruskal-Wallis test among dates for that site due to the lack of suitable replication (i.e., $n \leq 2$ on those dates). Fish community composition was summarized by the total number captured and percent composition for each species.

3.3 Results

A total of 7,365 silvery minnow were collected from the Bosque Farms site during monitoring; 59% were collected from the Bosque Farms nets 210 and 211 on May 26 and May 28. These fyke nets were located adjacent to the levee in the cottonwood (*Populus* sp.) forest, which was not inundated until May 25 when the discharge at Bosque Farms was estimated at 5,200 cfs.

3.3.1 Silvery Minnow Occupancy by Hydrograph and Date

Estimated CPUE values were highly variable among fyke net sites and throughout the monitoring period. CPUE varied among fyke net locations ($X^2_{0.05,5} = 21.807$, $p = 0.0001$) but not among dates at the Bosque Farms site ($X^2_{0.05,13} = 6.7623$, $p = 0.914$). Peak CPUE estimates were observed on May 26 and May 28, which coincide with the descending limb of the peak discharge that occurred during spring 2008 (Figure 3.2). Appendix C summarizes daily CPUE values for individual Bosque Farms fyke net sites.

3.3.2 Pairwise Comparisons of Silvery Minnow CPUE at Bosque Farms Fyke Net Sites

Pairwise comparisons indicate that CPUE was lower at fyke net 208 than fyke nets 201 and 209, and was higher at fyke net 209 than fyke net 207 (see Appendix C). No other significant differences between CPUE at individual fyke nets were found (Table 3.2).

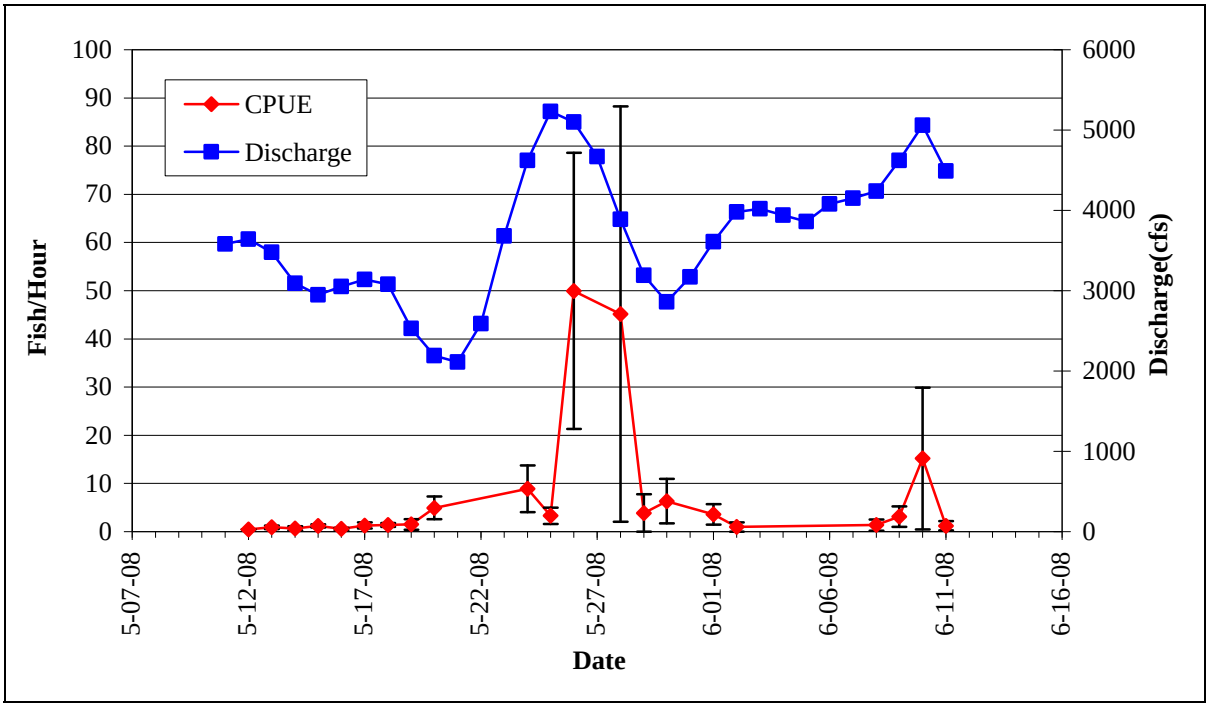

Figure 3.2. Arithmetic mean CPUE (fish/hour) values for silvery minnow collected from Bosque Farms fyke net sites and discharge (cfs) estimated from the USGS Bosque Farms Gage during monitoring. Error bars represent one standard error.

Table 3.2. Pairwise Comparisons between Bosque Farms Fyke Net Sites

Comparison	p Value
201 vs. 207	0.600
201 vs. 208	0.010
201 vs. 209	1.000
201 vs. 211	1.000
207 vs. 208	1.000
207 vs. 209	0.020
207 vs. 211	1.000
208 vs. 209	0.010
208 vs. 211	1.000
209 vs. 211	0.260

Note: p values are Bonferroni adjusted p values.

3.3.3 Community Composition

Daily community collections for monitoring sites are tabulated in Appendix D; 8,410 fish from 10 species were collected at the Bosque Farms site during monitoring (Table 3.3). Silvery minnow and red shiner were the most commonly collected species, comprising 87% and 11% of

the identifiable catch, respectively. In addition, three unidentifiable larval fish were captured with fyke nets.

Table 3.3. Total Number Captured and Relative Abundance for Fish Community Collections during Monitoring

Common Name	Scientific Name	Total	Percent
Rio Grande silvery minnow	*Hybognathus amarus*	7,365	87.57
Red shiner	*Cyprinella lutrensis*	926	11.01
Western mosquitofish	*Gambusia affinis*	58	0.69
Fathead minnow	*Pimephales promelas*	39	0.46
Common carp	*Cyprinus carpio*	10	0.12
River carpsucker	*Carpiodes carpio*	4	0.05
Channel catfish	*Ictalurus punctatus*	2	0.02
Green sunfish	*Lepomis cyanellus*	2	0.02
White sucker	*Catostomus commersonii*	1	0.01
Yellow bullhead	*Ameiurus natalis*	1	0.01
Flathead chub	*Platygobio gracilis*	2	0.02
Totals		**8,410**	**100**

4.0 SILVERY MINNOW SPAWNING INDICES

On each day of monitoring, efforts were made at all sites to collect silvery minnow eggs and larval fish. In addition, collected silvery minnow were visibly inspected for signs of reproductive maturity. Data collected at habitat restoration sites and the Bosque Farms site provide information regarding silvery minnow spawning. Relative changes in proportions of visibly mature silvery minnow, peaks in main channel and floodplain silvery minnow egg collections, observations of silvery minnow collected from floodplain sites issuing gametes, and the presence of larval fish were all documented during monitoring. These data suggest that silvery minnow spawn on habitat restoration and on naturally occurring off-channel habitats.

4.1 METHODS

4.1.1 INDICES OF SILVERY MINNOW MATURITY

Silvery minnow were observed for signs of reproductive status and were classified as gravid female, male issuing milt, spent female, and unknown. Reproductive status was not assessed for silvery minnow collected from Bosque Farms net sites 210 and 211 on May 26, because of an exceptionally high catch and to avoid stress-induced mortality.

4.1.2 MAIN CHANNEL EGG COLLECTIONS

Silvery minnow eggs were collected from the main channel using MECs set for 15–60 min on each sampling date (Altenbach et al. 2000). Number of eggs collected, velocity of water (m/s) flowing through the MEC, and the sample duration were recorded for each sample. Main channel egg collections were conducted at the SDC East, Bosque Farms, Central Bridge, and Central Wasteway sites when this could be safely accomplished.

4.1.3 MONITORING SITES EGG AND LARVAL FISH COLLECTIONS

On each sampling day, silvery minnow eggs and post-larval fish were sampled with D-frame kick nets (0.0428-m^2 opening fitted with 0.2-mm mesh nytex) with multiple grab samples over established 10-m-long (33-foot-long) transects and along fyke net wings. All collected eggs and larval fish were identified (when possible) enumerated, and released back to the site of collection.

4.1.4 DATA ANALYSIS

Reproductive status (for each classification group) is expressed as a percentage of the total number of silvery minnow inspected during each sampling week. MEC collections were standardized by dividing the number of eggs collected by the volume of water filtered (m^3) by the collector times 100. The resultant standardization is expressed as silvery minnow eggs/100 m^3. Eggs collected from fyke net wings and transects established at each site were not standardized and are simply expressed as the total number of eggs collected at each reach by sampling date.

4.2 RESULTS

4.2.1 INDICES OF SILVERY MINNOW MATURITY

Mature silvery minnow were first captured on May 9 at the Bosque Farms site during scouting surveys and were captured throughout the monitoring period. Initially 58% of silvery minnow could not be sexed and were classified as unknown.

During the four weeks of monitoring, the percentage of silvery minnow classified as gravid was initially estimated at 30%; the percentage increased during the second week to 43%, and then decreased by 16% per week to approximately 10% by the last week of monitoring (Figure 4.1). The percentage of silvery minnow classified as spent females was initially documented at approximately 1%; the percentage increased during the second and third weeks to 14%, and then increased during week four to 43%. This pattern was the inverse of that observed for gravid females.

A different pattern was observed for males. Only 7% of the silvery minnow were classified as males issuing milt during week one. This percentage increased during week two and remained at about 30% for the next three weeks. Between May18–June 1, 106 silvery minnow were observed issuing eggs during processing; most (85) were observed on May 25 and 26.

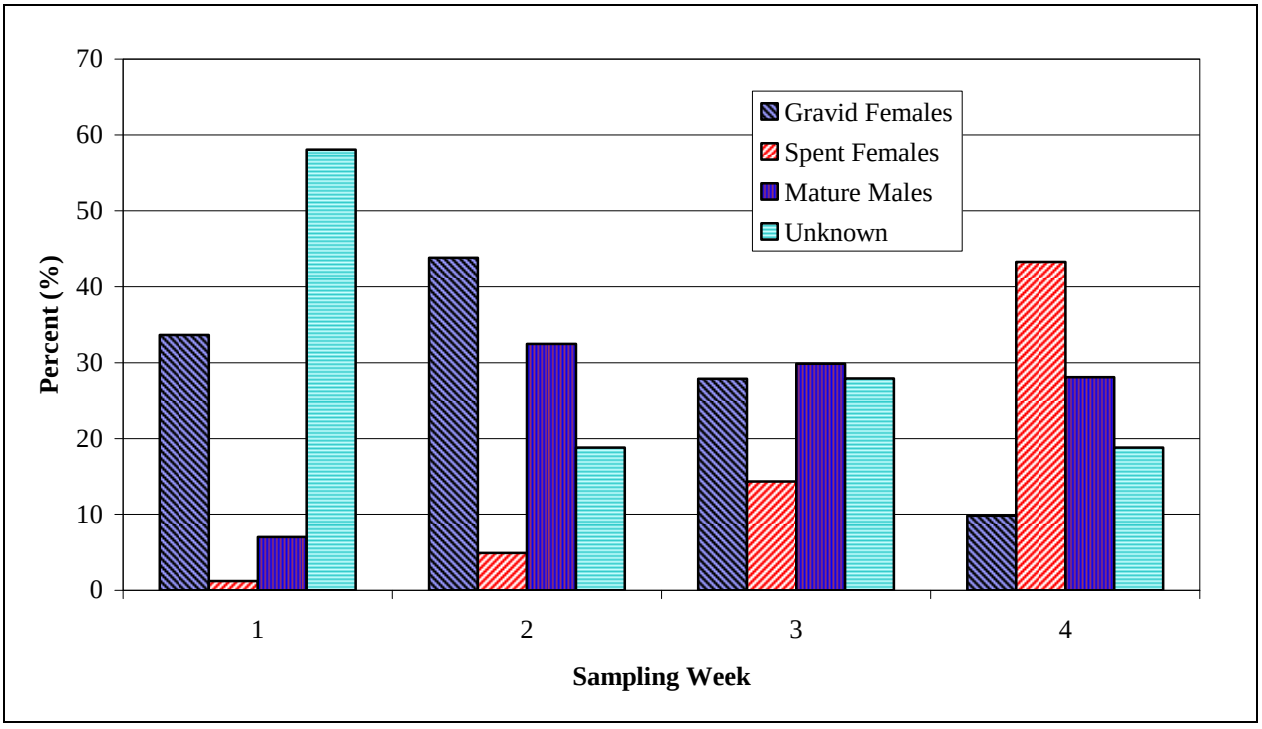

Figure 4.1. Percent of silvery minnow by reproductive classification observed during monitoring. Sampling week designations are week one: May 12–May 18; week two: May 19–May 25; week three: May 26–June 1; and week four: June 2–June 11.

4.2.2 Main Channel Egg Collections

Silvery minnow eggs were first collected on May 9 from the main channel adjacent to the Central Bridge and Bosque Farms sites during scouting surveys; 38 eggs were collected in the main channel using MECs during monitoring. The highest standardized values (silvery minnow eggs/100 m^3) were estimated in the main channel adjacent to the Bosque Farms site on May 14. No silvery minnow eggs were collected in the main channel after June 1.

4.2.3 Monitoring Sites Egg and Larval Fish Collections

A total 340 silvery minnow eggs were collected from transects and fyke net wings during monitoring. The majority (276) was collected from the Central Bridge site on May 26. No eggs were collected from the Atrisco site. Egg collections peaked on May 26 at both reaches (Figure 4.2 and Figure 4.3). An additional 2,053 eggs were collected from buckets during fish processing. It is unknown if these eggs were spawned in the bucket during processing or if they were spawned in the cod end of the fyke nets during capture.

Larval fish were first collected from the Central Wasteway site (see Figure 4.2) and the Bosque Farms site on May 14 (see Figure 4.3); 582 larval fish were collected during monitoring. Peak collections were earlier at Albuquerque Reach sites (May 24) than at the Bosque Farms site (June 1). Larval fish were more abundant at Albuquerque Reach sites and were found at all sites during monitoring.

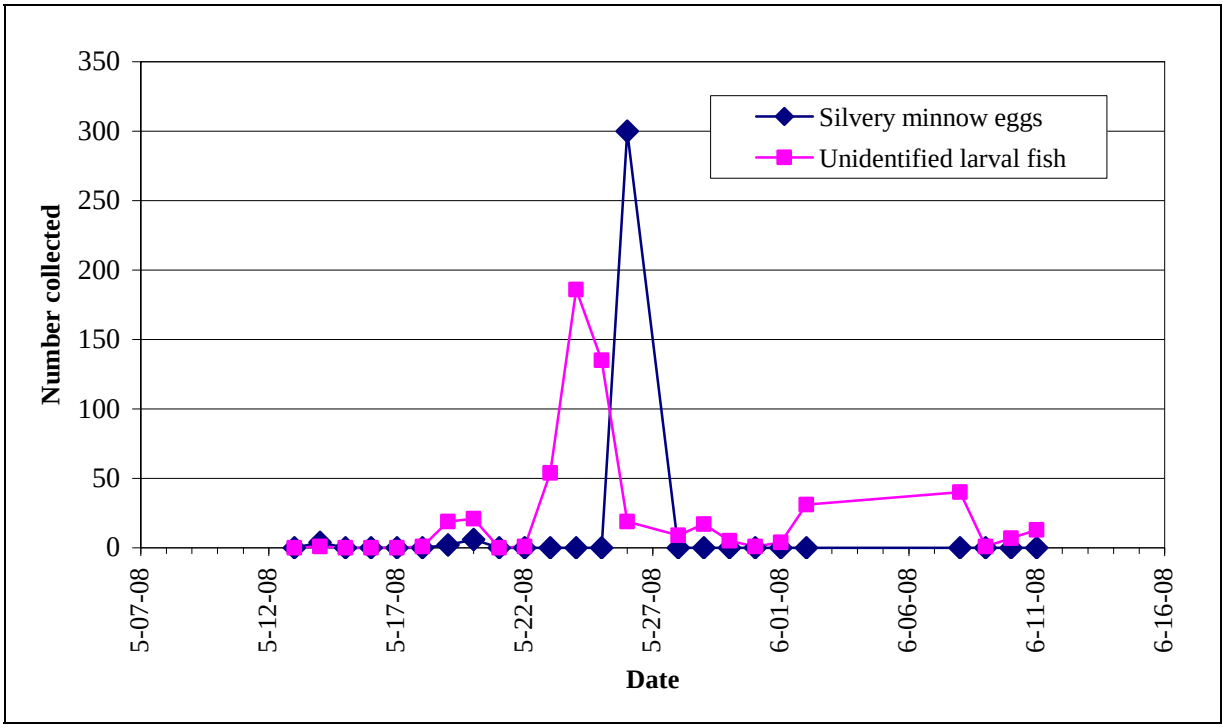

Figure 4.2. Number of silvery minnow eggs and larval fish collected from Albuquerque Reach transect sites during monitoring.

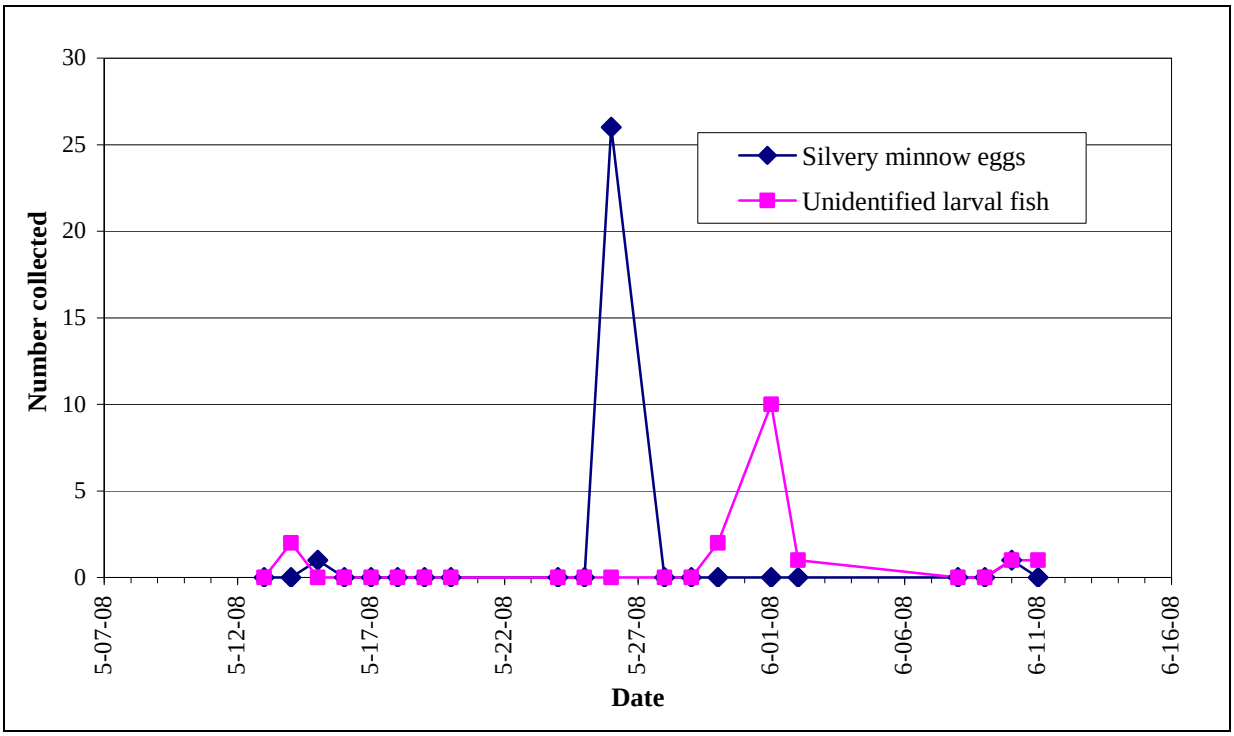

Figure 4.3. Number of silvery minnow eggs and larval fish collected from Bosque Farms transect sites during monitoring.

5.0 SILVERY MINNOW LENGTH AND WEIGHT

Monitoring included the collection of length and weight data from silvery minnow. Size information for wild silvery minnow is limited—such information may be useful for understanding variations in a species life history. Size comparisons were made among reproductive groups to describe size variation within the species.

5.1 METHODS

5.1.1 LENGTH AND WEIGHT

During monitoring, standard length (SL) was measured to the nearest millimeter (mm) and wet weight to the nearest 0.1 g was recorded from captured silvery minnow when this could be accomplished without stressing the fish. Standard length was measured with a handheld ruler, and fish were weighed with an Ohaus model CS 200 digital balance.

5.1.2 DATA ANALYSIS

Length and weight frequency histograms were constructed for the four reproductive groups (i.e., gravid female, male issuing milt, spent, and unknown) to assess the age composition of silvery minnow. Histogram bin sizes were set at 2 mm for length and 0.30 g for weight.

A one-way analysis of variance (ANOVA) was used to test for differences between mean standard length and weight among reproductive groups of silvery minnow. Only silvery minnow for which both length and weight were collected were included in the analysis. All length and weight data was log transformed prior to analysis, and assumptions of normality (examination of cumulative frequency plots) and heteroscedasticity (examination of residuals and Bartlett's test) were tested for all size analyses (Zar 1999). T-test pairwise comparisons using the Bonferroni adjustment method were used to assess mean length and weight differences between reproductive groups (Dalgaard 2002).

The mathematical relationship between weight and length was investigated for sexually mature male and gravid silvery minnow through least squares regression using the formula:

$$W = aL^b$$

where W is weight, L is length, a is a constant, and b is a constant that is usually between 2.5 and 4.0 (Pope and Kruse 2007).

5.2 RESULTS

5.2.1 LENGTH AND WEIGHT

Silvery minnow weight and length frequency histograms do not present clear demarcations between age groups of fish (Figure 5.1 and Figure 5.2). Despite the lack of demarcations, the presence of a minimum of two age groups can be inferred because of the right-handed tails of the gravid and unknown silvery minnow histograms.

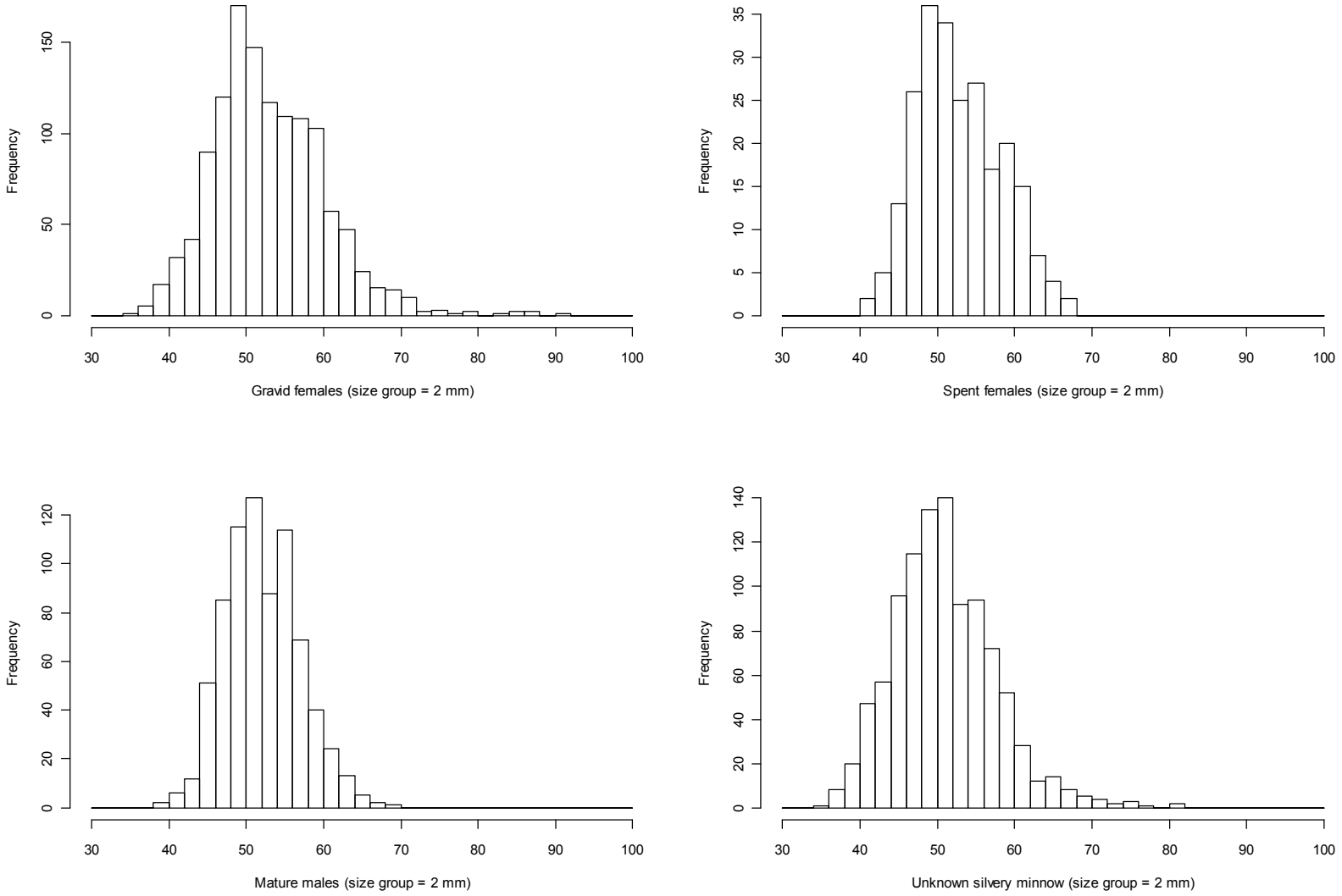

Figure 5.1. Length frequency histograms for reproductive categories of silvery minnow collected during monitoring. Size groups are 2 mm.

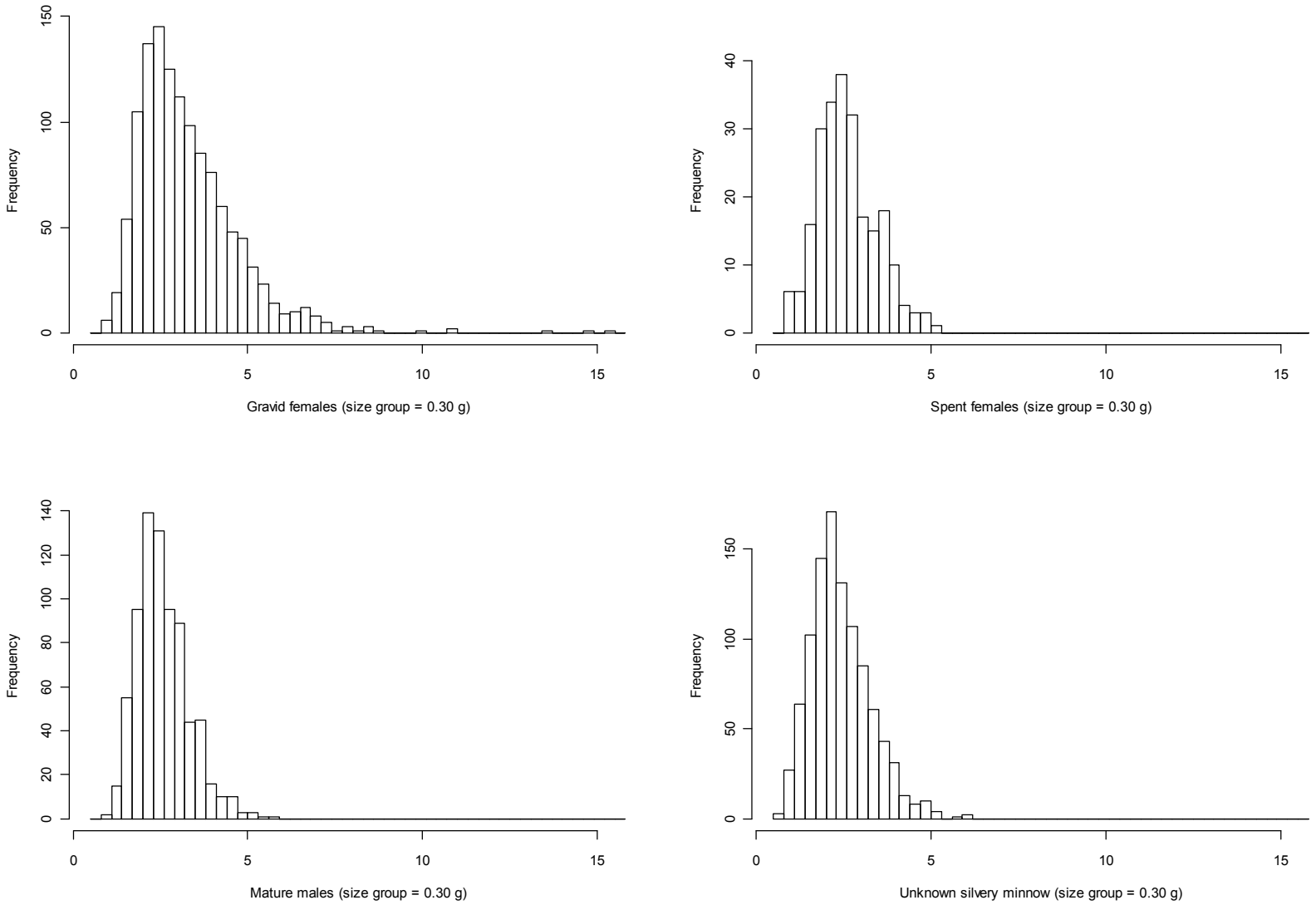

Figure 5.2. Weight frequency histograms for reproductive categories of silvery minnow collected during monitoring. Size groups are 0.30 g.

Paired standard length and weight data was collected from 3,237 silvery minnow and was significantly different among reproductive groups (standard length: $F_{3,3233} = 20.174$, $p = <0.0001$; weight: $F_{3,3233} = 128.55$, $p = <0.0001$). Gravid females had the highest mass of the four reproductive groups, and silvery minnow whose reproductive condition was unknown were the smallest (Table 5.1). A gravid female weighing 15.5 g with a standard length of 92 mm was the largest silvery minnow observed during monitoring, and a silvery minnow whose reproductive condition was unknown weighing 0.6 g with a standard length of 35 mm was the smallest fish observed. The smallest gravid silvery minnow observed during monitoring weighed 0.9 g and had a standard length of 36 mm. Male silvery minnow were intermediate in size relative to known females and silvery minnow whose reproductive condition was unknown.

Table 5.1. Mean Standard Length and Weight of Silvery Minnow Collected during Monitoring

Reproductive Group	Standard length (mm)	Weight (g)
Gravid female	53.50 (+/- 0.41) a	3.02 (+/- 0.08) a
Spent female	53.37 (+/- 3.37) a	2.65 (+/- 0.11) b
Mature male	52.64 (+/-0.35) a	2.62 (+/- 0.05) b
Unknown	51.47 (+/-0.42) b	2.47 (+/- 0.05) c

Notes: 95% confidence intervals are given in parenthesis. Length and weights followed by the same letter were not significantly different between groups at $\alpha = 0.05$ (e.g., a,a = no difference, a,b = difference for T-test pairwise comparisons using a Bonferroni adjusted $p = < 0.05$).

Pairwise comparisons indicate that weight was not significantly different between mature males and spent females, but was significantly different between all other groups. Unknown silvery minnow were significantly shorter than all other groups; no additional differences were found between groups for length.

The relationship between length and weight for sexually mature male and gravid female silvery minnow is illustrated in Figure 5.3. Gravid females spanned a greater range of sizes than male silvery minnow. On average, sexually mature females weigh slightly more than males for any given length. Generally, eggs were observed issuing from females $\geq$ 50 mm SL.

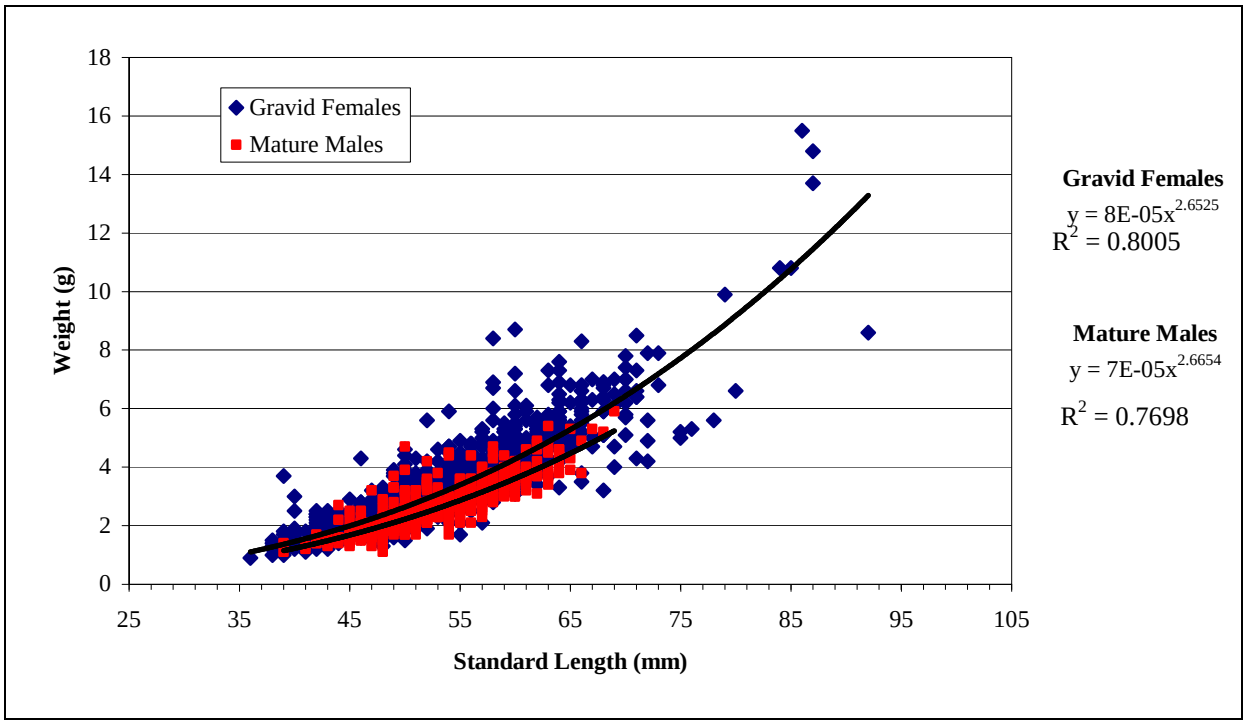

Figure 5.3. Length-weight relationship for sexually mature silvery minnow.

6.0 WATER QUALITY

6.1 METHODS

Water quality parameters were monitored concurrent with fish sampling events from the main channel and at floodplain sites. Water quality parameters were measured using a YSI 556 multi-parameter handheld meter, including temperature, dissolved oxygen, conductivity, salinity, pH, and turbidity. Water depth and flow velocity were measured using a USGS top-setting wading rod fitted with a Marsh-McBirney Flo-Mate portable flowmeter. Hobo event loggers were used to obtain hourly records of water temperature at each floodplain fish sample location and at one main channel location.

6.2 RESULTS

Water quality data for main channel and floodplain monitoring sites are tabulated in Appendix E. Values for all water quality parameters were within normal limits for low elevation potamon[1] systems and the provisional LC_{50} (Concentration that results in 50% mortality of the test animals) provided for silvery minnow by Buhl (2006).

A temperature profile was not collected from the Central Wasteway site due to an inoperable Hobo unit. Temperature was higher at floodplain sites than main channel sites, and recorded values increased at all sites throughout monitoring (Appendix F and Appendix G). The highest temperatures were observed at the Bosque Farms site near the levee road and the SDC East site. Hobo recordings at these sites were located the farthest from main channel flow of all sites.

Mean salinity values collected during monitoring were marginally higher at the Atrisco, Bosque Farms, and Central Wasteway floodplain sites than adjacent main channel sites (see Appendix E). Mean salinity was not different between the main channel and the remainder of the monitored floodplain sites.

[1] *Potamon* refers to the warmer and lower gradient river of the lowlands. Unaltered, the potamon is characterized by slower currents, finer substrate materials, and variety of size, depth, and flow of the river channel, including large river channels, oxbows, sloughs, and habitats of the floodplain. Autochthonous inputs of organic materials support a preponderance of detritivores, herbivores, and planktivores.

7.0 DISCUSSION

Silvery minnow were collected from all monitoring sites during spring 2008. The highest single-day catches occurred the day after the highest discharge observed during spring 2008 runoff. Mean CPUE and floodplain egg collections at both reaches were also highest on this day. This suggests that silvery minnow movement onto floodplain habitats and spawning are strongly associated with significant increases in flow.

Floodplain and main channel egg collections indicate that silvery minnow spawning was most pronounced May 12–June 1, with peak activity May 25–28. The collection of thousands of reproductively mature silvery minnow and the presence of females and males issuing eggs and milt during processing suggests active spawning on floodplain sites. Comparisons of the difference in egg densities between main channel collections and floodplain collections are confounded by the inability to accurately standardize floodplain site egg collections. Despite the lack of standardization, the volume of water sampled on each day was greater from the main channel and more silvery minnow eggs were collected on floodplain sites. Other *Hybognathus* species spawn on floodplain and backwater habitats (Raney 1939; Copp 1989; Galat et al. 2004), and these results suggest that when floodplain habitats are available, silvery minnow will spawn on them.

NMISC habitat restoration sites were designed to inundate at various flow targets to provide suitable low-velocity habitat for silvery minnow and their larvae over the range of potential spring runoff discharges. Pairwise comparisons indicate that monitored NMISC habitat restoration sites, with the exception of the Central Bridge site, were occupied by approximately the same numbers of silvery minnow. Mean floodplain flow velocity (0.43 m/s) at the Central Bridge site was greater than at all other monitoring sites (see Appendix E). In addition, CPUE of silvery minnow moving into the Atrisco site was consistently >1 fish/hour at velocities below 0.30 m/s and became zero at velocities above 0.30 m/s (see Appendix E). Low-velocity and shallow habitats have been described as the being preferred by silvery minnow (Dudley and Platania 1997). Results from this monitoring effort suggest that lower velocities, not depth, appear to be the key parameter related to silvery minnow habitat occupancy during spring runoff. This finding has been documented at other habitat restoration sites in the MRG (Hatch and Gonzales 2008).

In 2007, fisheries monitoring was conducted on a number of NMISC habitat restoration sites during spring runoff (SWCA 2008a, 2008b). Silvery minnow were the most abundant species collected from the I-40 subreach (78%) and were the second most abundant species collected from the SDC subreach (31.5%) in 2007. The highest observed discharge during 2008 (5,170 cfs at the Albuquerque Reach) was higher than the highest observed discharge in 2007 (3,700 cfs at the Albuquerque Reach). Absolute catches of silvery minnow were notably higher at habitat restoration sites during spring runoff of 2008 (2,180) than spring runoff of 2007 (160) (SWCA 2008a, 2008b), suggesting that silvery minnow occupancy of floodplain sites increases relative to the magnitude of the flood pulse.

Silvery minnow movement onto floodplain sites was higher than movement off of floodplain sites (see Figure 2.4 and Figure 2.5) and was likely an adaptive response to reduce mortality and displacement of individuals during floods (Schlosser 1991; Bunn and Arthington 2002; Lytle and

Poff 2004). Habitats with reduced water velocity, such as those typically found in the margins of rivers and flood terraces, provide fish with refuge from displacement during floods and promote energy conservation (Facey and Grossman 1992). In addition, low-velocity habitats may allow silvery minnow the opportunity to congregate so that spawning may take place.

Size of reproductively mature silvery minnow ranged from 35 to 92 mm. Females were readily identifiable from males by a larger girth, a highly vascularized swollen abdomen, and a bulbous fleshy vent. Throughout monitoring, male silvery minnow were noted to have a high occurrence of eroded fins, parasites, and fungal infections. During spawning silvery minnow males are highly active, continually attempting to drive females from the bottom toward the mid- or upper-water column (Platania and Altenbach 1998). Perhaps pursuits by male silvery minnow during spawning result in injuries that reduce their likelihood of post-spawning survival. Greater post-spawning mortality for male silvery minnow may explain the presence of larger and presumably older-aged females collected during this monitoring effort.

Silvery minnow were documented as gravid throughout monitoring (see Figure 4.1). Percentage of silvery minnow classified as gravid females was inversely related to the percentage of silvery minnow classified as spent females, suggesting that silvery minnow were spawning on the floodplain. These data suggest that the majority of silvery minnow spawned during spring runoff; however, 10% were documented as gravid during the fourth and last week of monitoring in June. These fish would likely spawn later in the season (USFWS 2007).

This monitoring effort documents differences in water temperature between floodplain and main channel habitats. Water temperatures were highest at floodplain sites located the furthest from the main channel (see Appendix G). Higher water temperatures reduce egg hatching time (Jobling 1995; Platania 1995) and result in increased production of shallow low-velocity habitats, which accelerates growth rates of larval and juvenile fish (Schlosser 1991; Platania and Altenbach 1998). Higher floodplain water temperatures increase larval silvery minnow survival by reducing the amount of time necessary for sufficient growth and development to occur, allowing individuals the ability to adequately respond to changing environmental conditions. Rapid declines in susceptibility to displacement are correlated to increases in size of cyprinid fishes (Harvey 1987), suggesting that rapid growth reduces the susceptibility of young-of-year fishes to variations in discharge.

Silvery minnow spawning is associated with high-flow events such as spring runoff and summer rainstorms (USFWS 2007). Information collected during monitoring, although not conclusive, suggests that when floodplain habitats are available silvery minnow may spawn there. Spawning on floodplain habitats benefits silvery minnow recruitment through the increased availability of low-velocity floodplain and backwater habitats that reduce downstream displacement of eggs and larvae (Fluder et al. 2007; Hatch and Gonzales 2008); reduced hatching and rearing time for eggs and larvae retained in warmer floodplain and backwater habitats (Jobling 1995; Pease et al. 2006; Hatch and Gonzales 2008); increased production of newly inundated habitats (Junk et al 1989; Valett et al 2005); and increased nursery habitat area (Pease et al. 2006).

8.0 RECOMMENDATIONS

1. **Continue fisheries monitoring at restoration sites to assess restoration techniques.** An additional detailed study should be conducted to document fish spawning on floodplain sites during spring runoff.

2. **Sample a minimum of three fyke nets at each monitoring site on each sampling day**. Collecting three fyke net samples on each day will allow for testing of individual site CPUE over the range of discharges and among dates during the monitoring period. Ideally, the same number of fyke nets would be sampled at each survey site throughout monitoring and on each sample day. A balanced survey design (i.e., same number of replicates at each survey site) would allow for a more robust statistical analysis than the current monitoring approach.

3. **Stratify net locations by depth and velocity**. Silvery minnow depth and velocity preferences during spawning may be assessed through catch rate metrics if adequate replication exists within depth and velocity strata.

4. **Sample over the range of habitat restoration treatment types**. Replication over the range of habitat restoration treatment types would allow for a catch rate based assessment of habitat restoration techniques.

5. **Assess if there is a periodic effect on catch rates.** The current standardization of silvery minnow CPUE (fish/hour) assumes that there is no periodic effect on catch rates. In theory the absolute numbers of fish collected should increase linearly with soak time. This assumption could be tested by fishing select nets over 4-hour blocks through a 24-hour period. This assumption may also be tested with data collected during this monitoring effort through a mixed model approach.

6. **Collect paired floodplain and main-channel MEC samples.** When sufficient flow is present, a floodplain MEC sample should be collected simultaneously with a main channel MEC sample. This would allow for a direct comparison of egg densities between the two habitat types.

7. **Modify floodplain egg collection techniques.** Modifications to egg collection techniques at low-velocity floodplain sites could include both a seining and a passive collection component to collect eggs that have settled on the floodplain sites.

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APPENDIX A
SPRING 2008 FISHERIES MONITORING SITES

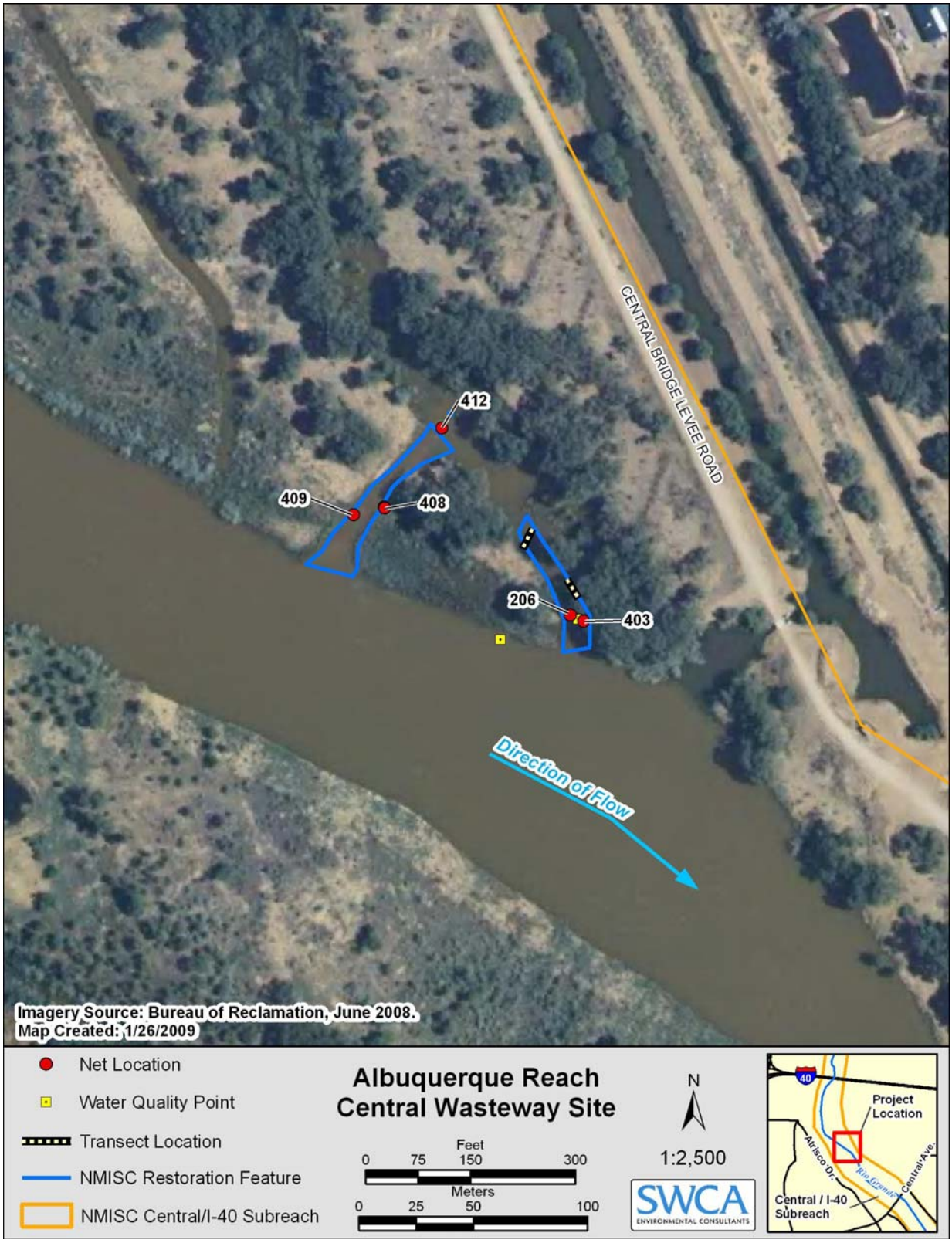

Figure A.1. Map depicting net, water quality, and transects locations at the Central Wasteway site (NMISC site I40-1ch).

Figure A.2. Map depicting net, water quality, and transects locations at the Atrisco site (NMISC site Old Atrisco Diversion).

Figure A.3. Map depicting net, water quality, and transects locations at the Central Bridge site (NMISC site I40-2b).

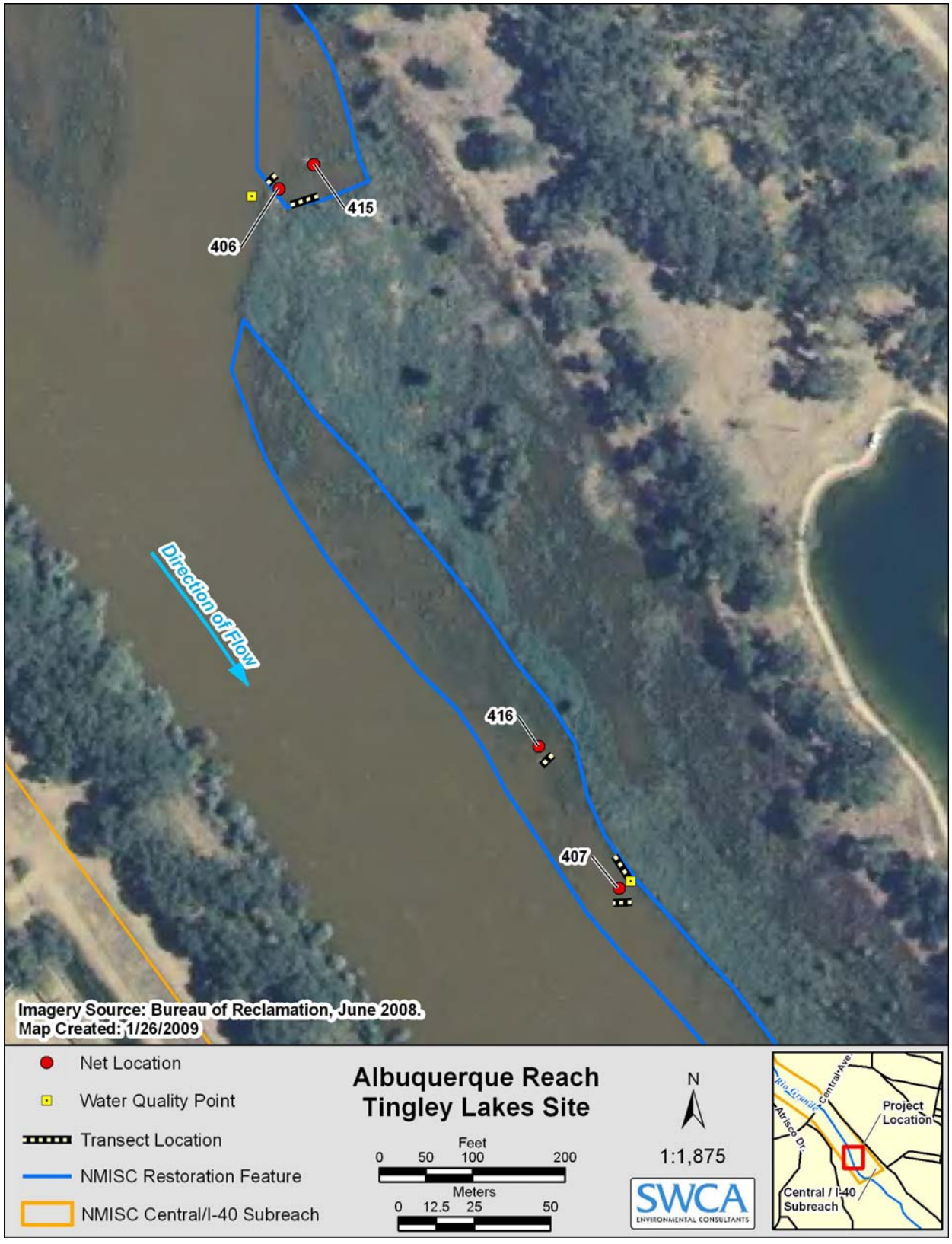

Figure A.4. Map depicting net, water quality, and transects locations at the Tingley Lakes site (NMISC site I40-4b).

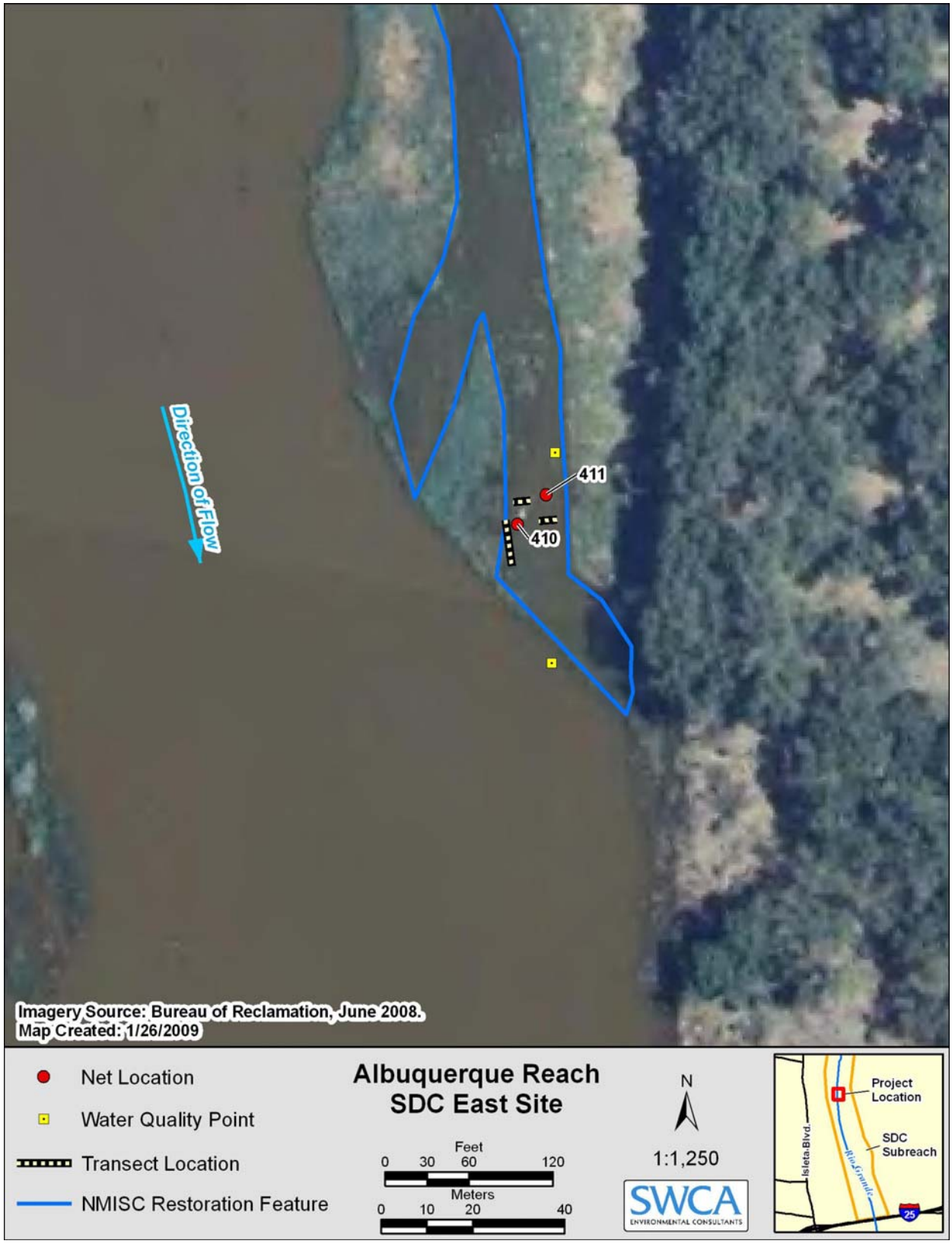

Figure A.5. Map depicting net, water quality, and transects locations at the SDC East site (NMISC site SDC-5b).

Figure A.6. Map depicting net, water quality, and transects locations at the Bosque Farms site.

APPENDIX B
PROJECT PHOTOS

Figure B.1. SWCA and NMISC staff setting up the "enclosure" at the Bosque Farms site area.

Figure B.2. Upstream view of the fyke net "enclosure" at the Bosque Farms site area.

Figure B.3. Photo facing upstream at Bosque Farms fyke net site 208 on May 20, 2008.

Figure B.4. Field staff collecting larval fish and eggs from fyke net wings at Bosque Farms fyke net site 207.

Figure B.5. Photo looking downstream at Bosque Farms fyke net site 209.

Figure B.6. Photo looking upstream at field staff removing fish from Bosque Farms fyke net site 201.

Figure B.7. Photo of Bosque Farms fyke net site 211 taken on May 26, 2008, from the levee road.

Figure B.8. Photo of Bosque Farms fyke net site 210 on May 25, 2008.

Figure B.9. Melanistic silvery minnow collected from the Bosque Farms site on June 1, 2008.

Figure B.10. Field crew weighing batches of silvery minnow collected on May 26, 2008, from Bosque Farms fyke net sites 210 and 211.

Figure B.11. Silvery minnow eggs collected from buckets at the Bosque Farms site during fish processing on May 25, 2008.

Figure B.12. Tingley lakes fyke net site 407.

Figure B.13. Tingley lakes fyke net site 415.

Figure B.14. Tingley lakes fyke net site 416.

Figure B.15. SDC East fyke net sites 410 and 411.

Figure B.16. Atrisco fyke net sites 401 and 402. Photo was taken facing southeast towards the main channel of the Middle Rio Grande.

Figure B.17. Gravid 49-mm SL silvery minnow collected from the Atrisco site on May 19, 2008.

Figure B.18. Gravid 65-mm SL silvery minnow collected from the Atrisco site on May 19, 2008.

Figure B.19. Gravid 45-mm SL silvery minnow collected from the Atrisco site on May 19, 2008.

Figure B.20. Central Wasteway fyke net sites 206 and 403. Photo was taken facing west with the main channel of the Middle Rio Grande in the background.

Figure B.21. Central Wasteway fyke net sites 206 and 403. Photo was taken facing east with the inundated floodplain in the background.

APPENDIX C
FISH SPECIES CATCH PER FYKE NET HOUR FISHED

Albuquerque Reach - Fish Species Catch per Fyke Net Hour – 2008 **

Sample Area	Net	Species	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Atrisco																											
	Atrisco 401																										
		Carpiodes carpio	---	---	---	---	0.00	0.00	0.00	0.04	0.00	0.04	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---
		Catostomus commersonii	---	---	---	---	0.00	0.00	0.00	0.21	0.00	0.13	0.04	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---
		Cyprinella lutrensis	---	---	---	---	0.00	0.00	0.00	0.04	0.34	0.60	1.23	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---
		Gambusia affinis	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---
		Hybognathus amarus	---	---	---	---	0.00	0.00	0.00	0.00	0.04	0.04	0.12	0.00	0.03	---	---	---	---	---	---	---	---	---	---	---	---
		Pimephales promelas	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---
		Platygobio gracilis	---	---	---	---	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---
	Atrisco 402																										
		Cyprinella lutrensis	---	---	---	---	2.05	2.45	0.55	2.83	3.07	2.34	6.44	0.18	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---
		Gambusia affinis	---	---	---	---	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---
		Hybognathus amarus	---	---	---	---	3.38	1.90	1.26	4.57	2.78	2.55	2.26	0.41	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---
		Ictalurus punctatus	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	---	---	---	---	---	---	---	---	---	---
		Pimephales promelas	---	---	---	---	0.10	0.04	0.00	0.17	0.15	0.21	0.04	0.00	0.00	0.00	0.03	---	---	---	---	---	---	---	---	---	---
		Platygobio gracilis	---	---	---	---	0.00	0.00	0.04	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---

Sample Area	Net	Species	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Central Bridge																											
	Central Bridge 404																										
		Cyprinella lutrensis	---	---	---	---	0.08	0.26	0.04	0.00	0.04	0.11	0.26	0.00	0.16	---	---	---	---	---	---	---	---	---	---	---	---
		Hybognathus amarus	---	---	---	---	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.19	---	---	---	---	---	---	---	---	---	---	---	---
		Platygobio gracilis	---	---	---	---	0.08	0.00	0.04	0.04	0.00	0.00	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---
	Central Bridge 405																										
		Catostomus commersonii	---	---	---	---	---	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Cyprinella lutrensis	---	---	---	---	---	0.09	0.12	0.00	0.00	0.00	0.00	0.00	0.04	0.12	0.04	3.39	0.38	0.30	0.90	2.09	1.87	0.23	0.20	0.00	0.00
		Gambusia affinis	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Hybognathus amarus	---	---	---	---	---	0.04	0.00	0.00	0.00	0.00	0.04	0.04	0.00	0.00	0.08	1.31	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00
		Ictalurus punctatus	---	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.08	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Platygobio gracilis	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.04	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00
	Central Bridge 413																										
		Cyprinella lutrensis	---	---	---	---	0.17	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Hybognathus amarus	---	---	---	---	0.00	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00
	Central Bridge 414																										
		Cyprinella lutrensis	---	---	---	---	---	---	---	---	---	---	---	---	---	0.04	1.73	---	---	---	---	---	---	---	---	---	---
		Hybognathus amarus	---	---	---	---	---	---	---	---	---	---	---	---	---	0.04	13.32	---	---	---	---	---	---	---	---	---	---

Sample Area	Net	Species	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Central Wasteway																											
	Central Wasteway 206																										
		Carpiodes carpio	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Catostomus commersonii	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Cyprinella lutrensis	---	0.08	0.00	0.06	0.04	0.60	0.25	0.33	0.00	0.00	0.00	0.11	0.00	0.00	0.04	0.00	1.20	2.39	3.97	0.77	3.68	0.00	0.00	0.22	10.25
		Hybognathus amarus	---	0.67	0.46	1.35	1.06	1.19	3.43	1.15	1.09	0.21	0.55	3.84	0.62	0.04	0.24	0.00	0.00	0.24	11.92	1.03	0.53	0.00	0.00	0.00	0.00
		Ictalurus punctatus	---	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Pimephales promelas	---	0.04	0.00	0.00	0.00	0.04	0.00	0.33	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18
		Platygobio gracilis	---	0.04	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.22	0.00
	Central Wasteway 403																										
		Catostomus commersonii	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Cyprinella lutrensis	---	---	---	---	0.00	0.09	0.00	0.15	0.29	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00
		Hybognathus amarus	---	---	---	---	0.58	1.38	0.20	0.11	2.10	0.72	1.01	0.04	0.09	0.08	0.42	0.00	0.00	0.00	0.00	0.80	0.00	0.00	0.20	0.00	0.00
		Lepomis cyanellus	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Pimephales promelas	---	---	---	---	0.00	0.00	0.00	0.04	0.10	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Platygobio gracilis	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00
	Central Wasteway 408																										
		Cyprinella lutrensis	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.08	---	---	---	---	---	---	---	---	---	---
		Hybognathus amarus	---	---	---	---	---	---	---	---	---	---	---	---	---	0.08	3.86	---	---	---	---	---	---	---	---	---	---
	Central Wasteway 409																										
		Cyprinella lutrensis	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.35	0.00	0.46	1.46	2.25	0.76	0.00	0.39	0.20	0.00
		Cyprinus carpio	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.20	0.17
		Hybognathus amarus	---	---	---	---	---	---	---	---	---	---	---	---	---	0.08	0.00	0.17	0.00	0.46	0.62	0.75	0.00	0.00	0.20	0.00	0.00
		Platygobio gracilis	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.25	1.02	0.00	0.00	0.20	0.00
	Central Wasteway 412																										
		Cyprinella lutrensis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.48	0.00	0.20	0.00	0.00	0.00	0.00	---
		Cyprinus carpio	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	---
		Gambusia affinis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---

South Diversion Channel East

South Diversion Channel East 410

	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Cyprinella lutrensis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.31	0.00	---	---	---	---	1.25	0.20	0.82	3.50	0.18
Cyprinus carpio	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	---	---	---	---	0.25	0.00	0.00	0.00	0.54
Gambusia affinis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	---	---	---	---	0.25	0.00	0.00	0.00	0.18
Hybognathus amarus	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.25	0.00	---	---	---	---	1.25	0.00	0.82	2.00	0.00
Pimephales promelas	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	---	---	---	---	0.00	0.00	0.20	0.00	0.00
Platygobio gracilis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	---	---	---	---	0.00	0.00	0.00	0.25	0.00

South Diversion Channel East 411

	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Cyprinella lutrensis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.06	0.61	---	---	---	---	0.00	0.20	0.00	1.02	0.00
Gambusia affinis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.35	0.00	---	---	---	---	0.00	0.00	0.00	0.00	0.00
Hybognathus amarus	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5.53	0.00	---	---	---	---	0.00	0.00	0.17	0.00	0.00

Sample Area	Net	Species	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun

Tingley Lakes

Tingley Lakes 406

	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Ameiurus natalis	---	---	---	---	0.00	0.00	0.00	0.05	0.00	---	0.00	0.00	0.00	0.04	---	---	---	---	---	---	---	---	---	---	---
Cyprinella lutrensis	---	---	---	---	0.46	1.12	0.24	0.47	1.83	---	0.08	0.08	0.04	0.00	---	---	---	---	---	---	---	---	---	---	---
Gambusia affinis	---	---	---	---	0.00	0.00	0.00	0.00	0.05	---	0.00	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---
Hybognathus amarus	---	---	---	---	0.27	2.28	0.56	0.80	2.48	---	0.00	0.36	0.38	0.00	---	---	---	---	---	---	---	---	---	---	---
Ictalurus punctatus	---	---	---	---	0.00	0.00	0.00	0.00	0.05	---	0.00	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---
Pimephales promelas	---	---	---	---	0.00	0.18	0.16	0.05	0.10	---	0.08	0.00	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---

Tingley Lakes 407

	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Cyprinella lutrensis	---	---	---	---	0.00	0.04	0.00	0.71	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Hybognathus amarus	---	---	---	---	0.22	1.37	0.12	1.62	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pimephales promelas	---	---	---	---	0.00	0.00	0.00	0.05	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Platygobio gracilis	---	---	---	---	0.04	0.00	0.00	0.05	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Tingley Lakes 415

	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Cyprinella lutrensis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.15	0.00	1.05	0.69	0.00	4.10	0.25	0.00	0.00	0.00	0.00
Cyprinus carpio	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
Hybognathus amarus	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5.54	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00

Tingley Lakes 416

	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Cyprinella lutrensis	---	---	---	---	---	---	---	---	---	3.06	---	---	---	0.00	0.10	0.40	0.22	0.00	0.92	1.57	1.44	0.95	2.39	2.11	0.00
Hybognathus amarus	---	---	---	---	---	---	---	---	---	1.12	---	---	---	0.00	0.07	0.20	1.33	2.31	4.37	1.31	2.16	0.95	1.30	2.50	0.00
Pimephales promelas	---	---	---	---	---	---	---	---	---	0.09	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Platygobio gracilis	---	---	---	---	---	---	---	---	---	0.00	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00

Isleta Reach - Fish Species Catch per Fyke Net Hour – 2008 **

Sample Area	Net	Species	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Bosque Farms																											
	Bosque Farms Down 201																										
		Carpiodes carpio	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04	0.00	---	---	---	0.00	0.00	---	---	---	0.00	---	0.00	---	---	---	---	---
		Catostomus commersonii	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	---	---	0.00	0.00	---	---	---	0.00	---	0.00	---	---	---	---	---
		Cyprinella lutrensis	0.25	1.08	0.38	0.13	0.20	0.70	0.56	2.23	7.12	---	---	---	0.23	1.51	---	---	---	6.87	---	4.57	---	---	---	---	---
		Gambusia affinis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	---	---	---	0.00	0.00	---	---	---	0.00	---	0.17	---	---	---	---	---
		Hybognathus amarus	0.46	2.25	2.38	1.11	0.97	1.86	1.92	1.09	7.79	---	---	---	0.99	7.67	---	---	---	4.72	---	3.38	---	---	---	---	---
		Ictalurus punctatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	---	---	---	0.00	0.05	---	---	---	0.00	---	0.00	---	---	---	---	---
		Lepomis cyanellus	0.00	0.00	0.04	0.04	0.00	0.00	0.00	0.00	0.00	---	---	---	0.00	0.00	---	---	---	0.00	---	0.00	---	---	---	---	---
		Pimephales promelas	0.00	0.00	0.04	0.00	0.04	0.08	0.12	0.18	0.28	---	---	---	0.03	0.05	---	---	---	0.00	---	0.00	---	---	---	---	---
	Bosque Farms Down 202																										
		Cyprinella lutrensis	---	0.08	0.04	0.00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Hybognathus amarus	---	0.58	0.46	2.13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Bosque Farms Down 203																										
		Cyprinella lutrensis	---	0.00	0.00	0.17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Hybognathus amarus	---	0.21	0.00	0.26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Bosque Farms Down 204																										
		Cyprinella lutrensis	---	0.00	0.13	0.99	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Hybognathus amarus	---	0.33	0.54	1.64	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Pimephales promelas	---	0.04	0.00	0.00	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Bosque Farms Down 205																										
		Cyprinella lutrensis	---	0.08	0.21	0.04	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		Hybognathus amarus	---	1.13	0.04	0.71	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Bosque Farms Down 207																										
		Cyprinella lutrensis	---	---	---	---	0.00	0.00	0.00	0.00	---	---	---	---	1.20	1.89	0.81	---	---	0.00	---	0.00	---	0.22	0.97	0.68	0.00
		Cyprinus carpio	---	---	---	---	0.00	0.00	0.00	0.00	---	---	---	---	0.00	0.00	0.00	---	---	0.00	---	0.35	---	0.00	0.00	0.00	0.00
		Gambusia affinis	---	---	---	---	0.00	0.00	0.20	0.13	---	---	---	---	0.00	0.00	0.00	---	---	0.00	---	0.18	---	0.00	0.24	0.00	0.00
		Hybognathus amarus	---	---	---	---	0.00	0.00	1.56	0.00	---	---	---	---	15.83	1.27	2.40	---	---	0.00	---	2.82	---	0.44	2.18	0.68	0.00
		Larval sp	---	---	---	---	0.00	0.00	0.00	0.00	---	---	---	---	0.00	0.00	0.00	---	---	0.00	---	0.00	---	0.00	0.24	0.00	0.00
		Pimephales promelas	---	---	---	---	0.00	0.00	0.00	0.00	---	---	---	---	0.04	0.00	0.00	---	---	0.00	---	0.00	---	0.00	0.00	0.00	0.00

Sample Area	Net	Species	12-May	13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May	22-May	23-May	24-May	25-May	26-May	28-May	29-May	30-May	31-May	01-Jun	02-Jun	08-Jun	09-Jun	10-Jun	11-Jun
Bosque Farms Down 208																											
		Ameiurus natalis	---	---	---	---	0.00	0.00	0.04	0.00	0.00	---	---	---	0.00	0.00	---	---	---	0.00	---	0.00	---	---	---	---	---
		Cyprinella lutrensis	---	---	---	---	0.00	0.20	0.08	0.12	0.26	---	---	---	0.03	0.25	---	---	---	0.41	---	0.00	---	---	---	---	---
		Gambusia affinis	---	---	---	---	0.00	0.00	0.00	0.00	0.35	---	---	---	0.00	0.00	---	---	---	0.00	---	0.17	---	---	---	---	---
		Hybognathus amarus	---	---	---	---	0.62	0.53	0.25	0.12	0.26	---	---	---	0.10	0.10	---	---	---	1.63	---	0.17	---	---	---	---	---
		Pimephales promelas	---	---	---	---	0.00	0.00	0.00	0.00	0.26	---	---	---	0.00	0.00	---	---	---	0.00	---	0.00	---	---	---	---	---
Bosque Farms Mid 209																											
		Carpiodes carpio	---	---	---	---	0.00	0.08	0.00	0.00	0.00	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00	0.00
		Cyprinella lutrensis	---	---	---	---	0.21	0.16	0.25	0.49	0.57	---	---	---	1.47	0.41	0.00	0.51	10.50	12.53	---	4.67	3.63	2.68	6.55	18.53	0.96
		Cyprinus carpio	---	---	---	---	0.00	0.00	0.00	0.00	0.00	---	---	---	0.00	0.00	0.00	0.00	0.00	0.51	---	0.00	0.24	0.24	0.00	0.00	0.00
		Gambusia affinis	---	---	---	---	0.00	0.04	0.00	0.04	1.48	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00	0.00
		Hybognathus amarus	---	---	---	---	0.68	2.76	1.82	4.76	6.74	---	---	---	18.63	4.22	0.00	2.03	7.75	24.55	---	11.68	1.94	3.65	7.21	44.63	3.13
		Ictalurus punctatus	---	---	---	---	0.00	0.00	0.00	0.00	0.00	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	---	0.00	0.24	0.00	0.00	0.00	0.00
		Pimephales promelas	---	---	---	---	0.05	0.08	0.00	0.04	0.22	---	---	---	0.08	0.00	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.00	0.00
		Platygobio gracilis	---	---	---	---	0.00	0.00	0.00	0.00	0.00	---	---	---	0.00	0.00	0.00	0.00	0.50	0.00	---	0.00	0.00	0.00	0.00	0.00	0.00
Bosque Farms Up 210																											
		Hybognathus amarus	---	---	---	---	---	---	---	---	---	---	---	---	---	---	111.70	---	---	---	---	---	---	---	---	---	---
Bosque Farms Up 211																											
		Cyprinella lutrensis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.24	0.00	0.80	---	0.00	0.00	0.00	0.00	0.00	0.00
		Cyprinus carpio	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.87	0.00
		Gambusia affinis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	---	0.21	0.00	0.00	0.00	0.00	0.00
		Hybognathus amarus	---	---	---	---	---	---	---	---	---	---	---	---	---	---	85.76	88.22	0.00	0.80	---	0.00	0.00	0.00	0.00	0.22	0.51
		Larval sp	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.00	0.00	0.00	0.00	---	0.00	0.00	0.00	0.00	0.44	0.00

APPENDIX D
DAILY FISH COMMUNITY COLLECTIONS

Fish Community Collection Report

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Atrisco 401					
Northing **3884615**					
Easting **346117**					
	16-May-2008	*Downstream*			
			NO FISH	0	---
	17-May-2008	*Downstream*			
			NO FISH	0	---
	18-May-2008	*Downstream*			
			NO FISH	0	---
	19-May-2008	*Downstream*			
			Carpiodes carpio	1	12.50
			Catostomus commersonii	5	62.50
			Cyprinella lutrensis	1	12.50
			Platygobio gracilis	1	12.50
	20-May-2008	*Downstream*			
			Cyprinella lutrensis	9	90.00
			Hybognathus amarus	1	10.00
	21-May-2008	*Downstream*			
			Carpiodes carpio	1	5.26
			Catostomus commersonii	3	15.79
			Cyprinella lutrensis	14	73.68
			Hybognathus amarus	1	5.26

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	22-May-2008	Downstream			
			Catostomus commersonii	1	2.70
			Cyprinella lutrensis	31	83.78
			Gambusia affinis	1	2.70
			Hybognathus amarus	3	8.11
			Pimephales promelas	1	2.70
	23-May-2008	Downstream			
			NO FISH	0	---
	24-May-2008	Downstream			
			Hybognathus amarus	1	100.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Atrisco 402					
Northing **3884608**					
Easting **346121**					
	16-May-2008	*Upstream*			
			Cyprinella lutrensis	43	37.07
			Hybognathus amarus	71	61.21
			Pimephales promelas	2	1.72
	17-May-2008	*Upstream*			
			Cyprinella lutrensis	58	55.24
			Gambusia affinis	1	0.95
			Hybognathus amarus	45	42.86
			Pimephales promelas	1	0.95
	18-May-2008	*Upstream*			
			Cyprinella lutrensis	14	29.79
			Hybognathus amarus	32	68.09
			Platygobio gracilis	1	2.13
	19-May-2008	*Upstream*			
			Cyprinella lutrensis	65	37.36
			Hybognathus amarus	105	60.34
			Pimephales promelas	4	2.30
	20-May-2008	*Upstream*			
			Cyprinella lutrensis	84	51.22
			Hybognathus amarus	76	46.34
			Pimephales promelas	4	2.44

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	21-May-2008	Upstream			
			Cyprinella lutrensis	55	45.83
			Hybognathus amarus	60	50.00
			Pimephales promelas	5	4.17
	22-May-2008	Upstream			
			Cyprinella lutrensis	157	73.36
			Hybognathus amarus	55	25.70
			Pimephales promelas	1	0.47
			Platygobio gracilis	1	0.47
	23-May-2008	Upstream			
			Cyprinella lutrensis	4	30.77
			Hybognathus amarus	9	69.23
	24-May-2008	Upstream			
			Ictalurus punctatus	1	100.00
	25-May-2008	Upstream			
			NO FISH	0	---
	26-May-2008	Upstream			
			Pimephales promelas	1	100.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Bosque Farms Down 201					
Northing **3859557**					
Easting **342774**					
	12-May-2008	*Upstream*			
			Catostomus commersonii	1	5.56
			Cyprinella lutrensis	6	33.33
			Hybognathus amarus	11	61.11
	13-May-2008	*Upstream*			
			Cyprinella lutrensis	26	32.50
			Hybognathus amarus	54	67.50
	14-May-2008	*Upstream*			
			Carpiodes carpio	1	1.45
			Cyprinella lutrensis	9	13.04
			Hybognathus amarus	57	82.61
			Lepomis (Chaenobryttus) cyanellus	1	1.45
			Pimephales promelas	1	1.45
	15-May-2008	*Upstream*			
			Cyprinella lutrensis	3	10.00
			Hybognathus amarus	26	86.67
			Lepomis (Chaenobryttus) cyanellus	1	3.33
	16-May-2008	*Upstream*			
			Cyprinella lutrensis	5	16.67
			Hybognathus amarus	24	80.00
			Pimephales promelas	1	3.33

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	17-May-2008	Downstream			
			Cyprinella lutrensis	17	26.56
			Hybognathus amarus	45	70.31
			Pimephales promelas	2	3.13
	18-May-2008	Upstream			
			Cyprinella lutrensis	14	21.54
			Hybognathus amarus	48	73.85
			Pimephales promelas	3	4.62
	19-May-2008	Downstream			
			Carpiodes carpio	1	1.22
			Cyprinella lutrensis	51	62.20
			Gambusia affinis	1	1.22
			Hybognathus amarus	25	30.49
			Pimephales promelas	4	4.88
	20-May-2008	Upstream			
			Cyprinella lutrensis	179	46.86
			Hybognathus amarus	196	51.31
			Pimephales promelas	7	1.83
	24-May-2008	Upstream			
			Cyprinella lutrensis	7	18.42
			Hybognathus amarus	30	78.95
			Pimephales promelas	1	2.63
	25-May-2008	Upstream			
			Cyprinella lutrensis	30	16.30
			Hybognathus amarus	152	82.61
			Ictalurus punctatus	1	0.54
			Pimephales promelas	1	0.54

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	30-May-2008	Upstream			
			Cyprinella lutrensis	32	59.26
			Hybognathus amarus	22	40.74
	01-Jun-2008	Upstream			
			Cyprinella lutrensis	27	56.25
			Gambusia affinis	1	2.08
			Hybognathus amarus	20	41.67

Bosque Farms Down 202

Northing **3859542**
Easting **342767**

	13-May-2008	Upstream			
			Cyprinella lutrensis	2	12.50
			Hybognathus amarus	14	87.50
	14-May-2008	Upstream			
			Cyprinella lutrensis	1	8.33
			Hybognathus amarus	11	91.67
	15-May-2008	Upstream			
			Hybognathus amarus	49	100.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Bosque Farms Down 203					
Northing **3859540**					
Easting **342771**					
	13-May-2008	*Downstream*			
			Hybognathus amarus	5	100.00
	14-May-2008	*Downstream*			
			NO FISH	0	---
	15-May-2008	*Downstream*			
			Cyprinella lutrensis	4	40.00
			Hybognathus amarus	6	60.00
Bosque Farms Down 204					
Northing **3859537**					
Easting **342771**					
	13-May-2008	*Downstream*			
			Hybognathus amarus	8	88.89
			Pimephales promelas	1	11.11
	14-May-2008	*Downstream*			
			Cyprinella lutrensis	3	18.75
			Hybognathus amarus	13	81.25
	15-May-2008	*Downstream*			
			Cyprinella lutrensis	24	37.50
			Hybognathus amarus	40	62.50

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Bosque Farms Down 205					
Northing **3859539**					
Easting **342768**					
	13-May-2008	*Upstream*			
			Cyprinella lutrensis	2	6.90
			Hybognathus amarus	27	93.10
	14-May-2008	*Upstream*			
			Cyprinella lutrensis	5	83.33
			Hybognathus amarus	1	16.67
	15-May-2008	*Upstream*			
			Cyprinella lutrensis	1	5.56
			Hybognathus amarus	17	94.44

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Bosque Farms Down 207					
Northing **3859587**					
Easting **342753**					
	16-May-2008	*Downstream*			
			NO FISH	0	---
	17-May-2008	*Downstream*			
			NO FISH	0	---
	18-May-2008	*Downstream*			
			Gambusia affinis	5	11.63
			Hybognathus amarus	38	88.37
	19-May-2008	*Downstream*			
			Gambusia affinis	3	100.00
	24-May-2008	*Diagonal Downstream*			
			Cyprinella lutrensis	33	7.05
			Hybognathus amarus	434	92.74
			Pimephales promelas	1	0.21
	25-May-2008	*Diagonal Downstream*			
			Cyprinella lutrensis	43	59.72
			Hybognathus amarus	29	40.28
	26-May-2008	*Downstream*			
			Cyprinella lutrensis	21	25.30
			Hybognathus amarus	62	74.70

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	30-May-2008	Downstream			
			NO FISH	0	---
	01-Jun-2008	Downstream			
			Cyprinus carpio	2	10.53
			Gambusia affinis	1	5.26
			Hybognathus amarus	16	84.21
	11-Jun-2008	Downstream			
			NO FISH	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Bosque Farms Down 208					
Northing **3859588**					
Easting **342777**					
	16-May-2008	*Downstream*			
			Hybognathus amarus	13	100.00
	17-May-2008	*Downstream*			
			Cyprinella lutrensis	5	27.78
			Hybognathus amarus	13	72.22
	18-May-2008	*Downstream*			
			Ameiurus natalis	1	11.11
			Cyprinella lutrensis	2	22.22
			Hybognathus amarus	6	66.67
	19-May-2008	*Downstream*			
			Cyprinella lutrensis	3	50.00
			Hybognathus amarus	3	50.00
	20-May-2008	*Downstream*			
			Cyprinella lutrensis	6	23.08
			Gambusia affinis	8	30.77
			Hybognathus amarus	6	23.08
			Pimephales promelas	6	23.08
	24-May-2008	*Downstream*			
			Cyprinella lutrensis	1	25.00
			Hybognathus amarus	3	75.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	25-May-2008	Downstream			
			Cyprinella lutrensis	5	71.43
			Hybognathus amarus	2	28.57
	30-May-2008	Downstream			
			Cyprinella lutrensis	2	20.00
			Hybognathus amarus	8	80.00
	01-Jun-2008	Downstream			
			Gambusia affinis	1	50.00
			Hybognathus amarus	1	50.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Bosque Farms Mid 209					
Northing **3859631**					
Easting **342737**					
	16-May-2008	*Upstream*			
			Cyprinella lutrensis	4	22.22
			Hybognathus amarus	13	72.22
			Pimephales promelas	1	5.56
	17-May-2008	*Upstream*			
			Carpiodes carpio	2	2.63
			Cyprinella lutrensis	4	5.26
			Gambusia affinis	1	1.32
			Hybognathus amarus	67	88.16
			Pimephales promelas	2	2.63
	18-May-2008	*Upstream*			
			Cyprinella lutrensis	6	12.24
			Hybognathus amarus	43	87.76
	19-May-2008	*Upstream*			
			Cyprinella lutrensis	12	9.16
			Gambusia affinis	1	0.76
			Hybognathus amarus	117	89.31
			Pimephales promelas	1	0.76
	20-May-2008	*Upstream*			
			Cyprinella lutrensis	13	6.28
			Gambusia affinis	34	16.43
			Hybognathus amarus	155	74.88
			Pimephales promelas	5	2.42

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	24-May-2008	Upstream			
			Cyprinella lutrensis	35	7.28
			Hybognathus amarus	444	92.31
			Pimephales promelas	2	0.42
	25-May-2008	Upstream			
			Cyprinella lutrensis	10	8.85
			Hybognathus amarus	103	91.15
	28-May-2008	Upstream			
			Cyprinella lutrensis	2	20.00
			Hybognathus amarus	8	80.00
	29-May-2008	Upstream			
			Cyprinella lutrensis	42	56.00
			Hybognathus amarus	31	41.33
			Platygobio gracilis	2	2.67
	30-May-2008	Upstream			
			Cyprinella lutrensis	49	33.33
			Cyprinus carpio	2	1.36
			Hybognathus amarus	96	65.31
	01-Jun-2008	Upstream			
			Cyprinella lutrensis	20	28.57
			Hybognathus amarus	50	71.43
	02-Jun-2008	Upstream			
			Cyprinella lutrensis	15	60.00
			Cyprinus carpio	1	4.00
			Hybognathus amarus	8	32.00
			Ictalurus punctatus	1	4.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Bosque Farms Up 210					
Northing **3859746**					
Easting **342923**					
	26-May-2008	*Upstream*			
			Hybognathus amarus	2234	100.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Bosque Farms Up 211					
Northing **3859750**					
Easting **342897**					
	26-May-2008	*Upstream*			
			Hybognathus amarus	1801	100.00
	28-May-2008	*Upstream*			
			Cyprinella lutrensis	1	0.27
			Hybognathus amarus	367	99.73
	29-May-2008	*Upstream*			
			NO FISH	0	---
	30-May-2008	*Upstream*			
			Cyprinella lutrensis	2	50.00
			Hybognathus amarus	2	50.00
	01-Jun-2008	*Upstream*			
			Gambusia affinis	1	100.00
	02-Jun-2008	*Upstream*			
			NO FISH	0	---
	08-Jun-2008	*Upstream*			
			NO FISH	0	---
			NO FISH	0	---
	09-Jun-2008	*Upstream*			
			NO FISH	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Central Bridge 404					
Northing **3884408**					
Easting **346589**					
	16-May-2008	*Upstream*			
			Cyprinella lutrensis	2	50.00
			Platygobio gracilis	2	50.00
	17-May-2008	*Upstream*			
			Cyprinella lutrensis	6	100.00
	18-May-2008	*Upstream*			
			Cyprinella lutrensis	1	50.00
			Platygobio gracilis	1	50.00
	19-May-2008	*Upstream*			
			Hybognathus amarus	2	66.67
			Platygobio gracilis	1	33.33
	20-May-2008	*Upstream*			
			Cyprinella lutrensis	1	100.00
	21-May-2008	*Upstream*			
			Cyprinella lutrensis	2	100.00
	22-May-2008	*Upstream*			
			Cyprinella lutrensis	6	100.00
	23-May-2008	*Upstream*			
			NO FISH	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	24-May-2008	Upstream			
			Cyprinella lutrensis	4	44.44
			Hybognathus amarus	5	55.56

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Central Bridge 405					
Northing **3884396**					
Easting **346587**					
	17-May-2008	*Diagonal Upstream*			
			Cyprinella lutrensis	2	66.67
			Hybognathus amarus	1	33.33
	18-May-2008	*Upstream*			
			Catostomus commersonii	1	25.00
			Cyprinella lutrensis	3	75.00
	19-May-2008	*Upstream*			
			NO FISH	0	---
	20-May-2008	*Upstream*			
			NO FISH	0	---
	21-May-2008	*Downstream*			
			NO FISH	0	---
	22-May-2008	*Upstream*			
			Gambusia affinis	1	50.00
			Hybognathus amarus	1	50.00
	23-May-2008	*Upstream*			
			Hybognathus amarus	1	100.00
	24-May-2008	*Upstream*			
			Cyprinella lutrensis	1	50.00
			Ictalurus punctatus	1	50.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	25-May-2008	Diagonal Upstream			
			Cyprinella lutrensis	3	42.86
			Ictalurus punctatus	2	28.57
			Platygobio gracilis	2	28.57
	28-May-2008	Upstream			
			Cyprinella lutrensis	13	72.22
			Hybognathus amarus	5	27.78
	29-May-2008	Upstream			
			Cyprinella lutrensis	2	66.67
			Hybognathus amarus	1	33.33
	30-May-2008	Upstream			
			Cyprinella lutrensis	1	100.00
	31-May-2008	Upstream			
			Cyprinella lutrensis	4	80.00
			Platygobio gracilis	1	20.00
	01-Jun-2008	Upstream			
			Cyprinella lutrensis	8	100.00
	02-Jun-2008	Upstream			
			Cyprinella lutrensis	11	100.00
	08-Jun-2008	Upstream			
			Cyprinella lutrensis	1	100.00
	09-Jun-2008	Downstream			
			Cyprinella lutrensis	1	100.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	11-Jun-2008	Upstream			
			NO FISH	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Central Bridge 413					
Northing **3884389**					
Easting **346567**					
	16-May-2008	*Upstream*			
			Cyprinella lutrensis	4	100.00
	28-May-2008	*Downstream*			
			NO FISH	0	---
	29-May-2008	*Downstream*			
			NO FISH	0	---
	30-May-2008	*Downstream*			
			NO FISH	0	---
	31-May-2008	*Downstream*			
			NO FISH	0	---
	01-Jun-2008	*Downstream*			
			Hybognathus amarus	1	100.00
	02-Jun-2008	*Downstream*			
			NO FISH	0	---
	08-Jun-2008	*Downstream*			
			NO FISH	0	---
	09-Jun-2008	*Diagonal Downstream*			
			NO FISH	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	10-Jun-2008	*Diagonal Downstream*			
			NO FISH	0	---
	11-Jun-2008	*Diagonal Downstream*			
			NO FISH	0	---

Central Bridge 414

Northing **3884393**
Easting **346566**

25-May-2008	*Upstream*			
		Cyprinella lutrensis	1	50.00
		Hybognathus amarus	1	50.00
26-May-2008	*Downstream*			
		Cyprinella lutrensis	48	11.51
		Hybognathus amarus	369	88.49

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Central Wasteway 206					
Northing **3885022**					
Easting **346018**					
	13-May-2008	*Upstream*			
			Cyprinella lutrensis	2	10.00
			Hybognathus amarus	16	80.00
			Pimephales promelas	1	5.00
			Platygobio gracilis	1	5.00
	14-May-2008	*Upstream*			
			Hybognathus amarus	11	100.00
	15-May-2008	*Upstream*			
			Cyprinella lutrensis	1	4.17
			Hybognathus amarus	23	95.83
	16-May-2008	*Upstream*			
			Cyprinella lutrensis	1	3.70
			Hybognathus amarus	26	96.30
	17-May-2008	*Downstream*			
			Cyprinella lutrensis	14	32.56
			Hybognathus amarus	28	65.12
			Pimephales promelas	1	2.33
	18-May-2008	*Upstream*			
			Cyprinella lutrensis	6	6.59
			Hybognathus amarus	84	92.31
			Platygobio gracilis	1	1.10

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	19-May-2008	Upstream			
			Cyprinella lutrensis	9	18.00
			Hybognathus amarus	31	62.00
			Ictalurus punctatus	1	2.00
			Pimephales promelas	9	18.00
	20-May-2008	Downstream			
			Hybognathus amarus	22	95.65
			Pimephales promelas	1	4.35
	21-May-2008	Downstream			
			Hybognathus amarus	5	83.33
			Pimephales promelas	1	16.67
	22-May-2008	Upstream			
			Catostomus commersonii	1	7.14
			Hybognathus amarus	13	92.86
	23-May-2008	Upstream			
			Cyprinella lutrensis	3	2.86
			Hybognathus amarus	102	97.14
	24-May-2008	Upstream			
			Hybognathus amarus	14	100.00
	25-May-2008	Upstream			
			Hybognathus amarus	1	100.00
	26-May-2008	Upstream			
			Cyprinella lutrensis	1	14.29
			Hybognathus amarus	6	85.71

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	28-May-2008	Upstream			
			NO FISH	0	---
	29-May-2008	Upstream			
			Cyprinella lutrensis	6	100.00
	30-May-2008	Upstream			
			Carpiodes carpio	1	8.33
			Cyprinella lutrensis	10	83.33
			Hybognathus amarus	1	8.33
	31-May-2008	Downstream			
			Cyprinella lutrensis	17	23.94
			Hybognathus amarus	51	71.83
			Platygobio gracilis	3	4.23
	01-Jun-2008	Upstream			
			Cyprinella lutrensis	3	42.86
			Hybognathus amarus	4	57.14
	02-Jun-2008	Upstream			
			Cyprinella lutrensis	14	87.50
			Hybognathus amarus	2	12.50
	08-Jun-2008	Downstream			
			NO FISH	0	---
	09-Jun-2008	Downstream			
			NO FISH	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	10-Jun-2008	*Upstream*			
			Cyprinella lutrensis	1	50.00
			Platygobio gracilis	1	50.00
	11-Jun-2008	*Upstream*			
			Cyprinella lutrensis	57	98.28
			Pimephales promelas	1	1.72

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Central Wasteway 403					
Northing **3885019**					
Easting **346024**					
	16-May-2008	*Downstream*			
			Hybognathus amarus	14	100.00
	17-May-2008	*Upstream*			
			Cyprinella lutrensis	2	6.06
			Hybognathus amarus	31	93.94
	18-May-2008	*Downstream*			
			Hybognathus amarus	5	100.00
	19-May-2008	*Downstream*			
			Cyprinella lutrensis	4	50.00
			Hybognathus amarus	3	37.50
			Pimephales promelas	1	12.50
	20-May-2008	*Upstream*			
			Cyprinella lutrensis	6	11.76
			Hybognathus amarus	43	84.31
			Pimephales promelas	2	3.92
	21-May-2008	*Upstream*			
			Cyprinella lutrensis	2	10.00
			Hybognathus amarus	17	85.00
			Pimephales promelas	1	5.00
	22-May-2008	*Downstream*			
			Catostomus commersonii	1	4.00
			Hybognathus amarus	24	96.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	23-May-2008	Downstream			
			Hybognathus amarus	1	100.00
	24-May-2008	Downstream			
			Hybognathus amarus	2	100.00
	25-May-2008	Downstream			
			Hybognathus amarus	2	100.00
	26-May-2008	Downstream			
			Hybognathus amarus	11	100.00
	28-May-2008	Downstream			
			Lepomis (Chaenobryttus) cyanellus	1	100.00
	29-May-2008	Downstream			
			NO FISH	0	---
	30-May-2008	Downstream			
			NO FISH	0	---
	31-May-2008	Upstream			
			NO FISH	0	---
	01-Jun-2008	Downstream			
			Hybognathus amarus	3	100.00
	02-Jun-2008	Downstream			
			NO FISH	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	08-Jun-2008	Upstream			
			NO FISH	0	---
	10-Jun-2008	Downstream			
			NO FISH	0	---
	11-Jun-2008	Upstream			
			NO FISH	0	---

Central Wasteway 408

Northing 3885070
Easting 345938

25-May-2008	Diagonal Downstream			
		Hybognathus amarus	2	100.00
26-May-2008	Downstream			
		Cyprinella lutrensis	2	1.92
		Hybognathus amarus	102	98.08

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Central Wasteway 409					
Northing **3885067**					
Easting **345925**					
	25-May-2008	*Upstream*			
			Hybognathus amarus	2	100.00
	26-May-2008	*Upstream*			
			NO FISH	0	---
	28-May-2008	*Upstream*			
			Cyprinella lutrensis	2	66.67
			Hybognathus amarus	1	33.33
	29-May-2008	*Upstream*			
			NO FISH	0	---
	30-May-2008	*Upstream*			
			Cyprinella lutrensis	2	50.00
			Hybognathus amarus	2	50.00
	31-May-2008	*Upstream*			
			Cyprinella lutrensis	7	70.00
			Hybognathus amarus	3	30.00
	01-Jun-2008	*Upstream*			
			Cyprinella lutrensis	9	69.23
			Hybognathus amarus	3	23.08
			Platygobio gracilis	1	7.69

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	02-Jun-2008	Upstream			
			Cyprinella lutrensis	3	42.86
			Platygobio gracilis	4	57.14
	08-Jun-2008	Upstream			
			Cyprinus carpio	1	100.00
	10-Jun-2008	Upstream			
			Cyprinella lutrensis	1	33.33
			Cyprinus carpio	1	33.33
			Platygobio gracilis	1	33.33
	11-Jun-2008	Upstream			
			Cyprinus carpio	1	100.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Central Wasteway 412					
Northing **3885104**					
Easting **345964**					
	28-May-2008	*Downstream*	*Gambusia affinis*	1	100.00
	29-May-2008	*Downstream*	*NO FISH*	0	---
	30-May-2008	*Downstream*	*Cyprinella lutrensis*	2	100.00
	31-May-2008	*Downstream*	*NO FISH*	0	---
	01-Jun-2008	*Downstream*	*Cyprinella lutrensis*	1	100.00
	02-Jun-2008	*Downstream*	*NO FISH*	0	---
	08-Jun-2008	*Downstream*	*Cyprinus carpio*	1	100.00
	09-Jun-2008	*Downstream*	*NO FISH*	0	---
	10-Jun-2008	*Downstream*	*NO FISH*	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
South Diversion Channel East 410					
Northing **3871288**					
Easting **345824**					
	26-May-2008	*Downstream*			
			Cyprinella lutrensis	5	20.00
			Hybognathus amarus	20	80.00
	28-May-2008	*Downstream*			
			NO FISH	0	---
	02-Jun-2008	*Downstream*			
			Cyprinella lutrensis	5	41.67
			Cyprinus carpio	1	8.33
			Gambusia affinis	1	8.33
			Hybognathus amarus	5	41.67
	08-Jun-2008	*Downstream*			
			Cyprinella lutrensis	1	100.00
	11-Jun-2008	*Downstream*			
			Cyprinella lutrensis	1	20.00
			Cyprinus carpio	3	60.00
			Gambusia affinis	1	20.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
South Diversion Channel					
East 411					
Northing **3871294**					
Easting **345831**					
	26-May-2008	*Upstream*			
			Cyprinella lutrensis	52	34.21
			Gambusia affinis	6	3.95
			Hybognathus amarus	94	61.84
	28-May-2008	*Upstream*			
			Cyprinella lutrensis	3	100.00
	02-Jun-2008	*Upstream*			
			NO FISH	0	---
	08-Jun-2008	*Upstream*			
			Cyprinella lutrensis	1	100.00
	09-Jun-2008	*Upstream*			
			Hybognathus amarus	1	100.00
	10-Jun-2008	*Upstream*			
			Cyprinella lutrensis	4	100.00
	11-Jun-2008	*Upstream*			
			NO FISH	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Tingley Lakes 406					
Northing 3883559					
Easting 347284					
	16-May-2008	Upstream			
			Cyprinella lutrensis	12	63.16
			Hybognathus amarus	7	36.84
	17-May-2008	Upstream			
			Cyprinella lutrensis	25	31.25
			Hybognathus amarus	51	63.75
			Pimephales promelas	4	5.00
	18-May-2008	Upstream			
			Cyprinella lutrensis	6	25.00
			Hybognathus amarus	14	58.33
			Pimephales promelas	4	16.67
	19-May-2008	Upstream			
			Ameiurus natalis	1	3.45
			Cyprinella lutrensis	10	34.48
			Hybognathus amarus	17	58.62
			Pimephales promelas	1	3.45
	20-May-2008	Downstream			
			Cyprinella lutrensis	37	40.66
			Gambusia affinis	1	1.10
			Hybognathus amarus	50	54.95
			Ictalurus punctatus	1	1.10
			Pimephales promelas	2	2.20

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	22-May-2008	Downstream			
			Cyprinella lutrensis	2	50.00
			Pimephales promelas	2	50.00
	23-May-2008	Upstream			
			Cyprinella lutrensis	2	18.18
			Hybognathus amarus	9	81.82
	24-May-2008	Upstream			
			Cyprinella lutrensis	1	10.00
			Hybognathus amarus	9	90.00
	25-May-2008	Diagonal Upstream			
			Ameiurus natalis	1	100.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Tingley Lakes 407					
Northing **3883328**					
Easting **347393**					
	16-May-2008	*Upstream*			
			Hybognathus amarus	6	85.71
			Platygobio gracilis	1	14.29
	17-May-2008	*Downstream*			
			Cyprinella lutrensis	1	3.13
			Hybognathus amarus	31	96.88
	18-May-2008	*Upstream*			
			Hybognathus amarus	3	100.00
	19-May-2008	*Upstream*			
			Cyprinella lutrensis	15	29.41
			Hybognathus amarus	34	66.67
			Pimephales promelas	1	1.96
			Platygobio gracilis	1	1.96

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Tingley Lakes 415					
Northing **3883566**					
Easting **347296**					
	26-May-2008	*Downstream*			
			Cyprinella lutrensis	4	2.58
			Hybognathus amarus	151	97.42
	28-May-2008	*Downstream*			
			NO FISH	0	---
	29-May-2008	*Perpendicular*			
			Cyprinella lutrensis	5	100.00
	30-May-2008	*Downstream*			
			Cyprinella lutrensis	3	100.00
	31-May-2008	*Upstream*			
			NO FISH	0	---
	01-Jun-2008	*Downstream*			
			Cyprinella lutrensis	15	93.75
			Hybognathus amarus	1	6.25
	02-Jun-2008	*Downstream*			
			Cyprinella lutrensis	1	100.00
	08-Jun-2008	*Downstream*			
			NO FISH	0	---

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	09-Jun-2008	Downstream			
			NO FISH	0	---
	10-Jun-2008	Downstream			
			NO FISH	0	---
	11-Jun-2008	Downstream			
			Cyprinus carpio	1	100.00

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
Tingley Lakes 416					
Northing **3883375**					
Easting **347367**					
	21-May-2008	*Diagonal Upstream*			
			Cyprinella lutrensis	71	71.72
			Hybognathus amarus	26	26.26
			Pimephales promelas	2	2.02
	25-May-2008	*Upstream*			
			NO FISH	0	---
	26-May-2008	*Upstream*			
			Cyprinella lutrensis	3	60.00
			Hybognathus amarus	2	40.00
	28-May-2008	*Diagonal Upstream*			
			Cyprinella lutrensis	2	66.67
			Hybognathus amarus	1	33.33
	29-May-2008	*Upstream*			
			Cyprinella lutrensis	1	14.29
			Hybognathus amarus	6	85.71
	30-May-2008	*Upstream*			
			Hybognathus amarus	10	100.00
	31-May-2008	*Upstream*			
			Cyprinella lutrensis	4	17.39
			Hybognathus amarus	19	82.61

Site Name	Collection Date	Net Orientation	Species	Total Number Collected	Percent Composition (by Site and Date)
	01-Jun-2008	Upstream			
			Cyprinella lutrensis	6	54.55
			Hybognathus amarus	5	45.45
	02-Jun-2008	Upstream			
			Cyprinella lutrensis	6	40.00
			Hybognathus amarus	9	60.00
	11-Jun-2008	Upstream			
			NO FISH	0	---

APPENDIX E
WATER QUALITY DATA

Water Quality - Basic Report

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Atrisco Floodplain											
	16-May-2008										
		7:23 AM	1.50	0.15	12.41	8.65	81.20	7.89	0.11	224.00	114.00
		7:33 AM	1.30	0.08	12.44	8.50	79.80	7.95	0.11	224.00	93.00
	17-May-2008										
		7:05 AM	1.60	0.07	15.21	7.70	76.80	7.76	0.11	231.00	100.00
		7:40 AM	1.55	0.08	15.24	7.85	78.30	8.00	0.11	230.00	93.00
	18-May-2008										
		8:32 AM	1.50	0.10	14.84	8.01	79.10	7.94	0.11	229.00	127.00
		8:47 AM	1.30	0.03	14.97	8.02	79.50	7.99	0.11	230.00	97.00
	19-May-2008										
		9:05 AM	1.00	0.03	15.54	6.98	71.30	8.17	0.11	224.00	66.00
		9:14 AM	1.10	0.05	15.45	7.21	72.20	7.94	0.11	225.00	134.00
	20-May-2008										
		11:17 AM	0.90	0.01	20.28	7.71	84.10	8.13	0.11	225.00	61.00
		11:21 AM	1.10	0.01	19.79	7.01	76.70	8.10	0.11	225.00	66.00
	21-May-2008										
		10:46 AM	0.80	0.02	20.58	7.03	78.20	7.99	0.11	228.00	64.00
		10:52 AM	1.00	0.02	20.36	6.99	77.50	8.11	0.11	228.00	61.00
	22-May-2008										
		10:50 AM	1.40	0.08	15.14	7.51	74.80	8.10	0.11	222.00	85.00
		12:12 PM	1.60	0.12	15.72	7.83	79.00	8.16	0.11	224.00	79.00
	23-May-2008										
		9:39 AM	2.00	0.11	14.30	7.49	73.20	8.11	0.10	220.00	94.00
		9:50 AM	2.10	0.34	14.28	7.60	74.40	8.01	0.11	221.00	86.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	24-May-2008										
		2:49 PM	2.50	0.39	16.42	8.66	88.70	7.98	0.11	221.00	101.00
	25-May-2008										
		9:39 AM	2.60	0.28	15.16	8.49	84.50	7.80	0.11	221.00	104.00
		9:45 AM	3.40	0.20	15.17	8.40	83.60	7.94	0.11	222.00	100.00
	26-May-2008										
		2:25 PM	1.50	0.37	16.86	8.30	85.70	7.99	0.10	214.00	85.00
	Summary Statistics for Atrisco Floodplain (20 records):										
		Avg.	1.59	0.13	16.01	7.80	78.93	8.00	0.11	224.40	90.50
		St. Dev.	0.65	0.12	2.42	0.57	4.67	0.11	0.00	4.16	20.74
		Max.	3.40	0.39	20.58	8.66	88.70	8.17	0.11	231.00	134.00
		Min.	0.80	0.01	12.41	6.98	71.30	7.76	0.10	214.00	61.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Atrisco Main Channel											
	16-May-2008										
		7:50 AM	1.60	0.25	12.87	8.97	84.60	7.95	0.11	224.00	81.00
	17-May-2008										
		7:20 AM	1.60	0.26	15.34	7.88	78.70	7.98	0.11	228.00	127.00
	18-May-2008										
		8:10 AM	1.30	0.31	14.83	7.49	74.30	7.90	0.10	211.00	88.00
	19-May-2008										
		8:54 AM	1.00	0.04	15.70	7.67	77.40	8.10	0.11	220.00	76.00
	20-May-2008										
		11:35 AM	0.40	0.39	17.62	7.77	81.50	7.82	0.11	222.00	79.00
	21-May-2008										
		11:00 AM	0.20	0.38	17.95	7.42	78.40	7.97	0.10	218.00	76.00
	22-May-2008										
		11:02 AM	1.40	0.29	14.62	7.68	75.70	7.98	0.10	220.00	82.00
	23-May-2008										
		9:44 AM	1.40	0.48	14.22	7.63	74.40	8.00	0.10	207.00	95.00
	24-May-2008										
		2:45 AM	1.50	0.72	16.31	8.86	90.50	7.89	0.10	220.00	117.00
	25-May-2008										
		10:10 AM	2.00	0.45	15.08	8.71	86.60	8.02	0.10	219.00	106.00
	26-May-2008										
		2:29 PM	1.50	0.46	16.65	8.35	85.80	8.03	0.10	213.00	95.00

Geographic Area	Date	Time		Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	Summary Statistics for Atrisco Main Channel (11 records):											
			Avg.	1.26	0.37	15.56	8.04	80.72	7.97	0.10	218.36	92.91
			St. Dev.	0.54	0.17	1.50	0.57	5.46	0.08	0.01	5.99	17.24
			Max.	2.00	0.72	17.95	8.97	90.50	8.10	0.11	228.00	127.00
			Min.	0.20	0.04	12.87	7.42	74.30	7.82	0.10	207.00	76.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Bosque Farms Floodplain											
	13-May-2008										
		9:03 AM	2.10	0.07	14.20	8.57	83.50	8.10	0.12	258.00	155.00
		9:26 AM	1.10	0.04	14.46	8.79	86.30	8.01	0.12	260.00	124.00
		11:33 AM	1.00	0.10	15.51	8.73	87.60	8.09	0.12	250.00	110.00
		11:46 AM	1.20	0.23	16.25	9.75	99.40	8.42	0.12	254.00	106.00
	14-May-2008										
		8:45 AM	1.90	0.05	13.35	7.82	75.40	8.07	0.12	261.00	93.00
		8:50 AM	0.60	0.04	13.19	6.62	63.30	8.39	0.13	274.00	76.00
		10:32 AM	0.70	0.70	14.01	8.34	80.90	8.09	0.12	251.00	113.00
		11:12 AM	0.90	0.15	14.06	8.50	82.30	8.08	0.12	254.00	102.00
	15-May-2008										
		8:15 AM	1.70	0.02	13.89	9.01	87.10	8.14	0.12	258.00	116.00
		8:25 AM	0.70	0.05	13.93	8.89	86.50	8.09	0.12	255.00	122.00
		8:29 AM	0.90	0.11	13.91	9.25	89.80	8.07	0.12	255.00	108.00
		8:29 AM	0.70	0.02	13.91	8.35	81.00	8.04	0.13	262.00	119.00
	16-May-2008										
		8:20 AM	1.40	0.03	12.03	8.98	84.30	8.23	0.13	263.00	67.00
		8:54 AM	0.80	0.02	11.05	7.60	69.40	8.16	0.13	270.00	102.00
		9:53 AM	1.75	0.03	12.80	9.02	86.40	8.23	0.12	260.00	140.00
		10:26 AM	0.75	0.02	14.27	9.53	93.10	8.37	0.13	265.00	93.00
		10:32 AM	2.50	0.04	13.05	8.86	84.30	8.26	0.12	258.00	63.00
	17-May-2008										
		8:36 AM	1.10	0.04	14.14	5.66	55.10	8.17	0.14	282.00	47.05
		9:06 AM	0.60	0.03	13.55	2.39	23.00	8.03	0.15	304.00	25.22
		10:34 AM	0.30	0.04	16.64	9.30	98.60	8.49	0.14	283.00	72.00
		10:37 AM	1.70	0.03	15.82	8.24	83.10	8.29	0.13	279.00	82.00
		10:40 AM	2.30	0.04	15.17	7.62	75.80	8.29	0.13	278.00	92.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	18-May-2008										
		8:40 AM	1.40	0.03	15.05	7.83	78.50	8.35	0.13	271.00	80.00
		8:50 AM	0.80	0.01	14.18	6.71	65.80	8.13	0.13	267.00	59.00
		9:45 AM	0.50	0.03	15.98	8.66	88.20	8.45	0.13	269.00	61.00
		9:50 AM	1.90	0.05	15.58	8.19	82.40	8.19	0.13	264.00	70.00
		9:53 AM	2.40	0.04	15.76	8.27	83.70	8.26	0.12	261.00	77.00
	19-May-2008										
		7:42 AM	1.00	0.02	15.35	5.49	55.00	8.01	0.14	283.00	51.00
		9:06 AM	0.50	0.04	15.07	3.29	32.30	7.98	0.14	299.00	30.42
		9:37 AM	0.40	0.01	17.88	6.68	70.30	8.22	0.13	273.00	49.75
		9:39 AM	1.50	0.03	16.38	7.05	72.00	8.19	0.13	266.00	66.00
		9:43 AM	1.90	0.02	15.79	6.56	66.50	8.08	0.13	266.00	59.00
	20-May-2008										
		7:45 AM	0.60	0.00	16.88	3.95	40.80	8.29	0.15	318.00	62.00
		9:30 AM	0.20	0.00	20.09	3.07	34.80	7.99	0.15	318.00	98.00
		9:34 AM	1.10	0.04	17.25	7.32	75.10	8.16	0.13	270.00	71.00
		9:41 AM	1.70	0.00	17.02	4.43	45.90	8.01	0.13	270.00	52.00
	24-May-2008										
		7:35 AM	1.70	0.04	14.39	7.80	75.90	8.33	0.12	253.00	91.00
		11:30 AM	1.30	0.07	15.86	8.63	88.00	8.47	0.12	249.00	96.00
		1:55 PM	1.30	0.14	17.60	9.21	95.70	8.53	0.12	252.00	105.00
		2:10 PM	3.20	0.17	17.64	7.91	83.20	8.21	0.12	253.00	96.00
		2:14 PM	2.50	0.12	17.72	7.87	83.00	8.16	0.12	255.00	104.00
	25-May-2008										
		8:15 AM	2.20	0.25	15.76	---	---	8.33	0.12	255.00	113.00
		9:04 AM	1.40	0.05	15.91	---	---	8.25	0.12	257.00	106.00
		10:20 AM	1.60	0.11	16.33	---	---	8.44	0.13	278.00	94.00
		10:21 AM	2.80	0.29	15.95	---	---	8.13	0.17	348.00	92.00
		10:24 AM	2.80	0.08	16.28	---	---	8.16	0.15	309.00	101.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	26-May-2008										
		7:45 AM	3.10	0.08	16.71	2.84	28.90	7.51	0.13	264.00	27.97
		7:55 AM	3.20	0.05	16.24	3.73	38.10	7.39	0.13	264.00	32.51
		10:45 AM	2.20	0.10	17.02	7.89	82.40	7.94	0.11	235.00	109.00
		11:04 AM	1.60	0.10	17.27	7.67	79.90	7.93	0.11	236.00	109.00
	28-May-2008										
		10:04 AM	1.70	0.10	17.26	8.91	93.10	8.30	0.11	233.00	108.00
		10:22 AM	1.20	0.08	17.34	8.40	88.30	7.98	0.11	234.00	96.00
		11:33 AM	2.30	0.09	18.02	2.28	24.20	7.49	0.14	285.00	23.89
	29-May-2008										
		10:06 AM	1.60	0.06	19.04	1.51	17.20	7.96	0.16	329.00	15.13
		11:08 AM	1.40	0.03	19.26	5.96	65.20	8.32	0.11	239.00	136.00
		12:05 PM	0.90	0.06	19.29	4.24	45.80	8.11	0.11	240.00	114.00
	30-May-2008										
		9:10 AM	1.00	0.10	18.55	0.37	3.90	7.62	0.20	408.00	8.43
		10:00 AM	1.30	0.04	19.29	5.97	63.00	8.20	0.11	241.00	112.00
		10:10 AM	0.80	0.03	16.72	6.70	68.90	7.95	0.12	255.00	103.00
		10:25 AM	1.00	0.06	17.99	7.62	80.60	8.19	0.12	245.00	83.00
		10:27 AM	2.00	0.17	17.66	7.96	83.50	8.09	0.12	243.00	89.00
		10:33 AM	2.40	0.06	17.49	7.57	79.20	8.06	0.12	245.00	88.00
	01-Jun-2008										
		8:42 AM	2.30	0.08	17.50	5.78	59.90	7.93	0.12	242.00	72.00
		8:47 AM	2.00	0.07	17.65	6.91	72.50	8.02	0.12	242.00	92.00
		8:50 AM	0.90	0.13	17.63	6.42	67.20	7.96	0.12	242.00	80.00
		8:55 AM	0.85	0.05	17.64	7.37	77.30	8.03	0.12	243.00	98.00
		9:01 AM	1.70	0.04	17.93	7.75	82.00	8.08	0.11	241.00	87.00
		12:37 PM	0.80	0.06	20.80	0.27	3.00	7.40	0.28	573.00	22.69

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	02-Jun-2008										
		10:45 AM	1.70	0.03	19.24	3.51	37.80	8.00	0.11	241.00	109.00
		10:50 AM	1.20	0.12	19.35	5.14	55.90	8.13	0.11	241.00	72.00
	08-Jun-2008										
		10:30 AM	1.30	0.04	20.29	1.50	15.80	8.14	0.15	345.00	10.17
		10:30 AM	1.30	0.04	20.29	1.50	15.80	8.14	0.15	345.00	10.17
		10:55 AM	1.40	0.09	19.04	3.05	32.90	8.59	0.11	231.00	79.00
		11:05 AM	1.20	0.09	19.44	2.79	30.30	8.25	0.11	228.00	68.00
		11:10 AM	1.30	0.14	19.07	2.87	30.80	8.07	0.11	228.00	63.00
	09-Jun-2008										
			1.50	0.18	19.23	1.97	21.40	8.08	0.11	225.00	68.00
		11:05 AM	1.40	0.09	19.68	1.49	16.50	7.77	0.16	325.00	6.91
		11:30 AM	1.80	0.11	18.78	2.34	26.10	8.34	0.11	228.00	77.00
		12:10 PM	1.30	0.12	19.47	2.07	22.60	8.22	0.11	225.00	80.00
	10-Jun-2008										
		12:20 PM	2.40	0.08	18.63	2.93	31.00	7.44	0.13	281.00	13.30
		12:45 PM	2.00	0.16	19.83	7.45	81.60	8.06	0.11	224.00	51.00
		1:50 PM	1.50	0.19	20.24	8.28	90.90	8.34	0.10	221.00	58.00
		1:55 PM	1.50	0.12	20.04	7.68	84.20	8.16	0.11	222.00	68.00
	11-Jun-2008										
		10:30 AM	2.40	0.16	18.76	2.48	26.50	7.74	0.12	260.00	12.82
		11:25 AM	2.00	0.12	19.29	7.77	85.00	8.32	0.11	225.00	43.03
		11:30 AM	1.30	0.15	19.31	7.60	82.50	8.15	0.11	226.00	60.00
		11:45 AM	1.50	0.20	19.09	7.19	77.90	7.97	0.10	226.00	53.00

Geographic Area	Date	Time		Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	Summary Statistics for Bosque Farms Floodplain (87 records):											
			Avg.	1.49	0.09	16.83	5.89	60.26	8.11	0.13	266.25	77.25
			St. Dev.	0.68	0.09	2.24	2.94	29.53	0.24	0.02	46.59	33.38
			Max.	3.20	0.70	20.80	9.75	99.40	8.59	0.28	573.00	155.00
			Min.	0.20	0.00	11.05	---	---	7.39	0.10	221.00	6.91

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Bosque Farms Main Channel											
	13-May-2008										
		1:26 PM	3.70	0.87	16.50	8.96	91.20	8.24	0.12	249.00	102.00
	14-May-2008										
		1:05 PM	2.60	0.37	14.75	8.60	84.90	8.08	0.12	248.00	82.00
	15-May-2008										
		9:05 AM	3.10	0.60	13.92	9.28	89.80	8.14	0.12	254.00	89.00
	16-May-2008										
		10:47 AM	3.60	0.22	13.50	9.22	88.60	8.09	0.12	254.00	96.00
	17-May-2008										
		10:44 AM	5.00	0.33	16.04	7.86	79.80	8.16	0.13	271.00	97.00
	18-May-2008										
		10:00 AM	4.00	0.15	15.63	7.99	80.40	8.10	0.12	258.00	88.00
	19-May-2008										
		9:47 AM	1.00	0.13	16.52	7.56	77.30	8.10	0.12	259.00	84.00
	20-May-2008										
		9:55 AM	4.00	0.67	17.16	7.85	81.30	8.17	0.12	260.00	78.00
	24-May-2008										
		2:20 PM	5.00	0.28	17.77	7.95	84.20	8.14	0.12	255.00	99.00
	25-May-2008										
		10:29 AM	5.00	0.12	16.60	---	---	8.18	0.12	259.00	98.00
	26-May-2008										
		11:40 AM	4.00	0.18	17.70	7.63	80.50	7.98	0.11	236.00	131.00
	28-May-2008										
		10:15 AM	1.90	0.09	17.43	8.64	89.50	7.93	0.11	236.00	129.00
	29-May-2008										
		11:55 AM	1.30	0.67	18.74	4.94	53.80	8.38	0.11	237.00	118.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	30-May-2008										
		10:13 AM	3.90	0.35	17.60	8.24	86.40	8.13	0.11	240.00	105.00
	01-Jun-2008										
		9:06 AM	4.60	0.33	17.89	7.60	80.30	8.01	0.12	244.00	76.00
	02-Jun-2008										
		11:05 AM	1.40	0.14	19.65	4.77	51.50	7.95	0.12	243.00	100.00
	08-Jun-2008										
		11:07 AM	1.70	0.11	19.19	2.97	32.20	8.06	0.11	229.00	74.00
	09-Jun-2008										
			1.26	0.05	19.56	1.94	21.10	8.11	0.11	226.00	74.00
	10-Jun-2008										
		2:00 PM	1.80	0.05	20.34	7.60	83.80	8.27	0.11	222.00	66.00
	11-Jun-2008										
		11:50 AM	2.70	0.17	19.25	7.25	78.50	7.86	0.11	225.00	64.00
	Summary Statistics for Bosque Farms Main Channel (20 records):										
		Avg.	3.08	0.29	17.29	6.84	70.76	8.10	0.12	245.25	92.50
		St. Dev.	1.38	0.24	1.90	2.57	25.59	0.12	0.01	13.67	18.87
		Max.	5.00	0.87	20.34	9.28	91.20	8.38	0.13	271.00	131.00
		Min.	1.00	0.05	13.50	---	---	7.86	0.11	222.00	64.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Central Bridge Floodplain Main Channel											
	16-May-2008										
		11:49 AM	0.90	0.02	14.96	8.91	88.40	8.16	0.11	237.00	69.00
	17-May-2008										
		10:46 AM	1.30	0.57	15.75	8.06	81.60	8.06	0.11	235.00	81.00
	18-May-2008										
		12:17 PM	0.80	0.08	16.93	8.48	87.80	8.15	0.11	233.00	71.00
	19-May-2008										
		12:47 PM	0.90	0.27	18.38	8.19	87.30	8.21	0.11	228.00	72.00
	20-May-2008										
		1:55 PM	0.80	0.30	20.35	8.13	90.10	8.26	0.11	225.00	69.00
	21-May-2008										
		8:22 AM	0.40	-0.02	18.04	7.44	78.60	7.86	0.11	226.00	64.00
	22-May-2008										
		7:50 AM	0.70	0.04	15.25	7.06	70.20	8.12	0.11	222.00	81.00
	23-May-2008										
		10:29 AM	1.20	0.26	14.14	7.69	74.90	8.09	0.11	222.00	93.00
	24-May-2008										
		12:49 PM	1.60	0.18	15.33	8.84	88.60	7.87	0.11	223.00	138.00
	26-May-2008										
		2:00 PM	0.90	0.02	17.14	---	---	8.18	0.11	228.00	129.00
	28-May-2008										
		1:34 PM	1.40	0.63	17.42	---	---	8.20	0.11	231.00	72.00
	29-May-2008										
		8:33 AM	1.30	0.61	16.13	---	---	8.13	0.11	232.00	88.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	30-May-2008										
		8:22 AM	1.20	0.52	16.09	---	---	8.22	0.11	233.00	76.00
	31-May-2008										
		8:10 AM	1.60	0.59	16.52	6.49	66.50	8.10	0.11	223.00	87.00
	01-Jun-2008										
		7:52 AM	1.60	0.82	16.82	---	---	8.22	0.11	236.00	66.00
	02-Jun-2008										
		7:48 AM	1.70	0.78	17.15	7.45	77.50	8.17	0.11	238.00	72.00
	08-Jun-2008										
		8:11 AM	0.90	0.58	16.94	9.03	93.40	8.14	0.11	222.00	31.33
	09-Jun-2008										
		7:41 AM	2.00	0.78	16.43	8.13	83.30	8.12	0.10	220.00	47.98
	10-Jun-2008										
		8:08 AM	2.10	0.91	16.40	8.21	83.90	8.17	0.10	218.00	49.24
	11-Jun-2008										
		8:17 AM	1.60	0.73	17.10	7.69	79.70	8.13	0.10	220.00	43.58
	Summary Statistics for Central Bridge Floodplain Main Channel (20 records):										
		Avg.	1.24	0.43	16.66	5.99	61.59	8.13	0.11	227.60	75.01
		St. Dev.	0.45	0.31	1.35	3.60	37.07	0.10	0.00	6.34	25.34
		Max.	2.10	0.91	20.35	9.03	93.40	8.26	0.11	238.00	138.00
		Min.	0.40	-0.02	14.14	---	---	7.86	0.10	218.00	31.33

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Central Bridge Main Channel											
	16-May-2008										
		12:06 PM	2.10	0.49	14.26	9.07	89.20	8.02	0.11	236.00	80.00
	17-May-2008										
		10:51 AM	2.60	0.50	15.30	8.22	82.00	7.94	0.11	234.00	77.00
	18-May-2008										
		12:10 PM	2.40	0.53	16.03	8.29	84.20	8.00	0.11	230.00	83.00
	19-May-2008										
		12:54 PM	2.10	0.45	17.28	8.06	83.90	8.07	0.11	228.00	73.00
	20-May-2008										
		2:08 PM	2.20	0.36	18.77	7.98	85.80	8.09	0.11	225.00	72.00
	21-May-2008										
		8:26 AM	2.30	0.37	17.34	7.29	76.50	7.88	0.11	226.00	65.00
	22-May-2008										
		7:54 AM	2.40	0.32	15.37	7.44	74.30	7.99	0.11	222.00	71.00
	23-May-2008										
		10:35 AM	2.80	0.41	14.11	7.74	75.20	8.03	0.11	221.00	105.00
	24-May-2008										
		12:55 PM	2.70	0.78	15.33	8.86	88.60	7.93	0.11	222.00	115.00
	26-May-2008										
		2:05 PM	2.60	0.75	17.04	---	---	8.14	0.11	227.00	115.00
	28-May-2008										
		1:59 PM	2.00	0.66	17.47	---	---	8.19	0.11	231.00	87.00
	29-May-2008										
		8:44 AM	1.80	0.63	16.11	---	---	8.18	0.11	232.00	79.00
	30-May-2008										
		8:25 AM	2.40	0.55	16.05	---	---	8.17	0.11	233.00	71.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	31-May-2008										
		8:19 AM	2.10	0.55	16.49	7.47	76.50	8.14	0.11	223.00	82.00
	01-Jun-2008										
		7:55 AM	2.10	0.57	16.83	---	---	8.19	0.11	235.00	66.00
	02-Jun-2008										
		7:53 AM	2.60	0.56	17.17	7.22	75.00	8.23	0.11	237.00	72.00
	08-Jun-2008										
		8:20 AM	2.40	0.55	16.93	8.94	92.40	8.13	0.11	221.00	52.00
	09-Jun-2008										
		7:50 AM	3.00	0.51	16.44	7.99	81.70	8.07	0.10	219.00	50.00
	10-Jun-2008										
		8:18 AM	2.90	0.52	16.38	8.10	82.80	8.13	0.10	217.00	55.00
	11-Jun-2008										
		8:27 AM	3.10	0.80	17.09	7.60	78.80	8.08	0.10	220.00	41.95
	Summary Statistics for Central Bridge Main Channel (20 records):										
		Avg.	2.43	0.54	16.39	6.01	61.35	8.08	0.11	226.95	75.60
		St. Dev.	0.35	0.13	1.12	3.60	36.66	0.10	0.00	6.23	19.57
		Max.	3.10	0.80	18.77	9.07	92.40	8.23	0.11	237.00	115.00
		Min.	1.80	0.32	14.11	---	---	7.88	0.10	217.00	41.95

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Central Wasteway Floodplain											
	13-May-2008										
		3:58 PM	1.50	0.02	15.58	9.42	94.70	8.57	0.11	227.00	99.00
	14-May-2008										
		4:20 PM	1.30	0.02	18.20	11.56	123.30	8.93	0.11	227.00	104.00
	15-May-2008										
		9:58 AM	1.30	0.00	13.34	7.38	70.70	7.93	0.10	215.00	76.00
	16-May-2008										
		9:57 AM	1.10	0.00	12.30	7.69	72.20	7.92	0.11	222.00	76.00
	17-May-2008										
		9:00 AM	1.40	0.04	15.45	8.05	80.60	8.16	0.11	226.00	95.00
	18-May-2008										
		10:10 AM	1.10	0.00	14.44	6.94	68.00	7.78	0.12	231.00	159.00
	19-May-2008										
		1:14 PM	0.90	0.00	19.23	7.60	82.70	8.20	0.10	221.00	111.00
	20-May-2008										
		9:23 AM	0.80	0.00	16.83	7.27	75.10	8.10	0.10	218.00	67.00
	21-May-2008										
		9:08 AM	0.70	0.00	17.52	6.81	71.00	8.11	0.11	223.00	77.00
	22-May-2008										
		8:37 AM	1.40	0.00	15.11	6.49	64.60	8.02	0.11	221.00	91.00
	23-May-2008										
		1:10 AM	1.80	0.15	15.33	7.47	74.60	8.13	0.10	217.00	94.00
	24-May-2008										
		9:40 AM	2.30	0.22	14.91	8.66	85.90	8.03	0.10	220.00	121.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	25-May-2008										
		11:22 AM	2.40	0.24	15.97	8.80	89.10	7.94	0.10	218.00	70.00
		1:53 PM	2.20	0.73	16.61	8.84	90.80	7.99	0.11	224.00	88.00
	26-May-2008										
		1:50 PM	2.20	0.19	17.07	---	---	8.19	0.11	221.00	103.00
	28-May-2008										
		2:23 PM	1.80	0.01	19.14	---	---	8.28	0.11	223.00	86.00
	29-May-2008										
		9:22 AM	1.70	0.06	16.79	---	---	8.20	0.11	225.00	73.00
	30-May-2008										
		8:57 AM	1.40	-0.04	16.24	---	---	8.29	0.11	228.00	69.00
	31-May-2008										
		8:42 AM	1.70	0.11	16.73	6.67	68.60	8.16	0.10	217.00	73.00
	01-Jun-2008										
		8:17 AM	1.70	0.10	16.96	---	---	8.24	0.11	230.00	85.00
	02-Jun-2008										
		8:15 AM	2.00	0.11	17.34	6.97	73.10	8.17	0.11	231.00	72.00
	08-Jun-2008										
		8:45 AM	2.00	0.11	17.25	8.80	91.30	8.16	0.10	215.00	32.78
	09-Jun-2008										
		6:51 AM	2.20	0.19	16.62	7.88	81.20	8.07	0.10	215.00	54.00
	10-Jun-2008										
		8:42 AM	2.10	0.21	16.57	8.02	82.30	8.15	0.10	210.00	53.00
	11-Jun-2008										
		8:47 AM	1.60	-0.04	17.43	7.03	73.20	8.17	0.10	215.00	37.37

Geographic Area	Date	Time		Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	Summary Statistics for Central Wasteway Floodplain (25 records):											
			Avg.	1.62	0.10	16.36	6.33	64.52	8.16	0.11	221.60	82.65
			St. Dev.	0.48	0.16	1.59	3.40	34.98	0.22	0.01	5.66	26.53
			Max.	2.40	0.73	19.23	9.42	94.70	8.93	0.12	231.00	159.00
			Min.	0.70	-0.04	12.30	---	---	7.78	0.10	210.00	32.78

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Central Wasteway Main											
	13-May-2008										
		4:01 PM	3.00	0.38	14.97	9.52	94.40	8.40	0.11	228.00	88.00
	14-May-2008										
		4:02 PM	1.00	0.32	15.63	9.66	97.20	8.43	0.11	228.00	84.00
	15-May-2008										
		9:20 AM	1.00	0.35	13.44	8.41	80.60	7.95	0.10	211.00	83.00
	16-May-2008										
		10:24 AM	1.00	0.35	14.01	9.34	90.70	8.08	0.11	223.00	91.00
	17-May-2008										
		9:05 AM	1.20	0.44	15.22	8.17	81.40	7.76	0.11	224.00	92.00
	18-May-2008										
		10:06 AM	1.00	0.21	15.49	9.40	94.40	8.08	0.11	223.00	79.00
	19-May-2008										
		1:34 PM	0.70	0.20	18.73	8.18	87.70	8.10	0.10	220.00	62.00
	20-May-2008										
		9:35 AM	0.50	0.18	17.13	7.62	79.10	8.10	0.10	218.00	71.00
	21-May-2008										
		9:10 AM	1.00	0.15	17.96	7.47	78.80	7.88	0.11	223.00	70.00
	22-May-2008										
		8:41 AM	0.70	0.21	15.16	7.46	74.30	8.15	0.10	217.00	75.00
	23-May-2008										
		12:50 PM	1.30	0.58	15.03	7.64	75.80	8.11	0.10	216.00	88.00
	24-May-2008										
		10:30 AM	1.90	0.66	15.02	8.69	86.20	7.96	0.10	218.00	133.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	25-May-2008										
		11:31 AM	3.30	0.73	15.75	8.86	89.20	7.96	0.10	217.00	87.00
		2:00 PM	3.15	0.73	16.55	8.73	89.90	8.01	0.11	223.00	88.00
	26-May-2008										
		2:23 PM	2.90	0.69	16.79	---	---	8.11	0.11	221.00	103.00
	28-May-2008										
		3:26 PM	3.40	0.68	18.44	---	---	8.24	0.11	224.00	91.00
	29-May-2008										
		9:27 AM	2.30	0.66	16.48	---	---	8.16	0.11	224.00	85.00
	30-May-2008										
		9:02 AM	2.00	0.46	16.23	---	---	8.19	0.11	226.00	76.00
	31-May-2008										
		8:55 AM	2.00	0.52	16.67	6.09	62.40	8.16	0.10	216.00	84.00
	01-Jun-2008										
		8:34 AM	1.40	0.53	16.91	---	---	8.19	0.11	229.00	81.00
	02-Jun-2008										
		8:23 AM	2.80	0.51	17.28	7.38	76.80	8.16	0.11	230.00	78.00
	08-Jun-2008										
		9:01 AM	1.80	0.21	17.19	8.95	92.90	8.20	0.10	213.00	45.38
	09-Jun-2008										
		6:54 AM	2.10	0.21	16.64	7.89	81.30	8.07	0.10	214.00	57.00
	10-Jun-2008										
		8:47 AM	1.70	0.38	16.50	8.17	83.80	8.14	0.10	210.00	19.64
	11-Jun-2008										
		8:51 AM	1.30	0.53	17.30	7.66	79.80	8.11	0.10	213.00	47.30

Geographic Area	Date	Time		Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	Summary Statistics for Central Wasteway Main (25 records):											
			Avg.	1.78	0.43	16.26	6.61	67.07	8.11	0.11	220.36	78.33
			St. Dev.	0.89	0.19	1.29	3.47	35.05	0.14	0.01	5.77	21.36
			Max.	3.40	0.73	18.73	9.66	97.20	8.43	0.11	230.00	133.00
			Min.	0.50	0.15	13.44	---	---	7.76	0.10	210.00	19.64

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
South Diversion Channel East Floodplain											
	26-May-2008										
		7:45 AM	0.90	0.20	16.01	---	---	8.04	0.12	243.00	96.00
	28-May-2008										
		1:50 PM	0.04	0.06	21.24	7.98	89.40	8.38	0.11	240.00	74.00
	02-Jun-2008										
		12:50 PM	1.00	0.03	21.19	4.45	50.00	8.35	0.11	242.00	70.00
	08-Jun-2008										
		12:50 PM	0.50	0.22	20.75	2.33	25.80	8.24	0.11	223.00	57.00
	09-Jun-2008										
		1:55 AM	0.80	0.31	19.77	1.93	21.20	8.11	0.11	229.00	91.00
	10-Jun-2008										
		10:40 AM	0.80	0.35	18.48	7.78	83.10	8.14	0.10	221.00	70.00
	11-Jun-2008										
		1:15 PM	0.30	0.27	22.80	9.32	108.30	8.42	0.11	225.00	36.51
	Summary Statistics for South Diversion Channel East Floodplain (7 records):										
		Avg.	0.62	0.21	20.03	4.83	53.97	8.24	0.11	231.86	70.64
		St. Dev.	0.35	0.12	2.22	3.58	40.52	0.15	0.01	9.53	20.09
		Max.	1.00	0.35	22.80	9.32	89.40	8.42	0.12	243.00	96.00
		Min.	0.04	0.03	16.01	---	---	8.04	0.10	221.00	36.51

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
South Diversion Channel East Main											
	26-May-2008										
		8:00 AM	4.20	0.47	16.15	---	---	7.98	0.11	241.00	110.00
	28-May-2008										
		2:00 PM	3.50	0.54	18.97	7.47	79.80	8.36	0.11	242.00	101.00
	02-Jun-2008										
		12:55 PM	1.40	1.17	19.85	7.77	84.70	7.88	0.11	241.00	80.00
	08-Jun-2008										
		1:00 AM	2.30	0.50	19.53	2.33	25.30	8.23	0.11	223.00	65.00
	09-Jun-2008										
		2:25 AM	2.20	0.94	19.38	1.99	21.50	7.89	0.11	228.00	55.00
	10-Jun-2008										
		10:45 AM	2.20	0.73	18.16	7.54	79.90	7.70	0.11	222.00	66.00
	11-Jun-2008										
		1:20 PM	2.20	0.71	19.59	7.39	80.70	7.70	0.11	225.00	53.00
	Summary Statistics for South Diversion Channel East Main (7 records):										
		Avg.	2.57	0.72	18.80	4.93	53.13	7.96	0.11	231.71	75.71
		St. Dev.	0.95	0.26	1.29	3.34	36.01	0.25	0.00	9.20	22.31
		Max.	4.20	1.17	19.85	7.77	84.70	8.36	0.11	242.00	110.00
		Min.	1.40	0.47	16.15	---	---	7.70	0.11	222.00	53.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Tingley Floodplain											
	16-May-2008										
		1:45 PM	1.00	0.01	17.03	10.88	112.80	8.50	0.11	233.00	88.00
		2:34 PM	0.80	0.18	18.64	13.42	143.70	8.89	0.11	231.00	96.00
	17-May-2008										
		11:58 AM	1.40	0.04	17.04	9.23	96.20	8.42	0.11	232.00	113.00
		1:25 PM	1.00	0.27	19.76	12.45	136.40	8.91	0.11	230.00	77.00
	18-May-2008										
		1:15 PM	1.20	0.01	18.22	9.82	105.00	8.74	0.11	231.00	128.00
	19-May-2008										
		10:11 AM	0.80	0.01	17.45	10.24	108.10	8.72	0.11	224.00	59.00
		11:01 AM	0.40	0.06	18.37	9.26	98.40	8.58	0.11	225.00	0.00
	20-May-2008										
		7:35 AM	0.70	0.02	16.06	7.24	74.70	7.97	0.11	225.00	122.00
	21-May-2008										
		7:05 AM	0.50	0.01	17.24	6.41	66.90	7.61	0.11	226.00	51.00
	22-May-2008										
		7:02 AM	1.00	0.02	15.52	6.83	68.70	7.83	0.10	219.00	63.00
	23-May-2008										
		7:42 AM	1.40	-0.02	14.47	7.03	69.00	7.57	0.11	223.00	85.00
	24-May-2008										
		7:30 AM	1.70	0.07	14.49	8.38	83.20	7.99	0.11	226.00	108.00
	25-May-2008										
		7:21 AM	2.10	0.15	15.12	8.33	82.80	7.95	0.11	225.80	102.00
		8:17 AM	1.60	0.40	15.10	8.60	85.50	7.77	0.11	224.00	109.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	26-May-2008										
		10:15 AM	1.75	0.04	15.56	---	---	8.22	0.11	227.00	96.00
		12:45 PM	1.60	0.47	16.58	---	---	8.19	0.11	227.00	104.00
	28-May-2008										
		12:00 PM	1.40	0.03	17.60	---	---	8.27	0.11	230.00	105.00
		12:48 PM	1.30	0.37	18.29	---	---	8.27	0.11	230.00	113.00
	29-May-2008										
		6:56 AM	1.10	0.02	16.41	---	---	8.16	0.11	231.00	74.00
		7:52 AM	1.20	0.44	16.48	---	---	8.17	0.11	231.00	90.00
	30-May-2008										
		7:16 AM	1.20	0.00	15.90	---	---	8.22	0.11	232.00	64.00
		7:33 AM	1.10	0.20	16.12	---	---	8.29	0.11	233.00	76.00
	31-May-2008										
		6:59 AM	1.50	0.03	16.76	8.12	83.60	7.96	0.11	222.00	79.00
		7:21 AM	1.30	0.37	16.76	7.63	78.70	8.18	0.11	222.00	97.00
	01-Jun-2008										
		7:04 AM	1.40	0.41	17.11	---	---	8.09	0.11	234.00	91.00
		7:22 AM	3.30	0.59	17.08	---	---	8.15	0.11	231.00	74.00
	02-Jun-2008										
		6:54 AM	1.60	0.03	17.46	6.68	69.90	8.14	0.11	237.00	73.00
		7:14 AM	1.40	0.35	17.45	7.41	77.50	8.23	0.11	236.00	109.00
	08-Jun-2008										
		7:06 AM	1.75	0.10	17.26	8.63	90.10	7.93	0.10	221.00	42.23
		7:39 AM	1.40	0.34	17.24	9.08	94.40	8.15	0.10	220.00	53.00
	09-Jun-2008										
		8:41 AM	2.00	0.07	16.51	7.66	78.10	8.11	0.10	219.00	28.87
		9:01 AM	1.90	0.57	16.66	8.35	86.00	8.13	0.10	218.00	45.82

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	10-Jun-2008										
		7:00 AM	1.80	0.06	16.79	8.03	83.50	8.11	0.10	217.00	64.00
		7:38 AM	1.80	0.54	16.69	7.94	81.80	8.12	0.10	217.00	46.84
	11-Jun-2008										
		7:26 AM	1.40	0.34	17.29	7.45	77.60	8.06	0.10	219.00	45.65
		7:36 AM	1.60	0.13	17.24	7.06	74.50	8.18	0.10	219.00	47.81
	Summary Statistics for Tingley Floodplain (36 records):										
		Avg.	1.40	0.19	16.83	6.17	64.09	8.19	0.11	226.33	78.34
		St. Dev.	0.52	0.19	1.12	4.14	43.50	0.31	0.00	5.76	28.93
		Max.	3.30	0.59	19.76	9.82	98.40	8.91	0.11	237.00	128.00
		Min.	0.40	-0.02	14.47	---	---	7.57	0.10	217.00	0.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
Tingley Main											
	16-May-2008										
		1:57 PM	2.10	0.51	16.28	9.94	102.00	8.15	0.11	234.00	102.00
	17-May-2008										
		12:05 PM	1.10	0.46	16.43	8.80	90.10	8.17	0.11	232.00	80.00
	18-May-2008										
		1:18 PM	1.20	0.56	16.92	9.10	94.00	8.17	0.11	230.00	85.00
	19-May-2008										
		10:15 AM	2.00	0.54	16.26	8.07	82.50	8.13	0.11	225.00	66.00
	20-May-2008										
		7:40 AM	1.40	0.52	16.48	7.66	78.40	7.94	0.11	223.00	80.00
	21-May-2008										
		7:14 AM	1.40	0.62	17.55	7.34	76.50	7.60	0.11	225.00	64.00
	22-May-2008										
		7:06 AM	1.40	0.61	15.72	7.38	74.30	7.88	0.11	221.00	78.00
	23-May-2008										
		7:45 AM	2.60	0.57	14.44	7.61	74.60	7.64	0.11	222.00	83.00
	24-May-2008										
		7:35 AM	2.00	0.62	14.48	8.68	84.60	7.68	0.11	225.00	113.00
	25-May-2008										
		7:30 AM	2.30	0.10	15.08	8.44	83.70	7.93	0.11	224.00	106.00
	26-May-2008										
		11:09 AM	3.10	0.50	15.42	---	---	8.11	0.11	226.00	107.00
	28-May-2008										
		12:05 PM	2.00	0.71	16.96	---	---	8.14	0.11	229.00	95.00
	29-May-2008										
		7:05 AM	1.70	0.57	16.51	---	---	8.13	0.11	231.00	85.00

Geographic Area	Date	Time	Depth (ft)	Current (m/s)	Temp (C)	DO (ppm)	DO (%)	pH	Salinity (ppt)	Cond (uS/cm)	Turbidity (ftu)
	30-May-2008										
		7:12 AM	1.90	0.64	16.29	---	---	8.27	0.11	232.00	100.00
	31-May-2008										
		7:03 AM	1.40	0.65	16.83	8.46	87.20	8.03	0.11	222.00	100.00
	01-Jun-2008										
		7:17 AM	1.50	0.03	16.85	---	---	8.23	0.11	235.00	72.00
	02-Jun-2008										
		6:57 AM	2.40	0.31	17.51	7.26	75.90	8.12	0.11	236.00	92.00
	08-Jun-2008										
		7:11 AM	2.30	0.60	17.25	8.91	92.70	7.97	0.10	220.00	63.00
	09-Jun-2008										
		8:47 AM	2.50	0.43	16.53	8.07	82.50	8.13	0.10	216.00	47.00
	10-Jun-2008										
		7:00 AM	2.70	0.80	16.79	7.94	81.90	8.05	0.10	217.00	46.65
	11-Jun-2008										
		7:40 AM	2.60	0.47	17.26	7.57	78.70	8.13	0.10	219.00	45.65
	Summary Statistics for Tingley Main (21 records):										
		Avg.	1.98	0.52	16.37	6.25	63.79	8.03	0.11	225.90	81.44
		St. Dev.	0.56	0.18	0.89	3.64	37.16	0.19	0.00	5.94	20.44
		Max.	3.10	0.80	17.55	9.94	94.00	8.27	0.11	236.00	113.00
		Min.	1.10	0.03	14.44	---	---	7.60	0.10	216.00	45.65

APPENDIX F
TEMPERATURE DATA PLOTS

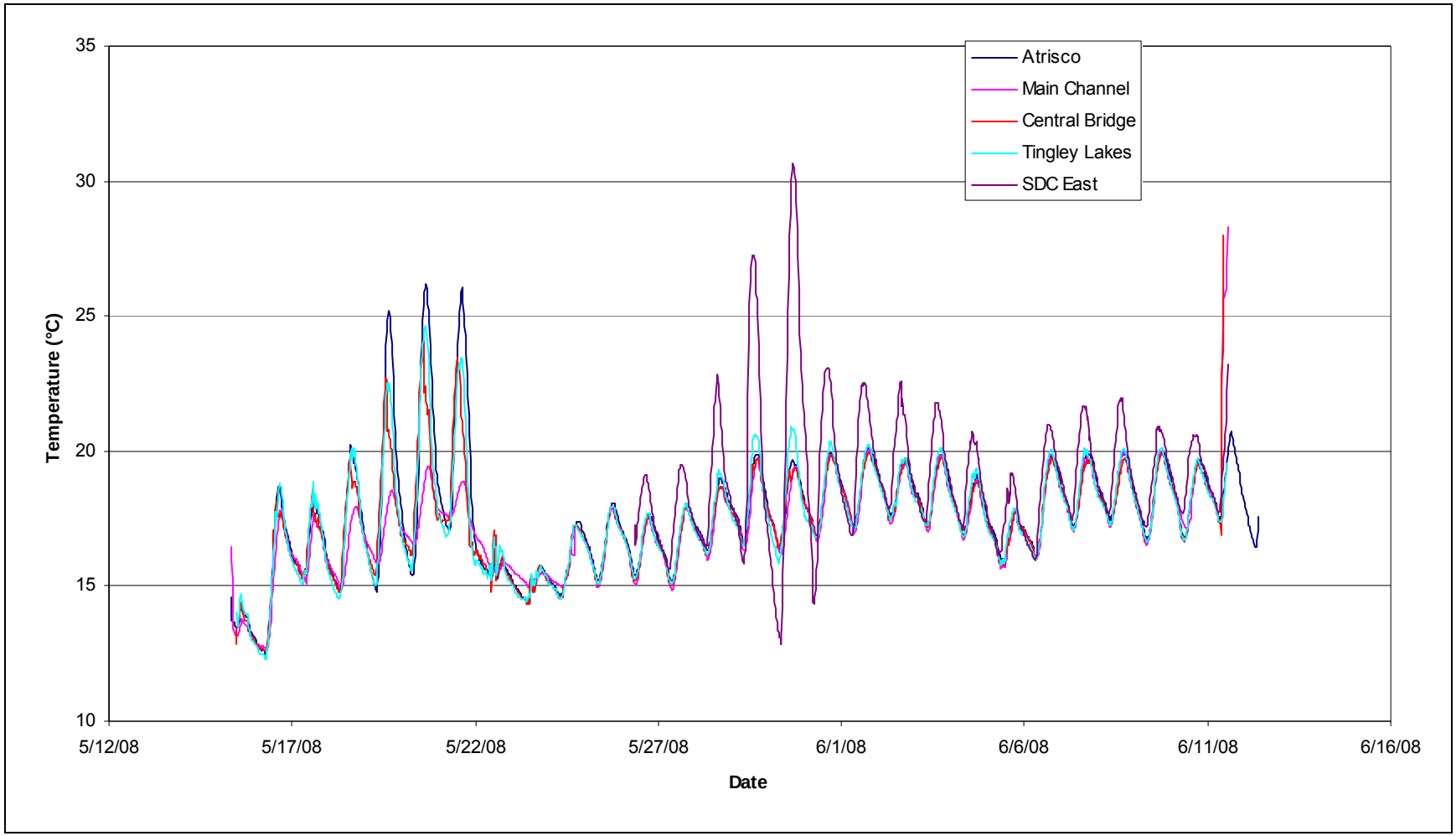

Figure F.1. Temperature plots (°C) collected from Albuquerque Reach sites during monitoring.

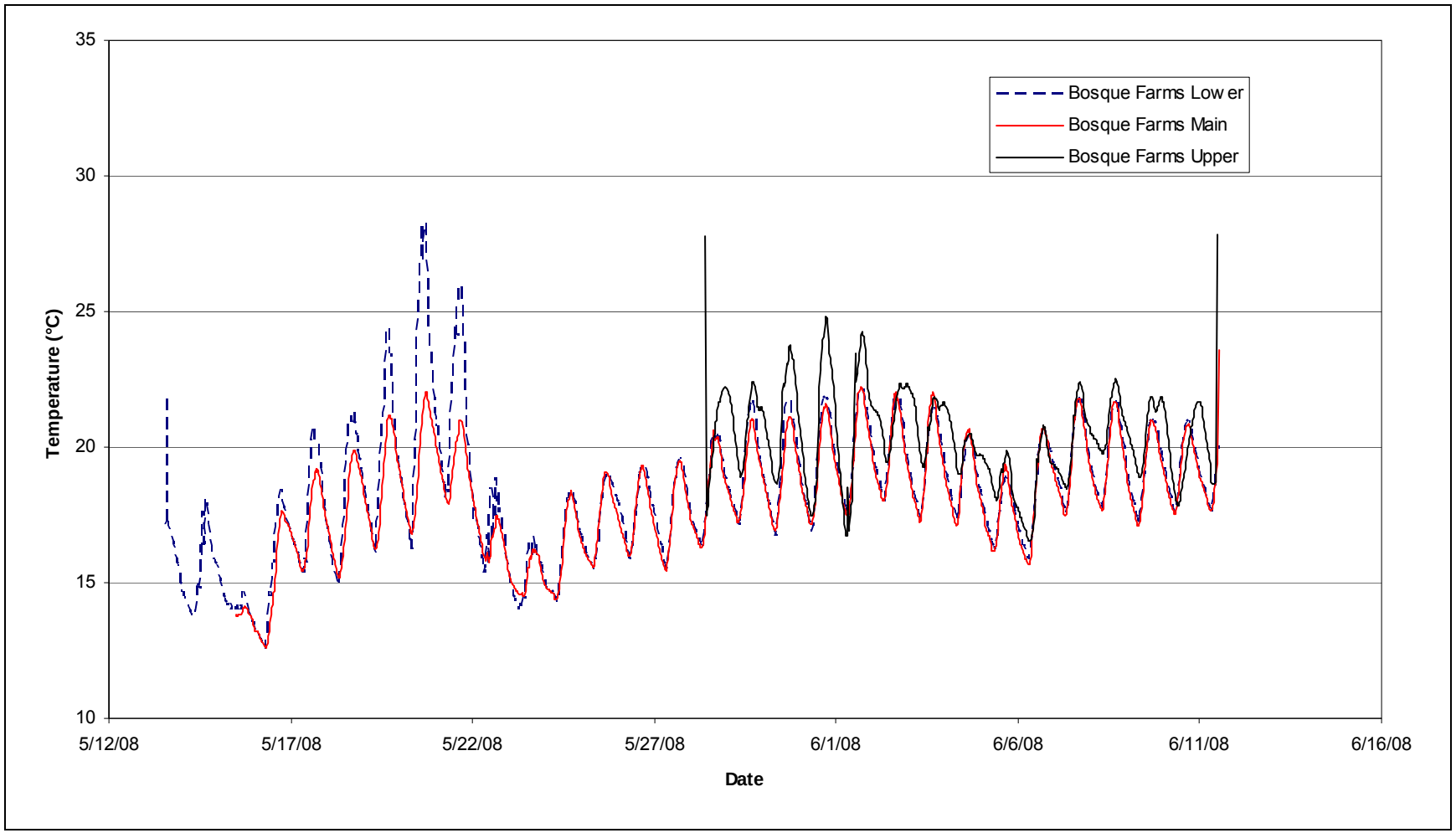

Figure F.2. Temperature plots (°C) collected from the Bosque Farms site during monitoring.

APPENDIX G
TABLE OF WEEKLY AVERAGE TEMPERATURE

Figure G.1. Hourly Temperature Data Collected from Floodplain and Main Channel Sites during Monitoring

		Albuquerque Reach Collection Sites					Bosque Farms Collection Sites		
		Central Wasteway (Main Channel)	Atrisco WW	Central Bridge	Tingley Lakes	SDC East	Bosque Farms (Main Channel)	Bosque Farms Lower	Bosque Farms Upper
20 (May 13–May 17)	**Avg.**	15.11	15.41	15.35	15.44	--	15.60	15.72	--
	St. Dev.	1.73	1.91	1.81	1.96	--	2.02	1.96	--
	Min.	12.68	12.50	12.59	12.30	--	12.61	12.59	--
	Max.	17.80	18.71	18.71	18.90	--	19.20	21.76	--
21 (May 18–May 24)	**Avg.**	16.60	17.60	17.12	17.16	--	17.57	18.31	--
	St. Dev.	1.21	3.16	2.28	2.55	--	2.01	3.20	--
	Min.	14.89	14.33	14.33	14.42	--	14.36	14.04	--
	Max.	19.46	26.20	24.06	24.64	--	22.06	28.26	--
22 (May 25–May 31)	**Avg.**	17.24	17.49	17.34	17.45	19.26	18.25	18.35	20.95
	St. Dev.	1.21	1.23	1.22	1.43	3.69	1.55	1.67	1.89
	Min.	14.86	15.19	15.00	15.09	12.88	15.46	15.47	17.48
	Max.	19.89	19.95	19.85	20.90	30.66	21.63	21.86	27.76
23 (June 1–June 7)	**Avg.**	18.07	18.25	18.09	18.17	19.01	19.01	19.01	20.08
	St. Dev.	1.09	1.10	1.05	1.15	1.67	1.65	1.57	1.66
	Min.	15.68	15.95	15.76	15.76	15.95	15.68	15.86	16.52
	Max.	20.03	20.14	19.95	20.23	22.62	22.23	22.14	24.26
24 (June 8–June 12)	**Avg.**	18.69	18.47	18.41	18.37	19.21	19.17	19.17	20.43
	St. Dev.	1.83	1.05	1.30	0.98	1.28	1.28	1.22	1.32
	Min.	16.53	16.43	16.62	16.62	17.19	17.08	17.19	17.86
	Max.	28.32	20.71	27.96	20.14	23.20	23.59	21.66	27.86
All Weeks	**Avg.**	17.27	17.66	17.43	17.49	19.14	18.15	18.19	20.39
	St. Dev.	1.67	2.09	1.79	1.91	2.51	1.99	2.39	1.68
	Min.	12.68	12.50	12.59	12.30	12.88	12.61	12.59	16.52
	Max.	28.32	26.20	27.96	24.64	30.66	23.59	28.26	27.86