

SUMMARY OF THE RIO GRANDE SILVERY MINNOW POPULATION MONITORING PROGRAM RESULTS FROM MAY 2013

prepared for:

MIDDLE RIO GRANDE ENDANGERED SPECIES COLLABORATIVE PROGRAM

under USBR Contract (GS-10F-0249X):

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### SUMMARY OF OVERALL MAY 2013 POPULATION MONITORING EFFORTS

Sampling during May 2013 would have represented the fourth effort of the 2012/2013 Rio Grande Silvery Minnow population monitoring program. This project is usually conducted monthly (except during January and March) at 20 sites throughout the Middle Rio Grande. However, all data from December 2012 to April 2013 are unavailable (i.e., designated by **NA** throughout this report) since funding from the Middle Rio Grande Endangered Species Collaborative Program for this research has not yet become available (as of June 2013). The following is a report of only the May 2013 population monitoring data with no historical documentation of trends that have occurred over the past five months.

Adult and juvenile fish were obtained by rapidly drawing a  $3.1 \text{ m} \times 1.8 \text{ m}$  small mesh ( $3/16^{\text{th}}$  inch) seine through discrete mesohabitats. During appropriate times of the year, larval fish were collected with a  $1.0 \text{ m} \times 1.0 \text{ m}$  fine mesh ( $1/16^{\text{th}}$  inch) seine. Rio Grande Silvery Minnow were counted and identified to age-class. Other fishes were identified to species and enumerated, but age-class was not determined. Figures illustrating fish densities (i.e., fish per  $100 \text{ m}^2$ ) were prepared for the ten focal species, including Rio Grande Silvery Minnow, to facilitate comparisons among reaches. Five sites were located in the Angostura Reach, six sites in the Isleta Reach, and nine sites in the San Acacia Reach. A list of collection localities is appended (Table A-1).

During May, sampling covered  $10,053.8m^2$  (surface area) of water and yielded 4,203 fish. Cumulative fish density during May was 41.8 individuals/100 m<sup>2</sup> sampled. The most common species included Red Shiner (n = 3,098), Fathead Minnow (n = 563), and Western Mosquitofish (n = 198). Eleven fish species were collected and Rio Grande Silvery Minnow (n = 12) was most common in the San Acacia Reach. Rio Grande Silvery Minnow was present in 9 of the 241 seine hauls that yielded fish during May.

### SUMMARY OF MAY 2013 POPULATION MONITORING EFFORT BY RIVER REACH

#### Angostura Reach

Mean daily discharge in the Angostura Reach (Rio Grande at Albuquerque, NM; USGS Gauge 8330000) ranged from 456 to 697 cfs from 16 April to 15 May. Water temperatures were low and stable (range = 13.1-16.2 °C) during the Angostura Reach sampling efforts (ca. 0830–1430 h). The water clarity was moderate throughout the reach; Secchi disk measurements ranged from 15 to 45 cm.

Sampling for fishes in the Angostura Reach during May yielded 404 individuals. The overall sampling effort in the Angostura Reach covered 2,599.5 m<sup>2</sup> (surface area) of water. Densities in the Angostura Reach, for all fish species combined, ranged from 5.2 to 21.7 individuals per 100 m<sup>2</sup>. Eight fish species were collected during May. Flathead Chub was the most abundant taxon (n = 149), followed by Red Shiner (n = 92), and White Sucker (n = 63). Rio Grande Silvery Minnow was not observed at any of the five sampling sites in the Angostura Reach.

#### Isleta Reach

In the Isleta Reach, mean daily discharge (Rio Grande at Isleta Lakes near Isleta, NM; USGS Gauge 08354900) ranged from 428 to 672 cfs from 16 April to 15 May. Water temperatures ranged from 15.2 to 23.5 °C throughout the sampling localities during the day (0930–1600 h). The water was modestly turbid throughout the reach; Secchi disk readings ranged from 11 to 17 cm during sampling.

The Isleta Reach produced the highest number of fish in any of the three sampling reaches. There were 3,252 individuals collected in May. The total sampling effort in the Isleta Reach during May covered 2,970.4 m<sup>2</sup> (surface area) of water. Fish densities (all species combined) at the six sites ranged from 13.7 to 178.4 individuals per 100 m<sup>2</sup> sampled. Nine fish species were collected in the Isleta Reach during May 2013. Red Shiner was the most abundant taxon (n = 2,513), followed by Fathead Minnow (n = 513), and Western Mosquitofish (n = 186). Rio Grande Silvery Minnow (n = 2) was observed in the Isleta Reach at one of the six sampling sites; all were recently stocked individuals.

#### San Acacia Reach

Flow at San Acacia (Rio Grande Floodway at San Acacia, NM; USGS Gauge 08354900) from 16 April to 15 May was higher (range = 146–213 cfs) as compared to San Marcial (Rio Grande Floodway at San Marcial, NM; USGS Gauge 08358400) during the same period (range = 37–61 cfs). Water temperatures in May for the San Acacia Reach ranged from 12.3 to 21.7  $^{\circ}$ C (ca. 0930–1500 h). Water turbidity was relatively stable throughout the reach (Secchi disk range = 8–17 cm).

Population monitoring efforts in the San Acacia Reach during May yielded 547 individuals. Sampling in the San Acacia Reach covered an area of 4,483.9  $m^2$  of water during May. Fish densities (all species combined) ranged from 0.0 to 48.6 individuals per 100  $m^2$  sampled in the San Acacia Reach. Of the nine fish species collected in the San Acacia Reach, Red Shiner was the most abundant taxon (n = 493), followed by Flathead Chub (n = 15), and Western Mosquitofish (n = 12). Rio Grande Silvery Minnow was observed in the San Acacia Reach at three of the nine sampling sites; all were recently stocked individuals.

### Conclusions

During the May sampling effort, Rio Grande Silvery Minnow was present at four of the 20 sampling sites in the Middle Rio Grande, New Mexico. Large numbers of hatchery-reared Rio Grande Silvery Minnow were released at sites in both the Isleta and San Acacia reaches during November 2012. The addition of nearly 300,000 hatchery-reared Rio Grande Silvery Minnow to the river (Thomas P. Archdeacon, New Mexico Fish and Wildlife Conservation Office, pers. comm.) resulted in modest numbers of Rio Grande Silvery Minnow during the November 2012 sampling efforts. However, Rio Grande Silvery Minnow was notably less common by May 2013. Also, no wild Rio Grande Silvery Minnow were collected during May. With the addition of large numbers of hatchery-reared Rio Grande Silvery Minnow in 2012, there should have presumably been adequate numbers of individuals for spawning in 2013. It is uncertain how well Rio Grande Silvery Minnow will rebound following spawning this year, particularly since flows are predicted to be low this spring/summer. The lack of any age-0 Rio Grande Silvery Minnow during sampling in early May is perhaps not too surprising since peak-spawning activity generally occurs during mid-May. The June sampling effort should be a good initial indicator of the 2013 spawning/recruitment success for Rio Grande Silvery Minnow.



Figure 1. Map of the study area and sampling localities (numbered) for the Rio Grande Silvery Minnow population monitoring program. Sampling locality information that corresponds with the numbered localities is provided in Appendix A (Table A-1).



Figure 2. Discharge in the Rio Grande from 1 January 2012 through 15 May 2013 as recorded at seven U. S. Geological Survey (USGS) gauge stations. The Otowi Bridge gauge site is outside of the study area (ca. 25.5 river miles upstream of Cochiti Dam) and provided for reference. \*\*Discharge data are provisional and subject to change.

Table 1.Scientific and common names and species codes of fish collected in the Middle Rio<br/>Grande during the Rio Grande Silvery Minnow population monitoring program (since<br/>1993).

Order Clupeiformes Family Clupeidae       herrings         Dorosoma cepedianum       Gizzard Shad       (DORCEP)         Dorosoma petenense       Threadfin Shad       (DORPET)         Order Cypriniformes Family Cyprinidae       carps and minnows       (CAMANO)         Campostoma anomalum       Central Stoneroller       (CAMANO)         Carapsaius auratus       Goldfish       (CARAUR)         Cyprinella lutrensis       Red Shiner <sup>1</sup> (CYPLUT)         Cyprinuls auratus       Goldfish       (CARAUR)         Gila pandora       Rio Grande Chub       (GILPAN)         Hybognathus amarus       Rio Grande Shivery Minnow <sup>1</sup> (HYBAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales vigilax       Bulhead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Bulhead Minnow <sup>1</sup> (PIMPRO)         Piatygobio gracilis       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (CATCOM)         Carpiodes carpio       River Carpsucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Black Bulhead </th <th>ientific Name</th> <th>Common Name</th> <th>Code</th>	ientific Name	Common Name	Code
Family Clupeidae       herrings         Dorosoma cepedianum       Gizzard Shad       (DORCEP)         Dorosoma petenense       Threadfin Shad       (DORPET)         Order Cypriniformes       Family Cyprinidae       carps and minnows         Campostoma anomalum       Central Stoneroller       (CAMANO)         Carassius auratus       Goldfish       (CARAUR)         Cyprinula lutrensis       Red Shiner <sup>1</sup> (CYPLUT)         Cyprinula lutrensis       Red Shiner <sup>1</sup> (CYPCAR)         Gila pandora       Rio Grande Silvery Minnow <sup>1</sup> (HYBAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales romelas       Fathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CACOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Smallmouth Buffalo       (MEMAT)         Ictalurus metas       Black Bullhead       (AMEMEL)         Ameiurus metas       Black Bullhead       (AMEMEL)         Ameiurus metas       Black Bullhead       (AMEMAT)	Order Clupeiformes		
Dorosoma cepedianum       Gizzard Shad       (DORCEP)         Dorosoma petenense       Threadfin Shad       (DORCEP)         Order Cypriniformes       Family Cyprinidae       carps and minnows         Campostoma anomalum       Central Stoneroller       (CAMANO)         Carassius auratus       Goldfish       (CARAUR)         Cyprinella lutrensis       Red Shiner <sup>1</sup> (CYPLUT)         Cyprinus carpio       Common Carp <sup>1</sup> (CYPLAR)         Gila pandora       Rio Grande Chub       (GILPAN)         Hybognathus amarus       Rio Grande Shivery Minnow <sup>1</sup> (NOTCRY)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Bullhead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Bullhead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       Carpoides carpio       River Carpsucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)       (ICTBUB)         Order Siluriformes       Family Ictaluridae       North American catfishes         Ameiurus natalis       Yellow Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead	Family Clupeidae	herrings	
Dorosoma cepedianum       Gizzard Shad       (DORCEP)         Dorosoma petenense       Threadfin Shad       (DORPET)         Order Cypriniformes       Family Cyprinidae       carps and minnows         Campostoma anomalum       Central Stoneroller       (CAMANO)         Carassius auratus       Goldfish       (CARAUR)         Cyprinella lutrensis       Red Shiner <sup>1</sup> (CYPLUT)         Cyprinus carpio       Common Carp <sup>1</sup> (CYPCAR)         Gila pandora       Rio Grande Silvery Minnow <sup>1</sup> (HYBAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CARCAR)         Ictibus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Ictalurus furcatus       Black Bullhead       (AMEMEL)         Ameiurus melas       Black Bullhead       (AMEMAT)       (ICTFUR)         Ictalurus furcatus       Channel Catfish <sup>1</sup> (ICTFUR)		nennigs	
Dorosoma petenense       Threadfin Shad       (DORPET)         Order Cypriniformes Family Cyprinidae       carps and minnows         Campostoma anomalum       Central Stoneroller       (CAMANO)         Carassius auratus       Goldfish       (CARAUR)         Cyprinella lutrensis       Red Shiner <sup>1</sup> (CYPLUT)         Cyprinus carpio       Commo Carp <sup>1</sup> (CYPCAR)         Gila pandora       Rio Grande Silvery Minnow <sup>1</sup> (HYBAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales vigilax       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       Carpoides carpio       River Carpsucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CARCAR)       (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Cations mersoni       White Sucker <sup>1</sup> (CARCAR)         Arneiurus melas       Black Bullhead       (AMEMAT)       (AMEMAT)         Ictalurus furcatus       Black Sullhead       (AMEMAT)       (DTPUN)         Pylo	Dorosoma cepedianum	Gizzard Shad	(DORCEP)
Order Cypriniformes Family Cyprinidae       carps and minnows         Campostoma anomalum       Central Stoneroller       (CAMANO)         Carassius auratus       Goldfish       (CARAUR)         Cyprinella lutrensis       Red Shiner <sup>1</sup> (CYPLUT)         Cyprinella lutrensis       Red Shiner <sup>1</sup> (CYPLUT)         Cyprinus carpio       Common Carp <sup>1</sup> (CYPCAR)         Gila pandora       Rio Grande Chub       (GILPAN)         Hybognathus amarus       Rio Grande Silvery Minnow <sup>1</sup> (HYBAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Bullhead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Bulhead Minnow <sup>1</sup> (PIMVIG)         Platygobio gracilis       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>3</sup> (RHICAT)         Family Catostomidae       suckers       Carpiodes carpio       (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Black Bullhead       (AMENAT)         Family Ictalurus furcatus </td <td>Dorosoma petenense</td> <td>Threadfin Shad</td> <td>(DORPET)</td>	Dorosoma petenense	Threadfin Shad	(DORPET)
Family Cyprinidae       carps and minnows         Campostoma anomalum       Central Stoneroller       (CAMANO)         Carassius auratus       Goldfish       (CARAUR)         Cyprinella lutrensis       Red Shiner <sup>1</sup> (CYPLUT)         Cyprinus carpio       Common Carp <sup>1</sup> (CYPCAR)         Gila pandora       Rio Grande Chub       (GILPAN)         Hybognathus amarus       Rio Grande Silvery Minnow <sup>1</sup> (HYBAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales promelas       Fathead Minnow       (PIMVIG)         Pimephales vigilax       Bullhead Minnow       (PIMVIG)         Platygobio gracilis       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       (CARCAR)         Carpiodes carpio       River Carpsucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)         Ictiburs bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Black Bullhead       (AMEMEL)         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus melas       Channel Caffish       (ICTFUR)      <	Order Cypriniformes		
Campostoma anomalum       Central Stoneroller       (CAMANO)         Carassius auratus       Goldfish       (CARAUR)         Cyprinella lutrensis       Red Shiner <sup>1</sup> (CYPLUT)         Cyprinus carpio       Common Carp <sup>1</sup> (CYPCAR)         Gila pandora       Rio Grande Chub       (GLPAN)         Hybognathus amarus       Rio Grande Silvery Minnow <sup>1</sup> (HYBAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMVIG)         Pimephales vigilax       Bullhead Minnow       (PIMVIG)         Piatygobio gracilis       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       Carpiodes carpio       (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Black Bullhead       (AMEMEL)         Ameiurus matalis       Yellow Bullhead       (AMEMEL)         Ameiurus natalis	Family Cyprinidae	carps and minnows	
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Cyprinus carpio       Common Carp <sup>1</sup> (CYPCAR)         Gila pandora       Rio Grande Chub       (GILPAN)         Hybognathus amarus       Rio Grande Silvery Minnow <sup>1</sup> (HYBAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Bullhead Minnow       (PIMVIG)         Platygobio gracilis       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CARCAR)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Smallmouth Buffalo       (ICTFUR)         Ictalurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus furcatus       Channel Catfish <sup>1</sup> (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (PYLOLI)         Order Salmoniformes       Flathead Catfish </td <td></td> <td>Red Shiper<sup>1</sup></td> <td></td>		Red Shiper <sup>1</sup>	
Gila pandora       Rio Grande Chub       (GILPAN)         Hybognathus amarus       Rio Grande Silvery Minnow <sup>1</sup> (HYBAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Bullhead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Bullhead Minnow <sup>1</sup> (PIMVIG)         Platygobio gracilis       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       (CARCAR)         Carpiodes carpio       River Carpsucker <sup>1</sup> (CARCAR)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Smallmouth Buffalo       (ICTFUR)         Ictalurus melas       Black Bullhead       (AMEMEL)         Ameiurus melas       Black Bullhead       (AMENAT)         Ictalurus furcatus       Blue Caffish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       (ONCMYK)         Salmo trutta       Rown Trout		Common Corn <sup>1</sup>	
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Anybog natrids analos       Rob Grande Sinter y Winnow       (In TDAMA)         Notemigonus crysoleucas       Golden Shiner       (NOTCRY)         Pimephales promelas       Fathead Minnow <sup>1</sup> (PIMPRO)         Pimephales vigilax       Bullhead Minnow <sup>1</sup> (PIMVIG)         Platygobio gracilis       Bullhead Minnow <sup>1</sup> (PIMVIG)         Platygobio gracilis       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CARCAR)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus matalis       Yellow Bullhead       (ICTFUR)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTFUR)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       trouts and salmons         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trut	Glia pandora	Pio Crondo Silvery Minnow <sup>1</sup>	
Noteiniguits crystelectas       Gotter Siliter       (NOTORT)         Pimephales promelas       Fathead Minnow       (PIMPRO)         Pimephales vigilax       Bullhead Minnow       (PIMVIG)         Platygobio gracilis       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CARCAR)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus melas       Channel Catfish       (ICTFUR)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       (ONCMYK)         Salmo trutta       Brown Trout       (ONCMYK)	Notomigonus arvadousos	Coldon Shinor	
Primephales proteitas       Partieud Millitow       (PIMPRO)         Pimephales vigilax       Bullhead Minnow       (PIMVIG)         Platygobio gracilis       Flathead Chub <sup>1</sup> (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       (CARCAR)         Carpiodes carpio       River Carpsucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       (ONCMYK)         Salmo trutta       Brown Trout       (ONCMYK)	Dimenhalas promalas	Esthead Minnow <sup>1</sup>	
Principliares vigitax       Builinead Millilow       (PINVIG)         Platygobio gracilis       Flathead Chub1       (PLAGRA)         Rhinichthys cataractae       Longnose Dace1       (RHICAT)         Family Catostomidae       suckers       (CARCAR)         Carpiodes carpio       River Carpsucker1       (CARCAR)         Catostomus commersonii       White Sucker1       (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish1       (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       trouts and salmons         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTELI)	Pimephales prometas		
Platygobio gracilits       Platygobio gracilits       (PLAGRA)         Rhinichthys cataractae       Longnose Dace <sup>1</sup> (RHICAT)         Family Catostomidae       suckers       (CARCAR)         Carpiodes carpio       River Carpsucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CARCAR)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTFUR)         Ictalurus punctatus       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       Trout         Family Salmonidae       trouts and salmons       (ONCMYK)         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTELI)	Pimephales vigilax	Eletheed Chuh <sup>1</sup>	
Rhinichtnys cataractae       Longnose Dace       (RHICAT)         Family Catostomidae       suckers         Carpiodes carpio       River Carpsucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       trouts and salmons         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTELI)	Platygobio gracilis		(PLAGRA)
Family Catostomidae       suckers         Carpiodes carpio       River Carpsucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Smallmouth Buffalo       (ICTBUB)         Pamily Ictaluridae       North American catfishes       (AMEMEL)         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       trouts and salmons         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTELI)	Rhinichtrys cataractae	Longhose Dace	(RHICAT)
Carpiodes carpio       River Carpsucker <sup>1</sup> (CARCAR)         Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       North American catfishes       (AMEMEL)         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       trouts and salmons       (ONCMYK)         Salmo trutta       Brown Trout       (ONCMYK)	Family Catostomidae	suckers	
Catostomus commersonii       White Sucker <sup>1</sup> (CATCOM)         Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       trouts and salmons       Oncorhynchus mykiss         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTRII)	Carpiodes carpio	River Carpsucker <sup>1</sup>	(CARCAR)
Ictiobus bubalus       Smallmouth Buffalo       (ICTBUB)         Order Siluriformes       Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       trouts and salmons         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTRU)	Catostomus commersonii	White Sucker <sup>1</sup>	(CATCOM)
Order Siluriformes       North American catfishes         Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       trouts and salmons       Oncorhynchus mykiss         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTRLI)	Ictiobus bubalus	Smallmouth Buffalo	(ICTBUB)
Family Ictaluridae       North American catfishes         Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       trouts and salmons       (ONCMYK)         Salmo trutta       Brown Trout       (ONCMYK)	Order Siluriformes		
Ameiurus melas       Black Bullhead       (AMEMEL)         Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       trouts and salmons       (ONCMYK)         Salmo trutta       Brown Trout       (ONCMYK)	Family Ictaluridae	North American catfishes	
Ameiurus natalis       Yellow Bullhead       (AMENAT)         Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       trouts and salmons       (ONCMYK)         Salmo trutta       Brown Trout       (ONCMYK)	Ameiurus melas	Black Bullhead	(AMEMEL)
Ictalurus furcatus       Blue Catfish       (ICTFUR)         Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       Family Salmonidae       trouts and salmons         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTRU)	Ameiurus natalis	Yellow Bullhead	(AMENAT)
Ictalurus punctatus       Channel Catfish <sup>1</sup> (ICTPUN)         Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       trouts and salmons       (ONCMYK)         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTRU)	Ictalurus furcatus	Blue Catfish	(ICTFUR)
Pylodictis olivaris       Flathead Catfish       (PYLOLI)         Order Salmoniformes       trouts and salmons       (PYLOLI)         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTRU)	Ictalurus punctatus	Channel Catfish <sup>1</sup>	(ICTPUN)
Order Salmoniformes Family Salmonidae trouts and salmons Oncorhynchus mykiss	Pylodictis olivaris	Flathead Catfish	(PYLOLI)
Family Salmonidae       trouts and salmons         Oncorhynchus mykiss       Rainbow Trout       (ONCMYK)         Salmo trutta       Brown Trout       (SALTRU)	Order Salmoniformes		
Oncorhynchus mykissRainbow Trout (ONCMYK)	Family Salmonidae	trouts and salmons	
Salmo trutta Brown Trout (SALTRU)	Oncorhynchus mykiss	Rainbow Trout	(ONCMYK)
	Salmo trutta	Brown Trout	(SALTRU)

Table 1.Scientific and common names and species codes of fish collected in the Middle Rio(continued)Grande during the Rio Grande Silvery Minnow population monitoring program<br/>(since 1993).

Scientific Name	Common Name	Code
Order Cyprinodontiformes		
Family Poeciliidae	livebearers	
Gambusia affinis	Western Mosquitofish <sup>1</sup>	(GAMAFF)
Order Perciformes		
Family Moronidae	temperate basses	
Morone chrysops	White Bass	(MORCHR)
Morone saxatilis	Striped Bass	(MORSAX)
Family Centrarchidae	sunfishes	
Lepomis cyanellus Lepomis macrochirus Lepomis megalotis Micropterus dolomieu Micropterus salmoides Pomoxis annularis Pomoxis nigromaculatus	Green Sunfish Bluegill Longear Sunfish Smallmouth Bass Largemouth Bass White Crappie Black Crappie	(LEPCYA) (LEPMAC) (LEPMEG) (MICDOL) (MICSAL) (POMANN) (POMNIG)
Family Percidae	perches	
Perca flavescens Percina macrolepida Sander vitreus	Yellow Perch Bigscale Logperch Walleye	(PERFLA) (PERMAC) (SANVIT)

<sup>1</sup> Focal taxa represent the most abundant species present in recent Middle Rio Grande collections; these species are illustrated in monthly plots of data.

#### Summary of the May 2013 Rio Grande Silvery Minnow population monitoring program Table 2. results (species list is based on fish collected since 1993).

FAMILY	SPECIES I	RESIDENCE	TOTAL NUMBER	PERCENT (%)	FREQUENCY OF	% FREQUENCY
	COMMON NAME	STATUS'	OF SPECIMENS	OF TOTAL	OCCURRENCE <sup>2</sup>	OCCURRENCE <sup>2</sup>
Clupeidae	Gizzard Shad	Ν	-	-	-	-
Clupeidae	Threadfin Shad	I	-	-	-	-
Cyprinidae	Central Stoneroller	I	-	-	-	-
Cyprinidae	Goldfish	I	-	-	-	-
Cyprinidae	Red Shiner	N	3,098	73.71	19	95
Cyprinidae	Common Carp	I	13	0.31	6	30
Cyprinidae	Rio Grande Chub	N	-	-	-	-
Cyprinidae	Rio Grande Silvery Minnov	v N	12	0.29	4	20
Cyprinidae	Golden Shiner	I	-	-	-	-
Cyprinidae	Fathead Minnow	N	563	13.4	10	50
Cyprinidae	Bullhead Minnow	I	-	-	-	-
Cyprinidae	Flathead Chub	N	176	4.19	7	35
Cyprinidae	Longnose Dace	Ν	41	0.98	3	15
Catostomidae	River Carpsucker	Ν	7	0.17	4	20
Catostomidae	White Sucker	I	75	1.78	10	50
Catostomidae	Smallmouth Buffalo	Ν	-	-	-	-
Ictaluridae	Black Bullhead	I	-	-	-	-
Ictaluridae	Yellow Bullhead	I	-	-	-	-
Ictaluridae	Blue Catfish	N	-	-	-	-
Ictaluridae	Channel Catfish	I	19	0.45	7	35
Ictaluridae	Flathead Catfish	Ν	-	-	-	-
Salmonidae	Rainbow Trout	I	-	-	-	-
Salmonidae	Brown Trout	I	-	-	-	-
Poeciliidae	Western Mosquitofish	I	198	4.71	8	40
Moronidae	White Bass	I	-	-	-	-
Moronidae	Striped Bass	I	-	-	-	-
Centrarchidae	Green Sunfish	I	-	-	-	-
Centrarchidae	Bluegill	N	1	0.02	1	5
Centrarchidae	Longear Sunfish	I	-	-	-	-
Centrarchidae	Smallmouth Bass	I	-	-	-	-
Centrarchidae	Largemouth Bass	I	-	-	-	-
Centrarchidae	White Crappie	I	-	-	-	-
Centrarchidae	Black Crappie	I	-	-	-	-
Percidae	Yellow Perch	I	-	-	-	-
Percidae	Bigscale Logperch	1	-	-	-	-
Percidae	Walleye	I	-	-	-	-
TOTAL			4,203			

 $^1$  N = native; I = introduced  $^2$  Frequency and % frequency of occurrence are based on 20 sample sites.

## Table 3.Summary of the monthly 2012/2013 Rio Grande Silvery Minnow population monitoring<br/>program results (species list is based on fish collected since 1993).

FAMILY	SPECIES COMMON NAME	D	F	A	M	J	J	A	S	0	Т
		C	В	R	Y	N	L	G	P	Т	T
											L
Clupeidae	Gizzard Shad	-	-	-	-	-	-	-	-	-	0
Clupeidae	Threadfin Shad	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Central Stoneroller	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Goldfish	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Red Shiner	-	-	-	3,098	-	-	-	-	-	3,098
Cyprinidae	Common Carp	-	-	-	13	-	-	-	-	-	13
Cyprinidae	Rio Grande Chub	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Rio Grande Silvery Minnow	-	-	-	12	-	-	-	-	-	12
Cyprinidae	Golden Shiner	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Fathead Minnow	-	-	-	563	-	-	-	-	-	563
Cyprinidae	Bullhead Minnow	-	-	-	-	-	-	-	-	-	0
Cyprinidae	Flathead Chub	-	-	-	176	-	-	-	-	-	176
Cyprinidae	Longnose Dace	-	-	-	41	-	-	-	-	-	41
Catostomidae	River Carpsucker	-	-	-	7	-	-	-	-	-	7
Catostomidae	White Sucker	-	-	-	75	-	-	-	-	-	75
Catostomidae	Smallmouth Buffalo	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Black Bullhead	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Yellow Bullhead	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Blue Catfish	-	-	-	-	-	-	-	-	-	0
Ictaluridae	Channel Catfish	-	-	-	19	-	-	-	-	-	19
Ictaluridae	Flathead Catfish	-	-	-	-	-	-	-	-	-	0
Salmonidae	Rainbow Trout	-	-	-	-	-	-	-	-	-	0
Salmonidae	Brown Trout	-	-	-	-	-	-	-	-	-	0
Poeciliidae	Western Mosquitofish	-	-	-	198	-	-	-	-	-	198
Moronidae	White Bass	-	-	-	-	-	-	-	-	-	0
Moronidae	Striped Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Green Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Bluegill	-	-	-	1	-	-	-	-	-	1
Centrarchidae	Longear Sunfish	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Smallmouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Largemouth Bass	-	-	-	-	-	-	-	-	-	0
Centrarchidae	White Crappie	-	-	-	-	-	-	-	-	-	0
Centrarchidae	Black Crappie	-	-	-	-	-	-	-	-	-	0
Percidae	Yellow Perch	-	-	-	-	-	-	-	-	-	0
Percidae	Bigscale Logperch	-	-	-	-	-	-	-	-	-	0
Percidae	Walleye	-	-	-	-	-	-	-	-	-	0
MONTHLY TOTAL	_S	NA	NA	NA	4,203	0	0	0	0	0	4,203

Table 4.Summary of the monthly catch of Rio Grande Silvery Minnow, by site and reach, during<br/>the 2012/2013 Rio Grande Silvery Minnow population monitoring program. Numerals in<br/>parentheses are the number of individuals in a site collection that were marked (subset of<br/>the total).

REACH	SITE #	SITE NAME	D	F	А	М	J	J	А	S	0	Т
			Е	Е	Р	А	U	U	U	Е	С	0
			С	В	R	Y	Ν	L	G	Р	Т	Т
												А
												L
Angostura	0	Angostura Dam	-	-	-	-	-	-	-	-	-	0
Angostura	1	Bernalillo	-	-	-	-	-	-	-	-	-	0
Angostura	2	Rio Rancho	-	-	-	-	-	-	-	-	-	0
Angostura	3	Central Ave.	-	-	-	-	-	-	-	-	-	0
Angostura	4	Rio Bravo Blvd.	-	-	-	-	-	-	-	-	-	0
Angostura Totals			NA	NA	NA	0	0	0	0	0	0	0
Isleta	5	Los Lunas	-	-	-	-	-	-	-	-	-	0
Isleta	6	Belen	-	-	-	-	-	-	-	-	-	0
Isleta	7	Jarales	-	-	-	-	-	-	-	-	-	0
Isleta	8	Bernardo	-	-	-	-	-	-	-	-	-	0
Isleta	9	La Joya	-	-	-	-	-	-	-	-	-	0
Isleta	9.5	North of San Acacia	-	-	-	2(2)	-	-	-	-	-	2
Isleta Totals			NA	NA	NA	2	0	0	0	0	0	2
San Acacia	10	San Acacia Dam	-	-	-	8(8)	-	-	-	-	-	8
San Acacia	11	South of San Acacia	-	-	-	-	-	-	-	-	-	0
San Acacia	12	Socorro	-	-	-	-	-	-	-	-	-	0
San Acacia	13	North of San Antonio	-	-	-	1(1)	-	-	-	-	-	1
San Acacia	14	San Antonio	-	-		-	-	-	-	-	-	0
San Acacia	15	South of San Antonio	-	-	-	-	-	-	-	-	-	0
San Acacia	16	San Marcial	-	-	-	1(1)	-	-	-	-	-	1
San Acacia	17	South of San Marcial 1	-	-	-	-	-	-	-	-	-	0
San Acacia	18	South of San Marcial 2	-	-	-	-	-	-	-	-	-	0
San Acacia Totals			NA	NA	NA	10	0	0	0	0	0	0
MONTHLY TOTALS	6		NA	NA	NA	12	0	0	0	0	0	12



Figure 3. Fish densities from May 2013 for each focal species in the Middle Rio Grande (see Table 1 for fish species codes).



Figure 4. Catch rates for ten focal species (upper graph\*), including Rio Grande Silvery Minnow, (RGM; lower graph\*) during May 2013 at Rio Grande Silvery Minnow population monitoring program collection sites (see Table 1 for fish species codes).



Figure 5. Inter-month fluctuations in densities of Rio Grande Silvery Minnow from December 2012 to May 2013 (**A** = all age-classes; **B** = age-0 only).

APPENDIX A.

Collection localities of the Rio Grande Silvery Minnow population monitoring program.

 Table A-1.
 Collection localities of the Rio Grande Silvery Minnow population monitoring program.

Site #	Site I	_ocality
ANGO SITE #	STURA REACH SITES	
0	New Mexico, Sandoval County, Rio Grande River Mile 209.7 3916006 N	, below Angostura Diversion Dam, Algodones. SAN FELIPE PUEBLO QUADRANGLE 363811 E
1	New Mexico, Sandoval County, Rio Grande State Highway 44 bridge crossing), Bernalill River Mile 203.8 3909722 N	, at US Highway 550 bridge crossing, (formerly NM o. BERNALILLO QUADRANGLE 358543 E
2	New Mexico, Sandoval County, Rio Grande crossing, at Rio Rancho Wastewater Treatm River Mile 200.0 3905355 N	, ca. 4 miles downstream of US Highway 550 bridge nent Plant, Rio Rancho. BERNALILLO QUADRANGLE 354772 E
3	New Mexico, Bernalillo County, Rio Grande, Albuquerque. River Mile 183.4 3884094 N	, at Central Avenue (US Highway 66) bridge crossing, ALBUQUERQUE WEST QUADRANGLE 346840 E
4 ISLETA	New Mexico, Bernalillo County, Rio Grande, Albuquerque. River Mile 178.3 3877163 N A REACH SITES	, at Rio Bravo Boulevard bridge crossing, ALBUQUERQUE WEST QUADRANGLE 347554 E
SITE #		
5	New Mexico, Valencia County, Rio Grande, Los Lunas. River Mile 161.4 3852531 N	at Los Lunas (NM State Highway 49) bridge crossing, LOS LUNAS QUADRANGLE 342898 E
6	New Mexico, Valencia County, Rio Grande, bridge crossing, Belen. River Mile 151.5 3837061 N	ca. 1.0 miles upstream of NM State Highway 309/6 TOME QUADRANGLE 339972 E
7	New Mexico, Valencia County, Rio Grande, bridge crossing (near Transwestern Natural River Mile 143.2 3827329 N	ca. 2.2 miles upstream of NM State Highway 346 Gas Pipeline crossing), Jarales. VEGUITA QUADRANGLE 338136 E

## Table A-1.Collection localities of the Rio Grande Silvery Minnow population monitoring program<br/>(continued).

Site #

Site Locality

### ISLETA REACH SITES (continued) SITE #

- New Mexico, Socorro County, Rio Grande, at US Highway 60 bridge crossing, Bernardo.
   River Mile 130.6
   ABEYTAS QUADRANGLE
   3809726 N
   334604 E
- 9 New Mexico, Socorro County, Rio Grande, ca. 3.5 miles downstream of US Highway 60 bridge crossing, La Joya.
   River Mile 127.0
   ABEYTAS QUADRANGLE
   3805229 N
   331094 E
- 9.5 New Mexico, Socorro County, Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia.
  River Mile 116.8 LA JOYA QUADRANGLE
  3792603 N 327902 E

## SAN ACACIA REACH SITES SITE #

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

SAN ACACIA QUADRANGLE 326162 E

- 11 New Mexico, Socorro County, Rio Grande, ca. 1.5 miles downstream of San Acacia Diversion Dam, San Acacia.
   River Mile 114.6
   3790442 N
   LEMITAR QUADRANGLE
   325263 E
- 12New Mexico, Socorro County, Rio Grande, 0.5 miles upstream of the Low Flow Conveyance<br/>Channel bridge, east and upstream of Socorro Wastewater Treatment Plant, Socorro.<br/>River Mile 99.5<br/>3771043 NLOMA DE LAS CANAS QUADRANGLE<br/>327097 E
- New Mexico, Socorro County, Rio Grande, ca. 4.0 miles upstream of US Highway 380 bridge crossing, San Antonio.
   River Mile 91.7
   SAN ANTONIO QUADRANGLE
   3761283 N
   328140 E
- 14New Mexico, Socorro County, Rio Grande, at US Highway 380 bridge crossing, San Antonio.<br/>SAN ANTONIO QUADRANGLE<br/>3754471 N3754471 N328914 E

## Table A-1.Collection localities of the Rio Grande Silvery Minnow population monitoring program<br/>(continued).

Site #

Site Locality

# SAN ACACIA REACH SITES (continued) SITE #

- New Mexico, Socorro County, Rio Grande, directly east of Bosque del Apache National Wildlife Refuge headquarters, San Antonio.
   River Mile 79.1 SAN ANTONIO, SE QUADRANGLE
   3740839 N 327055 E
- 16New Mexico, Socorro County, Rio Grande, at the San Marcial railroad crossing, San Marcial.<br/>River Mile 68.6<br/>3728347 NSAN MARCIAL QUADRANGLE<br/>315284 E
- 17 New Mexico, Socorro County, Rio Grande, at its former confluence with the Low Flow Conveyance Channel and 16 miles downstream of the southern end of the Bosque del Apache National Wildlife Refuge, San Marcial. River Mile 60.5
   PARAJE WELL QUADRANGLE 3718178 N
- 18 New Mexico, Socorro County, Rio Grande, ca. 10 miles downstream of the San Marcial Railroad Bridge crossing, San Marcial.
   River Mile 58.8 PARAJE WELL QUADRANGLE 3716150 N 307846 E

### APPENDIX B.

Ichthyofaunal composition of the May 2013 Rio Grande Silvery Minnow population monitoring efforts

\*\* Data are provisional and should be verified by direct inspection of field data whenever possible \*\*

NEW MEXICO: Rio Grande, dire	Rł	(D13-058			
Site Number: 0		River Mile:	209.7	09	May 2013
UTM Easting: 3	63811 UTM Northing:	3916006	Zone: 13	Quad: San Felipe P	ueblo
R.K. Dudley, J.L	Hester			Eff	ort: 515.0 sq. m
FAMILY			<u>N</u>		
76	Cyprinella lutrensis		1		
76	Pimephales promelas		1		
76	Rhinichthys cataractae		22		
81	Catostomus commersonii		3		

NEW MEXICO: SANDOVAL Co., RIO GRANDE Drainage**RKD13-059**Rio Grande, at US HWY 550 (formerly NM State HWY 44) bridge crossing, Bernalillo.

Site Number: 1		River Mile:	203.8			09 May	2013	
UTM Easting: 3	358543 UTM Northing:	3909722	Zone: 13	Quad:	Bernalillo			
R.K. Dudley, J.I	L. Hester					Effort:	538.7	sq. m
FAMILY			<u>N</u>					
76	Cyprinella lutrensis		25					
76	Platygobio gracilis		67					
76	Rhinichthys cataractae		6					
81	Catostomus commersonii		5					

NEW MEXICO:		RKD13	8-060					
Rio Grande, ca	. 4.0 miles downstream of L	JS HWY 550 (	formerly NM Sta	ate HWY	44) bridge	e crossi	ng, at	
Rio Rancho Wa	astewater Treatment Plant,	Rio Rancho.						
Site Number: 2	2	River Mile:	200.0			09 May	/ 2013	
UTM Easting:	354772 UTM Northing:	3905355	Zone: 13	Quad:	Bernalillo			
R.K. Dudley, J.	L. Hester					Effort:	515.0	sq. m
FAMILY			<u>N</u>					
76	Cyprinella lutrensis		21					
76	Pimephales promelas		4					
76	Platygobio gracilis		52					
76	Rhinichthys cataractae		13					
81	Catostomus commersonii		22					

NEW MEXICO:	BERNALILLO Co., RIO GF	RKD13-057		
Rio Grande, at (	Central Avenue bridge cros	sing (US HW`	Y 66), Albuquero	jue.
Site Number: 3		River Mile:	183.4	09 May 2013
UTM Easting: 3	UTM Northing:	3884094	Zone: 13	Quad: Albuquerque West
R.K. Dudley, J.L	Hester			Effort: 531.8 sq. m
FAMILY			<u>N</u>	
76	Cyprinella lutrensis		41	
76	Cyprinus carpio		7	
76	Pimephales promelas		2	
76	Platygobio gracilis		27	
81	Catostomus commersonii		4	

1

93

Ictalurus punctatus

81

93

Catostomus commersonii

Ictalurus punctatus

## Rio Grande Silvery Minnow Population Monitoring May 2013

NEW MEXICO: Rio Grande, at F	BERNALILLO Co., Rio Bravo Blvd. Brid	RIO GRAND ge crossing	E Drainage (NM State	e HWY 500) c	rossing,	Albuquerqu	<b>RKD13-056</b> ue.	
Site Number: 4		Riv	ver Mile: 17	8.3			09 May 2013	
UTM Easting: 3	47554 UTM No	rthing: 3877	163 Zo	one: 13	Quad:	Albuquerq	lue West	
R.K. Dudley, W.	H. Brandenburg, J.I	. Hester					Effort: 499.0	sq. m
FAMILY				N				
76	Cyprinella lutrensis			4	ļ			
76	Cyprinus carpio			2	2			
76	Pimephales prome	as		38	}			
76	Platygobio gracilis			3	5			
81	Carpiodes carpio			1				
81	Catostomus comm	ersonii		29	)			
93	Ictalurus punctatus			3	5			
NEW MEXICO:	VALENCIA Co., RIC	) GRANDE I	Drainage				RKD13-055	
Rio Grande, at I	os Lunas Bridge cr	ossing (NM S	State HWY	49), Los Lur	nas.			
Site Number: 5		Riv	ver Mile: 16	1.4			08 May 2013	
UTM Easting: 3	42898 UTM No	rthing: 3852	:531 Zo	one: 13	Quad:	Los Lunas	3	
R.K. Dudley, J.L	Hester, J.M. Barks	stedt					Effort: 520.5	sq. m
FAMILY				N				
76	Cyprinella lutrensis			262	2			
76	Pimephales prome	as		7				

3

1

NEW MEXICO: Rio Grande, ca.	en.	RKD13-054				
Site Number: 6		08 May 2013				
UTM Easting: 3	39972 UTM Northing:	3837061	Zone: 13	Quad:	Tome	
R.K. Dudley, J.L	Hester, J.M. Barkstedt					Effort: 491.6 sq. m
FAMILY			<u>N</u>			
76	Cyprinella lutrensis		339			
76	Cyprinus carpio		1			
76	Pimephales promelas		478			
81	Carpiodes carpio		3			
81	Catostomus commersonii		3			
93	lctalurus punctatus		1			
212	Gambusia affinis		52			

 NEW MEXICO: VALENCIA Co., RIO GRANDE Drainage
 RKD13-053

 Rio Grande, ca. 2.2 miles upstream of NM State HWY 346 bridge crossing, Jarales.
 8

 Site Number: 7
 River Mile: 143.2
 08 May 2013

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

 R.K. Dudley, J.L. Hester, J.M. Barkstedt
 Effort: 475.7 sq. m

 FAMILY

		<u>N</u>
76	Cyprinella lutrensis	593
76	Pimephales promelas	5
81	Carpiodes carpio	2
81	Catostomus commersonii	1
212	Gambusia affinis	16

212

Gambusia affinis

## Rio Grande Silvery Minnow Population Monitoring May 2013

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage RKD13-052 Rio Grande, at US HWY 60 bridge crossing, Bernardo.										
Site Number: 8	3		River Mile:	130.6				08 May	/ 2013	
UTM Easting:	334604	UTM Northing:	3809726	Zone: 13		Quad:	Abeytas			
R.K. Dudley, J.	L. Hester, J	.M. Barkstedt						Effort:	493.9	sq. m
FAMILY					N					
76	Cyprinella	lutrensis			769					
76	Pimephale	es promelas			23					
81	Carpiodes	s carpio			1					
212	Gambusia	a affinis			85					

NEW MEXICO		RKD13-051				
Rio Grande, ca	a. 3.5 miles downstream of	the US HWY	60 bridge cross	sing, Bernarc	lo.	
Site Number: 9 River Mile: 127.0					08 May 2013	
UTM Easting:	331094 UTM Northing	: 3805229	Zone: 13	Quad: A	beytas	
R.K. Dudley, J	.L. Hester, J.M. Barkstedt					Effort: 508.7 sq. m
FAMILY			ļ	N		
76	Cyprinella lutrensis		52	21		
93	Ictalurus punctatus			4		

16

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage								RKD13	8-050	
Rio Grande, ca	Rio Grande, ca. 0.6 miles upstream of San Acacia Diversion Dam, San Acacia									
Site Number: 9.5 River Mile: 116.8							03 May	/ 2013		
UTM Easting:	327902	UTM Northing:	379260	03 Zone: 13		Quad:	La Joya			
M.A. Farrington, W.H. Brandenburg, K.R. Naegele								Effort:	480.2	sq. m
FAMILY					N					
76	Cyprinella	a lutrensis			29					
76	Hybogna	thus amarus*			2					
76	Platygobi	io gracilis			12					
81	Catostom	nus commersonii			4					
93	Ictalurus	punctatus			2					
212	Gambusi	a affinis			17					
	*	Hybognathus ai	marus	by age class:						
				age-0:						
				age-1: 2						
				age-2:						

NEW MEXICO:	RKD13-049							
Rio Grande, dir	ectly below San Acacia Dive	ersion Dam, S	San Acacia.					
Site Number: 1	03 May 2013							
UTM Easting:	326162 UTM Northing:	3791977	Zone: 13	Quad: San Acad	cia			
M.A. Farrington	n, W.H. Brandenburg, K.R. N	laegele			Effort: 461.3 sq. m			
FAMILY			<u>N</u>					
76	Cyprinella lutrensis		199					
76	Cyprinus carpio		1					
76	Hybognathus amarus*		8					
76	Pimephales promelas		2					
76	Platygobio gracilis		6					
81	Catostomus commersonii		1					
212	Gambusia affinis		6					
294	Lepomis macrochirus		1					
* Hybognathus amarus by age class:								
			age-0:					
			age-1: 6					
			age-2: 2					
			Ū					
NEW MEXICO:	SOCORRO Co., RIO GRA	NDF Drainag	e		RKD13-048			
Rio Grande ca	1.5 miles downstream of S	an Acacia Div	version Dam Sa	n Acacia				
Site Number: 1	1	River Mile:	114.6		03 May 2013			
UTM Easting:	325263 UTM Northing:	3790442	Zone: 13	Quad: Lemitar				
M.A. Farrington	, W.H. Brandenburg, K.R. N	laegele			Effort: 496.9 sq. m			
FAMILY			<u>N</u>					
76	Cyprinella lutrensis		74					
76	Pimephales promelas		3					
76	Platygobio gracilis		9					
93	Ictalurus punctatus		7					

NEW MEXICC	: SOCORI	RO Co., RIO GRA	NDE Draina	ge				RKD13-047	
Rio Grande, ea	ast of Soco	orro, 0.5 miles ups	tream of Soc	orro Low Flo	w C	onveya	nce Chanr	nel bridge and	
east just upstre	eam of So	corro Wastewater	Treatment P	lant, Socorro					
Site Number:	12		River Mile	: 99.5				03 May 2013	
UTM Easting:	327097	UTM Northing:	3771043	Zone: 13		Quad:	Loma de	las Canas	
M.A. Farringto	n, W.H. Br	andenburg, K.R. N	laegele					Effort: 505.2	sq. m
FAMILY					<u>N</u>				
76	Cyprinel	la lutrensis			84				
212	Gambus	sia affinis			5				
NEW MEXICC Rio Grande, ca	): SOCORI a. 4.0 miles	RO Co., RIO GRA s upstream of U.S.	NDE Drainaç . 380 bridge (	ge crossing.				RKD13-046	
Cito Number	10		Divor Milo	. 01 7				02 May 2012	
	220140	UTM Northing		. 91.7 Zana: 12		Quadu	Con Anto		
MA Earringto	32014U n W U Dr	ondonburg K.P. N	3/01203	Zone. 13		Quau.	San Anto	Effort: 511.6	
	п, үү.п. ы	andenburg, K.R. r	vaegele					EIIUIL STI.0	sq. m
	0	11 - 1 t			N				
76	Cyprinei	ia lutrensis			1				
76	Hybogna	atnus amarus^			1				
		Hybognathus ar	narus by a	ige class:					
				age-0:					
				age-1: 1					
				age-2:					
NEW MEXICC Rio Grande, at	: SOCORI t US HWY	RO Co., RIO GRA 380 bridge crossir	NDE Drainag ng, San Anto	ge nio.				RKD13-045	
Site Number:	14		River Mile	: 87.1				02 May 2013	
UTM Easting:	328914	UTM Northing:	3754471	Zone: 13		Quad:	San Anto	onio	
R.K. Dudley, N	I.A. Farring	gton, K.R. Naegele	e					Effort: 496.2	sq. m
FAMILY	·	- <b>-</b>			Ν				-
	No Fish	Collected			_				

NEW MEXICO: SOCORRO Co., RIO GRANDE Drainage								RKD13-044	
Site Number: 1	15		River Mile:	79.1	luge	Tieddy		02 May 2013	
UTM Easting: 327055 UTM Northing: 3740839 Zone: 13 Quad: San An							San Antor	nio SE	
R.K. Dudlev. M	.A. Farring	ton. K.R. Naege	le					Effort: 465.4	sa. m
FAMILY	- 5	, 3			Ν				- 1
76	Cyprinella	a lutrensis			14				
NEW MEXICO	SOCORR	O Co., RIO GRA	ANDE Drainag	e				RKD13-043	
Rio Grande, at	San Marcia	al Railroad Bridg	je, San Marcia	d.					
Site Number: 1	16		River Mile:	68.6				02 May 2013	
UTM Easting:	315284	UTM Northing:	3728347	Zone: 13		Quad:	San Marc	ial	
R.K. Dudley, M	.A. Farring	ton, K.R. Naege	le					Effort: 534.9	sq. m
FAMILY					N				
76	Cyprinella	a lutrensis			36				
76	Hybogna	thus amarus*			1				
	*	Hybognathus a	<i>marus</i> by a	ge class:					
				age-0:					
				age-1: 1					
				age-2:					
	SOCORR	O Co., RIO GRA	ANDE Drainag	e				RKD13-042	
Rio Grande, ca	. 8 miles do	ownstream of the	e San Marcial	railroad brid	ge c	rossing			
Site Number: 1	17		River Mile:	60.5				02 May 2013	
UTM Easting:	309487	UTM Northing:	3718178	Zone: 13		Quad:	Paraje We	ell	
R.K. Dudley, M	.A. Farring	ton, K.R. Naege	le					Effort: 506.3	sq. m
FAMILY					N				
76	Cyprinella	a lutrensis			53				
76	Cyprinus	carpio			1				

1

212

Gambusia affinis

NEW MEXICO:	RKD13-041							
Rio Grande, ca. 10 mi downstream of the San Marcial railroad bridge crossing								
Site Number: 18	3	River Mile	: 58.8	02 May 2013				
UTM Easting: 3	07846 UTM Northi	ng: 3716150	Zone: 13	Quad	Paraje Well			
R.K. Dudley, M.	A. Farrington, K.R. Nae	gele			Effort: 506.2 sq. m			
FAMILY				<u>N</u>				
76	Cyprinella lutrensis			32				
76	Cyprinus carpio			1				