

## FISH MONITORING OF SELECTED STREAMS OF THE GILA RIVER BASIN, 2009

Final Annual Report

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### PERTINENT FINDINGS

Fishes of the Gila, Salt, and San Pedro rivers and Aravaipa and Cienega creeks, Arizona, were monitored using standard fishery methods during autumn 2009. One to three geomorphic reaches and two to three stations within each reach were sampled on each stream. A total of 4,251 individuals representing six native and 14 non-native fish species was encountered; 4,234 fish were captured using standardized (quantitative) boat- or backpack electrofishing and 17 were taken by other methods. Two new distributional records were found for the middle reach of the San Pedro River, and Gila chub was encountered for the first time in Cienega Creek. Natives were longfin dace, Gila chub, roundtail chub, desert sucker, Sonora sucker, and Gila topminnow. Non-natives were threadfin shad, common carp, fathead minnow, red shiner, black bullhead, yellow bullhead, flathead catfish, channel catfish, mosquitofish, black crappie, bluegill, green sunfish, largemouth bass, and blue tilapia. Most species were uncommon-to-rare at most sites. Total standardized backpack and boat electrofishing effort was 13,186 sec and mean catch per unit effort was 321 fish per 1,000 sec (k-sec). Non-native bullfrog and northern crayfish also were present.

Eight species, all non-native, were encountered in the Gila River. Total quantitative catch was 494 individuals, total electrofishing effort was 5,617 sec, and overall CPE was 88 fish per k-sec. Mosquitofish was the most abundant species in the Gila River sample (54% of total catch). Non-native bullfrog tadpoles and adults, and northern crayfish were throughout the stream.

In the Salt River, six species, one native and five non-native, were encountered. Only one site was sampled because of high flows at the other two sites. Total quantitative catch was 81

individuals, total boat-mounted electrofishing effort was 1,190 sec, and overall CPE was 68 fish per k-sec. Non-native largemouth bass was the most abundant species in the Salt River sample (86% of total catch). Three, short-term trammel net sets also captured adult Sonora sucker, largemouth bass, and blue tilapia.

Ten species, two native and eight non-native, were encountered in the San Pedro River. Total quantitative catch was 1,277 individuals, total backpack electrofishing effort was 4,262 sec, and overall CPE was 300 fish per k-sec. Native longfin dace was the most common species in the San Pedro River sample (48% of total catch) followed closely by mosquitofish (36%), and each other species including native desert sucker was 5% or less of total catch. Flathead catfish was not encountered and has not been detected since 2006. Non-native bullfrog tadpoles and adults, and northern crayfish were throughout the stream, and adult native lowland leopard frogs were encountered at three sites. Captures of red shiner and channel catfish at the Charleston station represent the first records for both species in the upper reach of the San Pedro River; prior to this time neither had been encountered further upstream than the vicinity of Aravaipa Creek.

Aravaipa Creek samples comprised seven species, four native and three non-native. Total quantitative backpack electrofishing catch was 1,348 individuals, total electrofishing effort was 1,159 sec, and overall CPE was 1,163 fish per k-sec. Longfin dace was the most abundant species and comprised 94% of total catch; other species each made up 3% or less of total catch. Two, short-term trammel net sets captured a single adult roundtail chub. Qualitative collections above the constructed fish barrier included native longfin dace and roundtail chub, plus non-native red shiner, yellow bullhead, and mosquitofish. Native lowland leopard frog adults were common at this site.

Cienega Creek samples comprised three native species. Total quantitative catch was 1,034 individuals, total backpack electrofishing effort was 958 sec, and overall CPE was 1,079 fish per k-sec. Longfin dace was 94% of total catch, Gila topminnow was 6%. A single Gila chub was taken in a seine haul at one site. Native lowland leopard frog was present at one site.

## INTRODUCTION

Completion of the Central Arizona Project (CAP) in 1993 facilitated the transport of non-native fishes and other aquatic biota from Lake Havasu (Colorado River), where the CAP network of canals originates, to central and southern Arizona. Several U.S. Fish and Wildlife Service (FWS) biological opinions (BOs) on transportation and delivery of CAP water to the Gila and Santa Cruz River basins determined that movements of non-native fishes through the CAP into streams occupied by native fishes would negatively affect several listed aquatic species.

One of the conservation measures established for the CAP directs Bureau of Reclamation (Reclamation) to monitor the baseline fish community composition and distribution of non-

native fishes in selected waters of the Gila River basin. Reclamation developed a monitoring plan to guide this effort (Clarkson 1996), under which monitoring was to occur annually at 22 nominal sampling stations across eight reaches of three streams: Gila River between Coolidge Dam and Ashurst-Hayden Diversion Dam, San Pedro River north of the U.S.-Mexico border, and Salt River between Stewart Mountain Dam and Granite Reef Diversion Dam. Two stations on Cienega Creek (Santa Cruz basin) were added to the program in 2007. Monitoring of Aravaipa Creek is in behalf of a barrier installed by Reclamation in 2001 to preclude invasion by non-native fishes that do not currently occur in the stream.

In cooperation with Reclamation and beginning in 2007, Marsh & Associates, LLC was to annually (1) monitor selected stream reaches to establish baseline data on the presence and distribution of non-native fishes in the target reaches and to detect changes in the species composition and distribution; (2) electronically enter and verify all monitoring data; and (3) report monitoring results to Reclamation. Tasks (1) and (2) were completed during 2009 for the fourth time, and this document fulfills requirement (3). Prior year reports for monitoring during 2006 to 2008 (Marsh et al. 2007, 2008, 2009) are available from Reclamation.

## METHODS

Standard monitoring stations (or sites) were initially identified by Reclamation. Some of these were modified by this contractor with Reclamation concurrence when a nominal station could not be sampled because of access issues, change in land ownership, physical change in station location (e.g., due to channel reconfiguration by flood), or other reason. Nominal station names and locations are provided in Clarkson (1996) and revised in Marsh et al. (2007 et seq.).

Streams have one to four reaches each and these are coded up- to downstream (1 for upstream most reach). Gila River has four: 1 for uppermost, 2 for upper-middle, 3 for lower-middle, and 4 for the lower reach. Salt River has one reach, San Pedro River two, Aravaipa two, and Cienega Creek has one. The upper reach on Aravaipa Creek is above the constructed fish barrier, while the lower reach is downstream of that structure.

Stations in streams generally follow the same up- to downstream order as reaches and are numbered 1 through 3; however, some stations have been eliminated or moved and so some numbers for some reaches are not used. Each station is comprised of a 200-m long, fixed stream segment that is sampled quantitatively by electroshocking. Additional, non-quantitative sampling may be performed within or outside a station or reach, using a variety of gears.

Specific methods to perform stream fish monitoring were detailed by Clarkson (1996) and restated by Marsh et al. (2007 et seq.). These procedures were generally applied during 2009.

Sampling gears included a backpack electrofisher (Smith-Root model 12B), seines ( $\frac{1}{8}$ - &  $\frac{1}{4}$ -inch mesh, 4-ft depth, various lengths), boat electrofisher (Smith-Root 5.0 GPP powered by a 5 KW generator), trammel nets (60-ft long x 4-ft deep x 1-inch inner and 10-inch outer mesh), and dip nets ( $\frac{1}{8}$ - &  $\frac{1}{4}$  inch mesh, rectangular or diamond shape). Other equipment was available but not applied during 2009.

Data were summarized for each stream, reach, and station. For each stratification, total catch, relative abundance (proportion of catch by species, rounded to the nearest integer), and relative abundance by size/age group within each species are provided. Proportion totals may not always be 100% because of cumulative effects of rounding. Catch per unit effort (CPE) for quantitative data (fish per 1,000 seconds electrofishing [per k-sec], nearest 1 unit for CPE  $\geq$  10, nearest 0.1 unit for CPE < 10; or fish per seine haul to the nearest 0.01 unit), plus a brief narrative that includes conditions at the time of sampling and a description of habitat, are provided below for each station.

## MONITORING RESULTS

Six native and 14 non-native species were encountered among the Gila, Salt, and San Pedro rivers, and Aravaipa and Cienega creeks in autumn-winter 2009 (common and scientific names of fishes are provided in Table 1). Natives were longfin dace, Gila chub, roundtail chub, desert sucker, Sonora sucker, and Gila topminnow; non-natives were threadfin shad, common carp, fathead minnow, red shiner, black bullhead, yellow bullhead, flathead catfish, channel catfish, mosquitofish, black crappie, bluegill, green sunfish, largemouth bass, and blue tilapia. Few species were abundant and most were uncommon-to-rare at most sties. Total standardized boat (Salt River) plus backpack (all other streams) electrofishing effort was 13,186 sec, total catch was 4,234 individuals, and mean catch per unit effort was 321 fish per 1000 sec (Table 2).

### Gila River

Gila River monitoring was conducted during the period November 15-17, 2009. Discharge was approximately 0.6 cfs below Coolidge Dam, 5 cfs at Kelvin, and zero at the Florence-Casa Grande Canal (USGS 2009). There are four reaches on the Gila River between Coolidge Dam and Ashurst-Hayden Dam, designated upper, upper-middle, lower-middle, and lower, each with 2 or 3 stations.

Eight fish species, all non-native, were encountered in the Gila River (Tables 1 & 3). Total quantitative catch was 494 individuals, total electrofishing effort was 5,617 sec, and overall CPE was 88 fish per k-sec. Mosquitofish was the most abundant species (53% of total catch), followed by red shiner (29%), channel catfish (9%), flathead catfish (4%), threadfin shad (3%), common carp (2%), and black crappie and green sunfish (<1% each). The two catfishes were

represented by both age-0 and age-1+ individuals; threadfin shad, black crappie, and green sunfish all were age-0, and only carp was all age-1+.

Northern crayfish *Orconectes virilis* and bullfrog *Lithobates catesbeianus* also were found in the Gila River; both are non-native.

#### Upper reach, Coolidge Dam to Needles Eye

No sampling took place in the Gila River upper reach during 2009, as detailed below.

*Upper station, Coolidge Dam, station 2-1-1.*-- Authorization to access the river at this site could not be obtained from the landowner, San Carlos Apache Tribe (SCAT). Repeated attempts to acquire permission were made by the contractor and Reclamation through U.S. Fish and Wildlife Service (USFWS), Pinetop, and other channels, but all were unsuccessful. See also "Deviations from Protocol," below.

*Lower station, Hook & Line Ranch, station 2-1-3.*--As above, authorization to access the river at this site could not be obtained from the landowner, SCAT. Repeated attempts to acquire permission were made by the contractor and Reclamation through U.S. Fish and Wildlife Service, Pinetop, and other channels, but all were unsuccessful. See also "Deviations from Protocol," below.

#### Upper-Middle Reach, Little Ash Creek to Hayden

A total of 269 individuals representing seven species was taken from the upper-middle reach of the Gila River (Table 3). Mosquitofish was most abundant (59% of total catch; Table 4), followed by red shiner (28%), channel catfish (6%), common carp and flathead catfish (3% each), and threadfin shad and black crappie (< 1% each). No native fishes were encountered. Non-native bullfrog and northern crayfish were present within the reach.

*Upper station, Dripping Springs Wash, station 2-2-1.*--The Dripping Springs Wash station on Gila River was visited on November 15, 2009. Weather was sunny, calm, and mild; air temperature was 6.1 C and water was 11.0 C at 0900. The 200-m fixed site was comprised of five habitats as follow, down- to upstream: pool, run, riffle, run, and pool. The first four habitats were relatively short 12 to 32 m-long, while the last was a deep, wide, 105 m-long pool. Stream flow was approximately 5 cfs. Water was slightly turbid and there was little aquatic vegetation or macroscopic algae. Substrate was embedded gravel-cobble in swifter habitats, firm sand and fines in quiet water; there was little instream debris save a thatch of downed riparian shrubbery at the margin of the lower run. The wetted channel was 5-8 m across the lower four habitats and the upstream-most pool was ca. 10-15 m wide. The channel was incised 1-3 m; riparian vegetation was sparse tamarisk and willow, and banks showed evidence of cattle use. The

lower 95-m of the fixed site was sampled by backpack electrofisher and 10 to 15% of each habitat was sampled; the large upstream pool was sampled by backpack electrofisher and with two, 60-ft long x 4 ft deep x 1 in mesh trammel nets, each set for 1.5 hrs.

A total of 70 individuals representing seven species, all non-native, were taken in electrofishing (Table 3). Red shiner was most common (73% of total catch; Table 4), followed by channel catfish (10%), mosquitofish (9%), and threadfin shad, common carp, flathead catfish, and green sunfish (each <5%). A single adult common carp was captured by trammel net.

*Middle station, Christmas, station 2-2-2.*--The Christmas station on Gila River was visited on November 15, 2009. Weather was partly cloudy, lightly breezy, and mild; air temperature was 13.3 C and water was 13.0 C at 1045. Water was clear. The 200-m fixed site was comprised of four habitats as follow, down- to upstream: run, pool, riffle, and pool. The wetted channel was 3-8 m wide. Substrate was mostly gravel-sand in swifter habitats, finer materials in quiet water; there was little debris except for coarse organic matter (snags) and angular boulders (rip-rap) along a cut bank on river right in the central pool. Riparian vegetation was tamarisk and willow. The entire 200-m fixed site was sampled by backpack electrofisher. Between 10 and 15% of each habitat was sampled.

A total of 109 individuals representing five fish species, all non-native, were taken in quantitative electrofishing (Table 3). Mosquitofish was most common (82% of total catch; Table 4), followed by red shiner (9%), and common carp, channel catfish, and flathead catfish (each 5% or less).

Non-native bullfrog tadpoles and adults, and northern crayfish were present at the site.

*Lower station, O'Carroll Canyon, station 2-2-3.*--The O'Carroll Canyon station on Gila River was visited on November 15, 2009. Weather was sunny and lightly breezy, and air temperature was 17.2 C at 1215. Water was clear and temperature was 15.0 C. The 200-m fixed site was comprised of five habitats as follow, down- to upstream: pool, riffle, pool, riffle, and pool. The wetted channel was about 5 m wide. Substrate was heavily embedded angular gravel and small cobble in swifter habitats, firm sand with some fines in quiet water. There was embedded, boulder-size rip-rap material on the river-right bank line near the upstream boundary of the site, and several bedrock outcrops along the same bank line of the central pool. Riparian vegetation was seep willow, willow, and Bermuda grass. The entire 200-m fixed site was sampled by backpack electrofisher. Between 5 and 20% of each habitat was sampled.

A total of 90 individuals representing four species, all non-native, were taken in quantitative electrofishing (Table 3). Mosquitofish was most common (71% of total catch; Table 4), followed by red shiner (17%), channel catfish (8%) and flathead catfish (4%).

Non-native bullfrog tadpoles and northern crayfish were present at the site.

### Lower-Middle Reach, Hayden to Mineral Creek

A total of 155 individuals representing six fish species, all non-native, were taken in quantitative samples from the lower-middle reach of the Gila River (Table 3). Red shiner was most abundant (46% of total catch; Table 4), followed by mosquitofish (43%), channel catfish (5%), flathead catfish (4%), and threadfin shad and green sunfish (1% each).

*Upper station, San Pedro River, station 2-3-1.*--The San Pedro River station on Gila River was visited on November 15, 2009. Weather was sunny, lightly breezy, and mild; air temperature was 18.3 C at 1425. The 200-m fixed station was largely desiccated; surface water was confined to a single small pool approximately 20 m<sup>2</sup> surface area and 0.2-m deep. Water was clear, temperature 13.5 C, and substrate comprised of cobble, coarse riprap, and fines. The pool was sampled in its entirety by dip net.

A total of 119 individuals representing six species, all non-native, were taken in 40, qualitative dip net sweeps (Table 3). Red shiner was most abundant (59% of total catch), followed by mosquitofish (31%), flathead catfish (5%), and threadfin shad, channel catfish, and green sunfish (2% each; Table 4).

Non-native bullfrog tadpoles and northern crayfish were present at the site.

*Middle station, Kearny, station 2-3-2.*--The Kearny station on Gila River was visited on November 15, 2009. Weather was sunny, light breeze, and air temperature was 16.7 C at 1525 hrs. Water was clear and temperature was 14.5 C. The 200-m fixed site was complex and comprised five primary habitat types, down- to upstream, a short pool, short riffle, wide deep pool, another short riffle, and shallow run habitat. Substrate was deeply embedded angular gravels-to-cobble and fines, almost cement-like, and in the pool was deep mud. Banks were variably undercut or gradually sloping. Riparian vegetation was dense tamarisk and Bermuda grass with some cattail. The entire 200-m fixed site was sampled by backpack electrofisher. About 5% to 25% of individual habitat was sampled. The pool was too deep (>2.0 m) to sample effectively.

A total of nine individuals representing two non-native species was captured (Table 3). Age-0 channel catfish was most common (67% of total catch; Table 4), followed by mosquitofish (33%).

Non-native bullfrog tadpoles and northern crayfish were present at the site.

*Lower station, Kelvin, station 2-3-3.*--The Kelvin station on Gila River was visited on November 16, 2009. Weather was sunny, lightly breezy, and air temperature was 8.3 C at 0830 hrs. Water was clear and temperature was 9.0 C. Stream flow was between 5.6 and 7.3 cfs (USGS 2009)

and much lower than during the previous visit. The 200-m fixed site was comprised of monotonous, pool-like run habitat. Depth was variable from about 0.5 to 1 m deep. The wetted channel was 12-15 m wide. Substrate was primarily loose, unconsolidated fines with some gravel. Banks were gradually sloping, or vertically cut in some places up to 1-2 m. Riparian vegetation was tamarisk and willow, some of which was down along the stream margins. The entire 200-m fixed site was sampled by backpack electrofisher; about 5% of the habitat was sampled.

A total of 27 individuals representing two non-native species was taken (Table 3). Catch comprised 1 red shiner (4% of catch) and 26 mosquitofish (96% of catch, Table 4).

Non-native northern crayfish were present at this site.

#### Lower Reach, Mineral Creek to Ashurst-Hayden Diversion Dam

A total of 70 individuals representing six species, all non-native, was taken from the lower reach of the Gila River (Table 3). Mosquitofish was most abundant (54% of total catch; Table 4), followed by threadfin shad (17%), channel catfish (23%), threadfin shad (14%), flathead catfish (7%), and common carp and red shiner (about 1% each). Non-native northern crayfish was present in the reach.

*Upper station, A-Diamond Ranch, station 2-4-1.*--The A-Diamond Ranch station on Gila River was visited on November 16, 2009. Weather was sunny, breezy, and air temperature was 12.8 C at 1000 hrs. Water was clear but appeared mineralized, and temperature was 9.5 C. Gross morphology of the area was little changed compared to prior visits but shallower as a result of accumulated sediments; flow was about 3 to 5 cfs. The 200-m fixed site was comprised of four habitats as follow, down- to upstream: run, pool (with short interconnecting riffles) and riffle, plus an isolated backwater pool adjacent to the lowermost run. The wetted channel was 2-6 m wide. Substrate was primarily large cobble with embedded fines, or sand in riffle tails and fines in the quiet pools. Banks were gradually sloping, or vertically cut in some places. Riparian vegetation was mixed, with tamarisk, willow, and cottonwood present. The entire 200-m fixed site was sampled by backpack electrofisher. Between 5 and 20% of each habitat was sampled. Sampling overall was relatively inefficient because of strong flow and deep habitats. Additional, non-quantitative electrofishing was conducted outside of the fixed station.

A total of 32 fish representing four non-native fish species was collected (Table 3). Mosquitofish was most abundant (75% of total catch, Table 4), followed by threadfin shad (16%), flathead catfish (6%), and common carp (3%). Flathead catfish was represented by age-0 and age-1 individuals, threadfin shad only by age-0, and common carp only by age-1+. Non-quantitative sampling yielded no fish. Non-native northern crayfish were present at this site.

*Middle station, Cochran, station 2-4-2.*--The Cochran station on Gila River was visited on November 16, 2009. Weather was clear, breezy, and air temperature was 12.8 C at 1215 hrs. Water was clear and temperature was 9.5 C; current was slight. The 200-m fixed site was comprised of a single monotonous pool. The wetted channel was up to 30 m wide. Substrate was primarily cobble and gravel, with a component of fines. Depth was variable from a few centimeters to about a meter. Banks were variably gradually sloping or vertically cut. Riparian vegetation was dense tamarisk. The entire 200-m fixed site was sampled by backpack electrofisher and approximately 10% of the habitat was sampled.

A total of 15 individuals representing three non-native species was taken in quantitative electrofishing (Table 3). Mosquitofish was most abundant (80% of total catch, Table 4), followed by age-1+ channel catfish (13%), and age-0 flathead catfish (7%).

*Lower station, Box-O Wash, station 2-4-3.*--The traditional station at the mouth of Box-O Wash station on Gila River was abandoned in 2008 because of access issues, and for the time being a new site, "Price," is being sampled (see Marsh et al. 2009 for details). Suitable alternatives to the Box-O and Price sites are being evaluated and assessed (see "RECOMMENDATIONS").

We visited the Price site on November 17, 2009. Weather was clear and windy, and air temperature was 18.3 C at 0930 hrs. Water was clear and the bottom was readily visible, and temperature was 10.0 C. The 200-m fixed site was comprised of three primary habitats, down to upstream: a wide, shallow riffle, a wide, shallow run, and a short pool. The wetted channel was 4-15 m wide. Substrate was primarily cobble mixed with gravel, sand, and some fines. Banks were mostly gradually sloping with some areas that were vertically cut. Riparian vegetation was absent on river right, dense woodland on river left. The entire 200-m fixed site was sampled by backpack electrofisher. Approximately 5 to 20% of each habitat was sampled. A non-quantitative electrofishing sample was taken in a debris pile-pool on river-left upstream from the fixed site; water was clear and depth was > 2 m.

A total of 23 individuals representing five non-native species was taken in quantitative electrofishing (Table 3). Channel catfish was most abundant (45% of total catch, Table 4), followed mosquitofish (28%), age-0 threadfin shad (18%), age-0 flathead catfish (8%), and red shiner (3% each). Non-quantitative sampling yielded 21 individuals of two non-native species: 4 mosquitofish plus 11, age-0 and 6, age-1+ channel catfish.

Non-native northern crayfish were throughout the site.

### **Salt River**

Salt River monitoring was conducted on December 18, 2009. Discharge was approximately 250 cfs below Stewart Mountain Dam (SRP 2009), substantially greater than the 8-10 cfs that is

typical for this time of year. There is only one reach on the Salt River, which extends from below Stewart Mountain Dam downstream to Granite Reef Dam, and three sample stations. However, the two upstream stations (Stewart Mountain Dam and Goldfield Administrative Site) could not be sampled because of the atypically high flows. There also were potential issues related to a pair of bald eagles *Haliaeetus leucocephalus* that occupied a nest adjacent to the latter site (see DEVIATIONS FROM PROTOCOL), and thus we only sampled the lowermost site.

*Lower station, Granite Reef Dam, station 3-1-3.*--The Granite Reef Dam station on Salt River was visited on December 18, 2009. Weather was clear, breezy, and mild; air temperature was 16.1 C at 1055 hrs. The 200-m fixed site was comprised of a single, wide pool with depths > 2-m; there was a perceptible downstream current of perhaps 0.5 fps. Water was clear-to-slightly turbid and temperature was 11.0 C. Substrate was mud and detritus; coontail and pondweed were common and grew in dense beds adjacent to the shore, where there also were stands of cattail. Shoreline was variably shallow, gently sloping mud on river right, cattail along the upstream river-left margin, and 0.5-1.5-m cut bank on the downstream river left. Riparian vegetation, where present, was a park like mixture of mesquite and willow. Boat-mounted electrofishing was conducted along approximately 400-m of the river-left margin, and around a small, sandy island margined with cattail at the upstream end of the site. The central portion pool was also sampled with three, 60 x 4-ft x 1-inch trammel nets deployed parallel to the current in mid-channel.

A total of 81 individuals representing six species, one native and five non-native, was taken at this site (Tables 1 & 5). Seventy-seven fish were taken in 1,190 seconds of quantitative electrofishing; catch per unit effort was 65 fish per k-sec (Table 2). Largemouth bass was most abundant in the electrofishing sample (65 age-0 and 4 age-1+, 90% of total catch; Table 6), followed by bluegill (5%), green sunfish (3%), and Sonora sucker and yellow bullhead (each about 1% of catch). Trammel nets were set from 1045 to 1155 (total effort = 3.50 hrs) and captured one largemouth bass, two native Sonora sucker, and one blue tilapia (CPE = 1.1 fish per net-hr). All fish were large, age-1+ individuals.

### **San Pedro River**

San Pedro River monitoring was conducted during the period October 13-15, 2009. There are three reaches on the San Pedro River between Hereford and the Gila River, designated upper, middle, and lower, each with 2 or 3 stations. Discharge at various sites within the sample area during the period ranged from 0 to about 3 cfs (USGS 2009); the precedent condition (prior 30 days) included only similar flows. Two sites, Hughes Ranch (site 1-2-1) and Mouth (site 1-3-3) were dry and no fish collections were made.

Ten species, two native and eight non-native, were encountered in the San Pedro River (Tables 1 & 7). Total catch was 1,277 individuals, total electrofishing effort was 4,262 sec, and overall

CPE was 300 fish per k-sec. Longfin dace and desert sucker were the only native species found; the dace was relatively common, but the sucker was uncommon and represented a small proportion of fish caught. Longfin dace was the most abundant species (48% of total catch; Table 8), followed by mosquitofish (36%), fathead minnow (5%), native desert sucker (4%), and common carp, red shiner, black bullhead, channel catfish, green sunfish, and largemouth bass (each 2% or less). Common carp, desert sucker, black bullhead and largemouth bass were represented by both age-0 and age-1+ individuals.

Native lowland leopard frog adults plus non-native bullfrog tadpoles and northern crayfish were present in the San Pedro River.

#### Upper reach, Hereford to Fairbank

A total of 1,123 individuals representing ten species, two native and eight non-native, were taken from the upper reach of the San Pedro (Table 7). Longfin dace and mosquitofish were most abundant (41% of total catch each; Table 8), followed by fathead minnow (6%) native desert sucker (5%), and common carp, red shiner, black bullhead, channel catfish, green sunfish, and largemouth bass (each 2% or less of total catch). Captures of red shiner and channel catfish at the Charleston station (see below) represent the first records for both species in this reach of the San Pedro River.

*Upper station, Hereford, station 1-1-1.*--The Hereford station on San Pedro River was visited on October 13, 2009. Weather was mostly sunny, windy, and warm; air temperature was 26 C at 1230 hrs. The 200-m fixed site was comprised a single, slightly sinuous, monotonous pool habitats, 5-8 m wide and to a maximum of about 1.25-m deep. Water was turbid (visibility < 20 cm), current was slight, and temperature was 18.5 C. There were three debris deposits of down trees and coarse particulate organic matter. Substrate was mud with variable amounts of sand and a few areas of gravel. Banks were mud, deeply incised, and vertical. Riparian vegetation was primarily cottonwood-willow and rushes. The entire 200-m fixed site was sampled by backpack electrofisher; approximately 5% of the pool was covered.

A total of 46 individuals representing four non-native species was taken. Black bullhead was the most common species (50% of the total catch, all age-1+; Table 8), followed by common carp (37%; age-0 plus age-1+ fish), mosquitofish (9%), and largemouth bass (4%). Non-native bullfrog tadpoles occupied at this site.

*Middle station, Lewis Springs, station 1-1-2.*--The Lewis Springs station on San Pedro River was visited on October 13, 2009. Weather was sunny, breezy, and mild (21 C). The 200-m fixed site was comprised of five habitats as follow, down- to upstream: run, pool, riffle, pool, and run. An isolated, shallow, side pool was adjacent to the confluence of the riffle and lower pool. The upstream run was about 60% of the reach, 3-5 m wide, flowing, and relatively shallow (25-35

cm deep). The pools were muddy and greater than 2-m deep, and the lower one was strewn with woody debris. Water was turbid (visibility < 20 cm), and temperature was 18.0 C. Substrate was silty mud in pools, and mostly sand with a component of gravel and cobble in the other habitats. The channel lacked aquatic vegetation or algae but contained some packets of leaves. Banks were mud, deeply incised, and vertical. Riparian vegetation was primarily cottonwood-willow and rushes. The entire 200-m fixed site was sampled by backpack electrofisher; approximately 5-20% of each habitat was covered.

A total of 331 individuals representing eight species, two native and six non-native, was taken (Table 7). Mosquitofish was the most abundant species (66% of total catch, Table 8), followed by native longfin dace (23%) and desert sucker (5%), and common carp, fathead minnow, black bullhead, green sunfish, and largemouth bass (each 2% or less). Non-native bullfrog tadpoles and northern crayfish were present.

*Lower station, Charleston, station 1-1-3.*--The Charleston station on San Pedro River was visited on October 13, 2009. Weather was mostly sunny, breezy, and warm; air temperature was 27.8 C. Water was turbid with a greenish cast, temperature was 22.4 C, and flow was approximately 0.5-1 cfs. The 200-m fixed site was comprised of a single run habitat punctuated by short (1-2 m long) riffle-like areas, and with a single pool-like area. The channel was 2-4 m wide throughout and mostly shallow (10-15 cm) with a few areas to 0.5 m deep. Substrates were variable from silty-sand to imbricated, irregular gravel and cobble. The green alga *Cladophora* was throughout the site but sparse. Banks were muddy, deeply incised and vertical in some places, gradually-to-steeply sloping in others. Riparian vegetation was primarily willow and bulrush. The entire 200-m fixed site was sampled by backpack electrofisher; about 20% of the habitat was covered.

A total of 746 individuals representing seven species, two native and five non-native was taken. Native longfin dace was the most common species (51% of the total catch; Table 8), followed by mosquitofish (32%), fathead minnow (8%), native desert sucker (5%), red shiner (3%), and black bullhead and channel catfish (each 1% or less of catch). Captures of red shiner and channel catfish at the Charleston station represent the first records for both species in this reach of the San Pedro River; prior to this time neither had been encountered further upstream than the vicinity of Aravaipa Creek. Non-native northern crayfish was present at the site.

#### Middle Reach, The Narrows to Redington

A total of 113 individuals a single native species, longfin dace, was taken from one site in the middle reach of the San Pedro River (Table 7). Native lowland leopard frog was present in the reach.

*Upper station, Hughes Ranch, station 1-2-1.*--The Hughes Ranch station on San Pedro River was visited on October 14, 2009. The stream was dry throughout the 200-m fixed site, and above and below. There was evidence of local channel down-cutting at the road crossing at downstream end of the site. No sampling was conducted.

*Lower station, Three Links, station 1-2-3.*--The Three Links station on San Pedro River was visited on October 14, 2009. Weather was sunny, breezy, and mild; air temperature was 18.3 C at 0845 hrs. The 200-m fixed site was comprised of five habitats, down- to upstream: riffle, pool, run, pool, and run. The channel was generally 1-3 m across and mostly 5-10 cm deep, with a few areas up to 30 cm deep along the stream margin where there were cut banks and woody debris. Substrate was variable among habitats and included coarse sand and fine gravel, fine silt was deposited throughout. Water was clear, flow was < 1 cfs, and temperature was 14.5 C. Banks were mud and riparian vegetation was primarily cottonwood-willow and rushes. The entire 200-m fixed site was sampled by backpack electrofisher; approximately 20-80% of each habitat was covered.

A total of 113 native longfin dace was captured (Tables 7 & 8). Fish were schooled and concentrated in small, localized areas. Typical longfin dace spawning depressions were present, as were undetermined larval fish (presumed to be longfin dace). Adult lowland leopard frog occupied the site.

#### Lower reach, Aravaipa Creek to Gila River

A total of 41 individuals representing one native species, longfin dace, was taken from two wetted sites in the lower reach of the San Pedro River (Table 7). Native lowland leopard frog adults were encountered in this reach of the San Pedro River.

*Upper station, Aravaipa Creek, station 1-3-1.*--The Aravaipa Creek station on San Pedro River was visited on October 14, 2009. Weather was sunny, breezy, and warm; temperature was 28.9 C at 1330 hrs. The 200-m fixed site was located approximately 400 m W of the fence at the end of the access road, and comprised of a single, nearly linear, monotonous run. The channel was 2-3 m wide and depths were mostly shallow to a maximum of about 25 cm. Water was turbid and grayish in color, flow was a few cfs at most, and temperature was 25.0 C. Substrate was mostly coarse sand with a high proportion of silt. There was little woody debris or other cover. Banks were mud and the local channel was scarcely incised. Riparian vegetation was primarily cottonwood-willow and tamarisk with a sparse under-story. The entire fixed site was sampled by backpack electrofisher, and approximately 25% of the habitat was covered.

A total of 39 native longfin dace was taken and no other fishes were captured or seen. Adult lowland leopard frog was encountered.

*Middle station, Dudleyville, station 1-3-2.*--The Dudleyville station on San Pedro River was visited on October 15, 2009. Weather was sunny, calm, and mild; air temperature was 18.3 C at 0845 hrs. The 200-m fixed site was comprised a single shallow (maximum depth 25 cm) punctuated by short riffle-like areas. The channel was mostly 0.5 to 1 m wide. Water was clear, movement sluggish, discharge less than 2.5 cfs, and temperature 14.5 C. Substrate was angular gravel and sand mixed with fines. Cover was wanting except for a small area of woody debris and a slight undercut. Banks were mud, steep, and incised to 2 m. Riparian vegetation was primarily cottonwood-willow and tamarisk with a sparse under-story. The entire 200-m fixed site was sampled by backpack electrofisher; approximately 50% of the habitat was covered.

A total of two native longfin dace was taken and no other fishes were seen or captured. Native lowland leopard frog adult was present at this site.

*Lower station, Lower Mouth, station 1-3-3.*--The Lower Mouth station on San Pedro River was visited on October 15, 2009. The entire 200-m fixed site was dry, and there was no evidence of water up- or downstream. No fish sampling was conducted.

### **Aravaipa Creek**

Aravaipa Creek was visited on October 5, 2009. Water was clear, temperature was 19.5 C at 1040 hrs, and discharge was near 9 cfs (USGS 2009). There are two reaches of stream, one each above and below the lower fish barrier, with a single, fixed station in the lower reach. Also sampled are one or more scour pools that may develop below either or both barriers. The 200-m fixed site was a split channel comprised of seven habitats: three runs, three riffles, and a pool. All were sampled by backpack electrofishing and between 10 and 80% of each habitat was covered. Additionally, two, 60-ft x 4-ft deep 1-inch mesh trammel nets were set in the scour pool below the lower barrier apron, and non-quantitative electrofishing was done in the stream segment between the two barriers.

Aravaipa Creek samples comprised seven species, four native and three non-native (Tables 1 & 9). Total quantitative catch including both backpack electrofishing and trammel netting collections was 1,340 individuals. Total backpack electrofishing effort was 1,159 sec, and overall CPE was 1,163 fish per k-sec (Table 2). Longfin dace was the most abundant species and comprised 94% of total catch (Table 10), followed by mosquitofish (3%), red shiner (2%), and roundtail chub, desert sucker, Sonora sucker, and yellow bullhead (each <1% of total catch).

Non-quantitative electrofishing between the barriers included most of the same species as above, but failed to capture the two native suckers.

Entanglement netting below the lower fish barrier (2.1 hrs of trammel net effort) captured a single adult roundtail chub.

Native lowland leopard frog adults were present throughout this site.

### **Cienega Creek**

Cienega Creek was visited on September 16, 2009. There is one reach on the stream between the Interstate 10 freeway bridge and Vail, with two stations. Discharge at various sites within the general area during the period ranged from 0 (dry channel) to perhaps 0.5 cfs; the precedent condition included a flash flow on September 4 that approached 200 cfs in Pantano Wash at a downstream gage near Vail (USGS 2009).

Cienega Creek samples comprised three native species (Tables 1 & 11). Total quantitative catch was 1,034 individuals, total backpack electrofishing effort was 958 sec, and overall CPE was 1,079 fish per k-sec (Table 2). Longfin dace was 94% of total catch, Gila topminnow was 6%, and Gila chub was <1% (Table 12). Native lowland leopard frog was present at one site.

*Upper station, Head Cut, station 9-1-1.*-- The Head Cut station on Cienega Creek was visited on September 16, 2009. Weather was sunny, calm, and warm; air temperature was 27.8 C at 1040 hrs. The 200-m fixed site was comprised of two habitat types, a 200-m long run and connected side pool at the upstream end. Water was clear and temperature was 22.0 C. The channel was 0.25-0.50 m wide, mostly less than 10 cm deep, and flow was estimated less than 0.25 cfs. Substrate was mostly gravel with some fines, and cobble to 30-cm dia. Dense stands of cattail occupied parts of the channel, and watercress was common throughout. In-stream structure was restricted to small areas of coarse organic debris, both with overhanging riparian vegetation. Banks were muddy, steep, and incised. Riparian vegetation was primarily cottonwood-willow with a sparse under-story. The pool was up to 1.5-m deep, with silty-sandy bottom, and bedrock or sandy banks. The entire site was sampled by backpack electrofisher and approximately 20% of the riffle and 30% of the pool was covered. The pool and another, smaller one adjacent upstream also were sampled by 15-ft x 4-ft, ¼-inch mesh straight seine.

A total of 828 individuals representing two native species was taken by quantitative electrofishing and 58 additional individuals of the same two species were captured by seine from the pool at the upstream end of the fixed station. Longfin dace was 93% of the catch and Gila topminnow was 7%. A single Gila chub was captured by seine in the pool upstream of the fixed site. This represents the first occurrence for the Gila River basin fish monitoring program of this species at this reach and site, but the species is known to occur upstream. Lowland leopard frog adults were present at the site.

*Lower station, 3-Bridges, station 9-1-2*--The lower station on Cienega Creek was visited on September 16, 2009. Weather was mostly sunny, breezy, and warm; air temperature was 30.0 C at 1245 hrs. A 200-m fixed site was comprised of a single, long, monotonous run. Water was clear and temperature was 25.0 F. The channel was 1-3 m wide, depth was scarcely more than 10 cm, and flow was estimated about 0.25 cfs. Substrate was silty-sand and gravel; bedrock formed the channel margin in two short places. There was no aquatic vegetation or algae and the canopy was open; riparian vegetation was dominated by mature cottonwood and willow. The entire fixed station was sampled by backpack electrofisher and approximately 15% of the total habitat was covered.

A total of 206 individuals representing two native species (Table 11) was taken in 597 seconds of quantitative electrofishing; overall CPE was 345 fish per k-sec. Longfin dace was 98% of the sample and Gila topminnow comprised the remaining 2% (Table 12).

### **DEVIATIONS FROM PROTOCOL**

The two nominal stations in the Upper Reach of the Gila River, Coolidge Dam (2-1-1) and Hook & Line Ranch (2-1-3), have not been sampled for a number of years, including 2009, because permission to access these sites has been unavailable from the landowner (San Carlos Apache Tribe).

*Lower station, Box-O Wash, station 2-4-3*--The traditional station at the mouth of Box-O Wash station on Gila River was abandoned in 2008 because of access issues. Specifically, we did not have the kind of specialized off-road vehicle that would be needed to safely traverse the undeveloped roadways that lead to the site. Instead, for the second year we sampled an alternative station hereafter referred to as "Price," located at UTM 3661310N 478980E, approximately 1.6 km downstream of the traditional Box-O site (Table 1). This new site required a hike of about 1.6 km along the railroad tracks and a difficult traverse of barbed wire fencing to attain the river flood plain, but otherwise is an acceptable, permanent replacement to the Box-O location. Other suitable alternatives may be evaluated and assessed in the future.

Salt River monitoring was conducted on December 18, 2009. Discharge was approximately 250 cfs below Stewart Mountain Dam and 350 cfs downstream of the Verde River confluence (SRP 2009), substantially greater than the 8-10 cfs that is typical for this time of year. There is only one reach on the Salt River, which extends from below Stewart Mountain Dam downstream to Granite Reef Dam, and three sample stations. However, the two upstream stations (Stewart Mountain Dam and Goldfield Administrative Site) could not be sampled because of the atypically high flows. Additionally, a pair of bald eagle occupied a tree nest near our Goldfield Administrative Site in autumn-winter 2009. Their future presence at the site could preclude our sampling in the area, and the situation will be addressed annually.

## VOUCHER MATERIALS

Voucher material was fixed, preserved, and retained for accurate determination of two (2) fathead minnow, ten (10) red shiner, and five (5) channel catfish from San Pedro River at Charleston. Digital color photographs were taken to document the record of Gila chub from Cienega Creek at Head-Cut.

## RECOMMENDATIONS

The two nominal stations that comprise the Upper Reach of Gila River should be deleted from the program unless reliable assurance that access will be granted can be obtained from the San Carlos Apache Tribe, which is the landowner. Current protocol as we understand is that the permissions process involving native American tribes is mediated by U.S. Fish and Wildlife Service, which is to act as liaison between the monitoring program and the landowner. Reclamation is encouraged to enter into discussions with the Service in attempt to resolve the long-standing stalemate, or failing that, to open communications directly with the tribe.

## SUMMARY

Fishes of the Gila, Salt, and San Pedro rivers and Aravaipa and Cienega creeks, Arizona, were monitored using standard fishery methods during autumn-winter 2009. A total of 4,234 individuals representing six native and 14 non-native species was encountered during quantitative sampling. New distributional records were recorded for San Pedro River (red shiner and channel catfish in Upper Reach at Charleston station) and for Cienega Creek (Gila chub at Head Cut). Natives were longfin dace, Gila chub, roundtail chub, desert sucker, Sonora sucker, and Gila topminnow. Non-natives were threadfin shad, common carp, red shiner, fathead minnow, flathead catfish, channel catfish, black bullhead, yellow bullhead, mosquitofish, largemouth bass, black crappie, bluegill, green sunfish, and blue tilapia. Total standardized electrofishing effort across all five streams was 13,186 sec and mean catch per unit effort was 321 fish per 1,000 sec.

Gila River catch was 494 individuals representing eight species, all non-native. Total electrofishing effort was 5,617 sec and overall CPE was 88 fish per k-sec. Mosquitofish was the most abundant species in the Gila River sample (55 % of total catch).

Only one of three Salt River sites was sampled because of high water. Six species, one native and five non-native, were encountered. Total catch was 81 individuals, total boat electrofishing effort was 1,190 sec, and overall CPE was 68 fish per k-sec. Non-native largemouth bass was the most abundant species (86% of total catch), and native Sonora sucker was 4% of the catch.

Ten species, two native and eight non-native, were encountered in the San Pedro River. Total catch was 1,277 individuals, total electrofishing effort was 4,262 sec, and overall CPE was 300 fish per k-sec. Native longfin dace was the most common species in the San Pedro River sample (48% of total catch). The other native species, desert sucker, was 4% of the catch and restricted to the upstream-most reach.

Aravaipa Creek quantitative samples below the fish barrier comprised 1,348 individuals among seven species, four native and three non-native. Effort was 1,159 sec and CPE was 1,163 fish per k-sec. Native longfin dace was the most common species (94% of total catch). Qualitative samples above (between) the fish barriers included most of the species in quantitative samples.

Cienega Creek samples comprised three native species, longfin dace (94% of total catch), Gila topminnow (6%), and a single Gila chub (< 1%). Total catch was 958 individuals, electrofishing effort was 1,034 sec, and CPE was 1,079 fish per k-sec.

In addition to fishes, native leopard frog plus non-native northern crayfish and bullfrog were also encountered.

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Table 1. Common and scientific names of fishes taken during 2009 annual monitoring of the Gila, Salt, and San Pedro (SanP) rivers and Aravaipa (Arav) and Cienega creeks, Arizona. Four-letter species abbreviations in parentheses after common name. Native species indicated by asterisk (\*); + indicates presence, 0 indicates absence.

Species	Gila	Salt	SanP	Arav	Cienega
Threadfin shad (DOPE) <i>Dorosoma petenense</i>	+	0	0	0	0
Carp (CYCA) <i>Cyprinus carpio</i>	+	0	+	0	0
Fathead minnow (PIPR) <i>Pimephales promelas</i>	0	0	+	0	0
*Gila chub (GIIN) <i>Gila intermedia</i>	0	0	0	0	+
*Longfin dace (AGCH) <i>Agosia chrysogaster</i>	0	0	+	+	+
Red shiner (CYLU) <i>Cyprinella lutrensis</i>	+	0	+	+	0
*Roundtail chub (GIRO) <i>Gila robusta</i>	0	0	0	+	0
*Desert sucker (PACL) <i>Pantosteus clarki</i>	0	0	+	+	0
*Sonora sucker (CAIN) <i>Catostomus insignis</i>	0	+	0	+	0
Black bullhead (AMME) <i>Ameiurus melas</i>	0	0	+	0	0
Channel catfish (ICPU) <i>Ictalurus punctatus</i>	+	0	+	0	0
Flathead catfish (PYOL) <i>Pylodictis olivaris</i>	+	0	0	0	0
Yellow bullhead (AMNA) <i>Ameiurus natalis</i>	0	+	0	+	0
*Gila topminnow (POOC) <i>Poeciliopsis occidentalis</i>	0	0	0	0	+
Mosquitofish (GAFF) <i>Gambusia affinis</i>	+	0	+	+	0
Black crappie (PONI) <i>Pomoxis nigromaculatus</i>	+	0	0	0	0
Bluegill (LEMA) <i>Lepomis macularius</i>	0	+	0	0	0
Green sunfish (LECY) <i>Lepomis cyanellus</i>	+	+	+	0	0
Largemouth bass (MISA) <i>Micropterus salmoides</i>	0	+	+	0	0
Blue tilapia (ORAU) <i>Oreochromis aureus</i>	0	+	0	0	0
Total species (taxa)	8	6	10	7	3
Native/non-native species	0/8	1/5	2/8	4/3	3/0
Percent native	0	17	20	57	100

Table 2. Effort (real-time back-pack or boat [Salt River only] electrofishing, in seconds), total catch (number) and catch per unit effort (CPE, no. per 1000 seconds) at the stream level for quantitative fish monitoring of the Gila, Salt, and San Pedro rivers and Aravaipa and Cienega creeks, autumn-winter 2009.

Gear	Stream	Effort (sec)	Catch	
			(no.)	CPE (no. per k-sec)
Bp	Gila	5617	494	88
Ef	Salt	1190	81	68
Bp	San Pedro	4262	1277	300
Bp	Aravaipa Creek	1159	1348	1163
Bp	Cienega Creek	958	1034	1079
Total (mean)		13186	4234	(321)

Table 3. Number of fish of each species and age caught by quantitative methods, by reach and station, from the Gila River during routine monitoring, November 15-17, 2009.

Species	Age	Reach							Reach			Totals		
		2-2-1	2-2-2	2-2-3	Sum	2-3-1	2-3-2	2-3-3	Sum	2-4-1	2-4-2		2-4-3	
Threadfin shad	0	1	0	0	1	2	0	0	2	5	0	7	12	15
Common carp	1	3	5	0	8	0	0	0	0	1	0	0	1	9
Red shiner		51	10	15	76	70	0	1	71	0	0	1	1	148
Channel catfish	0	7	0	7	14	2	6	0	8	0	0	1	1	23
	1	0	2	0	2	0	0	0	0	0	2	0	2	4
Flathead catfish	0	0	1	2	3	1	0	0	1	1	1	3	5	9
	1	1	2	2	5	5	0	0	5	1	0	0	1	11
Mosquitofish		6	89	64	159	37	3	26	66	24	12	11	47	272
Black crappie	0	1	0	0	1	0	0	0	0	0	0	0	0	1
Green sunfish	0	0	0	0	0	2	0	0	2	0	0	0	0	2
Totals		70	109	90	269	119	9	27	155	32	15	23	70	494

Table 4. Proportion of catch of each species and age as percent of total catch by quantitative methods, by reach and station, from the Gila River during routine monitoring, November 15-17, 2009.

Species	Age	Reach							Reach			Totals		
		2-2-1	2-2-2	2-2-3	Sum	2-3-1	2-3-2	2-3-3	Sum	2-4-1	2-4-2		2-4-3	
Threadfin shad	0	1.4	0.0	0.0	0.4	1.7	0.0	0.0	1.3	15.6	0.0	17.5	13.8	2.9
Common carp	1	4.3	4.6	0.0	3.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	1.1	1.8
Red shiner		72.9	9.2	16.7	28.3	58.8	0.0	3.7	45.8	0.0	0.0	2.5	1.1	29.0
Channel catfish	0	10.0	0.0	7.8	5.2	1.7	66.7	0.0	5.2	0.0	0.0	30.0	13.8	6.7
	1	0.0	1.8	0.0	0.7	0.0	0.0	0.0	0.0	0.0	13.3	15.0	9.2	2.0
Flathead catfish	0	0.0	0.9	2.2	1.1	0.8	0.0	0.0	0.6	3.1	6.7	7.5	5.7	1.8
	1	1.4	1.8	2.2	1.9	4.2	0.0	0.0	3.2	3.1	0.0	0.0	1.1	2.2
Mosquitofish		8.6	81.7	71.1	59.1	31.1	33.3	96.3	42.6	75.0	80.0	27.5	54.0	53.2
Black crappie	0	1.4	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Green sunfish	0	0.0	0.0	0.0	0.0	1.7	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.4
Totals		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 5. Number of fish of each species and age caught by quantitative methods, by station, from the Salt River during routine monitoring, December 18, 2009. There is only one monitoring reach on the Salt River

Species	Age	Reach		Totals
		3-1-3	Sum	
Sonora sucker*	0	1	1	1
	1	2	2	2
Yellow bullhead	1	1	1	1
Bluegill	0	1	1	1
	1	3	3	3
Green sunfish	1	2	2	2
Largemouth bass	0	65	65	65
	1	5	5	5
Blue tilapia	1	1	1	1
Totals		81	81	81

Table 6. Proportion of catch of each species and age as percent of total catch by quantitative methods, by station, from the Salt River during routine monitoring, December 18, 2009.

Species	Age	Reach		Totals
		3-1-3	Sum	
Sonora sucker*	0	1.2	1.2	1.2
	1	2.5	2.5	2.5
Yellow bullhead	1	1.2	1.2	1.2
Largemouth bass	0	80.2	80.2	80.2
	1	6.2	6.2	6.2
Green sunfish	1	2.5	2.5	2.5
Bluegill	0	1.2	1.2	1.2
	1	3.7	3.7	3.7
Blue tilapia	1	1.2	1.2	1.2
Totals		100.0	100.0	100.0

Table 7. Number of fish of each species and age caught by quantitative methods, by reach and station, from the San Pedro River during routine monitoring, October 13-15, 2009.

Species	Age	Reach			Sum	Reach			Sum	Totals
		1-1-1	1-1-2	1-1-3		1-2-3	1-3-1	1-3-2		
Common carp	0	12	2	0	14	0	0	0	0	14
	1	5	0	0	5	0	0	0	0	5
Fathead minnow		0	1	63	64	0	0	0	0	64
Longfin dace*		0	76	383	459	113	113	39	2	613
Red shiner		0	0	19	19	0	0	0	0	19
Desert sucker*	0	0	13	33	46	0	0	0	0	46
	1	0	4	2	6	0	0	0	0	6
Black bullhead	0	0	2	0	2	0	0	0	0	2
	1	23	1	1	25	0	0	0	0	25
Channel catfish	0	0	0	5	5	0	0	0	0	5
Mosquitofish		4	219	240	463	0	0	0	0	463
Green sunfish	0	0	8	0	8	0	0	0	0	8
Largemouth bass	0	1	5	0	6	0	0	0	0	6
	1	1	0	0	1	0	0	0	0	1
Totals		46	331	746	1123	113	113	39	2	1277

Table 8. Proportion of catch of each species and age as percent of total catch by quantitative methods, by reach and station, from the San Pedro River during routine monitoring, October 13-15, 2009.

Species	Age	Reach			Reach			Reach			Totals
		1-1-1	1-1-2	1-1-3	Sum	1-2-3	Sum	1-3-1	1-3-2	Sum	
Common carp	0	26.1	0.6	0.0	1.2	0.0	0.0	0.0	0.0	0.0	1.1
	1	10.9	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.4
Fathead minnow		0.0	0.3	8.4	5.7	0.0	0.0	0.0	0.0	0.0	5.0
Longfin dace*		0.0	23.0	51.3	40.9	100.0	100.0	100.0	100.0	100.0	48.0
Red shiner		0.0	0.0	2.5	1.7	0.0	0.0	0.0	0.0	0.0	1.5
Desert sucker*	0	0.0	3.9	4.4	4.1	0.0	0.0	0.0	0.0	0.0	3.6
	1	0.0	1.2	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.5
Black bullhead	0	0.0	0.6	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
	1	50.0	0.3	0.1	2.2	0.0	0.0	0.0	0.0	0.0	2.0
Channel catfish	0	0.0	0.0	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.4
Mosquitofish		8.7	66.2	32.2	41.2	0.0	0.0	0.0	0.0	0.0	36.3
Green sunfish	0	0.0	2.4	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.6
Largemouth bass	0	2.2	1.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5
	1	2.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Totals		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 9. Number of fish of each species and age caught by quantitative methods (backpack electrofishing, Reach 1 and trammel netting, Reach 2) from Aravaipa Creek during routine monitoring, October 5, 2009. See text for additional details about sampling gears and locations.

Species	Age	Reach			Reach		Totals
		8-1-1	Sum	8-2-1	8-2-2	Sum	
Longfin dace*		3	3	0	1263	1263	1266
Red shiner		2	2	0	28	28	30
Roundtail chub*	1	1	1	1	3	4	5
Desert sucker*	1	0	0	0	3	3	3
Sonora sucker*	0	0	0	0	1	1	1
Yellow bullhead	1	1	1	0	4	4	5
Mosquitofish		1	1	0	37	37	38
Totals		8	8	1	1339	1340	1348

Table 10. Proportion of catch of each species and age as percent of total catch by quantitative methods (backpack electrofishing, Reach 1 and trammel netting, Reach 2) from Aravaipa Creek during routine monitoring, October 5, 2009. See text for additional details about sampling gears and locations.

Species	Age	Reach			Reach		Totals
		8-1-1	Sum	8-2-1	8-2-2	Sum	
Longfin dace*		37.5	37.5	0.0	94.3	94.3	93.9
Red shiner		25.0	25.0	0.0	2.1	2.1	2.2
Roundtail chub*	1	12.5	12.5	100.0	0.2	0.3	0.4
Desert sucker*	1	0.0	0.0	0.0	0.2	0.2	0.2
Sonora sucker*	0	0.0	0.0	0.0	0.1	0.1	0.1
Yellow bullhead	1	12.5	12.5	0.0	0.3	0.3	0.4
Mosquitofish		12.5	12.5	0.0	2.8	2.8	2.8
Totals		100.0	100.0	100.0	100.0	100.0	100.0

Table 11. Number of fish of each species and age caught by quantitative methods, by station, from Cienega Creek during routine monitoring, September 16, 2009. There is only one monitoring reach on Cienega Creek.

Species	Age	Reach			Totals
		9-1-1	9-1-2	Sum	
Gila chub*	1	1	0	1	1
Longfin dace*		771	201	972	972
Gila topminnow*		56	5	61	61
Totals		828	206	1034	1034

Table 12. Proportion of catch of each species and age as percent of total catch by quantitative methods, by station, from Cienega Creek during routine monitoring, September 16, 2009. There is only one monitoring reach on Cienega Creek.

Species	Age	Reach			Totals
		9-1-1	9-1-2	Sum	
Gila chub*	1	0.1	0.0	0.1	0.1
Longfin dace*		93.1	97.6	94.0	94.0
Gila topminnow*		6.8	2.4	5.9	5.9
Totals		100.0	100.0	100.0	100.0