

**EL CORONADO RANCH HABITAT CONSERVATION PLAN 2013  
FISH MONITORING REPORT**



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*Yaqui chub*



*Yaqui catfish*



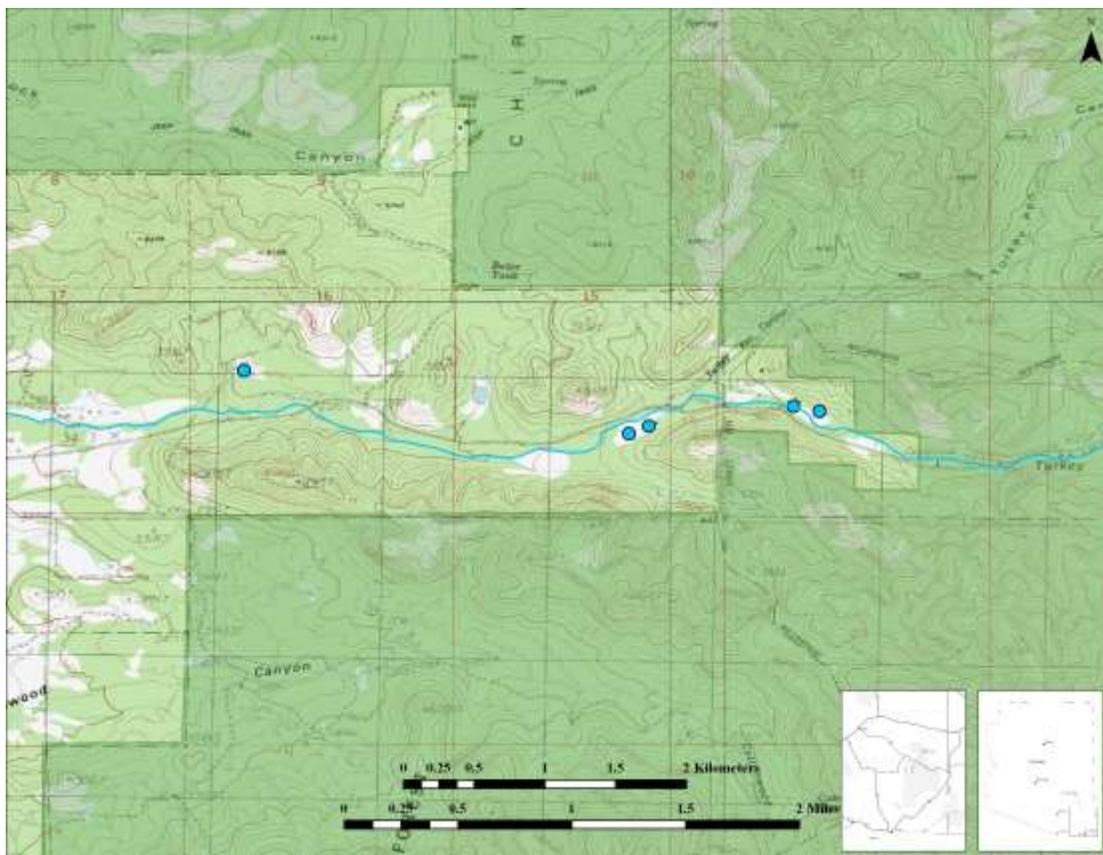
*Mexican stoneroller*



*longfin dace*

## INTRODUCTION

In 1998, El Coronado Ranch owners Josiah and Valer Austin entered into Arizona's first Habitat Conservation Plan (HCP), which allowed cattle ranch operations to continue while at the same time instituting conservation measures for the federally endangered Yaqui chub *Gila purpurea*. The El Coronado Ranch HCP and Implementation Agreement (USFWS 1998a; 1998b) require that monitoring and reporting on the success of conservation measures occur annually for the first five years of the permit. Coleman (2002) provided a thorough review of the biogeography of Rio Yaqui fishes in Arizona and the HCP study area (Figure 1), along with recent management efforts and results of fish monitoring conducted in 2000 and 2001. In 2003, the Arizona Fish and Wildlife Conservation Office (previously Fishery Resources Office) assumed responsibility to coordinate HCP fish monitoring efforts with the San Bernardino National Wildlife Refuge, and reports (Brouder 2003, 2004, 2006; Voeltz 2006; Johnson 2007; Voeltz 2009, Voeltz 2010) summarizing these activities were provided to all interested parties. In 2011 San Bernardino NWR assumed full responsibility of the HCP monitoring and associated report. This report summarizes results of the 2012 El Coronado Ranch HCP fish monitoring effort that continued to follow procedures outlined in the finalized El Coronado Ranch HCP Monitoring Plan (Coleman and Minckley 2003). Appendix A provides a summary table comparing this year's results with past monitoring results (Brouder 2005, 2006; Voeltz 2006, Johnson 2007; Voeltz 2009, Voeltz 2010, Lohrengel 2011, Lohrengel 2012).



**Figure 1.** General locations of El Coronado Ranch and Its Impoundments.

## **WEATHER AND OTHER INFLUENCES DURING YEAR**

El Coronado Ranch still shows signs of damage from the Horseshoe Two fire, but all areas of interest are recovering. The creek, due to post fire floods the last two years has had its pools scoured of the majority of sediment that was dumped there from floods immediately following the fire and understory vegetation on most of the burned areas has regenerated to near pre-fire levels.

Weather for the year followed the typical pattern for the region with the majority of precipitation coming during the summer monsoons. Winter precipitation was enough that the tanks on El Coronado held adequate water through the spring, with the exception of Dale's Tank, which had to be salvaged on June 5, during supplemental spring monitoring. Summer monsoons were above average and all tanks at the time of this monitoring were at capacity. Of note, all water from West Turkey Creek was being diverted to Big Tank. What little water remained in the creek between the diversion dam and the fish barrier was from underground seepage through the diversion dam. Just below the fish barrier a natural seep replenished the creek and a good flow was maintained in the creek from this point to at least the El Coronado Ranch Boundary.

## EL CORONADO RANCH PONDS SURVEY

### Big Tank

#### Methods

Four 20-m trammel nets, two 50-m trammel nets, one 20-m gill net, 16 baited minnow traps, and 20 baited mini-pomars (hoop net) were fished for approximately 42.5 hours each on a continuous period from 3:30 pm, October 21 to 10:00 am, October 23. The nets were checked three times, once at approximately 8:30 am on the 22<sup>nd</sup>, then again at 2:00 pm that same afternoon and then at 9:00 am on the 23<sup>rd</sup> when they were pulled from Big Tank. The use of the minnow traps; which were set up similar to a trout line, with all traps tied to a 20 meter long common line; were set to capture juvenile catfish if present. When Yaqui catfish (*Ictalurus pricei*) are captured they are measured for total length (TL; mm) and weighed (WT; g). Yaqui catfish captured are also scanned for the presence of a Passive Integrated Transponder (PIT) tag and fin clipped for genetic analysis. Black crappie (*Pomoxis nigromaculatus*) and green sunfish (*Lepomis cyanellus*) were counted and removed permanently.

**Table 1.** Yaqui catfish captures in 2013

| PIT Tag #  | Date     | Location  | Length | Mass   |
|------------|----------|-----------|--------|--------|
| 5326330672 | 10/07/00 | Lisa Tank | 294    | 680.4  |
|            | 06/05/13 | Big Tank  | 445    | 1110   |
| 5321062E1B | 10/07/00 | Lisa Tank | 275    | 623.7  |
|            | 06/05/13 | Big Tank  | 455    | 1220   |
| 5326185551 | 10/14/00 | Lisa Tank | 347    | 765.45 |
|            | 06/05/13 | Big Tank  | 410    | 815    |
| 5326427175 | 10/14/00 | Lisa Tank | 304    | 652.05 |
|            | 04/26/10 | Big Tank  | 391    | 520    |
|            | 06/05/13 | Big Tank  | 405    | 795    |
| 53212C0679 | 10/07/00 | Lisa Tank | 320    | 765.45 |
|            | 06/05/13 | Big Tank  | 440    | 935    |
| 532646705A | 10/14/00 | Lisa Tank | 295    | 652.05 |
|            | 06/06/13 | Big Tank  | 393    | 532    |
| 442150500E | 10/18/05 | Big Tank  | 382    | 690    |
|            | 10/22/13 | Big Tank  | 433    | 1015   |
| 5325794144 | 10/07/00 | Lisa Tank | 260    | 567    |
|            | 10/22/13 | Big Tank  | 502    | 1350   |
| 532635680B | 10/07/00 | Lisa Tank | 248    | 850.5  |
|            | 10/22/13 | Big Tank  | 390    | 580    |
| 532656635F | 10/14/00 | Lisa Tank | 238    | 510.3  |
|            | 10/22/13 | Big Tank  | 455    | 1040   |
| 532648322B | 10/14/00 | Lisa Tank | 282    | 623.7  |
|            | 06/24/09 | Big Tank  | 401    | 670    |
|            | 10/05/11 | Big Tank  | 410    | 710    |
|            | 10/23/13 | Big Tank  | 420    | 985    |

*Catfish from Lisa Tank were moved to Big Tank in October 2000*

## Results

A total of eleven catfish were captured this year, six in June, five on the 6th and one on the 7<sup>th</sup>, and five in October, four on the 22 and one on the 23<sup>rd</sup>. The table above shows the individual numbers and measurements for this years captured individuals, as well as their mark and recapture history.

## Discussion

Recaptured fish over the years tend to be unique (meaning, with the exception of three fish, we are not recapturing fish that have previously been captured in Big Tank). However, since re-encountered Big Tank fish are rare, it is difficult to get a population estimate to determine how many of the original 254 Yaqui catfish that were stocked remain, or if any reproduction has occurred (several catfish have been caught over the years without PIT-tags – either they shed their tags or were a result of reproduction, as all 254 stocked fish were tagged, although 8 tags are unknown). Since the fish were from the 1996 year class from the hatchery, they are now ~17 years old, which has exceeded the reported maximum life-span for the related channel catfish *Ictalurus punctatus*, which sometimes lives more than 10 years, but typically does not exceed six or seven years (Pflieger 1997).

Captures of green sunfish continue to go down, while black crappie saw and increase this year (see table below). It was discussed after the 2009 monitoring effort to do a rehabilitation on Big Tank, mostly to; 1) collect as many Yaqui catfish as possible to develop a population estimate and attempt to document recruitment, 2) remove all non-natives, green sunfish and black crappie, 3) and attempt to capture any longfin dace *Agosia sp.* or Yaqui chub that have been stocked several times, yet never recaptured. The rehab was not carried out due to significant winter precipitation in the area leading to maximum capacity water levels in Big Tank. The restoration of Big Tank was discussed again this year, and it is still highly recommended that Big Tank be allowed to dry/be drawn down so that a restoration may be performed, but due to the ongoing drought and the need for ranchers to hold onto as much water as possible, it is unlikely to occur in the near future.

**Table 2.** Numbers of fish collected between 2003 and 2013 from monitoring at Big Tank (effort and monitoring season is not the same for each year).

| Year | <u>Yaqui catfish</u> | <u>Black crappie</u> | <u>Grass carp</u> | <u>Green sunfish</u> |
|------|----------------------|----------------------|-------------------|----------------------|
| 2003 | 2                    | 20                   | 1                 | 0                    |
| 2004 | 1                    | 11                   | 0                 | 0                    |
| 2005 | 2                    | 0                    | 0                 | 0                    |
| 2006 | 3                    | 5                    | 0                 | 0                    |
| 2007 | 3                    | 0                    | 0                 | 0                    |
| 2008 | 2                    | 15                   | 0                 | 3                    |
| 2009 | 12                   | 137                  | 0                 | 24                   |
| 2010 | 5                    | *                    | *                 | *                    |
| 2011 | 2                    | 7                    | 0                 | 33                   |
| 2012 | 0                    | 1                    | 0                 | 14                   |
| 2013 | 11                   | 14                   | 0                 | 5                    |

\*data unavailable

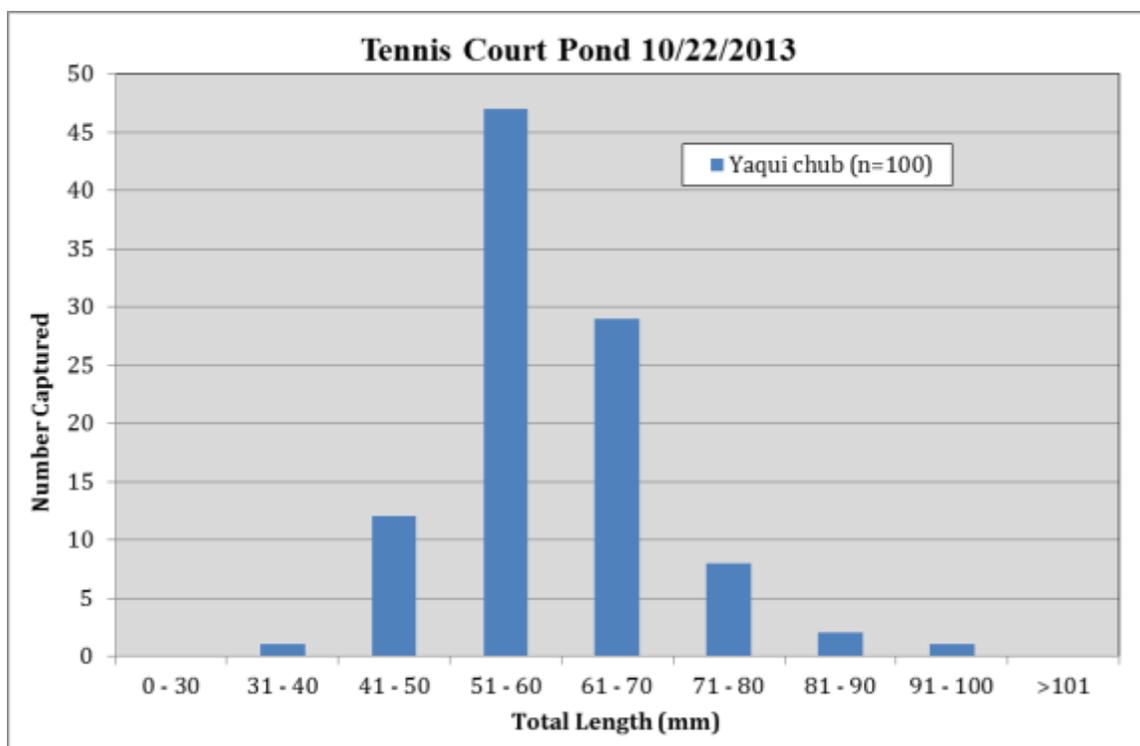
## Tennis Court Pond

### Methods

Twelve minnow traps were fished overnight (1310-hr to 0930-hr) on October 21-22, 2013 in the Tennis Court Pond. A sub-sample of fish collected were measured and immediately released back into Tennis Court Pond. CPUE was calculated as the number of fish/total hours (hours x # of traps) of trapping.

### Results

A total of 554 Yaqui chub were collected in approximately 18.5 hours of sampling. Mean CPUE of Yaqui chub collected in minnow traps was 2.2709 fish/hour. Mean total length of the sub-sample of Yaqui chub measured was 61.66 mm and ranged in size from 40 to 97 mm. 47% of fish in the measured sub-sample were of the 51-60 mm modal length class. The smallest individual encountered was in the 31-40 mm modal class length.



**Figure 2.** Length-frequency histogram of a sub-sample of Yaqui chub collected in Tennis Court Pond during El Coronado Ranch HCP monitoring in October 2013.

### Discussion

Tennis Court Pond has high numbers of Yaqui chub when the pond consistently holds water (Table 3 above). However, the pond dried in 2006, and no fish were collected in 2006 or 2007. In October 2007 (following the fall monitoring effort), 68 Yaqui chub were relocated from Lower Guesthouse Pond to re-establish the population in Tennis Court Pond. The explosion in population size between 2008 and 2009 can be attributed to consistent water levels in the pond.

The pond dried again in 2011 prior to the monsoon season. No fish were stocked into Tennis Court Pond from other locations on the ranch due to the effects of the Horseshoe II fire that year which, because of post-fire flooding, deposited large amounts of ash and sediment into the pond

and also a general lack of sufficient numbers of Yaqui chub throughout the ranch. At the completion of the 2012 monitoring, 450 Yaqui chub were moved from Upper Guesthouse Pond to Tennis Court Pond.

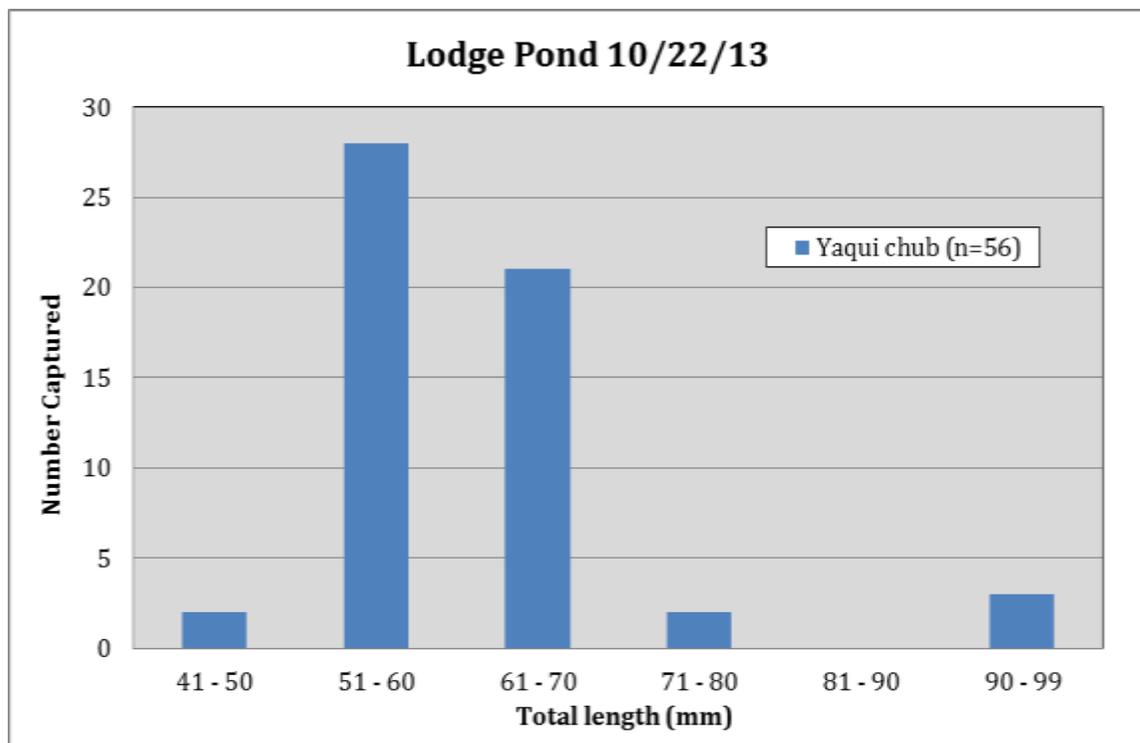
**Table 3.** Numbers of fish collected between 2003 and 2013 from Tennis Court Pond.

| Year | <u>Longfin dace</u> | <u>Yaqui chub</u> |
|------|---------------------|-------------------|
| 2003 | 0                   | 799               |
| 2004 | 0                   | 413               |
| 2005 | 0                   | 363               |
| 2006 | 0                   | 0                 |
| 2007 | 0                   | 0                 |
| 2008 | 0                   | 70                |
| 2009 | 0                   | 1264              |
| 2010 | 0                   | 1023              |
| 2011 | 0                   | 0                 |
| 2012 | 0                   | 0                 |
| 2013 | 0                   | 554               |

### Lodge Pond

#### *Methods*

Twelve minnow traps were fished overnight (1320-hr to 0930-hr) on October 21-22, 2013 in the Lodge Pond. All fish collected were measured and immediately released back into Lodge Pond. CPUE was calculated as the number of fish/total hours of trapping.



**Figure 3.** Length-frequency histogram of a sub-sample of Yaqui chub collected in Lodge Pond during El Coronado Ranch HCP monitoring in October 2013.

### *Results*

A total of 56 Yaqui chub were collected in approximately 20.16 hours of sampling. Mean CPUE of Yaqui chub collected in minnow traps was 0.231481 fish/hour. Mean total length of the sampled Yaqui chub measured was 64.71429 mm and ranged in size from 50 to 100 mm. 50% of fish in the measured sample were of the 51-60 mm modal length class. There were no fish in the < 40 mm modal class length. (See Figure 3 above)

### *Discussion*

Although not a traditional standard sampling site, Lodge Pond has been monitored every October since 2006 (Table 3 below) due to salvage efforts that occurred on May 31, 2006 (Voeltz 2006, Johnson 2007) and the restocking of 42 Yaqui chub on November 7, 2006 (Johnson 2007). Lodge Pond should continue to be sampled every year from now on, and fish used for re-establishment throughout the ranch, as needed. In addition, Yaqui topminnow should be stocked under the AGFD's (Arizona Game and Fish Department) Safe Harbor Agreement for topminnows and pupfish in Arizona (AGFD 2007).

The decrease in numbers since last year's monitoring is not of concern. There is an abundance of submerged vegetation in the pond and through experience conditions such as this tend to lead to fewer chub captures. During supplemental monitoring in June ninety-eight chub were captured.

**Table 4.** Numbers of fish collected between 2006 and 2012 from Lodge Pond.

| Year | <u>Longfin dace</u> | <u>Yaqui chub</u> | <u>Mexican stoneroller</u> |
|------|---------------------|-------------------|----------------------------|
| 2006 | 0                   | 0                 | -                          |
| 2007 | 0                   | 4                 | 0                          |
| 2008 | 0                   | 237               | 1                          |
| 2009 | 0                   | 1531              | 0                          |
| 2010 | 0                   | 862               | 0                          |
| 2011 | 0                   | 113               | 0                          |
| 2012 | 0                   | 391               | 0                          |
| 2013 | 0                   | 56                | 0                          |

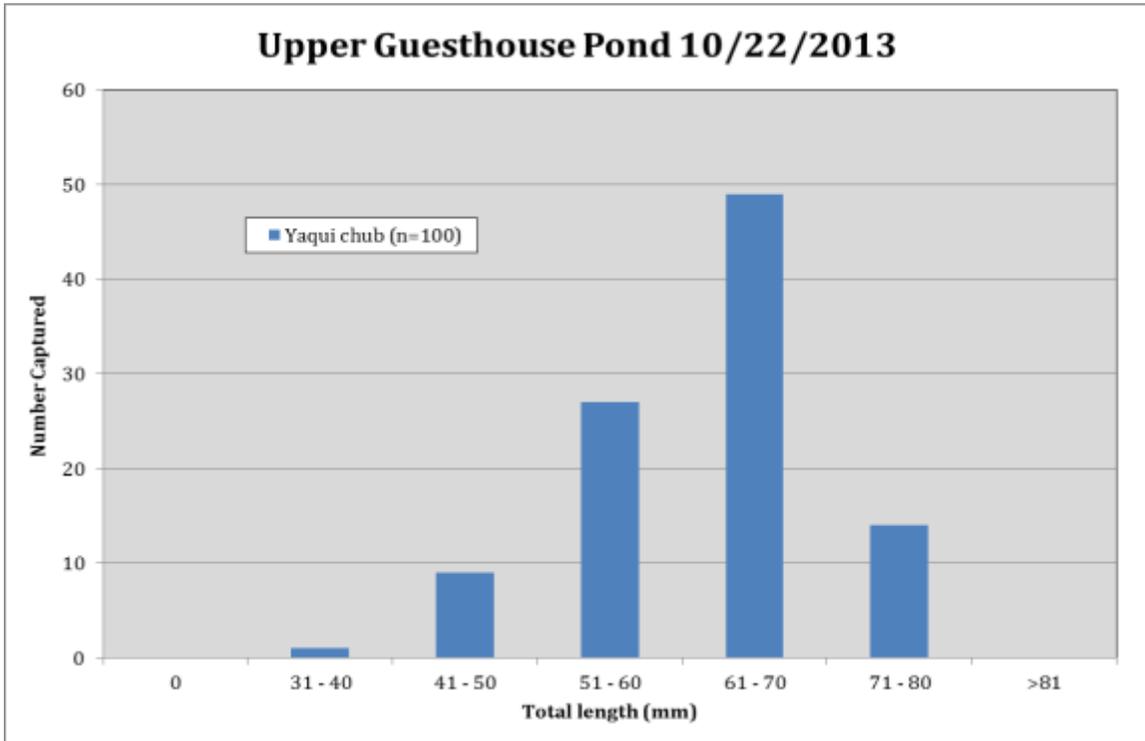
### **Upper Guesthouse Pond**

#### *Methods*

Twelve minnow traps were fished overnight (1530-hr to 0900-hr) on October 2-3, 2012 in the Upper Guesthouse Pond. A sub-sample of fish collected were measured and immediately released back into Lodge Pond. CPUE was calculated as the number of fish/total hours of trapping.

#### *Results*

A total of 1,431 Yaqui chub were collected in approximately 18.58 hours of sampling. Mean CPUE of Yaqui chub collected in minnow traps was 5.26 fish/hour. Mean total length of the sub-sample of Yaqui chub measured was 63.42 mm and ranged in size from 40 to 80 mm. 49% of fish in the measured sub-sample were of the 61-70 mm modal length class. The smallest fish sampled was in the 31-40 mm modal class length. (See Figure 4 below)



**Figure 4.** Length-frequency histogram of a sub-sample of Yaqui chub collected in Upper Guest House Pond during El Coronado Ranch HCP monitoring in October 2013.

*Discussion*

Numbers of fish captured in Upper guesthouse remain strong, allowing for it to be used again to stock ponds with no fish or very few fish, as was the case with Dale’s Tank. In June, approximately 430 Yaqui chub were salvaged from Dale’s Tank and stocked into Upper Guesthouse Pond. At the conclusion of this monitoring approximately 200 chub were placed back into Dale’s Tank.

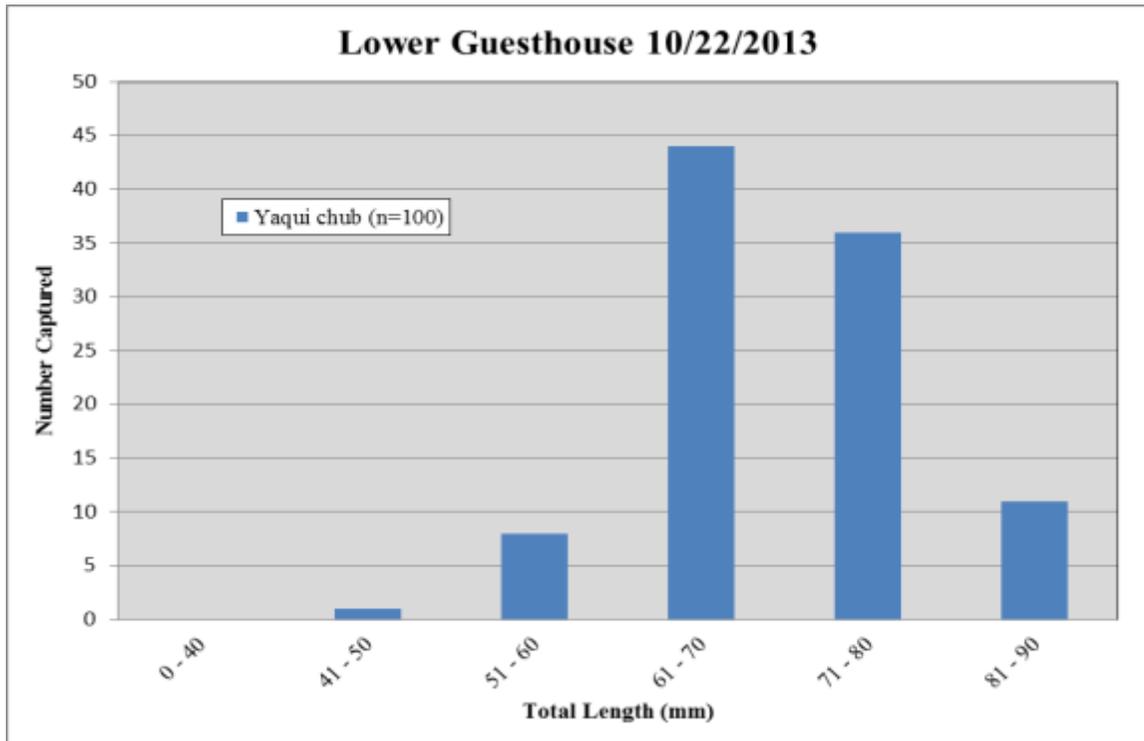
**Table 5.** Numbers of fish collected between 2003 and 2012 from Upper Guesthouse Pond.

| Year | <u>Longfin dace</u> | <u>Yaqui chub</u> |
|------|---------------------|-------------------|
| 2003 | 0                   | 1                 |
| 2004 | 0                   | 0                 |
| 2005 | 11                  | 240               |
| 2006 | 110                 | 0                 |
| 2007 | 0                   | 0                 |
| 2008 | 0                   | 52                |
| 2009 | 6                   | 2151              |
| 2010 | 0                   | 1131              |
| 2011 | 0                   | 0                 |
| 2012 | 0                   | 1431              |
| 2013 | 0                   | 1174              |

## Lower Guesthouse Pond

### Methods

Twelve minnow traps were fished overnight (1415-hr to 0900-hr) on October 21-22, 2013 in the Lower Guesthouse Pond. A sub-sample of fish collected were measured and immediately released back into Lodge Pond. CPUE was calculated as the number of fish/total hours of trapping.



**Figure 5.** Length-frequency histogram of a sub-sample of Yaqui chub collected in Lower Guest House Pond during El Coronado Ranch HCP monitoring in October 2012.

### Results

A total of 2 Yaqui chub were collected in about 18.75 hours of sampling. Mean CPUE of Yaqui chub collected in minnow traps was 1.3244 fish/hour. The number of fish captured was too small to allow for any true statistical analysis of age structure. Mean total length of the sub-sample of Yaqui chub measured was 71.31 mm and ranged in size from 50 to 88 mm. 44% of fish in the measured sub-sample were of the 61-70 mm modal length class. There were no fish in the < 50 mm modal class length. (See Figure 5 above)

### Discussion

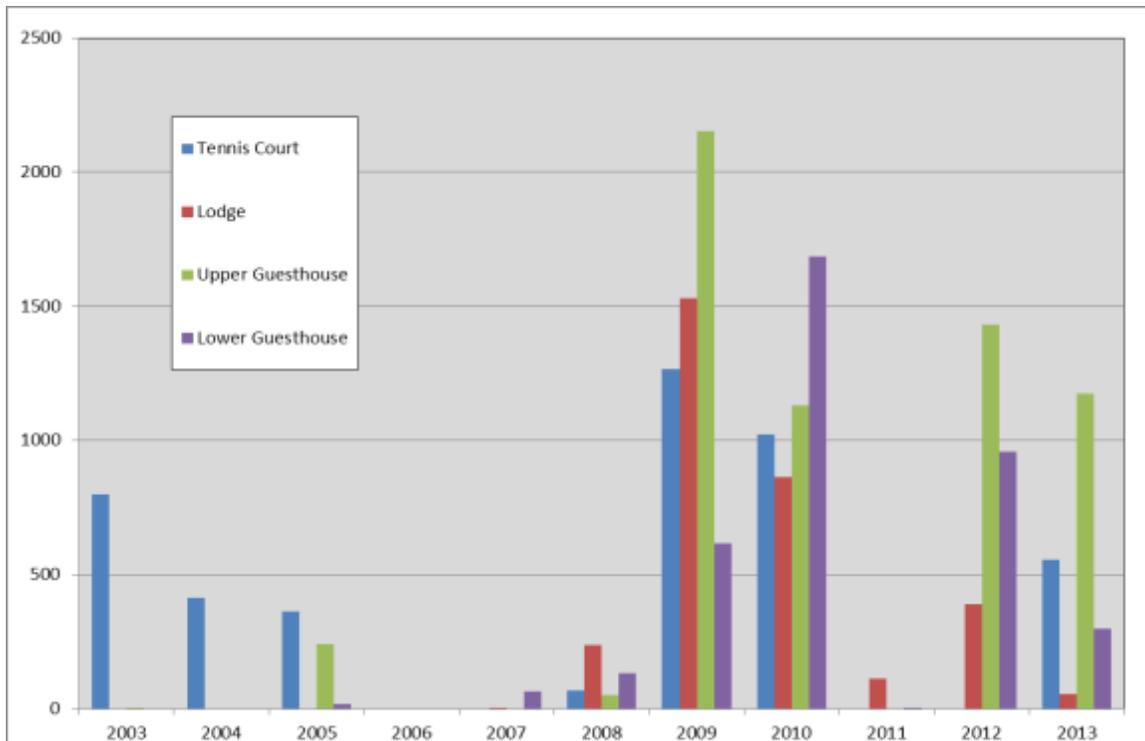
As with Lodge Pond it is assumed that the low number of captures is due to the abundance of vegetation within the pond. In addition to the submerged vegetation, which is predominately spiny naiad (*Najas minor*), parrot feather (*Myriophyllum aquaticum*), a floating emergent, has over taken the pond, occupying roughly seventy-five percent of the pond's surface.

**Table 6.** Numbers of fish collected between 2004 and 2012 from Lower Guesthouse Pond.

| Year | Longfin dace | Yaqui chub |
|------|--------------|------------|
| 2003 | 0            | 0          |
| 2004 | 0            | 0          |
| 2005 | 27           | 19         |
| 2006 | 11           | 0          |
| 2007 | 2            | 66         |
| 2008 | 35           | 132        |
| 2009 | 0            | 616        |
| 2010 | 0            | 1684       |
| 2011 | 0            | 2          |
| 2012 | 0            | 959        |
| 2013 | 0            | 298        |

### Ponds Summary

Following the severe drought conditions that dried, or nearly dried, all of the ponds on the ranch in 2006, the Yaqui chub populations had rebounded in all four regularly sampled ponds by 2008 (Figure 6). This was a result of restocking Tennis Court and Lodge ponds in 2007, and natural dispersal to Upper and Lower Guesthouse ponds. In 2011, because of the Horseshoe 2 Fire, fish numbers were set back to 2006 levels. With fish being moved (2011, 2012, and spring 2013) to all ponds except Lower Guesthouse, numbers have rebounded quite well.



**Figure 6.** Total numbers of Yaqui chub collected from four ponds during El Coronado Ranch HCP monitoring in October 2003 - 2013.

## WEST TURKEY CREEK SURVEY

### *Methods*

A Smith-Root, Inc. Model LR-24 backpack electrofishing unit (settings: 150-200 volts, 30 Hz, output ~0.4 amps) was used to sample all three standard monitoring sites of West Turkey Creek, and all three standard sites on the USFS (U.S. Forest Service) lands on October 13 and 14, 2009 (Appendix B). Each standard site is 100-m long and was shocked from downstream to upstream, with actual shocking seconds recorded. All fish captured were identified to species, measured (longfin dace and green sunfish were just counted), and native fish returned alive to West Turkey Creek (green sunfish were removed). CPUE was calculated as the number of fish/minute of shocking.

### **U.S. Forest Service Sites**

[(USFS-1) – Dispersed Campsite]

[(USFS-2) – Upper Sycamore Campground]

[(USFS-3) – Lower Sycamore Campground]

### *Discussion*

None of the Forest Service sites were shocked this year, but all were visually inspected. All sites recovered nicely with most pools being scoured out that were filled in with sediment from floods following the 2011 Horseshoe 2 fire, and the vegetation as returned to almost pre-fire conditions along the banks of the streams. The vegetation in the upper canyons continues recover.

### **El Coronado Ranch Site 1**

### *Results*

Forty-three fish were captured in 589 seconds of effort, resulting in a CPUE of 8.6577 fish/min.

### *Discussion*

After the previous two year's poor success, this year's is promising. All fish captured were Yaqui chub and appeared healthy, with some males still displaying breeding color. Size range for the fish captured was 30-90 mm, with a mean length of 55.1163 mm. The lack of Mexican stoneroller captures in any reach of the creek is of concern and at the completion of the Rucker Creek surveys in December or January, restocking of West Turkey Creek with stonerollers will be discussed.

**Table 7.** Numbers of fish collected between 2003 and 2013 from ECR-1.

| Year | <u>longfin dace</u> | <u>Yaqui chub</u> | <u>Mexican stoneroller</u> |
|------|---------------------|-------------------|----------------------------|
| 2003 | 0                   | 19                | -                          |
| 2004 | 1                   | 25                | -                          |
| 2005 | 12                  | 32                | -                          |
| 2006 | 1                   | 12                | -                          |
| 2007 | 55                  | 25                | 7                          |
| 2008 | 72                  | 16                | 36                         |
| 2009 | 67                  | 23                | 30                         |
| 2010 | 11                  | 36                | 76                         |
| 2011 | 0                   | 1                 | 0                          |
| 2012 | 0                   | 0                 | 0                          |
| 2013 | 0                   | 43                | 0                          |

## El Coronado Ranch Site 2

### Results

One Yaqui chub was captured in 298 seconds of effort, resulting in a CPUE of 0.2013 fish/min.

### Discussion

There was very little water available for fish habitat in this reach. All surface water was being diverted to Big Tank, with the only water present in the creek below the diversion dam provided by seepage from below the dam. The one fish, 45 mm, captured came from a side pool that looked healthy when compared to the rest of this reach with submerged vegetation and some emergent present as well.

**Table 8.** Numbers of fish collected between 2003 and 2013 from ECR-2.

| Year | <u>longfin dace</u> | <u>Yaqui chub</u> | <u>Mexican stoneroller</u> |
|------|---------------------|-------------------|----------------------------|
| 2003 | 2                   | 0                 | -                          |
| 2004 | 3                   | 5                 | -                          |
| 2005 | 45                  | 0                 | -                          |
| 2006 | 0                   | 0                 | -                          |
| 2007 | 32                  | 0                 | 1                          |
| 2008 | 47                  | 17                | 31                         |
| 2009 | 37                  | 0                 | 19                         |
| 2010 | 50                  | 184               | 79                         |
| 2011 | 0                   | 0                 | 0                          |
| 2012 | 1                   | 0                 | 0                          |
| 2012 | 0                   | 1                 | 0                          |

## El Coronado Ranch Site 3

### Results

A total of 323 longfin dace and two Yaqui chub collected during 1299 seconds of effort at ECR-3. CPUE for all native fish at this site was 15.0116 fish/min. In addition to the native fish, seventy-four green sunfish were captured. The non-natives were removed from the system.

**Table 9.** Numbers of fish collected between 2003 and 2013 from ECR-3.

| Year | <u>longfin dace</u> | <u>Yaqui chub</u> | <u>green sunfish</u> | <u>Mexican stoneroller</u> |
|------|---------------------|-------------------|----------------------|----------------------------|
| 2003 | 134                 | 0                 | 1                    | -                          |
| 2004 | 31                  | 1                 | 22                   | -                          |
| 2005 | 321                 | 0                 | 18                   | -                          |
| 2006 | 0                   | 0                 | 4                    | -                          |
| 2007 | 78                  | 1                 | 8                    | 0                          |
| 2008 | 362                 | 1                 | 2                    | 7                          |
| 2009 | 326                 | 0                 | 3                    | 14                         |
| 2010 | 568                 | 122               | 2                    | 2                          |
| 2011 | 7                   | 0                 | 0                    | 0                          |
| 2012 | 30                  | 0                 | 5                    | 0                          |
| 2013 | 323                 | 2                 | 74                   | 0                          |

### *Discussion*

Dace continue to occupy this reach even though they were not encountered at any of the other locations surveyed in the last three years. In addition to this, very few dace were salvaged from West Turkey Creek in 2011 prior to the monsoon season and none were salvaged in 2012 during the June salvage effort.

### **El Coronado Ranch Random Sites**

No surveys were conducted at random sites. Large portions of the creek did not possess adequate habitat or conditions conducive to electro-fishing. As an example the reach between the diversion dam and the fish barrier had extremely low water levels, while other portions were in wide channel bottoms that were very shallow (< 1"). Some sites were visually inspected, of these, only the pool below the chapel had fish present, Yaqui chub.

## **FUTURE MONITORING AND MANAGEMENT RECOMMENDATIONS**

### *Monitoring*

- In addition to sampling the six fixed monitoring sites on West Turkey Creek, continue sampling random sites to document the expansion/contraction of fish populations and to detect any new species that may not be found in the fixed sites.
- Continue to record each sampling gear, and more importantly, the number of each species collected in that gear separately. This is needed so that a mean CPUE, variance, and confidence intervals can be generated for each gear type and species. Mean CPUEs and confidence intervals are needed to detect changes in population trends. CPUEs generated from “pooled” data (i.e., 10 traps catching 10 fish over a period of 10 hours equaling a CPUE of 10fish/100 hours) do not allow for means, variances, and confidence intervals to be calculated.
- Continue to measure and record total length of all native fishes collected to allow for the development and interpretation of length-frequency histograms. Length-frequency histograms will also reduce biologist subjectivity with regards to categorizing fish as either juvenile or adult. Having multiple measuring boards and data books will allow for quicker processing as well.
- All Yaqui catfish captured should continue to be measured for total length, weighed, and scanned for the presence of a PIT tag. All “unmarked” catfish should have a PIT tag inserted and PIT tag number recorded.
- Continue implementing HACCP policy of disinfecting sampling gear used at one site before the use at another site in an effort to reduce inadvertent introductions of parasites or pathogens into uninfected waters. To date, Asian fish tapeworm has not been documented from any fish collected from West Turkey Creek or El Coronado Ranch.

### *Management*

- During suitable water levels, pump Big Tank dry. Salvage all Yaqui catfish during the project, and eliminate all green sunfish and black crappie. Depending on numbers of Yaqui catfish and the suitability of wetlands, translocate some to pond(s) on the Bar Boot Ranch, or return them to Big Tank when it fills.
- During annual monitoring efforts (if sufficient numbers of fish are available and suitable habitat is present) translocate Yaqui chub, longfin dace, and Mexican stoneroller (n = 25-50; each) from either West Turkey Creek or El Coronado Ranch ponds to West Turkey Creek on Forest Service lands, upstream of El Coronado Ranch boundary.
- During annual monitoring efforts, translocate any Mexican stoneroller and Yaqui chub from below the fish barrier to above the fish barrier.
- Yaqui topminnow should be stocked into at least Lodge Pond under AGFD’s Safe Harbor Agreement for topminnows and pupfish in Arizona (AGFD 2007).
- Explore adding and anchoring woody debris in areas of West Turkey Creek to increase pool habitat favored by Yaqui chub.

## **SPRING 2013 MONITORING SUMMARY**

On June 4, 5, and 6, WRS C. Lohrengel, Pathways Intern Rueben Mendoza, and Refuge Volunteer Chuck Minckley, along with Arizona Game and Fish Department biologists, surveyed locations on El Coronado Ranch in a supplemental monitoring effort to the Habitat Conservation Plan monitoring that typically takes place in the fall. However, for the last two years Yaqui catfish monitoring has been unsuccessful during the normal monitoring period. It was decided to attempt monitoring in the spring to see if the effort would yield better results. In addition, small fish monitoring was conducted due to the necessity of moving of fish between locations on and off the ranch from the effects of the ongoing drought and the Horseshoe 2 fire of 2011. In conducting the monitoring, the standard HCP protocol was followed, with the exception of the electro-fishing portion of the protocol. The creek was only visually surveyed due to extremely low water levels. The survey resulted in five Yaqui catfish captures, of which all were recaptures, 223 Yaqui chub from Lower Guesthouse Pond, 563 chub from Upper Guesthouse Pond, 162 chub from Tennis Court Pond, and ninety-eight chub from Lodge Pond. In addition, forty-two non-native fish, several adult bullfrogs, and numerous bullfrog tadpoles were removed from the ponds. Supplemental to the monitoring, Dale's Tank was salvaged due to drying. Approximately 430 Yaqui chub were removed and transferred to Upper Guesthouse Pond that had adequate water.

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Appendix A. El Coronado Ranch HCP fish monitoring 2009 results compared with El Coronado Ranch HCP fish monitoring between 2004 and 2009 (Brouder 2005, 2006, Voeltz 2006, Johnson 2007, Voeltz 2009). Values presented are number of fish caught. Sampling methods: ES=backpack electroshocking; DN=dip net; VO = visual observation; MT=minnow trap; TN=trammel net; GN=experimental gill net; S=seining; HN=hoop net, MHN = mini-hoop net; DNS = did not sample.

| Site  | Year | Method | Total effort | Yaqui chub | longfin dace | green sunfish | Mexican stoneroller |
|-------|------|--------|--------------|------------|--------------|---------------|---------------------|
| ECR-1 | 2004 | ES     | 1800 s       | 25         | 1            | -             | -                   |
|       | 2005 | ES     | 390 s        | 32         | 12           | -             | -                   |
|       | 2006 | ES     | 791 s        | 12         | 1            | -             | -                   |
|       | 2007 | ES     | 759 s        | 25         | 55           | -             | 7                   |
|       | 2008 | ES     | 605 s        | 16         | 72           | -             | 36                  |
|       | 2009 | ES     | 242 s        | 23         | 67           | -             | 30                  |
|       | 2010 | ES     | 797 s        | 67         | 30           | 23            | -                   |
|       | 2011 | ES     | 511 s        | 1          | -            | -             | -                   |
|       | 2012 | ES     | 589 s        | -          | -            | -             | -                   |
|       | 2013 | ES     | 589          | 43         | -            | -             | -                   |
| ECR-2 | 2004 | ES     | 827 s        | 5          | 3            | -             | -                   |
|       | 2005 | ES     | -            | -          | 45           | -             | -                   |
|       | 2006 | ES     | 486 s        | -          | -            | -             | -                   |
|       | 2007 | ES     | 510 s        | -          | 32           | -             | 1                   |
|       | 2008 | ES     | 557 s        | 17         | 47           | -             | 31                  |
|       | 2009 | ES     | 163 s        | -          | 37           | -             | 19                  |
|       | 2010 | ES     | 1069 s       | 50         | 184          | 79            | -                   |
|       | 2011 | ES     | 383 s        | -          | -            | -             | -                   |
|       | 2012 | ES     | 558 s        | -          | 1            | -             | -                   |
|       | 2013 | ES     | 298          | 1          | -            | -             | -                   |
| ECR-3 | 2004 | ES     | 928 s        | 1          | 31           | 22            | -                   |
|       | 2005 | ES     | 1405 s       | 5          | 45           | 13            | -                   |
|       | 2006 | ES     | 569 s        | 1          | -            | 3             | -                   |
|       | 2007 | ES     | 673 s        | 1          | 78           | 8             | -                   |
|       | 2008 | ES     | 951 s        | 1          | 362          | 2             | 7                   |
|       | 2009 | ES     | 415 s        | -          | 326          | 3             | 14                  |
|       | 2010 | ES     | 2039 s       | 568        | 122          | 2             | 2                   |
|       | 2011 | ES     | 665 s        | -          | 7            | -             | -                   |
|       | 2012 | ES     | 1100         | -          | 30           | 5             | -                   |
|       | 2013 | ES     | 1299         | 2          | 323          | 74            | -                   |

**Appendix A** (continued). El Coronado Ranch HCP fish monitoring 2012 results compared with El Coronado Ranch HCP fish monitoring between 2004 and 2009 (Brouder 2005, 2006, Voeltz 2006, Johnson 2007, Voeltz 2009). Values presented are number of fish caught. Sampling methods: ES=backpack electroshocking; DN=dip net; VO = visual observation; MT=minnow trap; TN=trammel net; GN=experimental gill net; S=seining; HN=hoop net, MHN = mini-hoop net; DNS = did not sample.

| Site                   | Year | Method   | Total effort       | Yaqui chub | longfin dace | Mexican stoneroller |
|------------------------|------|----------|--------------------|------------|--------------|---------------------|
| Tennis Court Pond      | 2004 | HN       | 32.0 h             | -          | -            | -                   |
|                        |      | MT       | 96.0 h             | 413        | -            | -                   |
|                        | 2005 | MT       | 177.0 h            | 363        | -            | -                   |
|                        | 2006 | MT       | 216.0 h            | -          | -            | -                   |
|                        | 2007 | MT       | 198.0 h            | -          | -            | -                   |
|                        | 2008 | MT       | 210.0 h            | 70         | -            | -                   |
|                        | 2009 | MT       | 204.0 h            | 1264       | -            | -                   |
|                        | 2010 | MT       | 176.0 h            | 1023       | -            | -                   |
|                        | 2011 | MT       | 204.0 h            | -          | -            | -                   |
|                        | 2012 | MT       | 206.25 h           | -          | -            | -                   |
| 2013                   | MT   | 243.96 h | 554                | -          | -            |                     |
| Lodge Pond             | 2004 | DNS      | -                  | -          | -            | -                   |
|                        | 2005 | DNS      | -                  | -          | -            | -                   |
|                        | 2006 | MT       | 100.2 h            | -          | -            | -                   |
|                        | 2007 | MT       | 198.0 h            | 4          | -            | -                   |
|                        | 2008 | MT       | 216.0 h            | 237        | -            | 1                   |
|                        | 2009 | MT       | 210.0 h            | 1531       | -            | -                   |
|                        | 2010 | MT       | 176.0 h            | 862        | -            | -                   |
|                        | 2011 | MT       | 204.0 h            | 113        | -            | -                   |
|                        | 2012 | MT       | 222.0 h            | 391        | -            | -                   |
|                        | 2013 | MT       | 241.92 h           | 56         | -            | -                   |
| Upper Guest House Pond | 2004 | HN       | 42.0 h             | -          | -            | -                   |
|                        |      | MT       | 84.0 h             | -          | -            | -                   |
|                        | 2005 | S        | 702 m <sup>2</sup> | 240        | 11           | -                   |
|                        | 2006 | S        | 600 m <sup>2</sup> | -          | 110          | -                   |
|                        | 2007 | MT       | 189.0 h            | -          | -            | -                   |
|                        | 2008 | MT       | 216.0 h            | 52         | -            | -                   |
|                        | 2009 | MT       | 222.0 h            | 2151       | 6            | -                   |
|                        | 2010 | MT       | 192.0 h            | 1131       | -            | -                   |
|                        | 2011 | MT       | 198.0 h            | -          | -            | -                   |
|                        | 2012 | MT       | 210.0 h            | 1431       | -            | -                   |
| 2013                   | MT   | 222.96   | 1174               | -          | -            |                     |
| Lower Guest House Pond | 2004 | HN       | 45.0 h             | -          | -            | -                   |
|                        | 2005 | S        | 180 m <sup>2</sup> | 19         | 27           | -                   |
|                        | 2006 | S        | 230 m <sup>2</sup> | -          | 11           | -                   |
|                        | 2007 | MT       | 173.3 h            | 66         | 2            | -                   |
|                        | 2008 | MT       | 222.0 h            | 132        | 35           | -                   |
|                        | 2009 | MT       | 222.0 h            | 616        | -            | -                   |
|                        | 2010 | MT       | 192.0              | 1684       | -            | -                   |
|                        | 2011 | MT       | 198.0 h            | 2          | -            | -                   |
|                        | 2012 | MT       | 207.0 h            | 959        | -            | -                   |
|                        | 2013 | MT       | 225.0 h            | 298        | -            | -                   |

**Appendix B.** Locations of monitoring sites on the El Coronado Ranch.

**Tennis Court Pond.** Located upstream of the Austin's office. Drive east along the road past the basketball court and tennis court. UTM (NAD83/WGS84) 3526947 N 654567 E

**Lodge Pond.** Located at the Austin's main building. UTM (NAD83/WGS84) 3527020 N 654387 E

**Upper Guesthouse Pond.** Located next to the guesthouses across the street from the El Coronado Ranch driveway. The upper pond is at the end of the circular driveway and has a stone dock. UTM (NAD83/WGS84) 3526867 N 653518 E

**Lower Guesthouse Pond.** Located immediately downstream of Upper Guesthouse Pond. UTM (NAD83/WGS84) 3526816 N 653405 E

**Big Tank.** Drive through the lower-most iron pipe gate on the north side of Turkey Creek road. Follow road to the tank. UTM (NAD83/WGS84) 3527188 N 651093 E

**El Coronado Ranch Site 1.** (ECR-1) Drive to the El Coronado Ranch guest houses. Follow the road through the turnaround by the last two houses; you will see the Upper Guesthouse pond. The road continues along the pasture fence where you will see the lower guesthouse pond. After the pasture, the road turns sharply to the left. Approximately 50m after the turn you will see another road on the right, turn right onto the orchard road. It will go down a hill, past an open field and a stock tank on the left. As you pass the western embankment of the stock tank the road will slope downward. Stop there. There will be a low point where a small outflow from the tank crosses the road. Follow the outflow NW until it meets West Turkey Creek. This is the upper point of the reach. Walk 100-m downstream and shock upstream. UTM (NAD83/WGS84) 3526655 N 652757 E.

**El Coronado Ranch Site 2.** [(ECR-2) – below Big Tank diversion] Begin below Big Tank infiltration intake (diversion). This site can be reached two different ways. First, is to drive down the orchard road past the ECR-1 site, and turning right before the road crosses the Cold Pit drainage. The road will cross West Turkey Creek just above the diversion. Second, drive down Turkey Creek road from the Austin's driveway to the first cattle guard. Go through a Texas gate (barbed wire gate) on the south side of the road before the cattle guard and follow the two-track road to the diversion site. UTM (NAD83/WGS84) 3526638 N 652468 E.

**El Coronado Ranch Site 3.** [(ECR-3) – Big Tank outflow barrier to lower boundary] Lowest barrier. Park at the very first cattle guard as you drive onto the El Coronado Ranch from Turkey Creek road, this is also the first cattle guard after Sander's house. There is a Texas gate (barb wire gate) on the north side of the road by the cattle guard. Go through the gate and walk down to the creek bottom. Follow the creek upstream until you reach the barrier. Walk 100-m downstream and shock upstream. UTM (NAD83/WGS84) 3526932 N 651015 E

**U.S. Forest Service Site 1.** [(USFS-1) – Dispersed Campsite] This sample site is approximately 0.40 miles from the end of West Turkey Creek road, below the junction of Morse Canyon and West Turkey Creek. The area was a small campsite that is being restored by USFS. It has sediment barrier fencing and has been seeded. UTM (NAD83/WGS84) 3525431 N 658180 E.

**U.S. Forest Service Site 2.** [(USFS-2) – Upper Sycamore Campground] Sycamore Campground upper waterfall. Park in Sycamore Campground and walk east until you reach West Turkey Creek. Follow the creek upstream to the base of the uppermost waterfall continuing downstream. UTM (NAD83/WGS84) 3526021N 657749 E.

**U.S. Forest Service Site 3.** [(USFS-3) – Lower Sycamore Campground] Sycamore Campground lower waterfall. From Sycamore Campground, follow the creek downstream until you reach a rock face (river left) along the stream below campground. Shock downstream from that point. UTM (NAD83/WGS84) 3526254 N 657399 E.