

- I. Project Title: Population monitoring of humpback and bonytail chub in Cataract Canyon.
- II. Lead Agency: Utah Division of Wildlife

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III. Project Summary:

Achievement of recovery goals for humpback chub will be determined in part by monitoring the six known self-sustaining populations in the upper and lower Colorado River basins. These populations include Black Rocks, Westwater Canyon, Desolation/Gray Canyons, Yampa Canyon, Cataract Canyon, and Grand Canyon. The period of monitoring for down listing is 5 years, in which at least three reliable population estimates will be taken for each of the six populations. Sampling in Cataract Canyon began in 1979 under the Service's Colorado River Fishery Project, and then continued under the U.S. Bureau of Reclamation contracted studies with Bio/West. Between 1990 and 2000, sampling was conducted intermittently by the Utah Division of Wildlife Resources (UDWR). This sampling included catch rate monitoring of the fish community in Cataract Canyon which was added to the Interagency Standardized Monitoring Program beginning in 1998. The catch rates observed during these studies were variable, and the population size could not be determined from these data. Beginning in 2003, three pass mark/recapture sampling was conducted for three consecutive years to estimate three annual point population estimates for adult humpback in the canyon, also meeting the criteria for downlisting consideration. The estimates for the Cataract population ranged from 273 - 468 humpbacks within the canyon. Due to the small size of the population and probable violations of modeling assumptions it was determined that this level of monitoring is not necessary for the Cataract population and that in 2008 monitoring would return to following annual fall catch rate trends. The monitoring schedule for this population will be an annual single trip occurring in September or October.

- IV. Study Schedule:
- a. Initial year: 2008
 - b. Final year: ongoing

V. Relationship to RIPRAP:

General Recovery Program Support Action Plan

V.B. Conduct research to acquire needed life history information.

V.B.1. Identify significant deficiencies in life history information and needed research.

Colorado River Action Plan: Mainstem

V.C.3. Monitor humpback chub annual CPUE within Cataract Canyon.

VI. Accomplishments of FY10-11 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1) Complete one sampling trip in Cataract Canyon in October 2010.

Annual sampling was conducted October 21-28 2010 at the three long-term trend monitoring sites and at Rapid 12 (Figure 1). Daily mean flows ranged from 6563 – 8282 ft³/sec (Figure 3) and water temperatures ranged from 13.9 – 11.1 °C. No sites were sampled below the “Big Drop” rapids.

Humpbacks: A total of 14 Humpback chub were captured in 2010. Of these 11 were caught in trammel nets during 566.2 hours of effort resulting in a catch rate of .019 Humpbacks/net hr. All Humpback chub caught by trammel nets were adults (i.e. >150 mm) with a mean total length of 225.2 mm.

Electrofishing yielded three juvenile (i.e. <150 mm) Humpback chub during 4.12 hours of sampling resulting in a catch rate of 0.73 Humpbacks/hr.

No Humpback chub tagged prior to the 2010 were captured.

Bonytails: Two adult Bonytail were captured in trammel nets in 2010 at Rapid 10 (RM 207.3-208.3). Their lengths were 265 and 255 mm. The 255 mm fish was initially stocked in April 1998 at river mile 94 on the Colorado River. It was recaptured in the Green River at river mile 341.2 in October 2008. During this time, this fish grew a total 149 mm gaining 21 mm over the previous two years. The other Bonytail was not previously marked.

Overall Catch: A total of 163 fish consisting of 14 species were captured by trammel nets in Cataract Canyon in 2010. Humpback chub, Razorback sucker, and Bonytail made up 12.9% of the total sample. The total catch was comprised of 20.9 % natives. Humpback chub and channel catfish were the most common native and nonnative species present (Table 2).

One hundred and twenty-five fish were encountered during electrofishing efforts. Endangered species, native species and nonnative species made up 3.2%, 5.6%, and 94.4% of the sample, respectively. Channel catfish and gizzard shad were the most abundant species in the sample.

Discussion: Humpback chub abundance within Cataract Canyon in 2010 remains stable comparable to previous years. Trammel net catch rates have fluctuated between 0.010 and 0.035 in the past 19 years and upward trend, although this trend is not significant ($R^2=.0745$, $P=.3370$; Figure 2). Even though there is no distinct trend revealed by electrofishing catch rates, electrofishing is still the most effective method to capture juvenile chub.

The longitudinal distribution of chub remains consistent with previous years at sites 1 through 4 (Figure 5). No sites have been sampled below the Big Drop rapids since 2008 and it is unknown if chub have expanded their range into this section of river.

The size structure of humpback chub within Cataract Canyon remains narrowly distributed (Figure 4). In 2010, the distribution was bimodal and lengths were confined to juveniles in the 100 – 140 mm range and adults in the 200 -260 mm range. Young of year and larger adult humpback chub were not encountered as they were in 2009.

The recaptured Bonytail at Rapid 10 revealed an interesting history. In the twelve years since its release, this fish grew only 149 mm; a rate that is slow compared to other stocked bonytail. Additionally, this fish was observed to move long distances throughout the upper Colorado River Basin. Between 1998 and 2008, this fish moved from Dewey Bridge on the Colorado River to Whirlpool Canyon on the Green River, a distance of 435 miles. Following 2008, this fish moved 350 miles downstream to the eddy above Rapid 11 in Cataract Canyon.

Task 2) Data entry:

The 2010 data have been entered and quality checked and will be transferred to the UCRRP database manager by January 15, 2011.

Task 3) Annual reporting:

An annual progress report summarizing the 2010 data and comparing it with past monitoring efforts will be submitted by Nov 13, 2010.

VII Recommendations:

- Persistent occurrence of humpback chub and bonytail warrants continued monitoring of distribution and relative abundance via a single sampling pass.
- Future monitoring should employ trammel nets as the primary sampling tool.
- Future monitoring should include electroshocking as an additional sampling tool for collecting YOY and juvenile chub.
- Future monitoring should include periodic surveys in suitable habitat below the Big Drop rapids.

IX. FY10 Budget:

| | |
|--|-------------|
| A. Funds budgeted: | \$ \$30,607 |
| B. Funds expended/obligated: | \$ \$30,607 |
| C. Difference: | \$ 0 |
| D. Percent FY2010 work completed: | 100% |
| E. Recovery Program funds spent for publication charges: | \$ 0 |

X. Signed: Kenneth Breidinger / Paul Badame Date: November 9, 2010

Table 1. Comparison of methods, years sampled, effort, and catch rates for adult humpback chub (HB, >150 mm TL), bonytail, and juvenile chub (all *Gila spp.*, <150mm) for all sites combined, Cataract Canyon, 2003-2010.

| Method | Year | <i>Gila spp.</i> | | | Effort (hrs or m ²) | CPUE (fish/hr) | | |
|-----------------|--------------|------------------|-----------|----------|------------------------------------|-------------------|--------------|--------------|
| | | # HB | # BT | # juv | | HB CPUE | BT CPUE | juv CPUE |
| Trammel netting | 2003 | 44 | 20 | 0 | 1375 | 0.032 | 0.008 | 0.000 |
| | 2004 | 43 | 1 | 0 | 1245 | 0.035 | 0.001 | 0.000 |
| | 2005 | 31 | 5 | 0 | 1375 | 0.022 | 0.003 | 0.000 |
| | 2008 | 6 | 0 | 0 | 409 | 0.015 | 0.000 | 0.000 |
| | 2009 | 18 | 1 | 0 | 623 | 0.029 | 0.002 | 0.000 |
| | 2010 | 11 | 2 | 0 | 566.2 | .019 | .004 | 0.000 |
| | Total | 142 | 27 | 0 | 5027 | 0.028 | 0.005 | 0.000 |
| Electroshocking | 2003 | 2 | 2 | 0 | 8.9 | 0.225 | 0.225 | 0.000 |
| | 2004 | 0 | 0 | 0 | 7.5 | 0.000 | 0.000 | 0.000 |
| | 2005 | 0 | 0 | 0 | 8.2 | 0.000 | 0.000 | 0.000 |
| | 2008 | 0 | 0 | 0 | 1.5 | 0.000 | 0.000 | 0.000 |
| | 2009 | 2 | 0 | 5 | 5.5 | 0.364 | 0.000 | 0.909 |
| | 2010 | 3 | 0 | 0 | 4.1 | .73 | 0.000 | 0.000 |
| | Total | 4 | 2 | 5 | 31.6 | 0.127 | 0.063 | 0.158 |
| Seine netting | 2003 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 |
| | 2004 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 |
| | 2005 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 |
| | 2008 | 0 | 0 | 0 | 184 | 0.000 | 0.000 | 0.000 |
| | 2009 | 0 | 0 | 0 | 56 | 0.000 | 0.000 | 0.000 |
| | | Total | 0 | 0 | 0 | 240 | 0.000 | 0.000 |

Table 1. Continued

| Method | Year | <i>Gila spp.</i> | | | Effort (hrs or m ²) | CPUE (fish/hr) | | |
|-------------------------------|--------------|------------------|-----------|----------|------------------------------------|-------------------|--------------|--------------|
| | | # HB | # BT | # juv | | HB CPUE | BT CPUE | juv CPUE |
| Minnow trap & Hoop netting | 2003 | 0 | 0 | 0 | 9.9 | 0.000 | 0.000 | 0.000 |
| | 2004 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 |
| | 2005 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 |
| | 2008 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 |
| | 2009 | 0 | 0 | 1 | 76.5 | 0.000 | 0.000 | 0.013 |
| | Total | 0 | 0 | 1 | 86.4 | 0.000 | 0.000 | 0.013 |
| Grand Total | | 146 | 29 | 6 | --- | --- | --- | --- |

Table 2. Comparison of catch rates for trammel netting versus electroshocking for fish species captured at all sites combined in Cataract Canyon, 2010.

| Species | Trammel netting CPUE (fish/netting hr) | Electroshocking CPUE (fish/shocking hr) |
|---------------------|--|---|
| Humpback chub | .019 | .728 |
| Bonytail | .002 | - |
| Razorback sucker | .016 | .243 |
| Flannelmouth sucker | .011 | .243 |
| Bluehead sucker | .011 | .486 |
| Roundtail Chub | .002 | - |
| Channel catfish | .161 | 18.692 |
| Common carp | .035 | 3.88 |
| Black crappy | .002 | .243 |
| Walleye | .004 | 1.214 |
| Gizzard shad | .019 | 4.612 |
| Yellow bullhead | .004 | - |
| Black bullhead | .002 | - |

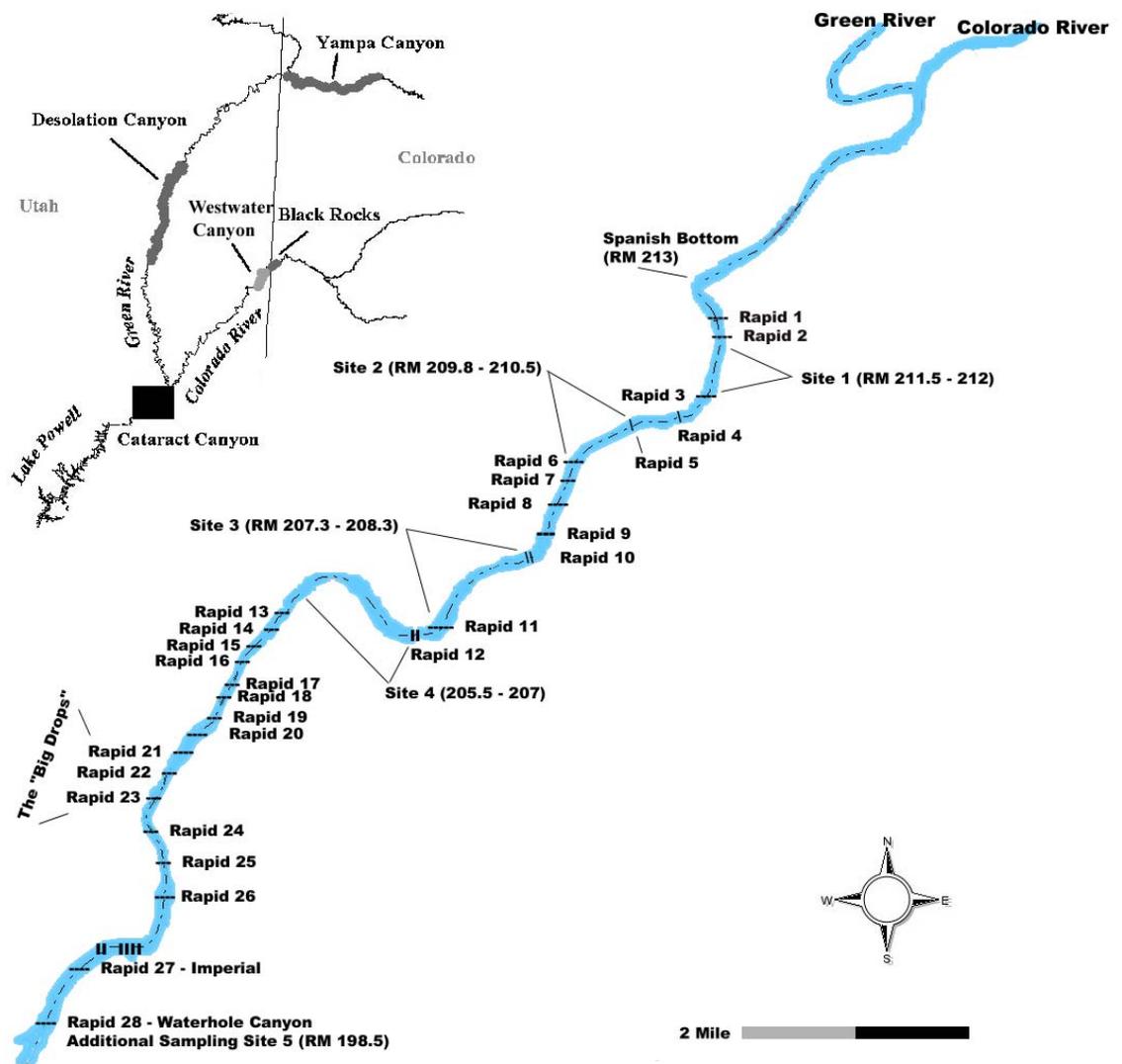


Figure 1. Cataract Canyon map detailing sampling locations during 2010. Site 5 was not sampled in 2010 due to the lack of humpback chubs below the “Big Drops” in previous surveys.

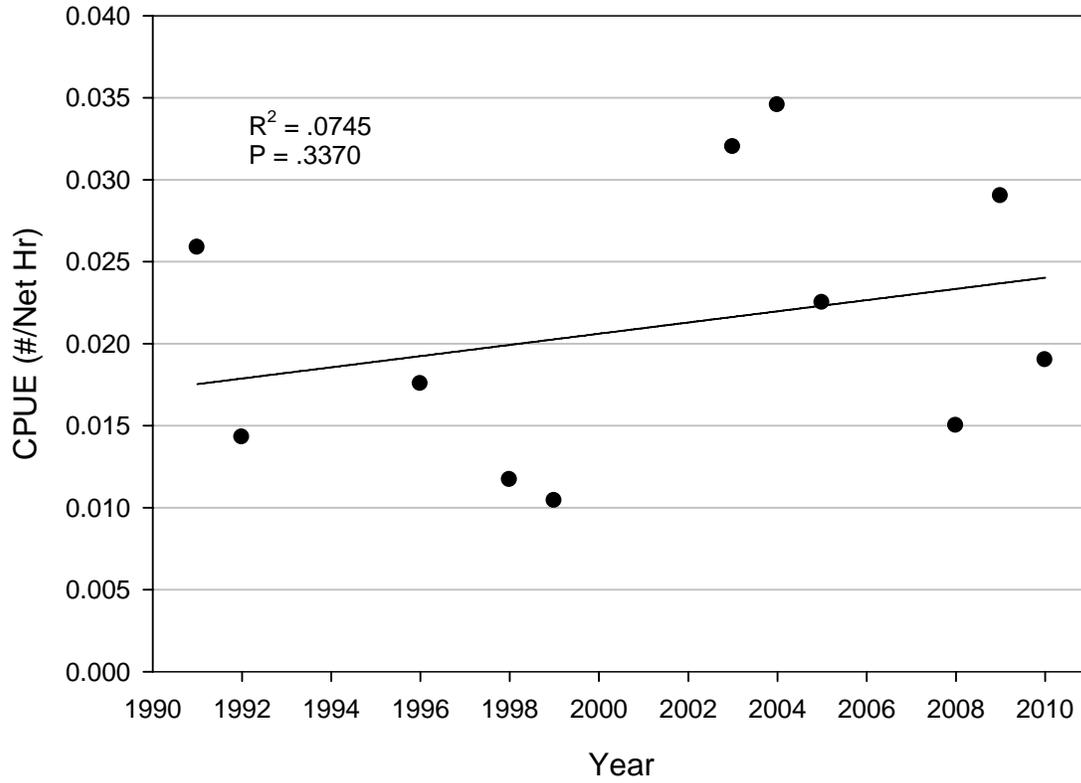


Figure 2. Total catch per unit effort (CPUE) for humpback chub in Cataract Canyon during fall collections for all captures between 1991 and 2010. P-value indicates statistical significance of trend line.

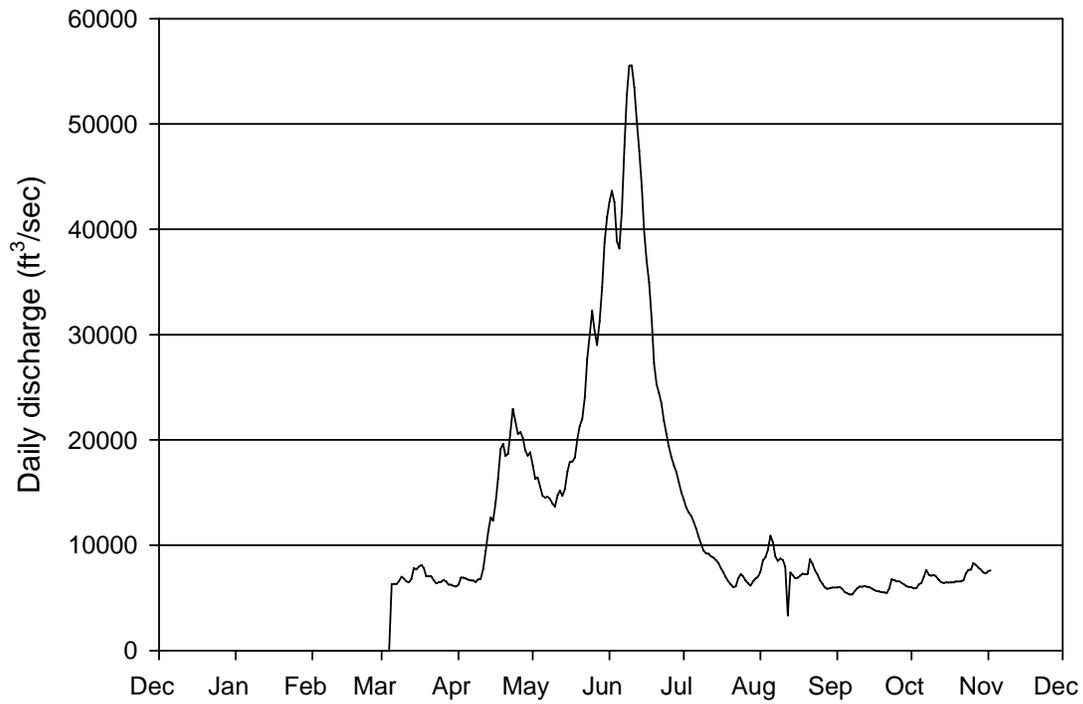


Figure 3. Hydrograph of daily discharge (ft³/sec) for Cataract Canyon in 2010. Data compiled from USGS gauge numbers 09315000, 09180500, and 09180000 on the Green, Colorado, and Dolores Rivers, respectively.

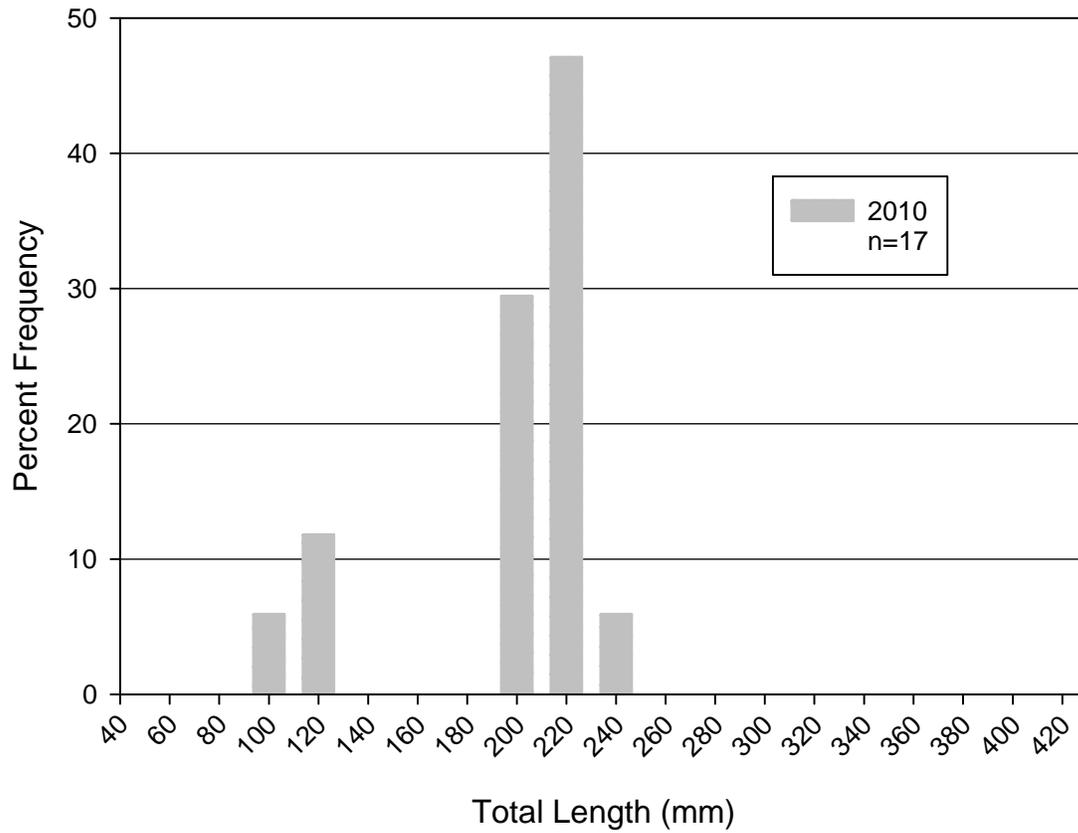


Figure 4. Length-frequency distribution for adult (>150mm TL) and juvenile (<150mm TL) humpback chub in Cataract Canyon for all captures in 2010.

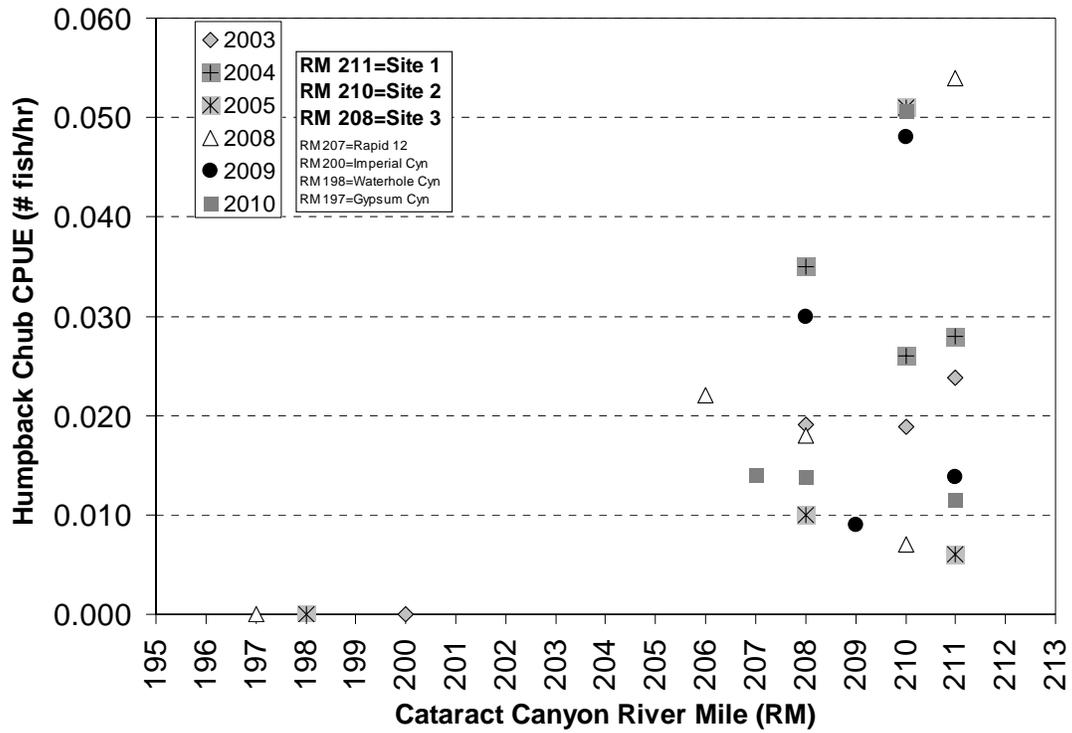


Figure 5. CPUE by river mile for adult humpback chub (>150mm TL) captured by trammel netting within Cataract Canyon, 2003-2010.