

- I. Project Title: Yampa Canyon Humpback chub (*Gila cypha*) population genetics.
- II. Principal Investigator(s):
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- III. Project Summary: In October 2007, 400 *Gila* spp. young of the year were collected from Yampa Canyon and subsequently maintained at Ouray National Fish Hatchery (ONFH; n = 200) and J.W. Mumma Native Aquatic Species Restoration Facility (NASRF; n = 200). The Yampa Canyon fish were grown to a size where a species determination could be made based on morphological characters as they can be identified to species using meristic and morphometric characters. However, this has proven to be difficult due to the fact that *G. cypha* and roundtail chub (*Gila robusta*) are very similar morphologically at a young age. The individuals being held at ONFH and NASRF, if *G. cypha*, are being considered for a broodstock program. The objective of the current study was to make a species determination of the individuals being held at ONFH using microsatellite loci.
- IV. Study Schedule: Samples (n = 40) were received at Dexter NFH on 11/2009. Final report submitted 11/2010.
- V. Relationship to RIPRAP:
GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN
IV. Manage genetic integrity and augment or restore populations.
IV.A. Genetics
IV. A. 4. Secure and manage the following species in refugia.
IV.A.4.c. Humpback chub
IV.A.4.c. (4) Yampa Canyon
- VI. Accomplishment of FY 2010 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings: A total of 88 individuals were analyzed using 16 microsatellite loci and included *G. cypha* from Desolation/Grey canyons (n = 32) and Yampa Canyon (n = 24), *G. robusta* from Muddy Creek, Wyoming (n = 16) and Yampa Canyon (n = 16). The results indicate that the *G. cypha* samples from Desolation/Grey canyons are a unique cluster that is separate from all other samples as are the *G. robusta* samples from Muddy Creek (Figure 1). The samples from Yampa canyon are more similar to each other, irrespective of morphology, and cannot be identified as either *G. cypha* or *G. robusta*. Likewise, the Yampa Canyon samples do not cluster with either the Desolation/Grey or Muddy Creek samples and indicate that these samples are most likely hybrids, if the morphologies are true to either humpback or roundtail chub. A baseline genetic study of adults known to be either humpback chub or roundtail chub based on morphology needs to be conducted. These results do not include the samples from NASRF, *Gila elegans* (bonytail), or the Grand Canyon population all of which will be added in the next set of analyses.

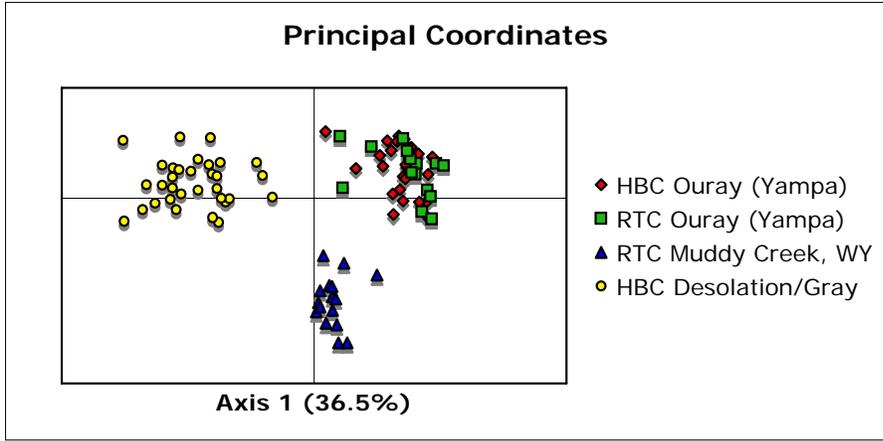


Figure 1. A Principal Coordinates plot of the genetic variation in three populations of *Gila cypha* (humpback chub; HBC) and *Gila robusta* (roundtail chub; RTC). Data is based on 16 polymorphic microsatellite loci. Yampa Canyon preliminary species identifications were based on meristic characteristics such as fin ray counts.

- VII. Recommendations: More information about the morphology of the individuals analyzed for this study is needed before recommendations are made. In addition, a baseline genetic study of adults known to be either humpback chub or roundtail chub based on morphology may need to be conducted on individuals from the Yampa Canyon (using the current marker set).
- VIII. Project Status: In addition to the 40 samples provided from Yampa Canyon, samples of *G. cypha* from the Grand Canyon will be added in addition to samples of *Gila elegans* (bonytail) from the stock at Dexter NFH.
- IX. FY 2010 Budget Status
 - A. Funds Provided: \$0 (CRRP), \$8,466 (BOR)
 - B. Funds Expended: \$8,466
 - C. Difference: \$0
 - D. Percent of the FY 2010 work completed, and projected costs to complete: 100% of the 40 samples provide have been analyzed.
 - E. Recovery Program funds spent for publication charges: \$0
- X. Status of Data Submission (Where applicable):
- XI. Signed: Connie Keeler-Foster and Wade Wilson
Principal Investigators Date: November 12, 2010