COLORADO RIVER RECOVERY PROGRAM **Project No.: 132**
FY-2004 PROPOSED SCOPE-OF-WORK for:
Population estimate of humpback chub in Westwater Canyon, Colorado River, Utah

Lead Agency: Utah Division of Wildlife Resources
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Category:
_X_ Ongoing project
___ Ongoing-revised project
___ Requested new project
___ Unsolicited proposal

Expected Funding Source:
_X_ Annual funds
___ Capital funds
___ Other (explain)

I. Title of Proposal:

Population estimate of humpback chub in Westwater Canyon, Colorado River, Utah

II. Relationship to RIPRAP:

Colorado River Action Plan: Mainstem
V.C. Estimate humpback chub populations
V.C.2. Westwater

III. Study Background/Rationale and Hypotheses:

The Recovery Implementation Program for Endangered Fish Species in the Upper

Colorado River Basin is currently involved in establishing recovery goals for the endangered humpback chub. Recovery goals will be based in part on maintaining populations of humpback chub in several locations, among which is the Westwater Canyon population on the Colorado River. Establishing and measuring progress toward recovery goals necessitates monitoring to obtain accurate and precise population estimates.

A three-year population estimate was conducted for the Westwater Canyon humpback chub population estimate within ISMP during 1998-2000. Dr. Ron Ryel used Capture (M_o model) to calculate population estimates for each of the three years (1998: $3{,}299 \leq 5{,}171 \leq 8{,}287$; 1999: $1{,}349 \leq 2{,}261 \leq 3{,}942$; 2000: $1{,}095 \leq 1{,}704 \leq 2{,}758$), with respective 95% confidence intervals (Hudson et al. *draft*). Through the three years of this Westwater Canyon humpback chub population estimate, the probability of capture (*p*-hat) increased slightly and the coefficient of variation (CV) decreased (1998: *p*-hat=0.0348, CV=5.0538; 1999: *p*-hat=0.0410, CV=4.7011; 2000: *p*-hat=0.0542, CV=4.0235; Hudson et al. *draft*). The recently revised approach should further increase the probability of capture and decrease the coefficient of variation through an increase effort using multiple techniques.

The recovery goals require that subsequent population estimates for Westwater Canyon humpback chub be conducted in three out of every five years. This population estimate will meet this direction and provide for six separate point estimates within an eight year time period. Information collected previously by the Utah Division of Wildlife Resources-Moab Field Station and recommendations from the USFWS population estimate workshops held in Winter 2002 are incorporated into the approach to provide the best opportunity of determining the most accurate and precise estimate for the Westwater Canyon humpback chub population.

IV. Goals, Objectives, End Product:

Goal: to estimate the population size of humpback chub in Westwater Canyon with the most precise confidence intervals possible.

Objectives:

1) to obtain a population estimate of adult humpback chub ($\geq$ 200 mm) in Westwater Canyon

2) to determine mean estimated recruitment of naturally produced subadult humpback chub (150-199 mm) in Westwater Canyon

End Product:

An in-depth annual progress report detailing these data (including population estimates,

95% confidence intervals, coefficients of variation, and probabilities of capture) will be completed before the winter Colorado River researchers meeting and provided to the Recovery Program and the USFWS for evaluation. At the completion of this project, the annual progress report will incorporate in-depth analyses (including population estimates, 95% confidence intervals, coefficients of variation, and probabilities of capture) for all three years of the study.

V. Study area:

Westwater Canyon, Colorado River (RM 124.5-112.5), Utah.

Sampling will occur at five locations:

- RM 124.5-123.7 - Above and Below Miners Cabin
- RM 123.2-121.7 - Between Miners Cabin and Cougar Bar[1]
- RM 121.7-120.8 - Cougar Bar to Little Hole
- RM 120.0-119.5 - Hades Bar
- RM 116.5-115.5 - Big Hole[2]

[1] *This location will be investigated to determine to what extent it can be sampled based on ability to access the area from a camp.*

[2] *This location will be sampled in the initial year of the project. However, sampling may be discontinued in subsequent years if the catch yields no humpback chub.*

VI. Study Methods/Approach:

Study methods will be similar to those used in the previous humpback chub population estimates in Desolation/Gray and Westwater canyons (Hudson et al. *draft*) and incorporate recommendations that resulted from the USFWS population estimate workshops held in Winter 2002.

Three sampling trips will be made in September and October approximately one to two weeks apart. Each of the five sampling locations will be sampled for one night around the crepuscular hours (i.e., late afternoon to midnight, and pre-dawn to mid-morning). Two of these sites will be sampled for an additional night to maximize captures of humpback chub in Westwater Canyon (Above and Below Miners Cabin, RM 124.5-123.7; Cougar Bar to Little Hole, RM 121.7-120.8).

Humpback chub will be captured using trammel nets, hoop nets and electrofishing at each sampling location. The number of trammel nets set at each sampling location will be maximized according to available sampling habitat (7-14 nets per sampling location). Trammel nets will be fished in 1.5 to 2 hour sets from late afternoon through approximately 2300 hrs. At that time, the nets will be pulled for the remainder of the night. Trammel nets will again be fished in 1.5 to 2 hour nets sets from pre-dawn through mid-morning. All chubs will be scanned for a pittag, pittagged (if necessary), measured

(mm; total length, depth of nuchal depression, length of origin of pectoral fin to origin of pelvic fin, length of dorsal fin base, length of anal fin base; Douglas et al. 1998, Smith et al. 1979), weighed (g), principle dorsal and anal fin rays counted and released. Other endangered fish captured will be scanned for a pittag, pittagged (if necessary), measured for total length (mm), weighed (g), and released. All other fish captured will be measured for total length (mm), weighed (g), and released or disposed of accordingly. This information will be collected immediately after capture to reduce handling stress.

Hoop nets will be set at each sampling location during the evening. These nets will be fished continuously until the following morning. All chubs will be scanned for a pittag, pittagged (if necessary), measured (mm; total length, depth of nuchal depression, length of origin of pectoral fin to origin of pelvic fin, length of dorsal fin base, length of anal fin base), weighed (g), principle dorsal and anal fin rays counted and released. Other endangered fish captured will be scanned for a pittag, pittagged (if necessary), measured for total length (mm), weighed (g), and released. All other fish captured will be measured for total length (mm), weighed (g), and released or disposed of accordingly.

Electrofishing will be conducted at each sampling location during the crepuscular period. In addition, electrofishing will be conducted in intervening reaches between sampling locations. All chubs will be scanned for a pittag, pittagged (if necessary), measured (mm; total length, depth of nuchal depression, length of origin of pectoral fin to origin of pelvic fin, length of dorsal fin base, length of anal fin base), weighed (g), principle dorsal and anal fin rays counted and released. Other endangered fish captured will be scanned for a pittag, pittagged (if necessary), measured for total length (mm), weighed (g), and released. All other fish captured will be measured for total length (mm), weighed (g), and released or disposed of accordingly. This information will be collected immediately after capture to reduce handling stress.

All data will be forwarded to Dr. Ron Ryel for analysis using CAPTURE. This analysis will result in annual point estimates of the Westwater Canyon adult humpback chub population ($\geq$200 mm) and mean estimated recruitment of naturally produced subadult humpback chub (150-199 mm).

VII. Task Description and Schedule (FY2004-2005):

Data from the 2003 field will be entered on the computer and transferred to USFWS by January 15, 2004. An in-depth annual progress report detailing these data (including population estimates, 95% confidence intervals, coefficients of variation, and probabilities of capture) will be completed and submitted to the Coordinator on the Recovery Program Annual Reports due date (approximately December 10). At the completion of this project, the annual progress report will incorporate in-depth analyses (including population estimates, 95% confidence intervals, coefficients of variation, and probabilities of capture) for all three years of the study.

VIII. FY2004 Work
Deliverables/Due Dates - See above
Budget:

Labor		
Biologists	(80 total work days/$315d)	$25,200
Technicians	(168 total work days/$180d)	$30,240
Project Leader	(7 total work days/$405d)	$ 2,835
Statistician	(5 total work days/)	$ 2,000
Subtotal (Labor)		*$60,275*
Current Expense		
Travel		
food	(24 days)	$ 2,100
mileage	(for vehicles/4 trucks/2 months)	$ 1,750
gasoline	(for boats/4 motors/24 days)	$ 750
Equipment		
nets		$ 600
maintenance		$ 1,800
Other		$ 500
Subtotal (Current Expense)		*$ 7,500*
Total		**$67,775**

FY2005 Work
Deliverables/Due Dates - See above
Budget:

Labor		
Biologists	(117 total work days/$315d)	$36,855
Technicians	(176 total work days/$180d)	$31,680
Project Leader	(11 total work days/$405d)	$ 4,455
Statistician	(5 total work days)	$ 2,000
Subtotal (Labor)		*$74,990*
Current Expense		
Travel		
food	(24 days)	$ 2,100
mileage [1]	(for vehicles/4 trucks/2 months)	$ 2,250
gasoline	(for boats/4 motors/24 days)	$ 750
Equipment		
nets		$ 600
maintenance		$ 1,800
Other	(final report prep)	$ 1,000
Subtotal (Current Expense)		*$ 8,500*
Total		**$83,490**

[1] Extra mileage in FY2005 is to account for additional travel related to completion and discussion of in-depth analyses at meetings that will occur in the final year of the project.

IX. Budget Summary

FY2004	$ 67,775
FY2005	$ 83,490
Total	**$151,265**

X. Reviewers

Tom Chart, USBR
Dr. Richard Valdez, Valdez and Associates

XI. References

Douglas, M.E., R.R. Miller, and W.L. Minckley. 1998. Multivariate discrimination of Colorado Plateau *Gila* spp.: The "art of seeing well" revisited. Transactions of the American Fisheries Society 127:163–173.

Smith, G.R., R.R. Miller, and W.D. Sable. 1979. Species relationships among fishes of the genus *Gila* in the upper Colorado River drainage. U.S. Nat. Park Serv. Trans. Proc., Ser. 5:613-623.