I. Project Title: Bonytail Reintroduction

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III. Project Summary:

Bonytail (*Gila elegans*) is thought to be functionally extirpated from the Upper Colorado River Basin. The goal of this project is to reestablish bonytail in the Upper Colorado River Basin. To accomplish this goal, we are stocking juvenile bonytail and monitoring radio-tagged adult bonytail. This methodology will provide insight into habitat used by stocked fish and help determine if the habitat used overlaps with that used by roundtail chub.

Several stockings of bonytail were completed this year. Approximately 20,000 bonytail were stocked into the Green River at Green River, Utah (RM 120.0), in April, and approximately 48,000 bonytail were stocked at this location in October (Table 1). The Colorado River at Dewey Bridge (RM 94.7) received approximately 15,000 bonytail in April and approximately 21,000 bonytail in November (Table 1). The river reaches in the Dinosaur National Monument received 10,000 bonytail in July (Table 1). All fish stocked were hatched at the Dexter National Fish Hatchery, and reared at the UDWR Wahweap Hatchery in Big Water, Utah. All fish were implanted with coded wire tags prior to stocking. Monitoring of these fish was accomplished through electrofishing, seining, and trammel netting.

Fourteen adult bonytail were radio-tagged prior to stocking in the Green River in March. These fish were monitored intensively in March and April, and sporadically in June and July, until it was assumed that the batteries in the transmitters had died. Wild roundtail chub (*Gila robusta*) were also to be radio-tagged to determine if

habitat

overlap occurred between the two species, but no roundtail chub of a suitable size were captured in the study area.

IV. Study Schedule:

a. Initial year: 1996
b. Final year: 2000

V. Relationship to the RIPRAP:

General Recovery Program Support
IV. Manage genetic integrity and augment or restore populations
IV.A.5. Implement basinwide bonytail restoration plan

VI. Accomplishments of FY2000 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Objective 1: Reintroduction of bonytail

To date, over 56,000 bonytail have been stocked into the Colorado River, over 81,000 bonytail have been stocked in the Green River, and 10,000 bonytail have been stocked in Dinosaur National Monument (approximately 5,000 each in both the Yampa and Ladore canyon river reaches) (Table 1). Far more fish were stocked this year relative to previous years. The majority of these fish were stocked after being held in ponds for only one year, but some fish were stocked after being held for two or more years. All fish stocked have been tagged with coded wire tags that are unique for each lot of fish. These tags can be detected in live fish, but the fish would have to be killed to read the unique codes. Therefore, since lethal sampling has not yet been approved, the tags have only been used to determine whether a fish was produced in the hatchery system.

Table 1. Summary of the number of bonytail stocked in the Colorado, Green, and Yampa rivers to date. Figures shown indicate the number of bonytail stocked with the cohort shown in parentheses.

Stock Site	FY 1997	FY 1998		FY 1999		FY 2000		FY 2001	Total
	Fall '96	Fall '97	Spring '98	Fall '98	Spring '99	Fall '99	Spring '00	Fall '00	
Colorado	1,996 (96)	2,165 (97) 10 (96)	114 (96) 2,812 (97)	2,232 (97) 1,048 (98)	15 (96) 10,000 (98)		15,037 (99)	19,000 (99) 2,237 (00)	56,666
Green				3,000 (97)	10,000 (98)		15 (96) 9,962 (98) 10,025 (99)	48,205 (00)	81,207
Dinosaur NM							10,000 (99)		10,000

Objective 2: Determine appropriate number and size of fish to stock

Task 1: Monitoring of bonytail from previous stockings (1996 through 2000)

In addition to active sampling for bonytail for this project, other projects conducted by the Utah Division of Wildlife Resources have contributed results relevant to bonytail monitoring. The number and size of bonytail captured, by gear type, during the 2000 field season are shown in Table 2. Electrofishing and seining were the primary methods used to collect bonytail; however, limited use of trammel nets produced larger bonytail than the other gear types. The total number of stocked bonytail captured by all gear types was low, but greater than the numbers captured in previous years. Nearly all fish captured this year appeared to be from the most recent stocking efforts. However, information such as stocking date, location, and the size at stocking can not be determined without killing the fish and retrieving the coded wire tag. Thus, it is unknown what proportion of these fish were stocked in previous years. In addition, parameters such as growth rates and movement patterns can not be determined without killing fish to retrieve the tags.

The majority of bonytail captured in both the Green and Colorado rivers were caught within a few river miles of the stocking site soon after stocking. However, a few bonytail were caught many miles downstream of the stocking sites. Several bonytail were also captured upstream of the stocking site on the Colorado River a few days after the fall stocking. Electrofishing was the only gear type that was used in a variety of different habitat types (e.g., low velocity, swift water, backwater). Most bonytail captured with electrofishing gear were found in swift water habitats (e.g. riffles, cobble bars, and the base of rapids) or near woody debris. Woody debris is uncommon near both stocking sites, and swift water habitat is very uncommon near the Green River stocking site. The limited occurrence of these habitat types, and the apparent affinity bonytail exhibit to them, may suggest a habitat preference.

Table 2. Number and size of bonytail captured in the Green and Colorado rivers, Utah, during the FY2000/2001* field season.

GEAR TYPE	NUMBER CAPTURED	AVERAGE and (RANGE) of LENGTHS in mm
GREEN RIVER		
Electrofishing	96	91.5 (66-216)
Trammel netting	3	203 (187-231)
Seining	87	103.2 (55-218)
TOTAL	186	-
COLORADO RIVER		
Electrofishing	214	141 (82-212)
Trammel netting	0	-
Seining	1	122 (122)
TOTAL	217	-

* FY2001 data refers to monitoring efforts following Fall 2000 stocking.

Task 2: Produce a report on stocking evaluation

A draft final report that summarizes the work done to address this objective will be completed in May 2001.

Objective 3: Determine movements of bonytail and habitat overlap with roundtails

Task 1: Monitor radio-tagged bonytail and roundtail chub.

Movement and habitat use of 14 stocked bonytail was accomplished through repeated radio tag contacts with fish stocked in the Green River on March 20, 2000. The radio tags used weighed 6 g and had a battery life of approximately 90 days. Radio tags were implanted in bonytails at Wahweap on March 9, 2000. Wild roundtail chub (*Gila robusta*) were also to be radio-tagged to determine if habitat overlap occurred between the two species, but no roundtail chub of a suitable size were captured in the study area.

Monitoring of radio-tagged fish was conducted by moving downstream along the river corridor with a scanning radio receiver until a signal was detected. An effort was then made to triangulate the location of each fish. The portion of the river near the release site (RM 122.0) was monitored more frequently than other areas, but the section from Tusher Wash Diversion Dam (RM 128.5) to Mineral Bottom (RM 52.2) was checked on a few occasions, as was the section from Mineral Bottom to the confluence with the Colorado River (RM 0.0). A 24 hour intensive tracking session was completed on one fish. Radio contact was made with each fish on several

occasions, but not all fish were found during each tracking effort. Most fish were followed for at least one month, while some fish were monitored for more than four months. Table 3 shows the size of each fish at the time when the radio was implanted, the greatest distance moved away from the stocking location, the distance away from the release site at the last contact, and the date of the last radio contact.

Initially, all 14 bonytail stayed in the area of low velocity water where they were stocked. Some fish began to move away from this area as the discharge began to rise about one month after the stocking date. There was no general movement pattern noted; some fish moved large distances downstream, some moved downstream and then moved back upstream, and some fish were relatively sedentary. On several occasions, especially during the first month after stocking, more than one fish appeared to be occupying a particular habitat. Movements of individual fish varied greatly and will be addressed more completely in the final report due in May 2001.

Table 3. Results of radio-telemetry efforts on the Green River for 14 bonytail. Fish were stocked at RM 120.0 on March 9, 2000. Downstream movements are shown as negative values, while upstream movements are shown as positive values.

Radio Frequency	TL (mm)	Wt (g)	Number of Days Contacted	Final Distance from Release Site (river miles)	Greatest Distance from Release Site (river miles)	Last Contact Date
40.021	390	486	15	-0.1	-2.7	4/25/00
40.041	411	590	16	-1.5	-1.5	5/25/00
40.061	400	576	16	-61.0	-61.0	5/19/00
40.081	430	748	9	0.0	-0.2	4/25/00
40.101	429	785	19	-0.9	-5.2	6/21/00
40.111	399	507	17	-48.2	-48.2	5/19/00
40.151	380	512	18	-0.5	-2.0	6/06/00
40.611	361	399	17	-76.5	-76.5	5/31/00
40.711	430	723	22	+6.0	-21.5	7/25/00
40.751	432	717	23	-1.0	-12.7	6/21/00
40.771	421	723	21	+5.7	-7.5	7/25/00
40.791	386	450	14	0.0	-0.2	4/19/00
40.811	456	908	21	-20.6	-20.6	7/27/00
40.831	425	704	16	-113.0	-113.0	6/02/00

Task 2: Produce a report on radio telemetry

Results from the radio telemetry monitoring will be included in the report written to summarize the work done to address Object 2. A draft of this report will be done in May 2001.

Objective 4: Flow Training

This work was conducted by Dr. Todd A. Crowl of Utah State University. Dr. Crowl is responsible for producing the annual and final reports related to this objective.

VII. Recommendations:

Efforts should be made to continue to produce bonytail in accordance to the approved stocking plans for stocking each year. While few stocked bonytail were captured this year, the catch rate was relatively high relative to previous years, when the number of fish stocked was also low. The best size of fish to stock and the proper timing of the stocking has not yet been determined, but it does seem clear that we need to stock more than a few thousand fish per year to be able to recapture fish in succeeding years.

Coded wire tags, as they are currently being used, are not providing enough information to make sound biological decisions. These tags can provide valuable information on such parameters as stocking date, location, and average fish size for each lot stocked. This information would allow us to make better decisions on the proper stocking protocol for bonytail. However, lethal sampling techniques are required to obtain this information. Approval for lethal sampling should be obtained, or PIT tags should be used, so that we can better evaluate our stocking methodologies.

Bonytail may prefer habitats with swift water and woody debris, but the area near the Green River stocking site has very little of this type of habitat. Therefore, future stocking of bonytail further upstream in the Green River (e.g. at Nefertiti Rapid in Gray Canyon) should be considered. Relative to the current Green River stocking site, the current stocking site on the Colorado River has more of the type of habitat that may be preferred. However, future stocking efforts should release bonytail at RM 110.5 to provide more of this potentially preferred habitat downstream of the stocking site.

VIII. Project Status: On-track and ongoing

IX. FY2000 Budget

A. Funds budgeted: $76,000
B. Funds expended/obligated: $76,000
C. Difference: $ 0
D. Percent FY2000 work completed: 100%
E. Recovery Program funds spent for publication charges: $ 0

X. Status of Data Submission: Data will be submitted with the final report. A draft final report is due in May, 2001.

XI. Signed: Pete Cavalli, December 8, 2000.