

I. Project Title: **Upper Basin Database**

II. Bureau of Reclamation Agreement Number(s): N/A

Project/Grant Period: Start date (Mo/Day/Yr): 10/1/2013
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Reporting period end date: 9/30/2014
Is this the final report? Yes _____ No X

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IV. Abstract: Development of a centralized database was a requirement of the Recovery Program when it was formed in 1986. All researchers and hatcheries who receive funding through the Recovery Program are required to submit all fishery data to the central database at the completion of their study or rearing season. This mandates that all researchers are required to submit a complete list of all endangered, native and non-native fish handled each year to the central database. Most data have been submitted and included into the centralized database through 2013. This report includes FY 2014 findings from the Price-Stubb Fish Passage Antenna on the Colorado River.

V. Study Schedule: Scheduled to continue for the length of the Recovery Program.

VI. Relationship to RIPRAP: General Recovery Program Support Action Plan.
V.A.2. Conduct interagency data management program to compile, manage, and maintain, all research and monitoring data collected by the Recovery Program.

VII. Accomplishment of FY 2014 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Tasks:

Most of the UCRB database consists of 'all fish' data collected during the different investigations funded by the Recovery Program. These data relate to species, number of individuals collected, collection date, site, gear, effort expended, habitat and any other parameter associated with collection or stocking of that fish. Fish collection data from the field, radiotelemetry data, stationary PIT tag antennae data, and program funded propagation data are required to be submitted. The Recovery Program does not require submitting data from invertebrate, geomorphology, or laboratory studies. All fishery data

associated with a study are due to the database when the final report is approved by the Recovery Program.

The database manager checks each file to ensure that the data conform to the required format. Future users will be referred to the reports for a complete description of the study design and conclusions of the original researchers. While an online GIS database has been developed for researchers to query the dataset, many researchers find the program to be not particularly user friendly and still query the database manager directly. This past year the database manager was asked to run queries by recovery program researchers over fifty times.

The database manager also distributes PIT tags to researchers as they request them and maintains a list of all tags and who they are distributed to. PIT tag lists submitted by researchers are compared with this database to identify transcription errors. All errors can't be corrected, but at least a few errors can be eliminated before they are included in the basin-wide tagging list. Other errors are corrected as they are identified.

The database manager is also tasked with collecting and reporting all data associated with a PIT tag antennae that was installed (8/13/2010) in the Colorado River at the Price-Stubb instream diversion dam within the fish passage structure at river mile 188.3. All of the FY 2014 data for the Price-Stubb PIT tag antenna array is reported in this annual report.

Accomplishments:

PIT tags have been distributed as researchers and hatchery managers have requested them. An Access database is maintained documenting distribution of all PIT tags that are sent to investigators in both the Upper Basin and San Juan Recovery Programs. With the new RFP going into place in 2012 and new tagging products available to the programs, we found that most researchers and hatchery personnel were interested in the new 'gun' style implanter and pre-loaded needles in trays. Both Dexter NFH and the Ouray NFH – Grand Valley Unit (Ouray NFH-GVU) had the ability to hold fish for a period of time after using the traditional and new style (gun) implanters. Their results varied. Ouray NHF-GVU found that the new implanters provided for fewer delayed mortalities and less slipped tags. Dexter NFH found a slight increase in delayed mortalities when using the new pre-loaded needles. However, considering each fish receives a new needle with the pre-loaded tags, we believe that the new style implanters are the way of the future for hatchery and research applications. Unfortunately, the trays in which pre-loaded tags come from the manufacturer are bulky and are going to require extra funds for distribution (shipping charges). It is estimated that shipping charges could cost an additional \$1,200 (or higher) per year.

All tagging databases (stocking and river) are up to date through 2012 and most data from 2013 are included. PIT tagging data from 2014 should be coming in during the next month or so. Tagging data from 2013 and 2014 will be updated over the coming winter. All tagging and stocking databases have been converted to Access. We worked with Karen Holt to provide data for an online database that is available to researchers looking for information on specific PIT tag numbers or general information of distribution of rare fish.

Efforts have continued to start bringing the 'other fish' data into consolidated Access files. They currently reside in a variety of Excel, Dbase, and Quattro Pro files. This will be a more complicated process because of the wide variety of data types that fall into this broad category.

Efforts in 2009 and 2010 concentrated on providing a consolidated database of all the nonnative fish data that has been accumulated since 2000. These consolidated data will play an important role in ongoing efforts to synthesize this important information for all rivers of the upper basin. This data has been updated through 2012. Data from 2013 non-native sampling has been received. However, it has not yet been included into the database due to time constraints.

Additionally, efforts were made to consolidate the YOY Colorado pikeminnow monitoring data for a long term analysis. Data from the now terminated adult monitoring program were also consolidated into an Access file. Catch data from both the Grand Valley Water User's Fish Ladder and Redlands Water and Power Fish Ladder were consolidated into an Access database.

Investigators are not nearly as diligent about submitting the 'other fish' data as they are about submitting rare fish data, so the Recovery Program will need to update that information as it is received. The database manager has been working with researchers to incorporate the more recent data. Work on updating the database is continually ongoing.

An RFP (request for project) to develop a web based PIT tag database was awarded by the Bureau of Reclamation in FY 2014 to the Colorado Natural Heritage Program (CNHP). Database managers from both the San Juan and Upper Basin Recovery Programs were on the Technical Panel for award of the contract. FY 2015 will require substantial time and coordination between these database managers and the CNHP for development, testing, and application of the new PIT tag database.

Humpback Collection for Refuge Population

The largest upper basin (Black Rocks and Westwater Canyon) humpback chub (*Gila cypha*) population core 2008 abundance estimates fell below the minimum viable population (MVP) described in the UCRRP Recovery Plan. Therefore, researchers suggested developing a refuge population in captivity and with approval for the UCRRP Biology Committee we began these efforts in 2014.

Miniature baited hoop nets (383.066 hours of effort), seining, and boat mounted electrofishing were the three methods used with hopes to collect young-of-year (YOY) and juvenile *Gila spp.* from 9/16/2014 through 9/18/2014. Both YOY and juvenile *Gila spp.* proved difficult to capture in 2014, so we also brought adult humpback chub into captivity. In total we collected 20 total fish (15 adult humpback chub, 2 juvenile humpback chub, 2 indeterminate juvenile *Gila*, and 1 indeterminate YOY *Gila spp.*).

These fish were collected and transported to Westwater Ranger Station, Utah by boat in a fiberglass tank mounted with oxygen diffusion stones, transferred to a trailer tank with oxygen diffusion stones and were driven to Horsethief Canyon State Wildlife Area,

Colorado. They were tempered with the receiving water at Horsethief Canyon Native Fish Facility (HCNFF) and were stocked into a 1/10 surface acre pond. The pond had Aquashade applied to help create cover from predacious birds. To date, we have had three mortalities, two adult humpback chub and one juvenile humpback chub. All three specimens have been retained in a freezer.

Price-Stubb Antennas

The Price-Stubb PIT tag antennae produced multiple hits on 217 unique PIT tags during FY 2014 (table 2). We reported in 2010 that the close placement of each of the four antennae (~10 inches) complicated determining directionality (upstream vs. downstream). After cleaning the passageway, in late June of 2011, of all of the debris from spring high water, Audrey Hopkins of Biomark adjusted some of the settings at the unit. She changed the antenna sequence (AS) from 1,2,3,4,0,0,0,0,0,0,0 to 1,3,1,3,1,3,2,4,2,4,2,4 and adjusted the delay time from 100mS to 45mS. These adjustments have provided more resolution for determining directionality from detections. There are still some unknowns; however, not as many as were previously encountered. For FY 2014; 24% (n=55) of the fish passed the antennae heading upstream, 38% (n=86) in an undetermined direction, and 37% (n=84) in a downstream direction. Bonytail (n=114, *Gila elegans*), roundtail chub (n=29, *Gila robusta*), Colorado pikeminnow (n=3, *Ptychocheilus lucius*), razorback sucker (n=69, *Xyrauchen texanus*), flannelmouth sucker (n=1, *Catostomus latipinnis*), and one unidentified PIT tag were detected during FY 2014. The following (Table 1) gives a detailed breakdown of the fish that were detected by the antennae:

Table 1

Month of Detection	Direction	Species	Number of Fish	History
October 2013	Upstream	BT	4	N = 53 stocked 8/13/2013 at CO RMI 195 N = 1 stocked 9/19/2013 at GR RMI 290 (questionable data, based on dates)
	Unknown		24	
	Downstream		26	
	Upstream	RZ	0	N=12 stocked in Sept. 2013 at Rifle Bridge RMI 240.7
	Unknown		2	
	Downstream		10	
	Upstream	RT	0	N=1 tagged Oct. 2011 in Black Rocks, this fish has been detected @ Price-Stubbs in July and Sept. 2013 N=1 tagged Sept. 2011 in Westwater
	Unknown		2	
Downstream	0			
November 2013	Upstream	BT	0	N = 30 stocked 8/13/2013 at CO RMI 195
	Unknown		14	
	Downstream		16	
	Upstream	RZ	0	N=4 stocked in Sept. 2013 at Rifle Bridge RMI 240.7 N=5 stocked in Sept. 2012 at Rifle Bridge RMI 240.7
	Unknown		4	
	Downstream		5	
December 2013	Upstream	BT	0	N = 6 stocked 8/13/2013 at CO RMI 195
	Unknown		5	
	Downstream		1	
	Upstream	RZ	0	N=1 stocked in Sept. 2013 at Rifle Bridge RMI 240.7
	Unknown		1	
	Downstream		0	
January 2014	Upstream	BT	0	N=1 stocked 8/13/2013 at CO RMI 195
	Unknown		1	
	Downstream		0	
	Upstream	RZ	0	N=2 stocked in Aug. and Sept. 2013 at Rifle Bridge RMI 240.7
	Unknown		0	
	Downstream		2	

Table 1 cont.

Month of Detection	Direction	Species	Number of Fish	History
February 2014	Upstream	BT	0	N=3 stocked 8/13/2013 at CO RMI 195
	Unknown		3	
	Downstream		0	
	Upstream	RZ	0	N=1 stocked in Sept. 2013 at Rifle Bridge RMI 240.7
	Unknown		0	
	Downstream		1	
March 2014	Upstream	BT	1	N=7 stocked 8/13/2013 at CO RMI 195
	Unknown		3	
	Downstream		3	
	Upstream	FM	1	N=1 tagged 11/20/2003 by CPW at CO RMI 155
	Unknown		0	
	Downstream		0	
	Upstream	RZ	0	N=1 stocked in Sept. 2013 at Rifle Bridge RMI 240.7
	Unknown		1	
	Downstream		0	
April 2014	Upstream	BT	0	N=7 stocked 8/13/2013 at CO RMI 195
	Unknown		1	
	Downstream		6	
	Upstream	CS	1	N=1 Male tagged 5/10/1995 GR RMI 254.0, recaptured twice in 1999 CO RMI 174-178, recaptured 5/16/2003 CO RMI 187.6, recaptured 5/26/2005 CO RMI 170.5, recaptured 4/22/2009 CO RMI 192.9, detected three times at Price-Stubb Antenna in 2012, recaptured 8/6/2013 CO RMI 177.1, detected twice at Price-Stubb Antenna in 2013
	Unknown		0	
	Downstream		0	
	Downstream		0	

Table 1 cont.

Month of Detection	Direction	Species	Number of Fish	History		
April 2014 cont.	Upstream	RT	2	<p>N=1 tagged Sept. 2011 in Black Rocks, recaptured in Black Rocks Oct. 2011, has been detected @ Price-Stubb in May 2012 and June 2013</p> <p>N=1 tagged Oct. 2008 in Black Rocks, recaptured in Black Rocks Oct. 2008, has been detected @ Price-Stubb May 2011, May 2012, Oct. 2012, and May 2013</p> <p>N=1 tagged Sept. 2011 in Westwater, has been detected @ Price-Stubb twice in June 2012, twice in July 2012, once in May 2013, and once in July 2013</p>		
	Unknown		1			
	Downstream		0			
	Upstream	RZ	6			
	Unknown		3			
	Downstream		0			
	May 2014	Upstream	BT		0	N=2 stocked 8/13/2013 at CO RMI 195
		Unknown			2	
Downstream		0				

Table 1 cont.

Month of Detection	Direction	Species	Number of Fish	History
May 2014 cont.	Upstream	CS	0	Same fish as April - N=1 Male tagged 5/10/1995 GR RMI 254.0, recaptured twice in 1999 CO RMI 174- 178, recaptured 5/16/2003 CO RMI 187.6, recaptured 5/26/2005 CO RMI 170.5, recaptured 4/22/2009 CO RMI 192.9, detected three times at Price-Stubb Antenna in 2012, recaptured 8/6/2013 CO RMI 177.1, detected twice at Price-Stubb Antenna in 2013
	Unknown		0	
			1	
	Downstream	RT		N=1 tagged Oct. 2011 in Black Rocks, has been detected @ Price-Stubb in May 2012 and July 2013
	Upstream		0	
	Unknown		1	
			0	
	Downstream	RZ		N=1 stocked Oct. 2008 at CO RMI 185.1 N=1 stocked Nov. 2009 at CO RMI 166.7 N=2 stocked Sept. or Oct. 2010 at CO RMI 183.6 N=1 stocked Oct. 2010 at CO RMI 227.6 N=1 stocked Oct 2011 at CO RMI 227.6 N=1 stocked Oct 2011 at CO RMI 240.7 N=5 stocked Sept. 2012 at CO RMI 240.7 N=1 tagged May 2013 at CO RMI 76.8 N=4 stocked Aug. or Sept. 2013 at CO RMI 240.7
	Upstream		1	
	Unknown		11	
	Downstream		5	

Table 1 cont.

Month of Detection	Direction	Species	Number of Fish	History
June 2014	Upstream	RT	9	N=1 tagged Sept. 2008 in Westwater N=1 tagged Oct. 2008 in Black Rocks, detected twice at Price-Stubb in June and July 2013 N=1 tagged Sept. 2011 in Westwater, detected at Price-Stubb Antenna Sept 2011, May and July 2012, and May 2013 N=3 tagged Sept. or Oct. 2011 in Black Rocks, one fish was detected at Price-Stubb three times in Sept. 2011, twice in June 2013 and twice in June 2014 N=1 tagged Oct. 2012 in Black Rocks N=3 tagged Oct. 2012 in Westwater, one fish was detected at Price-Stubb in June 2013
	Unknown		0	
	Downstream		2	
	Upstream	RZ	0	
	Unknown		2	
	Downstream		0	

Table 1 cont.

Month of Detection	Direction	Species	Number of Fish	History
July 2014	Upstream	RT	5	<p>N=2 tagged Sept. 2007 in Westwater, one fish was recaptured 9/24/2008 in Westwater and was detected at Price-Stubb may 2012</p> <p>N=1 tagged Sept 2008 in Westwater, was detected twice at Price-Stubb July 2011, recaptured 9/30/2011 in Westwater, detected again in May and July 2012 and once more in June 2013</p> <p>N=3 tagged in Sept or Oct. 2012 in Westwater, one fish was recaptured 10/6/2012 in Westwater, and one fish was recaptured three times Oct. 2012 in Westwater</p>
	Unknown		0	
	Downstream		1	
August 2014	Upstream	CS	2	<p>Same fish as April and May</p> <p>N=1 Male tagged 5/10/1995 GR RMI 254.0, recaptured twice in 1999 CO RMI 174-178, recaptured 5/16/2003 CO RMI 187.6, recaptured 5/26/2005 CO RMI 170.5, recaptured 4/22/2009 CO RMI 192.9, detected three times at Price-Stubb Antenna in 2012, recaptured 8/6/2013 CO RMI 177.1, detected twice at Price-Stubb Antenna in 2013</p> <p>N=1 tagged 5/13/2013 at CO RMI 27.1</p>
	Unknown		0	
	Downstream		0	

Table 1 cont.

Month of Detection	Direction	Species	Number of Fish	History
August 2014 cont.	Upstream	RT	4	<p>N=1 tagged Sept. 2011 in Black Rocks, recaptured three times Sept. 2011 in Black Rocks, and detected twice at Price-Stubb in June 2013</p> <p>N=1 tagged Sept. 2011 in Westwater, recaptured 9/28/2011 in Westwater</p> <p>N=4 tagged Oct. 2012 in Black Rocks, one fish was detected at Price-Stubb in June 2013 and was detected twice in Aug. 2014</p> <p>N=1 tagged Oct. 2012 in Westwater and was detected twice in Aug. 2014</p>
	Unknown		4	
			1	
	Downstream			
	Upstream	RZ	11	
	Unknown		0	
			0	
Downstream				
September 2014	Upstream	BT	0	<p>N=2 based on PIT distribution data we know they were implanted into a stocked BT stocking data is missing</p>
	Unknown		0	
			2	
	Downstream			
	Upstream	CS	1	<p>N=1 tagged 5/17/2013 at CO RMI 52.6</p>
	Unknown		0	
Downstream	0			

Table 1 cont.

Month of Detection	Direction	Species	Number of Fish	History
September 2014 cont.	Upstream	RT	3	N=2 tagged Sept. 2011 in Westwater, one fish was detected at Price-Stubb twice in both June and July 2012 and once in both May and July 2013 N=1 tagged Oct. 2012 in Westwater, recaptured 10/22/2012 in Westwater
	Unknown		0	
			0	
	Downstream	RZ	2	
	Upstream		0	
	Unknown		1	
Downstream			N=1 stocked May 2007 at CO RMI 167.7 N=1 stocked Sept. 2009 at CO RMI 185.1, recaptured 9/16/2011 at CO RMI 173.4, and was detected at Price-Stubb May 2013 N=1 stocked Oct. 2010 at CO RMI 227.6	

Table 2

Species	# of Individuals FY2010***	# of Individuals FY2011**	# of Individuals FY2012**	# of Individuals FY2013**	# of Individuals FY2014**
BT	0	16	88	138	114
CS	2	1	8	2	3
FM	0	1	3	1	1
HB	0	0	1	0	0
RT	6	19	36	79	29
RZ	0	83	135	239	69
* Antenna was only in operation for 1.5 months during FY 2010					
** Some of these fish were detected more than once during the fiscal year					

VIII. Additional noteworthy observations: *See above.*

IX. Recommendations: Continue to identify and acquire data sets that belong in the centralized database. Continue collecting data from Price-Stubb antennae. Consider additional budgeting for operation and maintenance (O&M) charges associated with the Price-Stubb antennae (~\$5,000 safety net for unforeseen costs). Consider providing additional funds for distributing (shipping) the trays with pre-loaded needles (~\$1,200) to hatcheries and researchers. Current data queries are more difficult to fulfill because of the many sources of tags and the lack of a centralized tag distribution database from all of these sources. Mandate that field stations working with more than one source of tags use

only program acquired tags in endangered fish – and to not use program acquired tags in projects that are not funded by the respective programs.

X. Project Status: On track and ongoing.

XI. FY 2014 Budget Status

A. Funds Provided: \$64,202

B. Funds Expended: \$64,202

C. Difference: -0-

D. Percent of the FY 2014 work completed, and projected costs to complete: 80%

E. Recovery Program funds spent for publication charges: -0-

XII. Status of Data Submission (Where applicable): Price-Stubb antenna and humpback chub refuge collection data will be submitted to UCRRP database by January 2015.

XIII. Signed: Travis Francis 11/12/2014
Principal Investigator Date