

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

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

Project/Grant Period: Start date (Mo/Day/Yr): 10/1/2014  
End date: (Mo/Day/Yr): 9/30/2015  
Reporting period end date: 9/30/2015  
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, including complete lists of all endangered, native, and non-native fish handled to the centralized database at the completion of their field study or rearing season. Most data have been submitted and included into the centralized database through 2014. STReaMS (<https://streamsystem.org/> -- an online PIT tag database) is 80% complete and now accessible to all researchers.

This report includes FY 2015 findings from the Price-Stubb Fish Passage Antenna on the Colorado River, as well as humpback chub (*Gila cypha*) collection from Black Rocks to develop a refuge population.

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 2015 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 antenna array 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 for submission to the centralized 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. 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 PIT tags received from the manufacturer and currently available for distribution, as well what tags have been distributed and to whom they were distributed. PIT tag lists submitted by researchers are compared with this database to identify transcription errors. While many transcription errors are unable to be reconciled, at least a few errors can be eliminated before they are included in the basin-wide tagging list. Other errors are able to be corrected later, as they are identified.

The database manager is also tasked with collecting and reporting all data associated with a PIT tag antenna array that was installed (8/13/2010) in the Colorado River at the Price-Stubb instream diversion dam within the non-selective fish passage structure at river mile 188.3. All of the FY 2015 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 2012 RFP 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 NFH-GVU found that the new implanters resulted in 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 require extra funds for distribution (shipping charges). It is estimated that shipping charges could cost an additional \$1,200 (or higher) per year for pre-loaded tags.

All tagging databases (stocking and river) are up to date through 2014 and some data from 2015 are included. PIT tagging data from 2015 should be coming in during the next

month. Tagging data from 2015 will be updated over the coming winter. All tagging and stocking databases have been converted to MicroSoft Access (Access) format.

Efforts have continued to start bringing the 'other fish' data into consolidated Access files. They currently reside in a variety of different formats, including 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 to 2014 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 young-of-year (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 passages were consolidated into an Access database.

Investigators haven't been nearly as diligent about submitting the 'other fish' data as they are about submitting rare fish data. So in the future, it will be up to the Recovery Program 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 required substantial time and coordination between these database managers and the CNHP for development, testing, and application of the new PIT tag database. The STReAMS database is now 80% complete and is accessible by researchers.

#### Humpback Chub Collection for Refuge Population

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

Miniature baited hoop nets (488.67 hours of effort), seining, and boat mounted electrofishing were the three methods used to try to collect YOY and juvenile *Gila spp.* from 8/14/2014 through 8/28/2014. Both YOY and juvenile *Gila spp.* proved difficult to capture in 2015, so we also brought adult humpback chub into captivity. In total we collected 18 total fish (8 adult humpback chub, 3 juvenile humpback chub, and 7

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 the Horsethief Canyon Native Fish Facility (HCNFF), Colorado. At HCNFF (aka Snook’s Bottom Ponds), they were treated for parasites (using Praziquantel), appropriately tempered, and stocked into a 1/10 surface acre pond.

The humpback chub that were collected in FY 2014 spawned in the HCNFF pond in FY 2015. We collected these fish, weighed and counted a subset and estimated that there were 1,541 YOY humpback chub. At the request of the Biology Committee, we collected fin clips from 146 YOY. These samples were sent to Wade Wilson at the Southwestern Native Aquatic Resources and Recovery Center (SNARRC), so he could conduct genetic analysis on them. The results of his analysis will hopefully provide information useful to the Recovery Program’s Biology Committee in making an informed management decision as to how to best utilize these young, pond-spawned humpback chub.

Price-Stubb Antennae

The Price-Stubb PIT tag antennae produced multiple hits on 423 unique PIT tags during FY 2015 (Table 2). We reported in 2010 that the close placement of the four antennae in relation to one another (~10 inches apart) complicated determining directionality of fish movements (upstream vs. downstream). In late June of 2011 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 of fish movements from detections. Some unknowns still remain, however not as many as were previously encountered. For FY 2015; 74% (n=385) of the fish passed the antennae heading upstream, 15% (n=80) in an undetermined direction, and 11% (n=57) in a downstream direction. Bluehead sucker (n=102, *Catostomus discobolus*), bonytail (n=22, *Gila elegans*), roundtail chub (n=19, *Gila robusta*), Colorado pikeminnow (n=4, *Ptychocheilus lucius*), razorback sucker (n=19, *Xyrauchen texanus*), flannelmouth sucker (n=229, *Catostomus latipinnis*), and twenty seven unidentified PIT tags were detected (many were detected on multiple dates) during FY 2015. 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
	Upstream	BT	1	N=1 stocked 7/10/2014 at

October 2014	Unknown	RZ	1	CO RMI 167 N=1 stocked 8/21/2014 at CO RMI 198
	Downstream		0	
	Upstream		1	N=1 stocked in Oct. 2012 at Rifle Bridge RMI 240.7; detected at Price Stubb 8/31/2014 N=1 stocked Sep. 2014 at CO RMI 204.5
	Unknown		1	
	Downstream		0	
December 2014	Upstream	RZ	0	N=1 stocked in Sep. 2013 at Rifle Bridge RMI 240.7
	Unknown		0	
	Downstream		1	
February 2015	Upstream	BT	0	N=1 stocked 8/21/2014 at CO RMI 198
	Unknown		1	
	Downstream		0	
March 2015	Upstream	Unknown	6	N=10 tags distributed to CPW for 3 spp. work
	Unknown		4	
	Downstream		0	
	Upstream	BH	36	N=39 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7
	Unknown		3	
	Downstream		0	
	Upstream	FM	69	N=84 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7
	Unknown		13	
	Downstream		2	
	Upstream	RT	2	N=1 tagged Oct. 2012 in Westwater, detected July 2014 at Price Stubb antenna N=1 tagged Sept. 2012 in Black Rocks, recaptured Oct. 2012 in Black Rocks; detected at Price Stubb antenna May 2012, June 2013, and April 2014
	Unknown		0	
	Downstream		0	
	Upstream	RZ	1	N=1 stocked Oct. 2010 at CO RMI 227.6
	Unknown		0	
	Downstream		0	

**Table 1 cont.**

Month of Detection	Direction	Species	Number of Fish	History
	Upstream	Unknown	16	N=17 tags distributed to

Apr. 2015	Unknown		2	CPW for 3 spp. work, 5 of these tags were detected more than once
	Downstream		4	
	Upstream	BH	48	N=54 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7, two of these tags were detected more than once
	Unknown		5	
	Downstream		3	
	Upstream	CS	1	N=1 tagged Apr. 2014 during CO CS Pop Est at CO RMI 142.6, recaptured May 2015 at CO RMI 166.7
	Unknown		0	
	Downstream		0	
	Upstream	FM	115	N=132 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7, seventeen of these tags were detected more than once
	Unknown		21	
	Downstream		17	
	Upstream	RZ	4	N=2 stocked in Oct. 2010 at CO RMI 227.6; one was detected at Price Stubb during Aug. 2014 N=1 stocked Sep. 2011 at CO RMI 184.7 N=1 stocked Apr. 2015 at CO RMI 166.7
	Unknown		0	
	Downstream		0	
	Upstream	RT	1	N=1 tagged Oct. 2011 in Black Rocks; this fish has been detected @ Price-Stubb in May 2012, and July 2013 N=1 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7
	Unknown		1	
	Downstream		0	
Unknown	0			
Downstream	2			

**Table 1 cont.**

Month of Detection	Direction	Species	Number of Fish	History
	Upstream	Unknown	2	N=4 tags distributed to CPW for 3 spp. work
	Unknown		1	

May 2015	Downstream	BH	1	N=16 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7		
	Upstream		13			
	Unknown		3			
	Downstream		0			
	Upstream	FM	28	N=38 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7, two of these tags were detected more than once		
	Unknown		6			
	Downstream		6			
	Upstream	RT	8	N=2 tagged Oct. 2008 in Black Rocks		
	Unknown		2			
	Downstream	RT	1	N=1 tagged Oct. 2008 in Westwater N=1 tagged Oct. 2011 in Black Rocks; detected at Price Stubb antenna May 2012 and June 2013 N=2 tagged Oct. 2012 in Black Rocks; one was detected at Price Stubb antenna in May and June 2013, and another was detected May 2013 N=1 tagged Oct. 2012 in Westwater; detected at Price Stubb antenna June 2013 and June 2014 N=4 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7		
					Upstream	3
					Unknown	1
	Downstream	RZ	0	N=1 stocked April 2009 at CO RMI 167.7, recaptured Aug. 2012 at CO RMI 171, recaptured April 2014 at CO RMI 168.2 N=1 stocked Oct. 2010 at CO RMI 227.6; detected at Price Stubb antenna March 2015 N=1 tagged April 2014 at CO RMI 163.1 N=1 stocked April 2015 at CO RMI 166.7		
					Upstream	3
	Unknown		1			

**Table 1 cont.**

Month of Detection	Direction	Species	Number of Fish	History
June 2015	Upstream	Unknown	0	N=2 tags distributed to CPW for 3 spp. work
	Unknown		1	
	Downstream		1	

	Upstream	FM	0	N=2 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7, one of these tags was detected more than once
	Unknown		2	
	Downstream		1	
	Upstream	RT	0	N=1 tagged Oct. 2008 in Black Rocks; it was detected at Price Stubb antenna in May 2011, May and Oct. 2012, May 2013, and April 2014
	Unknown		0	
	Downstream		1	
	Upstream	RZ	0	N=1 stocked Oct. 2012 at CO RMI 240.7
	Unknown		1	
	Downstream		0	
July 2015	Upstream	RZ	1	N=1 stocked April 2015 at CO RMI 166.7
	Unknown		0	
	Downstream		0	
August 2015	Upstream	BH	1	N=6 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7
	Unknown		3	
	Downstream		2	
	Upstream	BT	9	N=1 stocked July 2015 at CO RMI 184 N=9 stocked July 2015 at CO RMI 157
	Unknown		1	
	Downstream		0	
	Upstream	CS	2	N=1 Male tagged 5/10/1995 GR RMI 254.0,
Unknown	0			

**Table 1 cont.**

Month of Detection	Direction	Species	Number of Fish	History
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August 2015 cont.		CS cont.		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, detected three times in 2014 N=1 tagged 6/8/2005 at CO RMI 58.3, recaptured 6/20/2005 at CO RMI 52.8, recaptured 4/21/2014 at CO RMI 161.5	
	Downstream		0		
	Upstream	FM	0	N=2 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7	
	Unknown		1		
	Downstream		1		
	Upstream	RT	1	N=1 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7	
	Unknown		0		
	Downstream		0		
	Upstream	RZ	2	N=1 stocked Oct. 2011 at CO RMI 227.6 N=1 stocked May 2015 at CO RMI 204.5	
	Unknown		0		
	Downstream		0		
	September 2015	Upstream	BH	6	N=3 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7, two of these tags were detected more than once
		Unknown		0	
Downstream		6			
Upstream		BT	3	N=5 stocked July 2015 at CO RMI 157	
Unknown			2		
Downstream			0		

**Table 1 cont.**

Month of Detection	Direction	Species	Number of Fish	History
	Upstream	CS	0	N=1 tagged 5/14/2014 at

September 2015 cont.	Unknown		0	CO RMI 21.8
	Downstream		1	
	Upstream	FM	1	N=3 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7
	Unknown		0	
	Downstream		2	
	Upstream	RT	1	N=2 tagged Oct. 2008 in Black Rocks; one was detected at Price Stubb May 2015 and the other in June 2015 N=1 tagged Oct. 2011 in Westwater N=2 tagged by CPW for 3 Spp. work in Oct. 2014 between CO RMI 175.3 and 177.7; one was detected at Price Stubb in Aug. 2015
	Unknown		1	
	Downstream		3	
	Upstream	RZ	3	N=1 stocked Oct. 2009 at CO RMI 177.4; detected at Price Stubb April 2014 N=1 stocked Oct. 2010 at CO RMI 227.6 N=1 stocked Oct. 2011 at CO RMI 227.6 N=1 stocked April 2015 at CO RMI 166.7
	Unknown		0	
	Downstream		1	

**Table 2**

Species	# of Individuals FY2010*	# of Individuals FY2011**	# of Individuals FY2012**	# of Individuals FY2013**	# of Individuals FY2014**	# of Individuals FY2015**
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BH	0	0	0	0	0	102
BT	0	16	88	138	114	22
CS	2	1	8	2	3	4
FM	0	1	3	1	1	229
HB	0	0	1	0	0	0
RT	6	19	36	79	29	19
RZ	0	83	135	239	69	19
* 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 antenna array. Consider additional budgeting for operation and maintenance (O&M) charges associated with the Price-Stubb antenna array (~\$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; however, the STReAMS website should lessen this burden. Mandate that field stations working with more than one source of PIT tags use only program-acquired PIT tags in endangered fish – and that they not use program-acquired PIT tags in projects that are not funded by the respective programs. Alternatively, have agencies that use any PIT tags (program-acquired or not) within the boundaries of the Colorado River drainage (including all tributaries) submit all PIT tag data to the STReAMS database, no matter what the project is or what species of fish (or other aquatic animal) are being PIT-tagged.

X. Project Status: On track and ongoing.

XI. FY 2015 Budget Status

- A. Funds Provided: \$65,956
- B. Funds Expended: \$65,956
- C. Difference: -0-
- D. Percent of the FY 2015 work completed, and projected costs to complete: 80% completed, no additional costs will be incurred
- 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 2016.

XIII. Signed: Travis Francis 11/10/2015

Principal Investigator

Date