

BRIGHT ANGEL CREEK HUMPBACK CHUB TRANSLOCATION

May 13-16, 2018

TRIP REPORT



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**Report Prepared for the Upper Colorado Region, Bureau of Reclamation, Interagency
Agreement Number: R14PG00051**

Grand Canyon National Park

May 9, 2019

INTRODUCTION

To provide redundancy for the primary Little Colorado River (LCR) spawning population of humpback chub (*Gila cypha*) in Grand Canyon, translocations to other suitable tributaries are a conservation measure included in multiple Biological Opinions on the Bureau of Reclamation's (BOR) operations of Glen Canyon Dam. In an analysis of the suitability of various Grand Canyon tributaries for humpback chub translocations, Valdez et al. (2000) ranked Havasu and Shinumo Creeks 1st and 2nd after the LCR, and Bright Angel Creek 5th, owing to its high density of nonnative trout, despite its relatively favorable flow and temperature parameters. During the same period that translocations of humpback chub to Shinumo and Havasu creeks began, a parallel, stream-wide effort to suppress nonnative trout was initiated in Bright Angel Creek (beginning in 2012). The Comprehensive Fisheries Management Plan for Grand Canyon National Park and Glen Canyon National Recreation Area (NPS, 2013) identified the following objectives for Bright Angel Creek:

- Reduce and maintain abundance of nonnative trout at approximately 20% of baseline, or less, over five years to allow for enhanced populations of native resident species
- Maintain stable or increasing populations of bluehead sucker (*Catostomus discobolus*), flannelmouth sucker (*Catostomus latipinnis*), and speckled dace (*Rhinichthys osculus*) (i.e., existing native fish)
- Following reduction of nonnative species (brown trout [*Salmo trutta*], rainbow trout [*Oncorhynchus mykiss*]), begin experimental humpback chub translocations to potentially establish a spawning aggregation, with the mature population increasing toward the estimated carrying capacity in Bright Angel Creek or toward minimum viable population size in the Bright Angel Inflow Aggregation, while maintaining genetic integrity

After five years of annual trout removal via electrofishing throughout Bright Angel Creek and operation of a weir at the delta, a peer review panel found that both prerequisites—trout suppression and positive native fish response—were judged adequately successful to proceed with the first humpback chub translocation to the creek (Healy et al., 2018; Schelly et al., 2018). Here we report on that translocation, which took place on May 14, 2018.

OBJECTIVES

1. Install PIT-tag antenna near the Bright Angel Creek delta ahead of humpback chub translocation, to detect movements in and out of the creek by humpback chub and other tagged native and nonnative fishes.
2. Use helicopter support to transport the first installment of wild-collected hatchery-grown humpback chub to Bright Angel Creek for acclimation and release.
3. Film translocation activities for inclusion in documentary highlighting GRCA Fisheries Program's humpback chub recovery efforts.

RESULTS

PIT-tag antenna installation

A PIT-tag antenna was installed just downstream of the bridge below the Phantom Ranch campground, near Rock House, the week prior to the translocation. Slings were built at the South Rim helibase and a team of four hiked in to Phantom Ranch on May 7, 2018, and the antenna installation was completed on May 9, 2018. The antenna consisted of a series of three Biomark pass-by PIT-tag antennas, each spanning the entire channel and spaced ~3 m apart, anchored to the substrate (Figure 1a), and wired to a control box on the trail-side of the fence behind Rock House (Figure 1b). For power, the antenna was plugged into Grand Canyon Monitoring and Research (GCMRC) electrical box under the bridge, and cable from the control box followed an existing trench with GCMRC cable leading under bridge, minimizing the footprint and risk of interfering with APS cables. Data from the antenna can be remotely downloaded via satellite uplink.

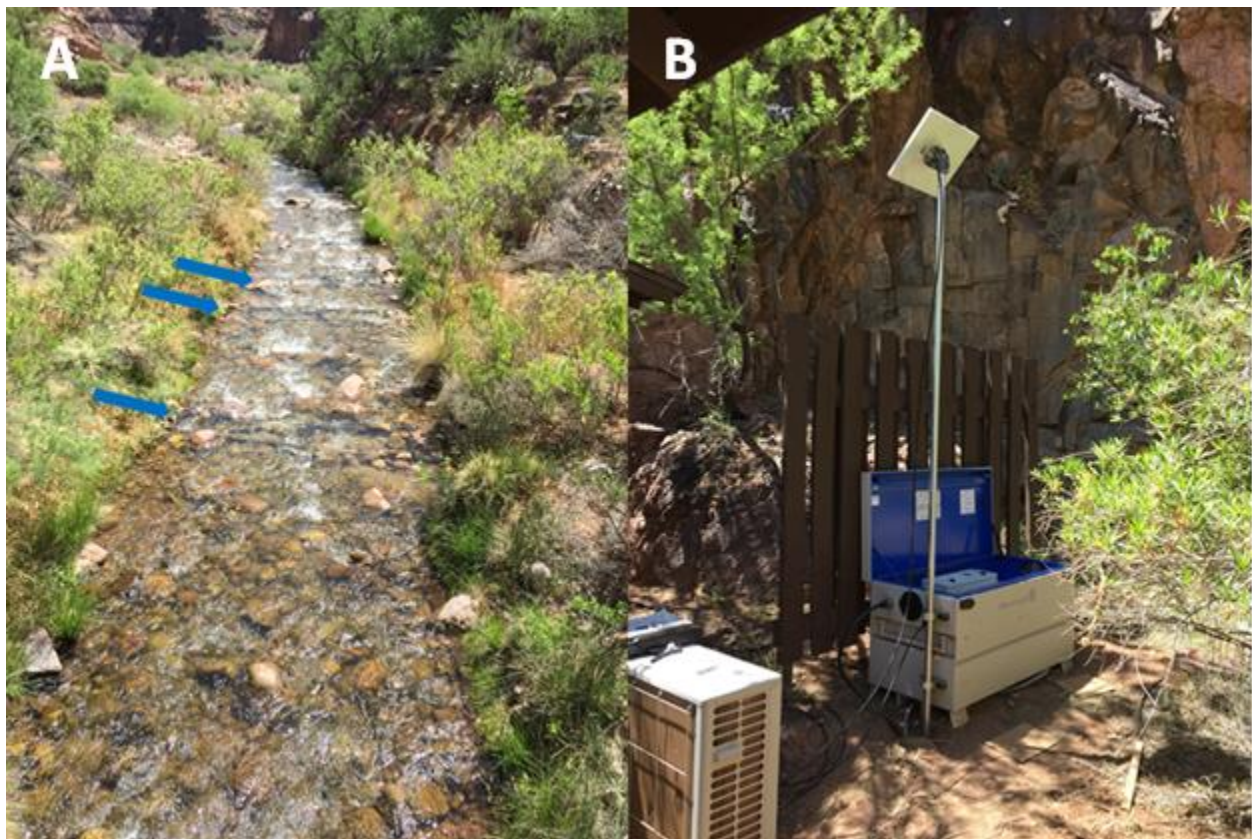


Figure 1. Three pass-over PIT-tag antennas installed in Bright Angel Creek channel (A), wired into control box next to Rock House (B).

Translocation

On Sunday, May 13, a combined crew of five fisheries personnel and two documentary filmmakers hiked to the Phantom Ranch bunkhouse, and on the morning of Monday, May 14, hiked to the translocation site, a series of pool habitats above the box and below Ribbon Falls (approximately 7.5 km upstream of the Bright Angel Creek confluence with the Colorado River).

The humpback chub, originally collected as young-of-year in the LCR in 2014 and grown out at the Southwestern Native Aquatic Resource and Recovery Center (SNARRC), were driven from Dexter, NM to the South Rim helibase and flown in to Bright Angel Creek on May 14. Fish were divided between two 55 gal plastic-lined steel barrels modified for helicopter sling-load transport and flown separately to the translocation site. Once the barrels were on the ground at the site, an acclimation process (following Trammel et al. 2012) was begun using buckets of creek water to gradually mix and replace the water in the barrels. Due to the heat and direct sunlight on the barrels, once acclimatization was complete, fish were transferred to closed mini-hoop nets anchored in a slackwater in the creek, so that water quality parameters no longer needed to be monitored and maintained during fish processing. As fish were measured and scanned, they were bucketed in groups of 8-15 to multiple pools across ~100 m of stream. A block net was placed downstream of these pools, to prevent immediate downstream emigration during a two-day acclimatization period (“soft release”). A total of 116 humpback chub were measured (186-326 mm TL; mode 251 TL; see Figure 2) and scanned for PIT tags; approximately 4 escaped into the creek from the mini-hoop nets prior to workup. A total of 107 unique PIT tags were recorded. No PIT tag was detected in nine fish, possibly due to tag cancellation in double-tagged fish or tag loss. These nine fish were not re-tagged prior to release.

The block net was checked daily and cleaned of debris for the next two days. No mortalities were observed, and groups of translocated chub were observed in pools above the net on both days. The empty fish barrels were flown out on May 15, and on May 16 the block net was removed and the remaining crew hiked out. In addition to the antenna at the delta placed to detect movements of translocated humpback chub and other PIT tagged fishes in and out of the creek, bi-annual (spring and fall) mini-hoop-net sampling is planned to monitor this population. In addition, winter electrofishing sampling will continue to maintain trout suppression, giving an additional opportunity to contact humpback chub in Bright Angel Creek. As they become available following years of successful collection of young-of-year in the LCR and grow-out at the SNARRC, additional translocations are planned to bolster numbers of chub in the creek and maintain genetic diversity.

PROBLEMS ENCOUNTERED AND SOLUTIONS

From a total of 300 humpback chub originally collected as young-of-year in the LCR and grown out at SNARRC, an even split was planned between the Bright Angel Creek translocation (n=150) and a translocation to Western Grand Canyon (n=150) by U. S. Fish and Wildlife Service (USFWS). Due to a mix-up at the hatchery, however, the PIT-tag list of scanned fish created at the hatchery did not match the list of tag numbers we recorded while scanning fish at the release site. Additionally, tags were not re-scanned in the field for the portion of fish released in Western Grand Canyon. Given the small number of fish that escaped in Bright Angel Creek prior to scanning, and the possibility of interference in double-tagged fish leading to missed detections of tags in some of the cohort released at Bright Angel Creek, some tags may be detected in the future that cannot be unambiguously tied to one or the other translocation.

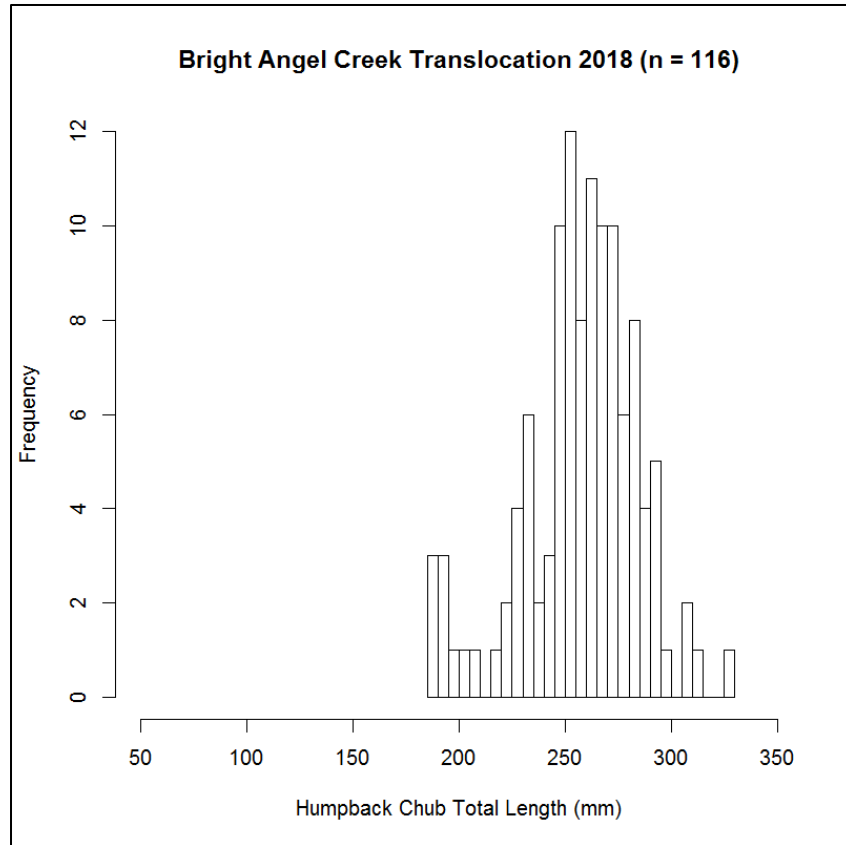


Figure 2. Length-frequency plot of humpback chub translocated to Bright Angel Creek.

The project was funded by the Bureau of Reclamation with additional support by the Grand Canyon Conservancy and National Park Service.

References

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Appendix 1: List of PIT-tags, lengths, and weights of humpback chub translocated to Bright Angel Creek, recorded at the release site:

	Species	PIT_tag	TL (mm)	FL (mm)	Weight (g)
1	HBC	3DD.003BB9AEC9	268	231	139
2	HBC	3D9.2794E9FCDB	258	223	131
3	HBC	3DD.003BB9AF9A	276	239	158
4	HBC	3DD.003BFC4D38	255	221	179
5	HBC	3DD.003BB9A772	251	217	124
6	HBC	3DD.003BB9A809	231	199	105
7	HBC	3DD.003BB9A722	292	256	195
8	HBC	3DD.003BB9AEA3	265	230	129
9	HBC	3DD.003BB9A8F4	263	232	155
10	HBC	3DD.003BB9A84E	254	220	125
11	HBC	3D9.2794E96E97	292	261	190
12	HBC	3DD.003BB9A74C	289	248	176
13	HBC	3DD.003BB9A845	231	203	98
14	HBC	3D9.2794E9C9E6	283	244	184
15	HBC	3D9.2794E98033	229	194	88
16	HBC	3D9.2794E91E46	264	228	171
17	HBC	3D9.2794E7BA8F	271	235	162
18	HBC	3DD.003BB9AF86	313	271	229
19	HBC	3DD.003BB9AF6D	262	231	171
20	HBC	3DD.003BFC4D27	262	229	149
21	HBC	3D9.2794E7E9F1	250	215	113
22	HBC	3D9.2794E96BCD	293	253	184
23	HBC	3DD.003BB9A8D4	291	251	203

24	HBC	3D9.2794E91A96	260	228	152
25	HBC	3D9.2794E7C3E9	272	234	155
26	HBC	3DD.003BB9AEEB	277	242	210
27	HBC	3DD.003BB9A7C9	232	212	90
28	HBC	3DD.003BB9AEA4	296	253	218
29	HBC	3DD.003BB9A747	269	239	178
30	HBC	3DD.003BB9A7A4	202	175	67
31	HBC	3DD.003BB9AEE4	282	247	164
32	HBC	3DD.003BB9A738	272	235	166
33	HBC	3DD.003BB9A805	221	194	86
34	HBC	3DD.003BFC4D2A	252	220	116
35	HBC	3DD.003BB9A768	256	222	145
36	HBC	3DD.003BB9AEDE	287	260	202
37	HBC	3DD.003BB9A7D2	228	205	99
38	HBC	3D9.2794E9D929	267	235	168
39	HBC	3DD.003BB9A733	259	228	142
40	HBC	3DD.003BB9AFAB	248	223	140
41	HBC	No Tag	270	231	156
42	HBC	3D9.2794E7C577	281	248	174
43	HBC	3DD.003BB9AED5	278	245	174
44	HBC	3DD.003BB9A80D	258	224	130
45	HBC	3DD.003BB9A785	194	168	62
46	HBC	3DD.003BB9A870	186	161	50
47	HBC	3DD.003BB9A786	222	190	73
48	HBC	3DD.003BB9A837	192	177	64
49	HBC	3D9.2794E89EFD	266	228	135
50	HBC	3DD.003BB9A7C5	190	163	50
51	HBC	3DD.003BB9A86F	217	193	80
52	HBC	3DD.003BB9A843	210	184	78
53	HBC	3D9.2794EB091C	267	238	178
54	HBC	3D9.2794E9265E	290	258	198
55	HBC	3D9.2794E9FE2C	252	215	129
56	HBC	3DD.003BB9A8B6	248	213	129
57	HBC	No Tag	326	284	250
58	HBC	3DD.003BB9AEB1	255	218	129
59	HBC	No Tag	289	250	182
60	HBC	3D9.2794EB15B5	267	232	164
61	HBC	3DD.003BB9A8F5	245	215	110
62	HBC	3D9.2794EB03B0	281	245	198
63	HBC	3DD.003BB9A7BA	189	165	66
64	HBC	3D9.2794EB041F	279	250	183
65	HBC	3DD.003BB9A778	281	248	197
66	HBC	3D9.2794EAE825	308	270	242

67	HBC	3D9.2794E87B63	235	205	125
68	HBC	3DD.003BB9AF9D	263	229	133
69	HBC	3DD.003BFC4D2C	249	221	146
70	HBC	3DD.003BB9AEDD	285	245	181
71	HBC	3D9.2794E9A1B3	310	270	196
72	HBC	3DD.003BB9A7F3	226	200	91
73	HBC	3DD.003BB9A742	271	240	163
74	HBC	3DD.003BC2CAAD	265	233	132
75	HBC	3D9.2794EB0EA4	269	233	159
76	HBC	3D9.2794E956A8	236	205	105
77	HBC	3D9.2794E89B0E	249	214	112
78	HBC	3DD.003BB9A741	241	208	103
79	HBC	3D9.2794E85725	293	255	197
80	HBC	3DD.003BB9AEBA	282	247	162
81	HBC	3DD.003BB9A72E	275	244	183
82	HBC	3DD.003BB9A754	262	230	120
83	HBC	3DD.003BB9AEB6	255	226	116
84	HBC	No Tag	275	240	137
85	HBC	3D9.2794EACBFD	262	229	133
86	HBC	3D9.2794EA1450	250	220	122
87	HBC	No Tag	271	235	147
88	HBC	3DD.003BB9C44B	276	242	164
89	HBC	No Tag	251	215	127
90	HBC	3DD.003BB9AEC2	258	220	139
91	HBC	3DD.003BB9A726	272	239	164
92	HBC	3D9.2794D84B97	235	200	110
93	HBC	3DD.003BB9AF62	256	225	147
94	HBC	No Tag	273	238	144
95	HBC	No Tag	250	218	110
96	HBC	3DD.003BB9AF6B	244	218	117
97	HBC	3DD.003BB9AEE5	233	200	98
98	HBC	3DD.003BB9AF58	268	233	150
99	HBC	3DD.003BB9A80A	191	164	52
100	HBC	3DD.003BB9A73F	251	219	141
101	HBC	3D9.2794E9641E	264	235	144
102	HBC	3DD.003BB9A732	268	239	140
103	HBC	3DD.003BB9A721	280	246	146
104	HBC	3DD.003BFC4D1F	281	242	144
105	HBC	3D9.2794E9864E	255	223	114
106	HBC	No Tag	251	215	133
107	HBC	3D9.2794E9F40D	238	206	93
108	HBC	3DD.003BB9A724	265	233	142
109	HBC	3D9.2794EB193C	251	226	138

110	HBC	3D9.2794E86FCE	248	214	120
111	HBC	3DD.003BB9AF60	259	232	133
112	HBC	3D9.2794E7B9B6	230	195	127
113	HBC	3DD.003BFC4D1E	272	240	164
114	HBC	3D9.2794E8BD1A	246	222	
115	HBC	3D9.2794E839EB	246	211	117
116	HBC	3DD.003BB9A7C6	198	173	56