

I. Project Title: **Retrieval of fish from the Grand Valley Irrigation Company and Grand Valley Water Users canals**

II. Bureau of Reclamation Agreement Number(s): R15PG00083

Project/Grant Period: Start date: 10/1/2014
End date: insert end date: 9/30/2019
Reporting end date: 9/30/2017
Is this the final report? Yes _____ No X

III. Principal Investigator(s): Brendan Crowley, Biological Science Technician
Dale Ryden, Project Leader
U.S. Fish and Wildlife Service
445 West Gunnison Avenue, Suite 140
(970) 628-7202
E-mail: brendan_crowley@fws.gov
dale_ryden@fws.gov

IV. Abstract:
A fish screen to limit entrainment of fishes into the Grand Valley Irrigation Company's (GVIC) irrigation canal was constructed during winter 2001–2002, becoming fully operational a few years later. A similar fish screen was constructed in summer 2005 for the Grand Valley Water Users (GVWU; aka Government Highline) irrigation canal, becoming fully operational during spring 2010. However, during times when heavy in-river debris loads clog these fish screens (3/32-inch spacing), preventing sufficient amounts of water from passing down the canal to meet irrigation and/or power generation demands, the irrigation companies have the option of lifting the screens and diverting water through the bypass channel. During these time periods, it is possible for fish from the river to become entrained in these irrigation canals. These fish then become stranded in these canals when they are dewatered at the end of the irrigation season, each fall. Additionally, while the fish screens (when in operation) are effective at precluding entry of larger fish into the canal, larval fish from the river can freely pass through the 3/32-inch wedge wire screens becoming entrained into the canals whenever they are present. After the 2016 irrigation season (which ended in early November 2016), a total of 57,731 native fish were actively salvaged from these two irrigation canals and returned alive to adjacent sections of the Colorado River.

V. Study Schedule:
A. initial year: 2002
B. final year: Ongoing

- VI. Relationship to RIPRAP: Colorado River Action Plan: Colorado River; II.B.1.b.
Screen GVIC diversion canal to prevent endangered fish entrainment; II.B.3.b.
Screen Government Highline diversion canal to prevent endangered fish entrainment
- VII. Accomplishment of FY 2017 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

A. FY 2017 Tasks and Deliverables:

Task 1. Sample GVIC and GWU canals; remove native fish and re-locate to the Colorado River.

Task completed.

B. Findings (FY 2017 Highlights)

Fish salvage is conducted by driving major portions of the canals looking for pools of water that contain fish after the irrigation water is turned off for the year. Irrigation water diverted from the Colorado River during the spring and summer months for irrigation and power generation are halted usually in early November. The pools are sampled with truck-mounted electrofishing units and/or seines. All native fish collected are identified and loaded into a hatchery truck, transported to, and released into the Colorado River. Total numbers of native fish collected and transported are recorded. Nonnative fish encountered are left in the canal. Sampling ceases at the end of the week immediately prior to Thanksgiving week, or once ice becomes too thick in the remaining pools to prevent the effective collection of fish.

Grand Valley Irrigation Company (GVIC) canal

The Grand Valley Irrigation Company's (GVIC) canal was sampled from the diversion dam head works in the Colorado River, downstream to 22 Road, from 7-18 November 2016. Sampling was limited to areas where the roads were dry enough to avoid damaging the road surface by our heavy vehicles. Crews traveled the canal road and sampled every pool encountered that could hold fish.

A total of 3,442 native fish were collected in the GVIC canal, including (in descending order) 1,919 speckled dace, 902 roundtail chub, 552 flannelmouth sucker, 60 bluehead sucker, 8 endangered razorback sucker, and 1 endangered bonytail.

The bonytail was a hatchery-produced fish, stocked into the Colorado River on 7/7/2016 in Palisade, CO. The fish had no previous captures in the river but grew a total of 29 mm since its stocking date. All 8 razorback sucker were hatchery-produced fish that had been stocked into the Colorado River at either Rifle, CO or Palisade, CO. All 8 of these fish were stocked in the fall between 2014 and 2016 and all but one fish had no previous captures in the river. The one razorback sucker that was the exception had been stocked

in fall 2014 and was recaptured just upstream of its stocking site in Palisade, CO in 2015. It was detected again on six different dates by the remote PIT tag antenna reader at the Price-Stubb Diversion in the fall of 2017.

A running total of all native fishes collected in the GVIC canal from 2002-2016 is provided in Table 1 of the Appendix. However, effort varied considerably among these 15 years and therefore, direct comparison of individual fish species collected and the overall total number of fish collected among years is not advisable.

Grand Valley Water User's (GVWU) canal

The Grand Valley Water User's (GVWU; aka Government Highline) canal was sampled from the point at which the canal enters the Grand Valley through a series of tunnels, east of Palisade, to about 22 Road, from 7-18 November 2016. Sampling was limited to areas where the roads were dry enough to avoid damaging the road surface by our heavy vehicles. As with the GVIC canal, crews traveled the canal road and sampled every pool encountered that could hold fish.

A total of 54,254 fish were collected in the GVWU canal, including (in descending order) 24,612 speckled dace, 25,455 roundtail chub, 4,004 flannelmouth sucker, and 183 bluehead sucker. The vast majority of these fish were collected from a short section of the canal (dubbed the "Hotspot") between 35³/₁₀ and 35⁸/₁₀ roads in Palisade, CO.

A running total of all native fishes collected in the GVWU canal from 2002-2016 is provided in Table 2 of the Appendix. However, effort varied considerably among these 15 years and therefore, direct comparison of individual fish species collected and the overall total number of fish collected among years is not advisable.

Palisade Irrigation District (Price Ditch – piped canal)

The Price Ditch is Palisade Irrigation District's main water conveyance system. It is a large lateral canal that branches off of the GVWU canal just as that canal enters the Grand Valley from a tunnel in the east side of the valley near Palisade, CO. The Price Ditch runs through an underground concrete pipe that starts out as a 4-foot diameter pipe and then, within ¼ of a mile of its origination point, necks down to a 3-foot diameter pipe. In conjunction with fish salvage efforts in the GVWU canal, we salvage fish from the first section (the 4-foot diameter underground pipe) of the Price Ditch. This entails crawling through an underground pipe with headlamps and hand-held dip nets to actively collect any stranded fish off of the bottom surface of the rounded pipe in pitch black conditions. Electrofishing is impossible, except for at the very upstream terminus of the Price Ditch at the pump house, and seines are not a viable option for collecting fish.

In November 2016, a total of 35 fish were collected from Price Ditch, including (in descending order) 17 speckled dace, 8 roundtail chub, 5 flannelmouth sucker, and 5 bluehead sucker (Table 3 in the Appendix).

Grand Valley Irrigation Company (GVIC) canal.

CALENDAR YEAR	FM	BH	FM X BH	RT	SD	MF	MS	RZ	BT	CS	TOTALS
2016	552	60	0	902	1,919	0	0	8	1	0	3,442
2015	458	25	0	389	131	0	0	2	0	0	1,005
2014	657	12	0	139	26	1	0	1	9	0	845
2013	467	34	0	1,669	153	0	0	1	3	0	2,327
2012	2,386	451	0	2,453	450	0	0	2	2	0	5,744
2011	428	17	1	258	6	1	0	2	0	0	713
2010	571	4	0	478	80	0	0	0	0	0	1,061
2009	877	48	0	79	232	4	0	0	0	0	1,240
2008	892	59	0	150	0	0	0	1	0	0	1,102
2007	128	3	0	35	0	0	0	0	0	0	166
2006	2,252	123	0	1,322	0	0	0	1	0	0	3,698
2005	897	80	0	730	0	0	0	0	0	0	1,707
2004	1,783	22	0	588	26	0	0	0	0	0	2,419
2003	-	-	-	-	-	-	-	-	-	-	2,908
2002	-	-	-	-	-	-	-	-	-	-	3,371

Fish Species: FM-flannelmouth sucker, BH-bluehead sucker, RT-roundtail chub, SD-speckled dace, MF-mountain whitefish, MS-mottled sculpin, RZ-razorback sucker, CS-Colorado pikeminnow, BT- bonytail

Table 2. Total numbers of native fish collected by species and year from 2002-2016 in the Grand Valley Water User's (GVWU; aka Government Highline) canal.

CALENDAR YEAR	FM	BH	FM X BH	RT	SD	MF	MS	RZ	CS	BT	TOTALS
2016	4,004	183	0	25,455	24,612	0	0	0	0	0	54,254
2015	6,310	85	0	22,290	20,414	0	0	2	0	0	49,101
2014	19	2	0	2	8	0	0	0	0	0	31
2013	598	66	0	5,732	1,004	0	0	2	0	8	7,410
2012	1,574	632	0	5,924	3,942	0	0	1	0	2	12,075
2011	808	77	1	16,813	328	3	19	3	0	0	18,052
2010	1,517	88	0	23,299	1,043	30	0	0	0	0	25,977
2009	6,255	797	0	26,527	5,135	7	1	0	0	0	38,722
2008	738	77	0	754	23	6	0	0	0	0	1,598
2007	433	93	0	6,543	70	0	0	1	0	0	7,140
2006	-	-	-	-	-	-	-	-	-	-	-
2005	722	173	0	3,815	48	0	0	0	1	0	4,759
2004	893	118	0	5,166	140	0	1	0	24	0	6,343
2003	-	-	-	-	-	-	-	-	-	-	~ 3,000
2002	-	-	-	-	-	-	-	-	-	-	~ 1,100

Fish Species: FM-flannemouth sucker, BH-bluehead sucker, RT-roundtail chub, SD-speckled dace, MF-mountain whitefish, MS-mottled sculpin, RZ-razorback sucker, CS-Colorado pikeminnow, BT- bonytail

Table 3. Total numbers of native fish collected by species and year in Palisade Irrigation Company's underground Price Ditch (piped canal).

CALENDAR YEAR	FM	BH	FM X BH	RT	SD	MF	MS	RZ	CS	BT	TOTALS
2016	5	5	0	8	17	0	0	0	0	0	35

Fish Species: FM-flannemouth sucker, BH-bluehead sucker, RT-roundtail chub, SD-speckled dace, MF-mountain whitefish, MS-mottled sculpin, RZ-razorback sucker, CS-Colorado pikeminnow, BT- bonytail