COLORADO RIVER RECOVERY PROGRAM
FY 2014 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: FR-115

I. Project Title: Monitoring effects of Flaming Gorge Dam releases on the Lodore and Whirlpool Canyon fish communities

II. Bureau of Reclamation Agreement Number(s): R14AP00001
Project/Grant Period: Start date (Mo/Day/Yr): 1 Oct. 2013
End date: (Mo/Day/Yr): 30 Sept. 2018
Reporting period end date: 30 Sept. 2014
Is this the final report? Yes _____ No _X__

III. Principal Investigator(s): Lead Agency: Larval Fish Laboratory, Department of Fish, Wildlife, and Conservation Biology, Colorado State University; Bureau of Reclamation; U.S. Fish and Wildlife Service

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IV. Abstract: The primary purpose of this study is to determine the cumulative effect that flow and temperature regimes have had on the fish community of the Green River in Lodore and Whirlpool canyons and to recommend how to monitor effects into the future. A secondary purpose is to determine the distribution and abundance of the humpback chub population in Whirlpool Canyon to serve as the basis for future monitoring efforts. Finally, a third purpose is to remove non-native fishes present in the study reach. Future monitoring will be needed to evaluate the contribution of the Whirlpool Canyon population of humpback chub to the overall recovery of the species, and to monitor response of the fish community to removal of smallmouth bass, particularly in the Whirlpool Canyon reach of the Green River. A portion of nonnative fish removal work is devoted to better understanding the reproductive ecology of smallmouth bass in the Green River study area. This will be accomplished by collection of young-of-year smallmouth bass, and analysis of otolith microstructure. This will allow determination of hatching dates of bass relative to streamflow and water temperature patterns, information that may be useful to understand if flow releases from Flaming Gorge Dam may be useful

to disadvantage smallmouth bass in the study area. Northern pike are also a species targeted in removal efforts and that occurs mainly in upstream Browns Park. Information gathered will be used to evaluate the relative benefit of flow and temperature regimes from Flaming Gorge Dam to native and endangered fishes in the Green River compared to effects on distribution and abundance of non-native fishes.

V. Study Schedule: Initial Year: 2002; Final Year: Not determined

VI. Relationship to RIPRAP:

Green River Action Plan: Mainstem.
II.D. Evaluate and revise as needed, flow regimes to benefit endangered fish populations.

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

Task 1: Thermographs

We assisted with temperature data collection in Lodore and Whirlpool canyons by removing thermographs[1] from the river in July and September, resetting new ones in their place, and establishing new locations in both lower Lodore Canyon near the existing site, and in lower Mitten Park on river right in 2012; that monitoring continues through 2014. Over the past decade, the thermal regime of the Green River upstream of the Yampa River has varied. The section experienced a relatively warm regime from 2002-2007 (2005 was cool) when water temperatures routinely exceeded 20°C at the Gates of Lodore, and cool thermal regimes in much of the 2008-2011 period, when water temperatures exceeded 20°C for just a few days each summer (Figure 1). Water temperatures were warmer in 2012 and 2013 but cooler in 2014, when mean daily water temperature did not exceed 20°C at the Gates of Lodore (gauge 404417108524900).

In 2014, water temperatures at the Gates of Lodore were increasing to nearly 20°C in late May, but during high flow releases (up to 8600 cfs) from late May into early June, water temperatures were reduced to less than 10°C (Figure 1B). Comparison of Green River water temperatures at Flaming Gorge Dam and the Gates of Lodore (Figure 1B & C) showed little warming downstream during high flow releases. However, water temperature recovered after high flows ceased. Highest water temperatures in 2014 were in July, with daytime highs exceeding 20°C for many days.

Task 2: Sample main channel fish community (large-bodied fishes).

We completed two electrofishing trips through the study area in 2014, as prescribed in the study proposal. We reported on data collected through 2006 in a summary report. Data entry and verification is complete for 2007-2013; 2014 data is preliminary but is included in this report.

[1] Thermograph data will be provided by Carrie Cordova, U.S. Fish and Wildlife Service, Lakewood, and by Utah State University, at up to 10 other localities in the Green River.

A total of 11 native species, 19 nonnative species, and several hybrids have been collected in the study area by all sampling gears in the period 2002-2014 (Table 1). The most species are captured by electrofishing, followed by seining, and trammel netting. In 2014, the most abundant species in the study area captured by electrofishing were native flannelmouth and bluehead suckers (59% of all fishes captured); native fishes were 65% of all fishes captured. Brown trout, channel catfish, and smallmouth bass, in descending order, were the most abundant nonnative fishes captured in the study area.

Native fishes were more abundant in downstream Whirlpool Canyon, 75% of all fishes collected by electrofishing, than in upstream Lodore Canyon (56%). The main difference was that abundance of bluehead sucker was much greater in Whirlpool Canyon. Conversely, native coolwater mountain whitefish were more abundant in Lodore Canyon than Whirlpool Canyon. Among nonnative fishes, coolwater brown trout were more abundant in upstream Lodore Canyon and warmwater smallmouth bass and channel catfish were more abundant downstream in Whirlpool Canyon.

Abundance patterns of fishes in the study area that were captured in electrofishing samples beginning in 1994-1996 reflected a dynamic community for both non-native and native fishes (Figures 2 and 3). For example, non-native brown trout were abundant through time in Lodore Canyon, apparently increasing in 2012, but declined in abundance in 2013. In 2014, the decline continued, reaching the lowest level since 2008. Brown trout abundance increased slightly in Whirlpool Canyon in recent years, but the species was only considered abundant there in 2008 due to large numbers of fish captured near Jones Creek. Channel catfish reached a peak in abundance in both Lodore and Whirlpool canyons in the 2005-2008 period but have declined steadily since; note the 1994-1996 abundance as the lowest in the period of record in Lodore Canyon. Common carp abundance appears to be declining in both reaches over time, especially in Whirlpool Canyon. Northern pike abundance is low overall, but highest in Lodore Canyon and declining over time. Northern pike abundance in Whirlpool Canyon is low and none were captured in 2013 or 2014. Browns Park pike removal efforts in 2011-2014 are discussed more extensively below.

Smallmouth bass abundance in Lodore and Whirlpool canyons showed slightly different patterns. In Whirlpool Canyon, bass abundance peaked in 2007, declined through 2011, but subsequently increased (especially in 2013). Recent increases may be the result of warm water temperatures in 2012, leading to successful spawning that produced many age-1 fish in 2013. While earlier declines may reflect substantially increased removal effort beginning in 2007 and lack of high recruitment through 2011, recent years of warm water temperatures may have reversed that trend. In contrast to Whirlpool Canyon, smallmouth bass abundance in Lodore Canyon peaked in 2009 and 2010, declined through 2012, but then only increased slightly. White sucker abundance increased in Lodore Canyon through 2009 but then declined through 2014. With the exception of 2008, white suckers in Whirlpool Canyon were relatively uncommon through 2014.

Native bluehead sucker are abundant in both reaches, but abundance is higher in Whirlpool than Lodore Canyon. Although abundance declined through 2012, abundance

increased in both 2013 and 2014 abundance was the highest ever. Bluehead sucker abundance in Lodore Canyon has stabilized or increased slightly since 2009, following a decline in abundance from the mid-1990s through 2008. Colorado pikeminnow abundance has been variable and relatively low over the study period, but increased in 2010 and 2012 in each reach. The finding of pikeminnow in upstream Vermillion Creek in 2011-2104 is discussed below. Flannelmouth sucker, the most common large-bodied native fish in the study area, has been declining over time in Lodore Canyon. Flannelmouth suckers were very abundant in 2008 in Whirlpool Canyon but declined over time until 2011; after which abundance increased slightly through 2014. In Lodore Canyon, flannelmouth sucker abundance was stable through 2011 but has subsequently declined. Mountain whitefish abundance increased rather dramatically in the study area in some years such as 2009 and 2012, but were uncommon in 2013 and 2014. Decreased salmonid abundances in both reaches in 2013 and 2014 may be a response to warmer water temperatures.

Abundance of all chub species declined rather dramatically, especially since 2002-2004, which is also reflected by trammel net sampling. Capture of a few chubs in 2013 in Lodore Canyon increased abundance there temporarily, but 2014 abundance was reduced.

Trammel net sampling occurred on 16-20 September concurrent with an electrofishing sampling trip on two evenings, and on 6-9 October (three evenings), which was dedicated to trammel net sampling. In September, we captured a total of seven roundtail chub and one bonytail, and in October an additional three roundtail chub were captured. Roundtail chubs in both sampling trips ranged from 275-415 mm TL and six of 10 were recaptures from previous years of sampling, a high number.

In 2011-2014, we increased sampling effort for removal of northern pike in the Browns Park reach of the Green River. Beginning in 2005, only smaller pike were captured in seine samples taken in backwaters in July and September at Swinging Bridge near the Colorado-Utah state line. Their continued presence motivated additional floodplain sampling to attempt to remove as many adults as possible. In 2011, during high flows in May and June, we captured and removed many large pike, some exceeding 900 mm TL (n=22, 11-39 inches, 271-984 mm); all were from a relatively restricted area about 1 mile long. During that sampling, two adult Colorado pikeminnow *Ptychocheilus lucius* were captured, one by angling and another in a trap net. This was unusual because pikeminnow are thought rare in the 56 mile reach between Flaming Gorge Dam and the upstream end of Lodore Canyon which includes the Swinging Bridge area. In 2012, we captured additional northern pike in the Browns Park reach during a relatively brief period of high flows. Interestingly, only three young-of-year were captured in summer and autumn, which was perhaps a function of the brief period of floodplain inundation. No young of year northern pike were captured in 2013 in Browns Park, again likely a result of relatively short-term floodplain inundation. This is in spite of capture of ripe northern pike in late May and early June, indicating reproduction was taking place. More details on pike abundance and spawning patterns were presented at the non-native fish workshop in December 2013.

In 2014, we continued to sample and remove northern pike in Browns Park. Backwaters and floodplain habitat was sampled continuously with trammel and fyke nets from 26 May to 20 June. A total of 12 adult northern pike was captured, ranging in size from 626 to 794 mm TL (1814-3657 g). Most were captured in Beaver Creek (n = 7), but others were also captured at or near Hog Lake (n = 2) or in Vermillion Creek (n = 3). The Vermillion Creek fish were the first pike captured there. In spite of warm water temperatures earlier in the season, many pike were still in reproductive condition in late May to mid-June. Of the ten fish whose sex was determined, six were females.

A total of 13 age-0 northern pike was captured in 13 July seine sampling in Browns Park at the mouth of Beaver Creek, ranging in size from 44 to 61 mm TL. An additional seven age-0 northern pike were captured in seine sampling on 14 September at Beaver Creek (n = 6) and Hog Lake (n=1), ranging in size from 174 to 218 mm TL.

The discovery of Colorado pikeminnow motivated additional Green River sampling in Browns Park National Wildlife Refuge on the 21-22 June 2011 via boat electrofishing. Two crews sampled from Swinging Bridge downstream 14 miles to Vermillion Creek, a tributary to the Green River a short distance upstream of the boundary of Dinosaur National Monument. High flows benefitted sampling efforts because of increased access to important habitats. One adult pikeminnow was captured in the Green River near Crook Campground. High Green River flows also allowed access to the lower end of Vermillion Creek, where an additional 8 adult pikeminnow (23-27 inches, 595-692 mm total length,) were captured; at least three more were observed but not captured. In all, only five pikeminnow had been previously tagged and two of those were tags with number series that have not been used for many years, which may indicate that those fish reside in that section of the Green River for substantial periods of the year. Vermillion Creek, a relatively small, turbid, and low flow system, was relatively warm at 72°F (22°C) compared to the Green River (48°F, 9°C) during these captures; several individual pikeminnow were tuberculate (nearing reproductive readiness) likely because of the warm water. High reproductive condition for pikeminnow was not expected because of high, late, and cold flows, and because pikeminnow in the downstream Yampa River did not spawn until late July in 2011. Very high densities of suckers, both native flannelmouth sucker *Catostomus latipinnis*, non-native white sucker *Catostomus commersonii*, and their hybrids, were also captured in Vermillion Creek. Findings supported the importance of floodplain wetlands and flooded tributary mouths for enhancing condition of endangered fishes like Colorado pikeminnow. In spring 2012, we captured three additional pikeminnow at or in the mouth of Vermillion Creek, in spite of relatively low effort. Consecutive years of capture at that location suggest that the mouth of Vermillion Creek may be a concentration area for pikeminnow in spring.

In spring 2014, we captured six Colorado pikeminnow in or at the mouth of Vermillion Creek in fyke nets; an additional pikeminnow was captured at Beaver Creek. Captures were from 28 May to 11 June and each fish was captured only once. Colorado pikeminnow ranged in length from 502 – 756 mm TL (1162-4309 g) and six of the seven were previously tagged; one was tagged for the first time. One of those individuals that we captured (8 June) was also detected by a PIT tag detection array set in Vermillion

Creek a few days earlier (4 June)[2]. Two additional individuals were also detected by arrays, but we did not capture those fish. Thus, a total of nine Colorado pikeminnow adults was captured in 2014 between 1-16 June, and eight were from Vermillion Creek.

On 3 June, flows increased from Flaming Gorge Dam to 4350 cfs, peaked on 7 June at 9090 cfs, and by 18 June flows were declining to or were below powerplant flows of 4650 cfs or less. As it relates to flows, one pikeminnow was detected in the mouth of Vermillion Creek on 28 May at low base flows of 872 cfs. All pikeminnow except the first one were captured in or near Vermillion Creek during high flows (2-18 June) when the mouth of Vermillion Creek was inundated, and the Green River was cold (about 10°C). Vermillion Creek was warm and > 20°C for most of that high flow period.

Trammel net sampling was generally conducted only once per year and only in Whirlpool Canyon, including 2014. Overall, humpback chub and roundtail chub abundance was diminished substantially in recent years compared to the period 2002-2004 (Bestgen et al. 2006). This pattern was similar to that reported from electrofishing sampling (e.g., Figure 3). Reduced chub abundance was coincident with invasion and establishment of large populations of smallmouth bass in Lodore and Whirlpool canyons. The 2014 sampling indicated presence but low abundance of roundtail chub; recently stocked bonytail were also detected. Continued low abundance of bonytail recaptures from fish stocked the prior year furthered the notion that they have very low post-stocking survival (Bestgen et al. 2008).

Task 3: Sample small-bodied fish community.

About 100 seine samples were collected in the study area from middle Browns Park downstream to the lower end of Rainbow Park during summer and autumn 2014. We have begun identification of summer and autumn samples. We will update seine capture data when 2014 samples are identified.

An additional task in this scope of work was to analyze otoliths from age-0 smallmouth bass captured in the Green River study area. This work will assist with understanding smallmouth bass spawning periodicity in the upper Green River. This information can potentially assist with disruption of reproduction of that species via flow releases from Flaming Gorge Dam. Studies in other parts of the range of smallmouth bass have shown that weather-related water temperature reductions or floods reduce their spawning success and number of offspring (citations in Hill and Bestgen 2014). Reduced water temperatures often result in abandonment of spawning nests by the guarding male bass, after which developing eggs and just-hatched young are susceptible to predation and other mortality factors. Sampling in the Green River and other areas has shown that higher stream flow, often coupled with increased water turbidity, sweeps weak-swimming young bass away from nests or quiet near-shore habitat, and results in high mortality.

[2] both a flat plate and a submersible antenna was deployed in the mouth of Vermillion Creek on 3 June (A. Webber, U.S. Fish and Wildlife Service, Vernal, Utah)

Portions of this work were reported at the January 2010-2014 Researchers meetings. We found that smallmouth bass in the Green River-Lodore Canyon study area first hatched well after spring peak releases declined and just slightly after (usually within one week) mean daily water temperatures regularly exceeded 16°C in the period 2003-2011 (Figure 4, note axis change for 2011 to accommodate the late spawning initiation); spawning initiation was postulated for 2012 based on water temperature. Hatching date distributions were very similar in 2008 and 2009, reflecting the similar flow and temperature regimes in those years. Hatching date and the extent of the reproductive season was much shorter in 2011 when high flows were relatively cool, and hatching did not begin in 2011 until after bass had *finished* hatching in nearly every other year. The 2012 water temperatures suggest a relatively late initiation of hatching as well, and that is supported by capture of very few and relatively small bass in Lodore Canyon in a late-July sampling trip. We are progressing well on a synthesis of smallmouth bass hatching date distribution data that is expected to be ready in early 2015.

Drift net sampling documented high downstream displacement of small-bodied smallmouth bass during high turbidity and flow events in 2004 and 2007. Such flow and turbidity events may have been responsible for low abundance of smallmouth bass < 100 mm TL in summer 2004, and subsequent low number of Age-1 smallmouth bass in 2005 (data in RIP annual rpts. Badame et al. synthesis report; discussion in Bestgen et al. 2006; 2007). Unfortunately, high flows in 2011 prevented sampling of the Green River because sampling crews were unable to cross the very high Yampa River to reach the Green; drift sampling in 2012 and 2014 was completed for the entire summer.

Task 4: Sample larval drift and process samples.

Just a few drift samples were collected in the Green River just upstream of the Yampa River during summer 2014. River flows were very high all summer and prevented crossing the Yampa River to reach the Green River.

Task 5: Process preserved samples of small-bodied fish (seine hauls).

We have completed identification of 2012 and 2013 samples and are progressing with 2014 samples.

Task 6: Prepare and submit annual report.

This report was submitted to the Recovery Program office in November of 2014.

VIII. Additional noteworthy observations:

IX. Recommendations: Continue with sampling in 2015. Continue preparation of report summarizing the smallmouth bass otolith data and hatching date distributions.

X. Project Status: On Track and Ongoing.

XI. FY 2014 Budget Status

A. Funds Provided: $96,951
B. Funds Expended: $81,377
C. Difference: $15,574
D. Percent of the FY 2014 work completed, and projected costs to complete:
E. Recovery Program funds spent for publication charges:

XII. Status of Data Submission (Where applicable): endangered fish data submitted

XIII. Signed: Kevin R. Bestgen 17 November 2014
Principal Investigator Date

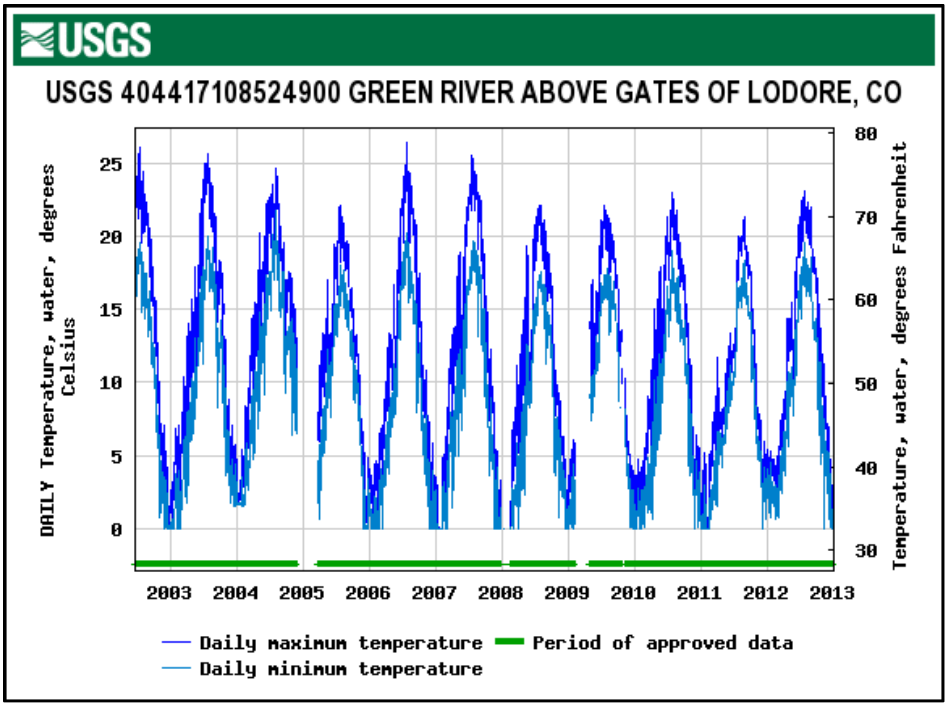
Table 1.—List of fishes captured in the Green River, from Browns Park downstream to Rainbow Park with electrofishing, trammel nets, and seining, 2002-2014. N = native, I = introduced.

Species	Status	Electrofishing	Trammel netting	Seining
Mountain whitefish	N	X		X
Humpback chub	N	X	X	
Bonytail	N	X	X	X[1]
Roundtail chub	N	X	X	X
Colorado pikeminnow	N	X	X	X
Speckled dace	N	X		X
Bluehead sucker	N	X	X	X
Flannelmouth sucker	N	X	X	X
Razorback sucker	N	X		
Mountain sucker	N			X
Mottled sculpin	N	X		X
Cutthroat trout	I	X		
Brook trout	I	X		
Rainbow trout	I	X		X
Brown trout	I	X	X	
Northern pike	I	X		X
Red shiner	I	X		X
Common carp	I	X	X	X
Creek chub	I			X
Fathead minnow	I			X
Sand shiner	I			X
Redside shiner	I	X		X
White sucker	I	X	X	X
WS x FM		X	X	
FM x BH		X		
WS x BH		X		
RZB x FM		X		X
Channel catfish	I	X	X	X
Black bullhead	I	X		X
Bluegill	I	X		X
Green sunfish	I	X		X
Smallmouth bass	I	X	X	X
Walleye	I	X		
Iowa darter	I			X

[1] Stocked fish.

Table 2. Number of fish of selected species captured by sampling trip (July and September) in the Lodore (LD) and Whirlpool Canyon (WH) reaches of the Green River, 2014, using raft electrofishing.

Species	July LD	July WH	Sept LD	Sept WH	July Total	Sept Total	LD Total	WH Total	Grand Total
bluehead sucker	72	138	36	167	210	203	108	305	413
bluehead x white sucker	2	2	3	1	4	4	5	3	8
brown trout	47	9	113	16	56	129	160	25	185
channel catfish	32	22	12	45	54	57	44	67	111
Colorado pikeminnow	1	0	0	1	1	1	1	1	2
common carp	33	3	23	4	36	27	56	7	63
flannelmouth sucker	165	97	93	134	262	227	258	231	489
flannelmouth x bluehead sucker	2	0	2	2	2	4	4	2	6
flannelmouth x white sucker	8	0	9	4	8	13	17	4	21
mountain whitefish	7	0	65	11	7	76	72	11	83
northern pike	0	0	3	0	0	3	3	0	3
roundtail chub	2	0	0	2	2	2	2	2	4
smallmouth bass	25	39	13	32	64	45	38	71	109
white sucker	14	3	11	1	17	12	25	4	29
Totals	410	313	383	420	723	803	793	733	1526



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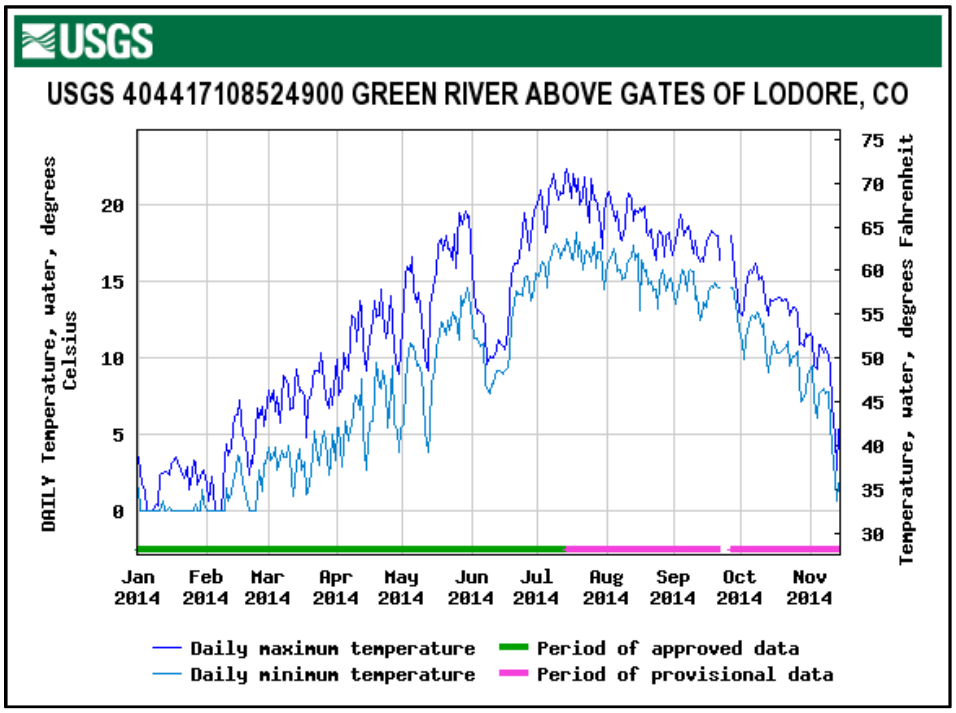

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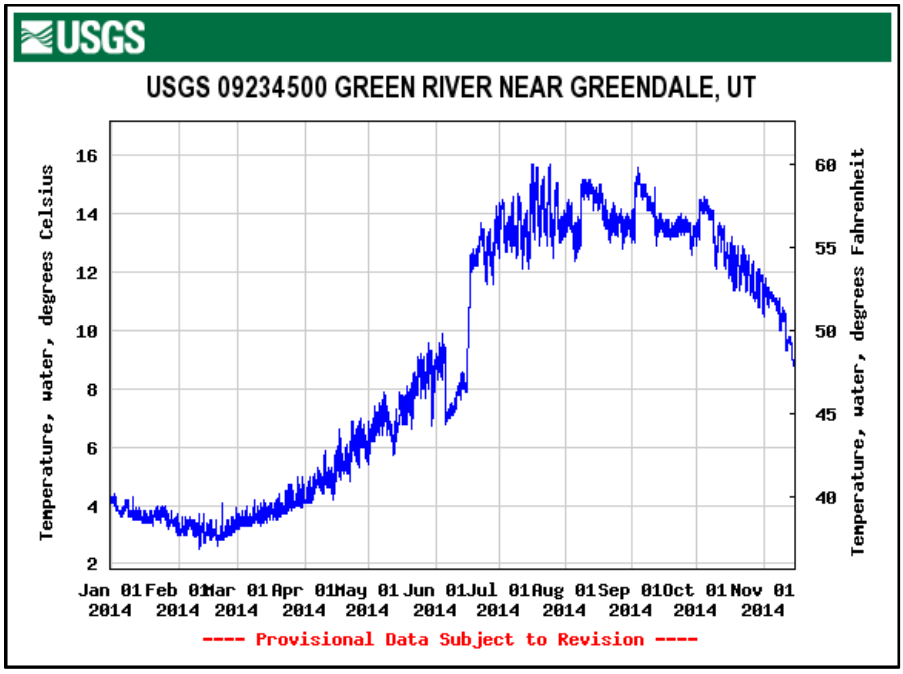

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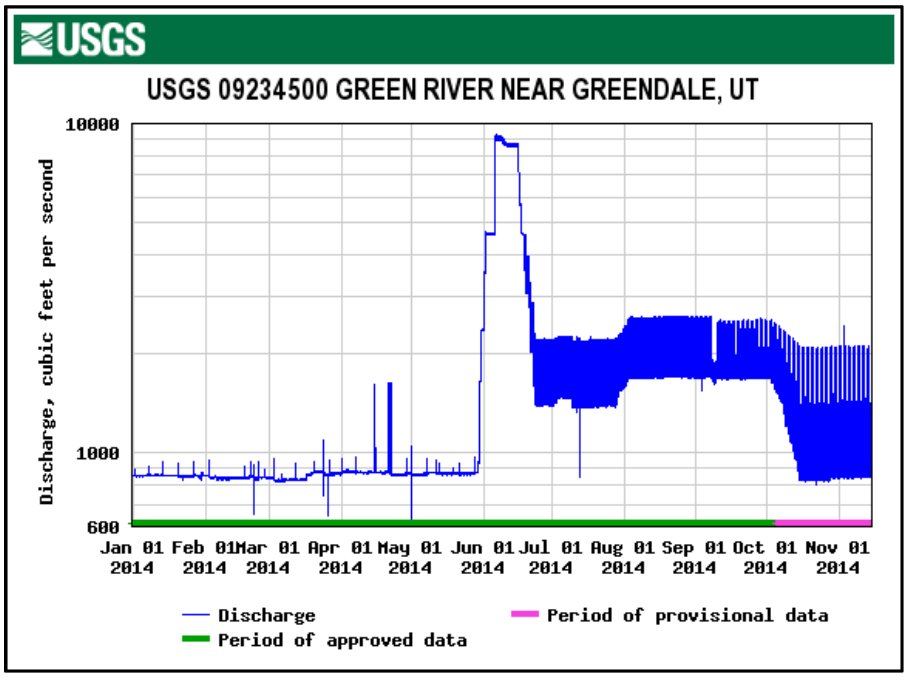


D.

Figure 1. Green River water temperatures at the Gates of Lodore, near the Dinosaur National Monument campground, June 2002- December 2013 (Panel A, preceding page) and 2014 (panel B, preceding page). Panels C and D represent mean daily water temperature and flow at the Greendale gauge just downstream of Flaming Gorge Dam.

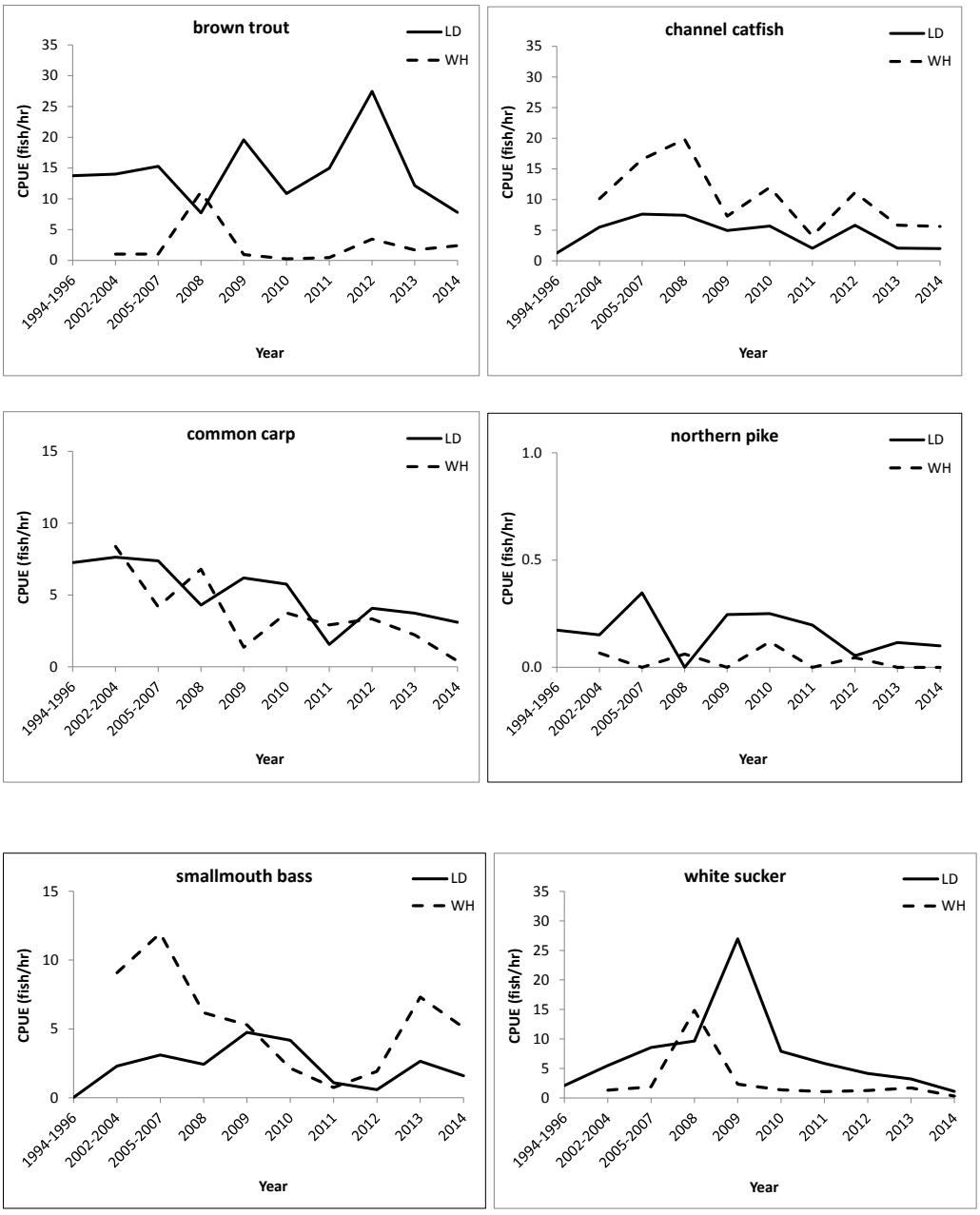


Figure 2.—Number of nonnative brown trout, channel catfish, common carp, northern pike, smallmouth bass, and white sucker captured per hour of raft electrofishing effort in four reaches of Lodore Canyon and two reaches of Whirlpool Canyon, Green River, Colorado and Utah, in from 1994-2014. LD is Lodore Canyon and WH is Whirlpool Canyon.

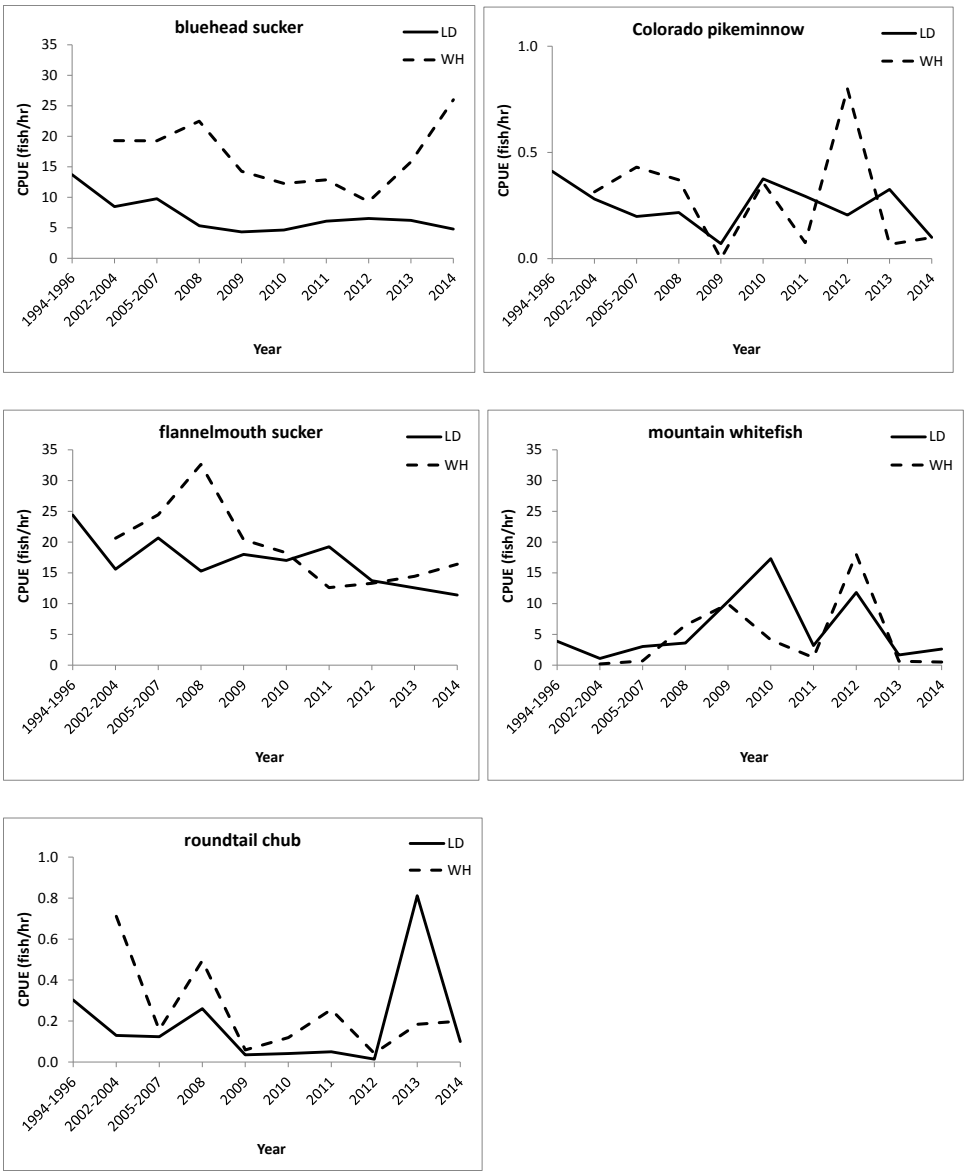
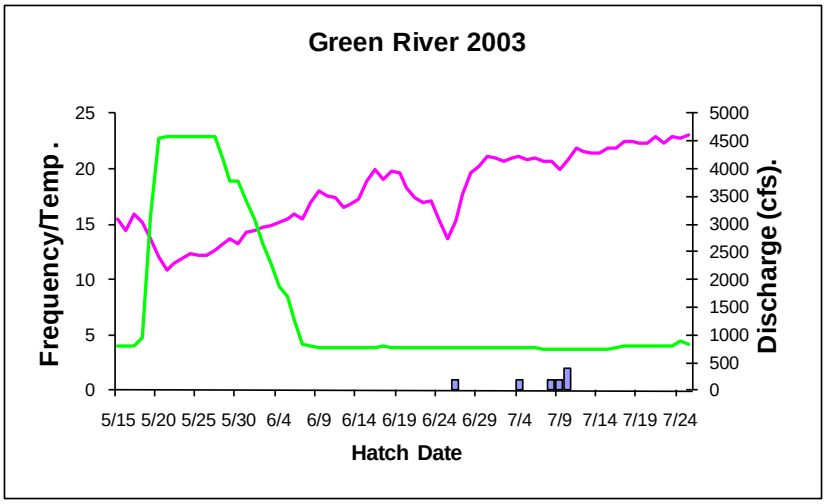
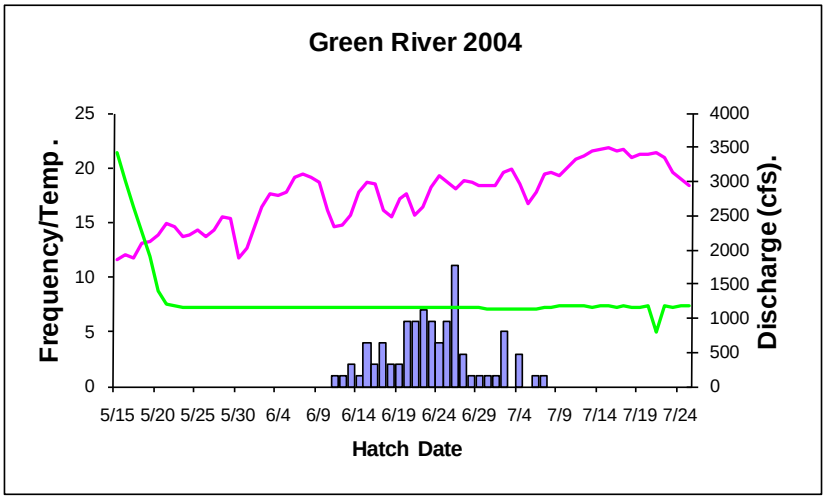
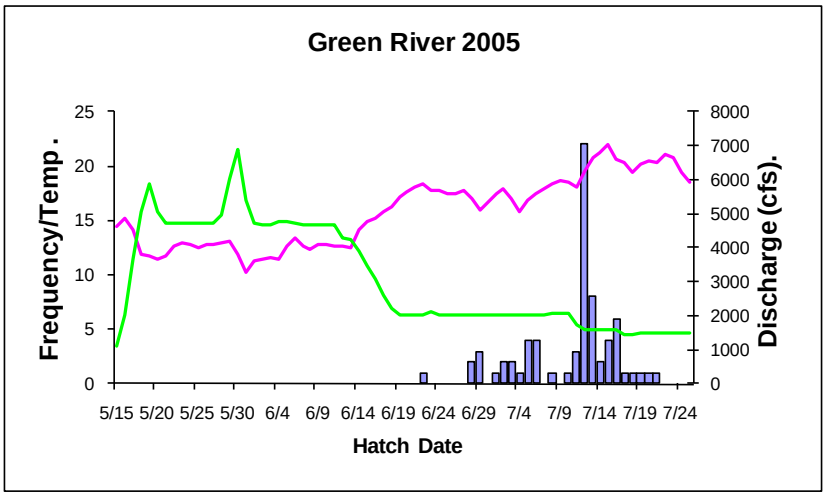


Figure 3.—Number of native bluehead sucker, Colorado pikeminnow, flannelmouth sucker, mountain whitefish, and roundtail chub captured per hour of raft electrofishing effort in four reaches of Lodore Canyon and two reaches of Whirlpool Canyon, Green River, Colorado and Utah, in from 1994-2014. LD is Lodore Canyon and WH is Whirlpool Canyon.







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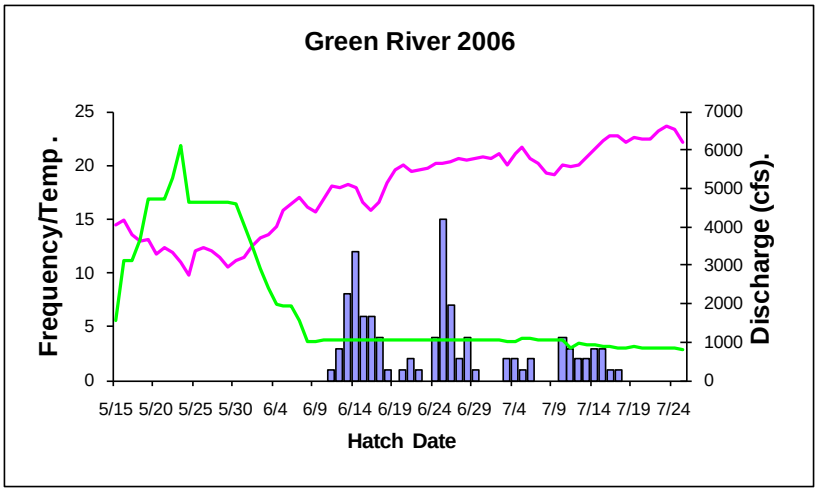

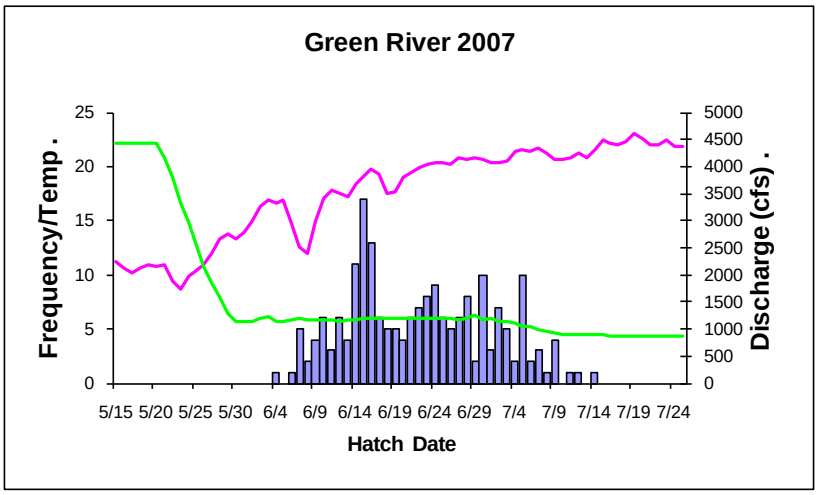

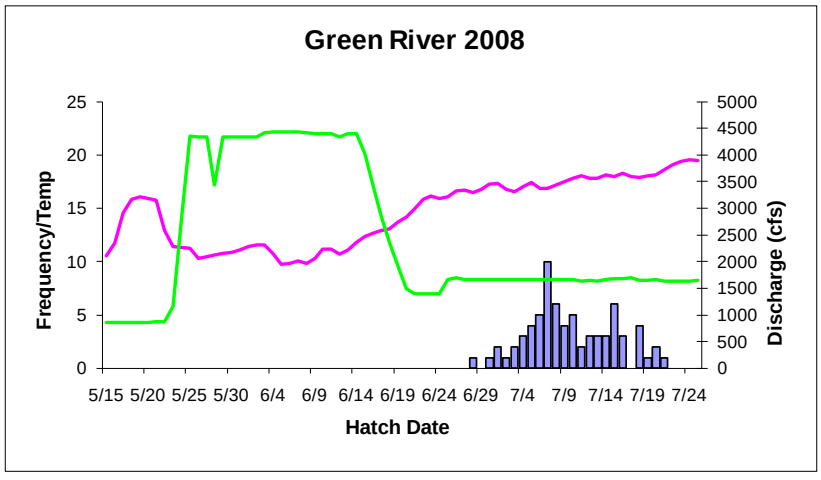

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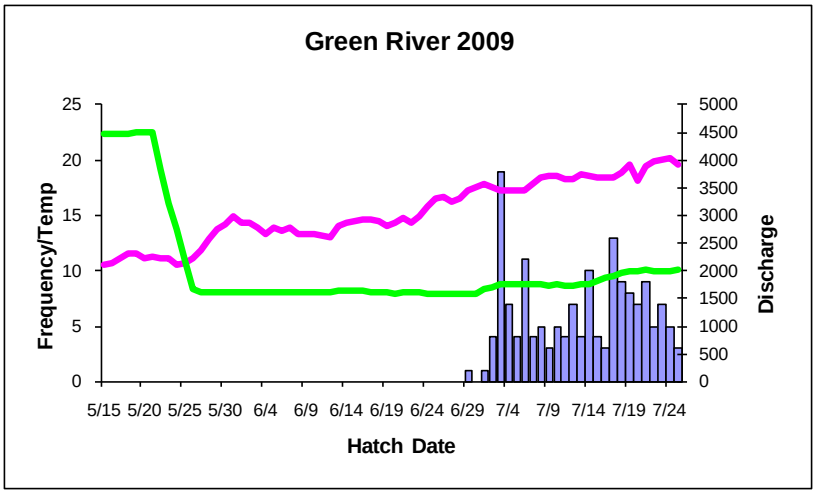

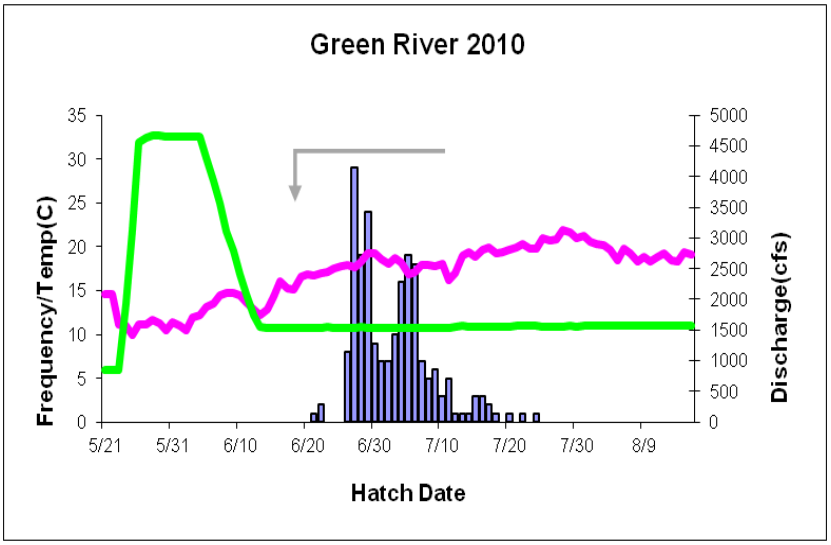

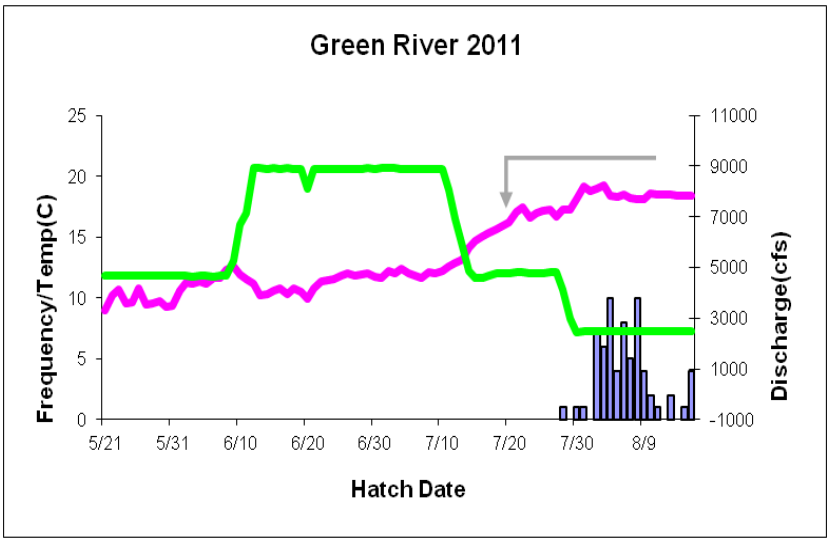

Figure 4 continued below.

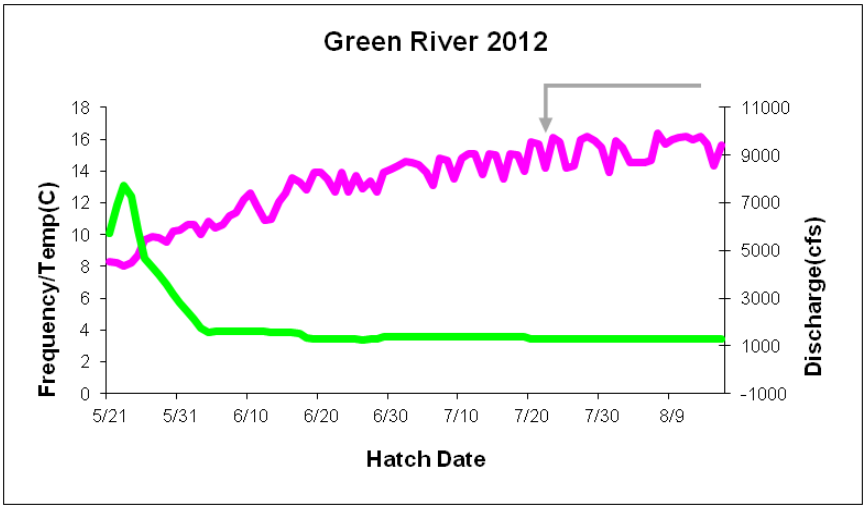

Figure 4.—Distributions of hatching dates of Age-0 smallmouth bass estimated by otolith daily increment analysis, 2003-2009, and first hatching and hatch duration in 2011. Bass were collected from the Green River in Lodore Canyon. Left vertical axis is the frequency of fish in the histograms or water temperature (increasing but variable trace through time, red if in color); right vertical axis is Green River discharge (in cubic feet per second and is depicted by a declining or stable line time, green if in color).

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: R14AP00001
UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: FR-115

Project Title: Monitoring effects of Flaming Gorge Dam releases on the Lodore and Whirlpool Canyon fish communities

Principal Investigator: Kevin R. Bestgen, K. Zelasko, C. T. Wilcox, and A. A. Hill.
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Project/Grant Period: Start date (Mo/Day/Yr): 1 Oct. 2008
End date: (Mo/Day/Yr): 30 Sept. 2018
Reporting period end date: 30 Sept. 2014
Is this the final report? Yes _____ No X

Performance: The Larval Fish Laboratory completed three sampling trips with assistance from the USFWS, Vernal, Utah. Samples were collected and preserved and data on large-bodied fishes was collected. Samples are being identified and data are yet being analyzed, as some information was only recently collected. We also produced an annual report on activities and will prepare presentations based on data at workshops or meetings in December 2014 and January 2015.

ANNUAL PERFORMANCE PROGRESS REPORT (PPR)

BUREAU OF RECLAMATION AGREEMENT NUMBER: R13PG40020

UPPER COLORADO RIVER RECOVERY PROGRAM PROJECT NUMBER: FR-115

Project Title: Monitoring effects of Flaming Gorge Dam releases on the Lodore and Whirlpool Canyon fish communities

Principal Investigator: Tildon Jones
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Project/Grant Period: Start date (Mo/Day/Yr): 10/01/2013
End date: (Mo/Day/Yr): 9/30/2015
Reporting period end date (Mo/Day/Yr): 09/30/2014
Is this the final report? Yes _____ No __X__

Performance: USFWS completed our portions of tasks 1 and 2, sampling large and small bodied fish communities. We provided personnel and equipment to successfully complete 2 electrofishing and seining passes from Lodore Canyon through Island/Rainbow Parks, as well as a trammel netting trip in Whirlpool Canyon. These tasks were completed in collaboration with CSU, who maintains data files and is ultimately responsible for submitting project reports and analyses.