COLORADO RIVER RECOVERY PROGRAM
FY 2010 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: 158

I. Project Title: Assessment of larval Colorado pikeminnow presence and survival in low velocity habitats in the middle Green River

II. Principal Investigator(s):

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III. Project Summary:

This study seeks to address the possible influence nonnative fishes may have on age-0 Colorado pikeminnow (CPM) as they arrive and grow in backwater habitats. A second focus is to confirm the arrival and entrainment of larval CPM into backwaters in the middle Green River. The following objectives have been outlined for young-of-the-year (YOY) CPM:

1. Verify that larval CPM are arriving in nursery habitat

2. Document abundance of larval CPM in backwaters as season progresses

3. Reduce densities of nonnative fish, particularly cyprinids, in backwater habitats before and after arrival of CPM

4. Determine success of removing and excluding nonnative fish from backwaters using various blocking techniques and depletion treatments

5. Assess small-bodied fish community effects from removing nonnative fishes from backwaters

IV. Study Schedule:

a. Initial year: 2009
b. Final field year: 2011
c. Final report year: 2012

V. Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

III. Reduce negative impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).
III.A. Reduce negative interactions between nonnative and endangered fishes.
III.A.2. Identify and implement viable active control measures.
III.A.2.c. Implement and evaluate the effectiveness of viable active control measures.
III.A.2.f. Develop control program for removal of small nonnative cyprinids in backwaters and other low velocity habitats.

GREEN RIVER ACTION PLAN: MAINSTEM

III. Reduce impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).
III.A.4. Develop and implement control programs for nonnative fishes in river reaches occupied by the endangered fishes to identify required levels of control.
III.A.4.b. Nonnative cyprinids and centrarchids in nursery habitats.
III.A.4.b.(1) Small nonnative cyprinids from backwaters and other low velocity habitats in the lower Green River.

VI. Accomplishment of FY 2010 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings

Task Description (FY 2010):

Task 1. Determine abundance of larval CPM present in drift at Split Mountain and arriving in backwaters in the Ouray reach.

Task 2. Deplete nonnative fish in backwaters prior to larval CPM drift and experiment with a blocking scenario to keep backwaters free of nonnative fish.

Task 3. Determine fish community in manipulated and control backwaters.

Task 1: Determine abundance of larval CPM present in drift at Split Mountain and arriving in backwaters in the Ouray reach.

Three drift nets were used to collect larval fish drifting past the Split Mountain campground area on the Green River. Netting began July 13 and continued 5 days a week through August 13. The mean daily discharge at the USGS gage at Jensen measured 3,170 cfs and decreased to 2,220 cfs during that time. Colorado pikeminnow 9-10mm total length were captured on the following days: 13 July (n=1), 21 July (n=1), 23 July (n=3), 28 July (n=1), and 29 July (n=1). The 23 July captures were during a turbidity event from heavy rains the night of 21 July. Preliminary results from the Larval Fish Lab suggest a pulse of pikeminnow larvae drifting from the Yampa spawning reach coincident with the 23 July captures (K. Bestgen, pers. comm.). The final results from the Echo Park sampling are not available, so further comparisons are not possible at this time.

Backwaters and low velocity habitats on the Ouray National Wildlife Refuge were sampled using seines starting July 27-28 and continued August 2-3 and August 9-10. Samples from the first two rounds of sampling were preserved and sent to the Larval Fish Lab for identification. The results of these samples are pending. By August 9, age-0 Colorado pikeminnow were sufficiently large enough to identify in the field and release. These pikeminnow were small (~30mm TL) and were not measured in order to minimize handling stress from higher temperatures and desiccation. During the August 9-10 sampling, twelve unique backwater and low velocity areas were sampled, some twice. We repeated sampling in certain backwaters to verify the presence/absence of fish at different times of day and at different water temperatures. Of the twelve unique sites sampled, seven had at least one age-0 CPM (58%). Fifty-four CPM were collected in all sampling during this period, much lower than in 2009 (N>186). The maximum number of pikeminnow captured in a single backwater this year was twenty-four fish, compared to 124 fish from one backwater in 2009 during a similar time of year.

At the time of this report, most of the samples are still being processed, and further analyses are pending.

Task 2: Deplete nonnative fish in backwaters prior to larval CPM drift and experiment with a blocking scenario to keep backwaters free of nonnative fish.

Depletion of backwaters began on 27 July and sampling was conducted every other week through 23 September 2010. Six backwaters were chosen starting below Baezer boat ramp and ending in the Ouray National Wildlife Refuge (Figure 1). Two backwaters were treated as controls, two backwaters were blocked with ¼ inch mesh and two backwaters were blocked with ½ inch mesh block nets. The four treatment backwaters were blocked with a block net at the mouth of the backwater, depleted of all nonnative fish possible, and the block net was left up throughout the study period. After the initial depletion, all study backwaters were sampled every other week

following the YOY CPM sampling protocol. A recording HOBO® Pendant temperature data logger was placed in each backwater. Backwater temperatures ranged from 13.08 to 31.68 throughout the study. Logger placement was adjusted throughout the study as backwater size changed. Green River discharge (as measured at the Jensen gauge) ranged from 2,440 cfs (at the start) to 2,190 cfs (at the end) during the sampling period and did not seem to fluctuate drastically between days.

Field measurements of the backwaters were taken at every sampling event. Measurements included date and time of sampling, UTM coordinates, the depth for the temp logger as well as the maximum and minimum depth of the backwater. The width and length of the backwater was also measured to gage how the backwater changed over time (Table 1).

Due to diversity in habitat throughout each backwater, we tended to capture varying amounts of fish throughout the backwater depending upon the depth, vegetation, substrate, and cover. For the initial depletion at each backwater and after placing the blocknet, we repeated seine passes (1/4 inch mesh) until the catch equaled approximately 10 percent or fewer fish than was caught in the initial pass. At one ¼ inch mesh blocked backwater site, we were only able to complete two passes due to time constraints and we depleted approximately only 80% of the fish in the backwater. At the control backwater sites, a temporary block was put up during the initial depletion effort in order to reach our depletion criteria. A depletion effort was only attempted on the first sampling occasion of each backwater. When we were able to identify CPM, the depletion effort was no longer attempted to avoid the stress this would have caused to the CPM. Sampling then followed the YOY CPM sampling protocol. Also, despite the use of two different mesh size block nets, keeping the backwaters free from nonnative fish over time proved problematic. Throughout the study period, we observed larger YOY nonnative fish than the mesh diameter. The fish may have gotten through the block nets, or may have not been removed at the initial depletion effort. However, the backwaters blocked by the ¼ inch mesh size nets did have smaller nonnative fish in them compared to the backwaters blocked by the ½ mesh size nets. This is based on qualitative observation since no length measurements were taken of the nonnative fish species.

In addition to the depletion passes, we also completed two seine hauls in each backwater with a small mesh seine (1/8 inch) to obtain a representative sample of small unidentifiable fish. These samples have been sent to the Larval Fish Lab for identification.

On the third sampling trip, we discovered that one of our ½ inch block nets had been removed. Since we can not determine when this block net was taken, the data from this backwater will not be included in this report.

During the study period, multiple YOY CPM were observed in the three different types of backwaters. The average number of YOY CPM observed over all sampling

periods was highest for the ¼ mesh sites (7.5), followed by ½ mesh sites (1.75), and the lowest average was observed at the control site (.75) (Figure 2).

Very few additional native species were collected: only 3 unknown sucker species were returned to the backwaters. Seine samples were dominated by nonnative cyprinids including red shiner, sand shiner, and fathead minnow (Table 2). There were a total of 7 nonnative species collected in seine samples, compared to 11 in 2009. Nonnative species include red shiner (n = 7,260), sand shiner (n = 1,894), fathead minnow (n = 448), carp (n = 425), smallmouth bass (n = 57), green sunfish (n = 32), and white sucker (n = 9); however, there may be even more as small fish during the sampling period were sent to the Larval Fish Lab for later identification.

Task 3: Determine fish community in manipulated and control backwaters.

To determine the fish community in the manipulated and control backwaters, the final sampling trip was conducted simultaneously with the young of year CPM monitoring. Sampling in study backwaters took place from 21 September until 23 September. Very few CPM were found in the study backwaters on this sampling trip compared to earlier sampling trips, similar to the observations from last year. One YOY CPM was sampled from a control backwater and 9 YOY CPM were sampled from a backwater blocked by ¼ mesh. Despite the presence of YOY CPM, each of the study backwaters contained predominantly nonnative fish, however, the backwaters blocked by ¼ mesh consistently had more YOY CPM than either the controls or the backwater blocked by ½ mesh.

Task 4:

Report Preparation

Annual report November 2010

Overall, the second year of this study met many of the 5 objectives that it set out to meet. The drift sampling was able to verify that larval CPM are arriving in nursery habitat in the middle Green River, and with the seining of the backwaters we were able to document the abundance of larval CPM present in the backwaters as the season progressed. Initially, it does look like we were able to effectively reduce the densities of nonnative fish in each of the backwaters. With continued experimentation on blocking methods and an increase in the depletion effort, the success of removing and excluding nonnative fish from the backwaters will increase. Objective five will be evaluated after the identification of the early samples by the Larval Fish Lab.

VII. Recommendations:

a. increase the number of backwaters blocked by the different mesh sizes

b. continue to block selected backwaters using various blocking techniques to

determine if it is possible to prevent nonnatives from invading blocked backwaters (i.e., block nets with smaller mesh than ¼ inch).

c. Compare the Split Mtn. drift net data and backwater sampling data to Echo Park drift net sampling and ISMP sampling in order to get an overall picture of CPM reproduction and recruitment this year. Compare this data to previous years. Continue to collect backwater samples in order to assess drift net and ISMP sampling as indicators of overall reproductive and recruitment success.

VIII. Project Status:

On track and ongoing

IX. FY 2010 Budget Status

A. Funds Provided: $85,547.25
B. Funds Expended: $85,547.25
C. Difference: 0.00
D. Percent of FY 2010 work completed: 90%
E. Recovery Program funds spent for publication charges: $0

X. Status of Data Submission:

XI. Signed: Leisa Monroe and Tildon Jones 10/25/2010
Investigators Date

Table 1. Backwater type, dates sampled, backwater maximum depth (mm), backwater initial width and length (m), backwater final width and length (m), and total number of seine hauls for each backwater on the Green River, July 27 – September 23, 2010.

Backwater	**1 (Control)**	**2 (Control)**	**3 (1/2 mesh)**	**4 (1/4 mesh)**	**5 (1/4 mesh)**	**9 (1/2 mesh)**
Dates sampled	7/27, 8/9, 8/23, 9/8, 9/21	7/27, 8/9, 8/23, 9/8	7/28, 8/9, 8/23, 9/8, 9/22	7/28, 8/9, 8/23, 9/8, 9/22	7/29, 8/10, 8/24, 9/8, 9/23	7/29, 8/10, 8/24, 9/8, 9/23
Max depth (mm)	690	670	810	425	635	590
Initial Width (m)	9	14	15.5	21.5	23	15
Initial Length (m)	52.5	20	39	48	31	77
Final Width (m)	8	13	21.5	46	21	14.5

Final Length (m)	39	15	52	21.5	17.5	92
Total # of seine hauls	44	21	33	35	20	59

Table 2. Total number of fish of each fish species captured at each backwater on the Green River, July 27- September 23, 2010.

Backwater	**Control** (1 & 2 combined)	¼ (1 & 2 combined)	½
Total # of RS[1]	1065	3742	1573
Total # of SS[1]	458	1152	317
Total # of FH[1]	112	330	56
Total # of CP[1]	124	96	96
Total # of GS[1]	5	28	1
Total # of WS[1]	5	0	0
Total # of SM[1]	22	0	1
Total # of CR[1]	1	0	0
Total # of CS[1]	4	50	7
Total # of all fish	1796	5398	2051

[1]RS = red shiner, SS = sand shiner, FH = fathead minnow, CP = common carp, GS = green sunfish, WS = white sucker, SM = smallmouth bass, CR = creek chub, CS = Colorado pikeminnow

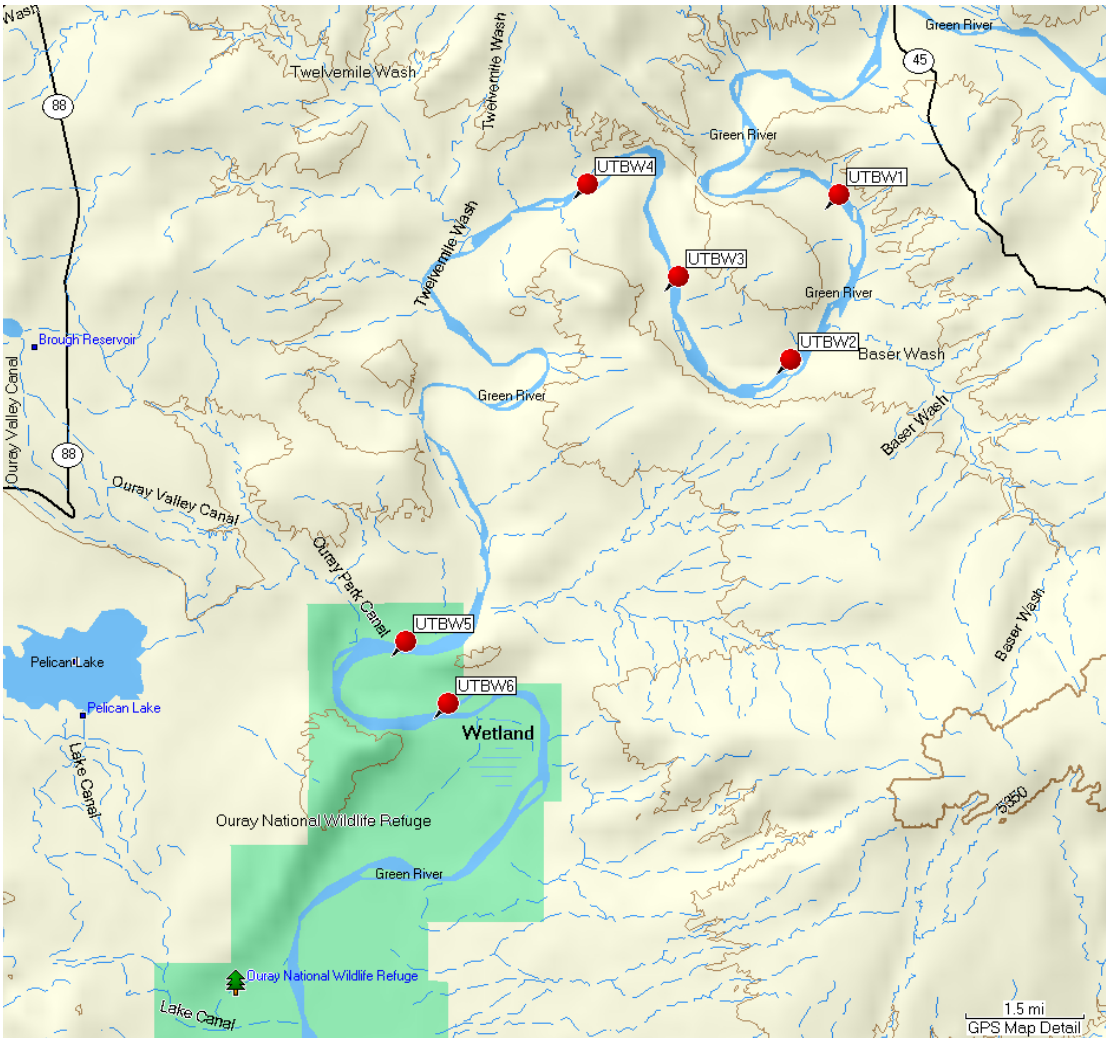

Figure 1. Locations of Green River backwaters (n=6), July 27 – September 23, 2010.

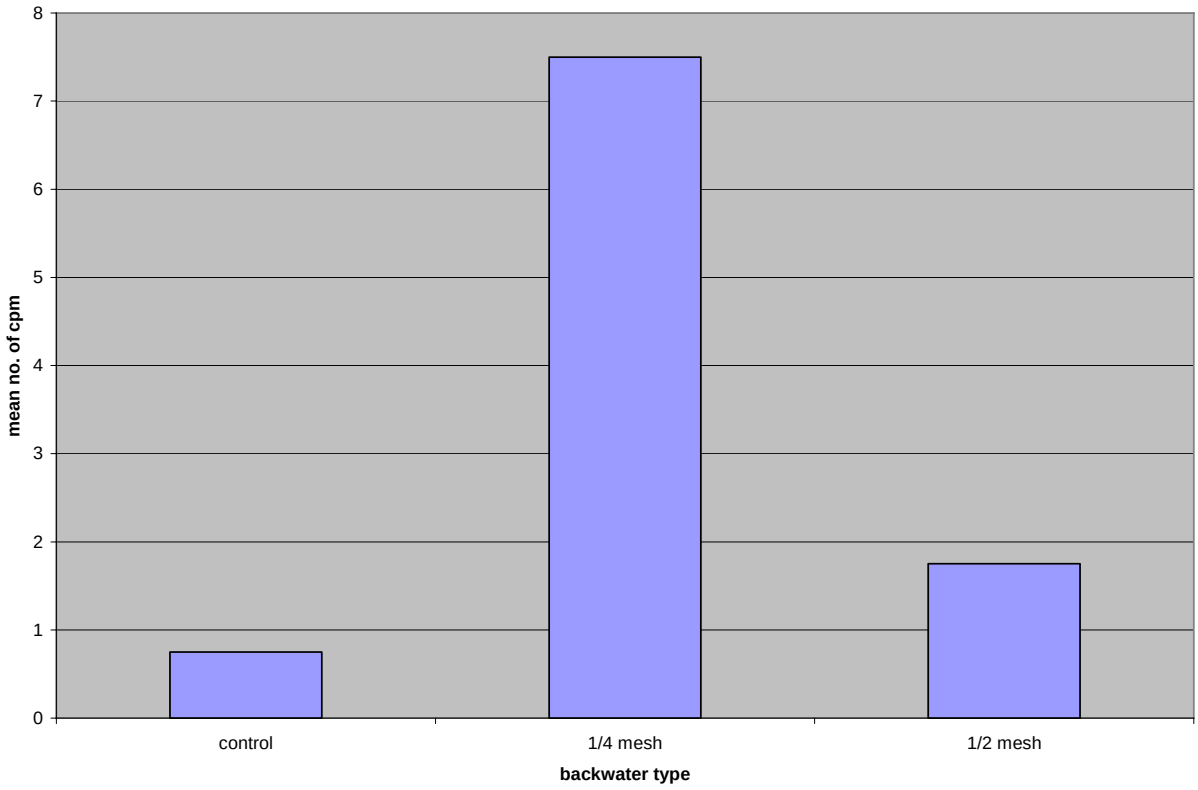

Figure 2. Average number of YOY CPM sampled in each backwater type.