

I. Project Title: Evaluation of larval sucker drift into floodplain wetlands

Note: As a result of the Green River Subbasin Floodplain Management Plan, this project has been relocated to Thunder Ranch and Stewart Lake. This report serves as the final report for the FY 03 effort.

II. Principal Investigator(s): Ron Brunson / Kevin Christopherson
Utah Division of Wildlife Resources
Northeast Region
152 East 100 North
Vernal, Utah 84078
Phone: (435) 781-9453 fax: (435) 789-8343
E-mail: ronaldbrunson@utah.gov
kevinchristopherson@utah.gov

III. Project Summary:

An experimental effort to improve river-floodplain connection was conducted in the spring of 2000 and levee breaches were cut on the upstream ends of the Above Brennan and Bonanza Bridge sites. Breaches configured in this manner should maximize larval razorback entrainment because water flowing into the site is not dependent on “filling surges”. Instead water will flow into these sites constantly during the period river flows exceed the floodability level of the upstream breaches. Evaluating the effectiveness of these new levee-breach configurations will provide answers to several important questions pertaining to the flood plain restoration program. These are: 1) Can we entrain larval razorback suckers in the flood plain by lowering levees to improve the river-flood plain connection? 2) Can they be entrained at high enough numbers to ensure some survival from predation by nonnative fish and piscivorous insects? And how should future levee breaches be configured? To evaluate the entrainment effectiveness of the new upstream breaches the strategy is to monitor the passage of drifting larvae into the sites and estimate the number of larvae entrained. Then assuming some larvae are entrained, determine if any survive within the sites.

IV. Study Schedule:

Initial year: FY 2001

As a result of low river flows these flood plains did not connect in 2001 or 2002 so the project and funding was carried over into FY 2003.

Final year: FY 2004

V. Relationship to RIPRAP:

Green River Action Plan: Mainstem

- II. Restore habitat.
- II.A. Restore and manage flooded bottomland habitat.
- II.A.3. Implement levee removal strategy at high priority sites.
- II.A.3.d. Evaluation.

VI. Accomplishment of FY 2003 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Field Data Collection

Larval drift nets were set in the levee breaches of the Bonanza, Brennan and Stirrup floodplain wetland sites. Sampling began as soon as the floodplain site was connected with the river through the breach. River water began to flow into Brennan when the Jensen gage read 12,000 cfs, the Stirrup when the gage read 13,000 cfs and Bonanza when the gage read 15,000 cfs. The upstream breach at Brennan was the first to be sampled on 21 May 2003. The Stirrup was first sampled on 23 May 2003 and Bonanza was sampled beginning 27 May 2003.

A total of 47 drift net sets were made at the Brennan breach with a duration of approximately one hour per set. A total of 61 drift net sets were made at the Bonanza breach with a duration of approximately 30 minutes per set. Nineteen samples were also taken at the downstream breach at the Stirrup site with duration of approximately 45 minutes per set.

In addition to work outlined in the approved scope of work, neutrally buoyant beads were also used to evaluate rates of entrainment of drifting particles into the upstream breaches of the Bonanza and Brennan floodplain sites. This was done primarily due to the fact that the likelihood of collecting sufficient numbers of naturally drifting larvae in drift net sets to make an evaluation was poor. Also, high river flows were expected to be of short duration. This would limit the number of sample days. On 29 May 2003, approximately 700,000 neutrally buoyant beads were distributed across the river channel one mile above the Bonanza and Brennan breaches in an effort to better evaluate drift and entrainment. Forty-eight drift net samples of approximately 20 minutes duration each were taken at the Bonanza breach and 19 samples of approximately one hour each were taken at the Brennan breach. At least three drift nets were set at a time and samples were collected on a rotating basis from each net to ensure continuous sampling of incoming water.

Task 2: Drift Net Sample Processing

Analysis of drift net samples is complete. All samples taken on 29 May 2003 as part of the bead drift component were picked through to look for beads on the day they were collected and then preserved in alcohol to be analyzed for larvae at a later date. Larval fish were not detected in drift net samples. Adult and juvenile red shiner were the only fish detected. Results of bead drift sampling are presented in Table 1. Bead drift sampling was conducted at the upstream breach of Bonanza and Brennan floodplain sites. During the 2003 high flow period the Bonanza floodplain wetland connected at higher flows (15,000 cfs) than the Brennan floodplain wetland (12,000 cfs). As a result, the volume of water entrained at the Bonanza breach was much less than that at the Brennan breach. The total volume entrained during the sample period was 23,088 m³ and 666,924 m³ at Bonanza and Brennan respectively. Approximately 700,000 beads were released one mile upriver from the breach at each floodplain wetland. A total of 45 beads were collected in Bonanza drift samples and 14 in Brennan drift samples. Beads collected per volume of water sampled were 0.45 beads/m³ at Bonanza and 0.004 beads/m³ at Brennan. The estimated number of beads entrained with the total volume of water entrained during the sampling period is 10,387 and 2,668 for Bonanza and Brennan respectively. The proportion of the total beads released that were entrained was estimated at 1.5% and 0.39% for Bonanza and Brennan respectively. Although a much higher volume of water was entrained into Brennan, it is estimated that nearly four times the number of beads were entrained in Bonanza.

Table 1. Data for bead drift evaluation at Bonanza and Brennan floodplain wetlands during spring connection flows on 29 May 2003.

	Bonanza	Brennan
* Drift Time (minutes)	52	373
* Volume sampled m ³	99.08	3,153.19
* Total volume	23,088	666,924
Beads released	~691,000	691,000
Beads sampled	45	14
Beads sampled/m ³	.45	.004
Est. # entrained	10,389	2,668
Proportion entrained	1.5%	0.39%

* Drift time, volume sampled and total volume data is only for the time period beginning at the first detection of beads and the last detected bead.

Task 3: Data Management

All data have been entered into a database

Task 4: Report Preparation

Annual RIP Report (November 14, 2003) complete

VII. Recommendations:

Our experience using biodegradable gelatinous neutrally buoyant beads (beads) has shown that this method is very useful and practical for evaluating entrainment of drifting particles. We recommend evaluating drift and entrainment rates of beads released at known (Razorback/Escalante bar) and potential spawning sites into selected floodplain wetlands.

We also, recommend continuing to evaluate the most effective breach connections for entraining drift at various points on the hydrograph and using these data to refine the Floodplain Drift Model and to test floodplain management scenarios.

VIII. Project Status:

On track and scheduled to be completed in 2004

IX. FY 2003 Budget Status

- A. Funds Provided: \$28,000
- B. Funds Expended: \$28,000
- C. Difference: \$ 0
- D. Recovery Program funds spent for publication charges: \$ 0

X. Status of Data Submission (Where applicable):

Data will be submitted at the conclusion of the project (December 2004)

XI. Signed: Kevin Christopherson April 16, 2003
Principal Investigator Date