



### How it Began...

Citizens and Angling Guides of the Fryingpan Valley approached Roaring Fork Conservancy (RFC) staff with concerns about low winter flows, formation of anchor ice, decreased American Dipper and macroinvertebrate populations and, in turn, the potential impacts on the river resource. Flows during the winter of 2012-13 were maintained at a meager 40cfs for over a three month period. Interested citizens along with RFC staff attended the annual Bureau of Reclamation (BOR) meeting to voice these concerns. From these encounters, a scientific study was created to evaluate current conditions on the Lower Fryingpan River. In addition, an update of the 2002 Fryingpan Valley Economic Study was envisioned to aid in understanding how the fishery continues to impact the vitality of the Town of Basalt and the Roaring Fork Valley. In May of 2014, RFC hosted staff from the U.S. Environmental Protection Agency, including Nancy Stoner, Acting Assistant Administrator for the Office of Water, and gave them a tour of the Fryingpan River, discussing the potential impacts of the current study. To learn more about the study's inception, click [here](#).



### Macroinvertebrates and Water Temperature



#### *The Study:*

Renowned macroinvertebrate expert, Dr. Bill Miller was contracted by RFC to repeat earlier studies which examined the health of the aquatic insect population on the Fryingpan River. In the fall of 2013 and spring of 2014, three sites within the Fryingpan River were sampled, with three samples collected at each site. Additionally, in October 2013 remote temperature loggers were placed in the river at each macroinvertebrate sampling location, recording temperature every hour to monitor for conditions prime for anchor ice formation. During the winter months, anchor ice can be detrimental to the macroinvertebrate population, scouring their habitat and potentially causing the organisms to freeze. To learn more about macroinvertebrates and their role in the stream ecosystem, click [here](#).

#### *Preliminary Findings/Results:*

The draft of this study is currently under review by RFC staff and preliminary findings show:

- The main metrics like evenness, diversity, and taxa richness (how many of each different type of macroinvertebrate is in a sample) all increase with distance downstream from the dam which is the expected result in a healthy river system.
- The functional feeding group analysis and other metrics do not indicate a decline in stream conditions when compared with the data from the early 2000s. Biomass measurements also indicates a healthy river system.
- Water temperature was ripe for anchor ice formation only at the site in Downtown Basalt, and only in December of 2013 when air temperature was low, flows were low, and water temperatures dipped to freezing for an extended period of time. With ample snow, and regular communication with the BOR, flows were significantly higher (near 90cfs) for most of the 2013-2014 winter compared to the previous two years.

### *Didymosphenia Geminata (a.k.a. Didymo or "rock snot")*

#### *The Study:*



RFC partnered with Colorado Mountain College's (CMC) Natural Resource Department in Leadville, to develop an original study to examine the extent of Didymo on the Fryingpan below Ruedi Reservoir. Didymo is an aquatic algae that grows in cold water streams and inhabits the same space as macroinvertebrate habitat. Observations were made at 20 sample sites along the river to determine the extent of didymo presence. Didymo samples were collected in the spring of 2014 prior to runoff, and again following high flows, with the final samples scheduled to be collected in early fall of 2015. Samples were analyzed in a CMC laboratory, providing species confirmation and examining volume. For more information about Didymo, click [here](#).

### ***Preliminary Findings/Results:***

After two rounds of sampling and collection, CMC reported the following results:

- There was less didymo throughout the river in the second sampling which followed high flows.
- Didymo increases in stretches of water that are shallower and slower moving.
- Didymo does not thrive in stagnant water such as beaver ponds. It prefers oxygenated (moving) water.
- Above Ruedi Reservoir, didymo is present in reference sites in concentrations below nuisance level.
- For a video about the study, click [here](#).

## **American Dipper (a.k.a. Water Ouzel)**

### ***The Study:***

RFC enlisted local biologist, Delia Malone, to document the Fryingpan Dipper population. Malone surveyed the river three times, once each during pairing, nesting, and fledgling phases. For more about the American Dipper, click [here](#).

### ***Results:***

- The Fryingpan currently sustains 28 mating pairs with 28 active nests. This year, 23 of 28 nests were successful.
- Stream-riparian habitat 50m up and downstream of nesting sites was significantly better than other stream habitat.
- Dipper success is limited by: available nest sites, abundant and accessible forage, sufficient bank vegetation, and anthropogenic disturbance.
- To read the full study, click [here](#).



## **Fryingpan Valley Economic Study**

### ***The Study:***

The 2014 Fryingpan Valley Economic Study mirrors the study conducted by RFC in 2002. Since March of 2014, RFC surveyors have been engaging anglers on the Fryingpan River and recreationalists at Ruedi Reservoir. Participants are asked questions about general demographics, monetary spending, and water level preferences. For the 2014 study, RFC partnered with Colorado State University Economic Professors, Dr. John Loomis, who was also instrumental in the 2002 study, Dr. Martin Shields, along with a post-doctoral student, to create the survey questions and analyze results. The 2002 study found that Fryingpan Valley recreation contributed over \$2.6 million dollars in direct spending to the Roaring Fork Valley. For more on the 2002 study, click [here](#). The 2014 study surveying will continue through October, with final study results expected in March of 2015.

### ***Update:***

- At this time, RFC staff have interviewed over 300 anglers on the Fryingpan and nearly 100 recreationalists at Ruedi Reservoir.
- Current results indicate that anglers spend most of their money on: (1) accommodations; (2) food; (3) fishing specific/guide expenses. Ruedi users spend most of their money on: (1) food; (2) boat specific expenses; (3) gasoline.

## **The Impact of the Flow Regime on the Fryingpan**



Preliminary results are helping facilitate understanding of how changes in flow impact the Fryingpan River. The healthy macroinvertebrate population following high winter flows, aid the argument made in Miller's 2006 publication, "Study of Macroinvertebrate Community Responses to Winter Flows on the Fryingpan," which recommends winter flows of greater than 70cfs to minimize anchor ice formation and thus benefit aquatic life.

Likewise, the decrease in the level of didymo from the first versus second sampling, suggests the need for sustained springtime flushing flows to keep the didymo population from reaching nuisance levels and negatively impacting aquatic life.

*Please note that these are preliminary findings. A final report synthesizing results and recommending future action will be released spring 2015.*