

Attachment B

Recent Development in Reach B of Mammoth Creek

1.0 BACKGROUND

Fish population analyses indicate that due to the relatively high densities of YOY brown trout in Reach B, combined with the weak to moderate, but significant decreasing linear trend in recent YOY brown trout density in Reach B, the overall slight declining linear trend in YOY brown trout density in Mammoth Creek during recent years (1999-2008) is mostly influenced by Reach B. Also, a weak to moderate, but highly significant negative relationship is evident between annual average YOY brown trout density for the entire creek and spring/early summer peak runoff flows (i.e., the higher the peak runoff flow, the lower the YOY brown trout density the following autumn). However, further examination of the data reveals that annual average YOY brown trout density in Reach B (individually) is not significantly associated ($r^2 = 0.11$, $P = 0.19$) with spring/early summer peak runoff flow (expressed as OMR High Flow), whereas moderately weak ($r^2 = 0.20$, 0.29 and 0.26) and often significant ($P = 0.07$, 0.03 , 0.04) relationships were found for reaches C, D and E, respectively. This conflicting trend in Reach B, relative to the entire Mammoth Creek, suggests that some other factor or factors contribute, at least partially, to the weak to moderate, and moderately significant declining linear trend in YOY brown trout density in Reach B during recent years. Potential contributing factors are uncertain, although it is noted that Reach B passes through the Town of Mammoth Lakes, where much of the local area development has occurred during recent years.

MCWD staff Ericka Hegeman and Justin Mulbay examined the amount of development and activities along Reach B of Mammoth Creek and provided the following information. MCWD permit files were pulled for all parcels located adjacent to, or near the stream. The parcels that had new buildings constructed on them or redevelopment of existing structures during the past decade (1997 through September 2007) were compiled, and a GIS layer was created to delineate these parcels. This period was examined in support of the fish population analyses conducted for recent years.

Also, a visual examination of activities within and adjacent to Mammoth Creek was conducted in early September 2007 in Reach B of Mammoth Creek. The visual examination encompassed one of the major branches of Mammoth Creek, from Sherwin Street to Snowcreek IV (**Figure B-1**). This area was chosen because it contained the majority of new development that has occurred during the past decade, and the amount of potential instream and riparian habitat disturbance was largely unknown. Photographs were taken, GPS coordinates were documented of various habitat disturbances observed within and along the creek, and descriptions of habitat disturbances were compiled.

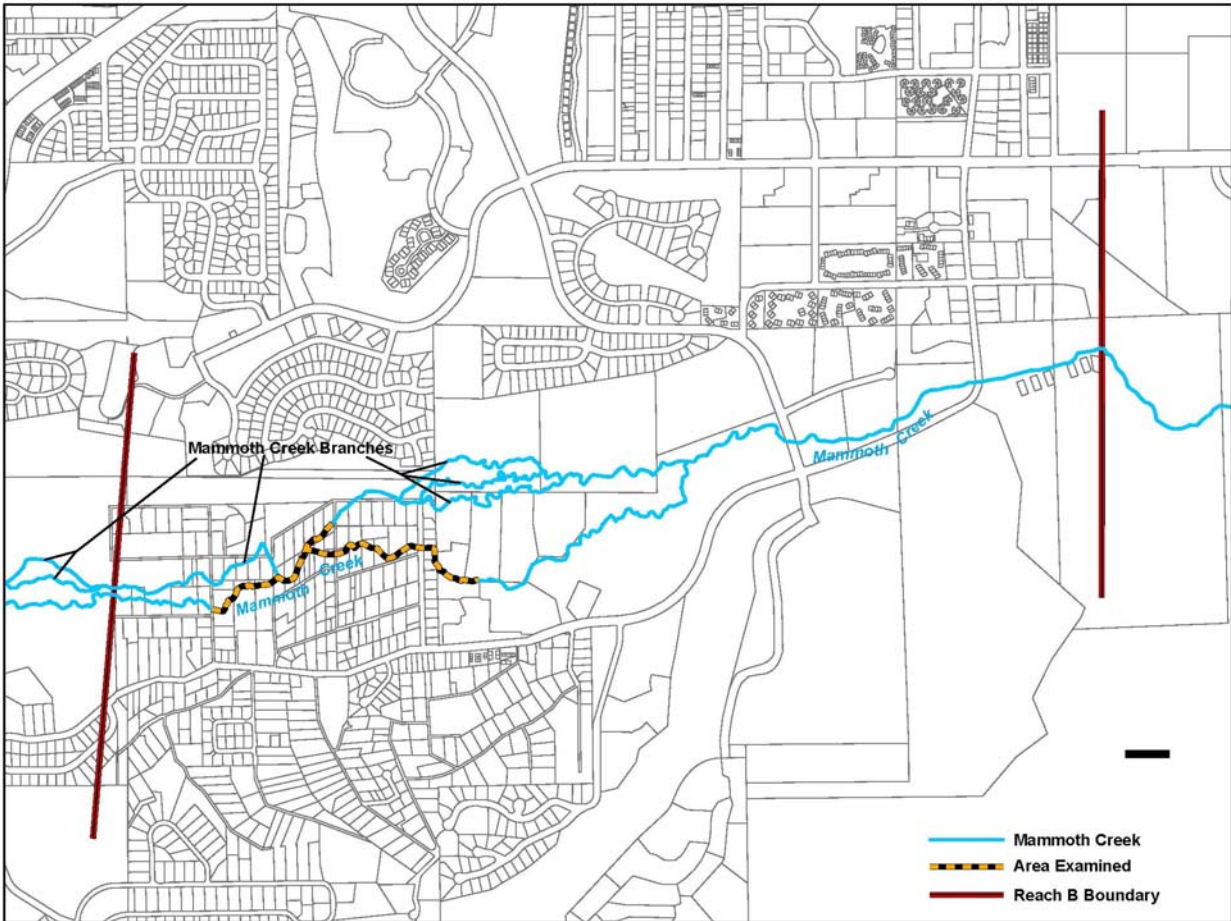


Figure B-1. Reach B of Mammoth Creek, showing the multiple branches of the creek and the area visually examined during September 2007.

2.0 CONSIDERATIONS

The installation of diversions and man-made ponds, and the introduction of turf directly up to the edge of the creek in the Snowcreek area (I, II, III, IV) is well documented. Because the Snowcreek area was generally developed prior to the 1990s, potential effects on YOY brown trout densities during the last decade in Reach B of Mammoth Creek cannot have occurred concurrently with these habitat disturbances, although altered habitat conditions subsequently could affect the manner in which fish populations respond.

During recent years, several Town-issued variances were found within the permit files. In 1996, three parcels were given variances to reduce the stream setback from 50 feet to 10 feet, and two of the three parcels subsequently were built upon. In 2004, a parcel was granted a variance to reduce the stream bank setback from 50 feet to 20 feet, and subsequently was built upon. In 2005, a parcel was granted a variance to reduce the stream setback from 50 feet to 10 feet, but this parcel has not yet been built upon.

Compiled development permit information and observed habitat disturbances within and along Reach B of Mammoth Creek are presented in **Figure B-2**. Examination of Figure B-2

demonstrates that a substantial amount of residential development and habitat disturbance activities have recently occurred along Mammoth Creek between Sherwin Street and Snowcreek.

In addition to various residential development construction-related effects, many homeowners have directly influenced the creek in other ways. Twenty-two parcels between Snowcreek and Sherwin Street have modified the aquatic habitat of Mammoth Creek through the construction of rock dams within the creek, installing bridges over the creek, or installing turf directly up to the creek banks. Other influences include the installation of “drainpipes” directly feeding into the creek from unknown sources, creation of diversions and additional man-made channels, the dumping of grass clippings in the creek, and the installation of artificial decorative rock walls along the creek banks. One of the most common situations noted during the visual survey of Reach B of Mammoth Creek was the apparent reduction in water velocity associated with the installation of rock dams, which appear to have caused localized siltation in the creek.

Over thirty dams were counted in Mammoth Creek between Sherwin Street and Snowcreek. Some of the instream rock dams are substantial, and may have the potential to act as a fish barrier under low flow conditions. Two dams were observed on many parcels, and one parcel had six rock dams installed within a small section of the creek.

Photographs of ongoing development and instream habitat disturbance activities in Reach B of Mammoth Creek are presented in **Figures B-3** through **Figure B-7**.



Figure B-2. Compiled development permit information and observed habitat disturbances within and along Reach B of Mammoth Creek.

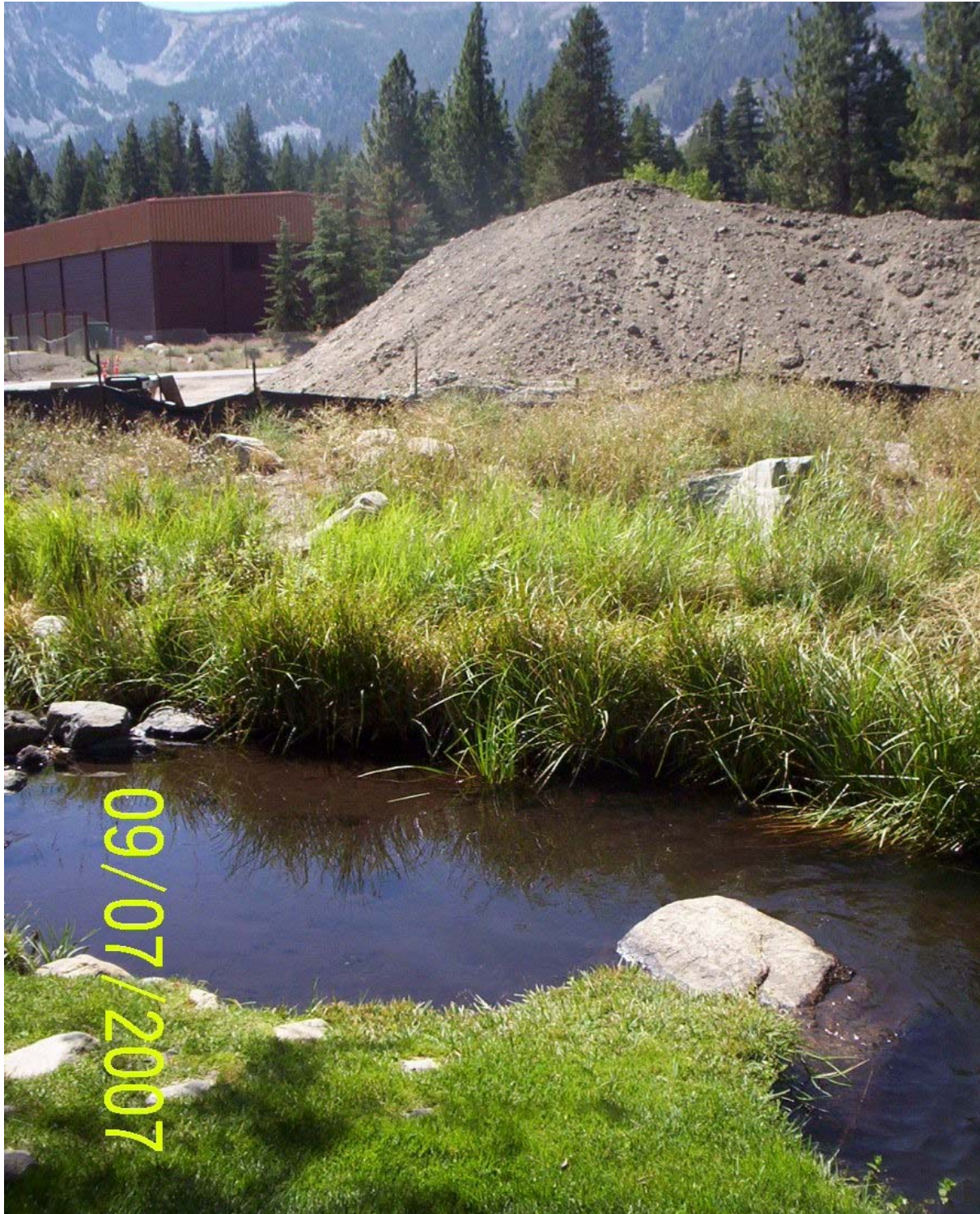


Figure B-3. Ongoing development across Mammoth Creek from Snowcreek IV, near MCWD's groundwater treatment plant.



Figure B-4. A culvert installed in Reach B of Mammoth Creek as part of a driveway to provide access to a private residence.

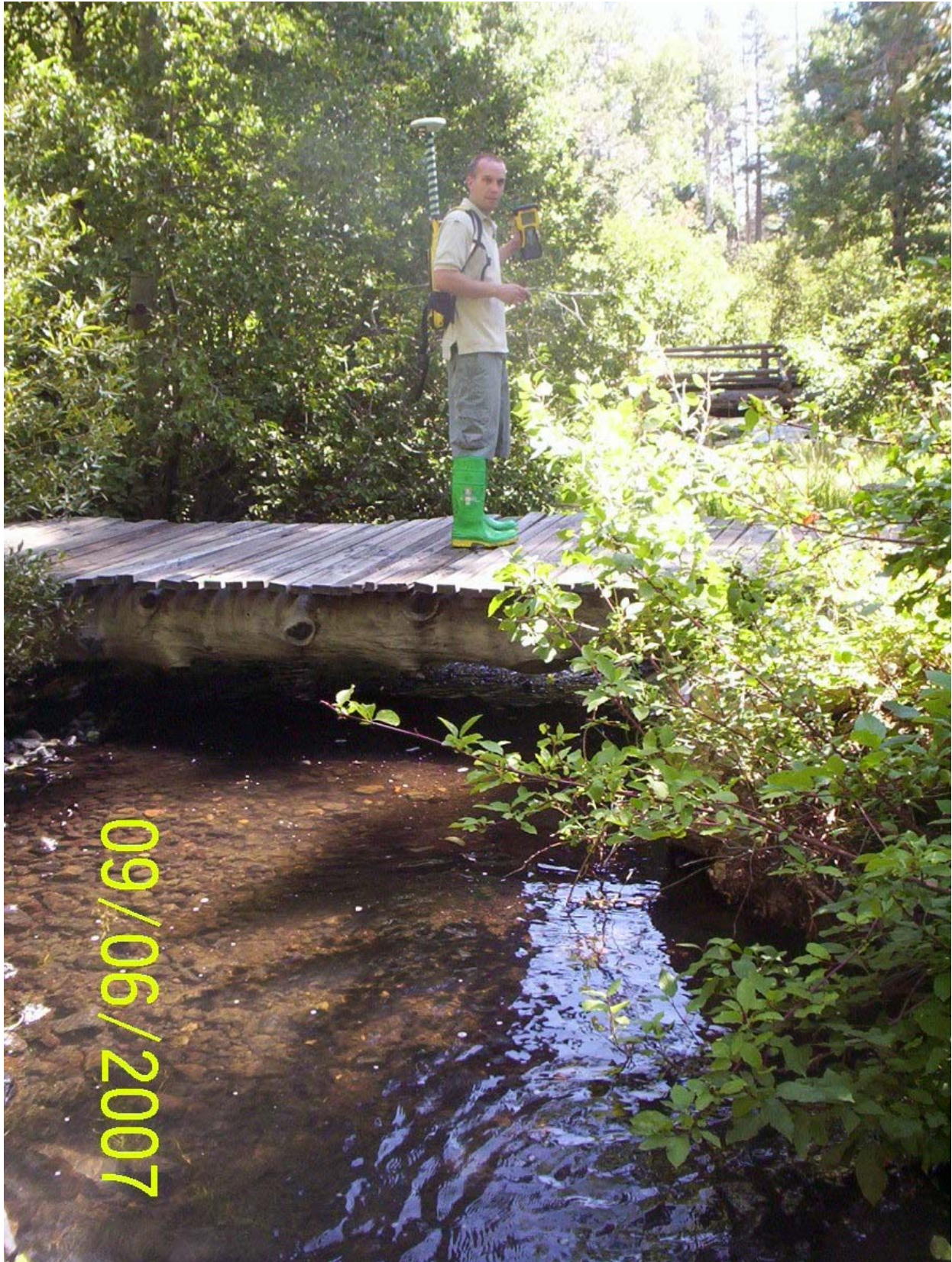


Figure B-5. Multiple bridges installed in Reach B of Mammoth Creek.



Figure B-6. One example of instream rock dams constructed in Reach B of Mammoth Creek. Some of the instream rock dams are substantial, and may have the potential to act as a fish barrier under low flow conditions.



Figure B-7. One example of a private parcel exhibiting grass installation up to the creek bank, rocks installed along the creek bank, and an instream rock dam.