Quarterly Report

January 1, 2005 to March 31, 2005

Project Title

Fish Passage in Montana Culverts Phase II – Passage Goals

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Introduction

This progress report covers work completed between January 1, 2005 and March 31, 2005. Work on the project during this period has been primarily devoted to equipment development and testing, permitting and permissions for field work, and development of the experimental design.

Project Objective

Culverts are a common and often cost effective means of providing transportation intersections with naturally occurring streams or rivers. Fish passage and fish habitat considerations are now typical components of the planning and design of waterway crossings. Many culverts in Montana span streams that support diverse fisheries. The health of these fisheries is an essential element of a recreational industry that draws hundreds of thousands of visitors to Montana annually. Transportation system planners, designers and managers recognize that fish passage through Montana's culverts is a concern. However, there is much contention concerning the impact that a culvert can have on a fishery. Recent basin-wide studies in Montana (Phase I of this project - final report in November 2004) indicate that the tools that some planners and designers promote for forecasting fish passage concerns may be overly conservative. This is reflected in the diversity of fish passage goals that are being considered by state agencies in the Northwest. Some managers contend that all culverts should pass all fish at all times, whereas others suggest that this is an unrealistic criterion, particularly during high flow events. Which species, life stages, and how many individuals must have fish passage access for how long, are questions that are often brought forward during discussions on the design and retrofitting of culverts to accommodate fish passage concerns. ***The problem is that for fish species and settings in Montana, the timing and***

number of fish that must pass a culvert to maintain viable species diversity in the watershed is unknown.

Progress

Site Selection: Five culverts on Mulherin Creek near Gardiner, Montana will be equipped for direct assessment of fish passage (approximate locations shown below in Figure 1). Mulherin Creek is a tributary to the Yellowstone River and is known to have a substantial spawning run of Yellowstone Cutthroat trout, usually on the falling limb of the spring runoff hydrograph.

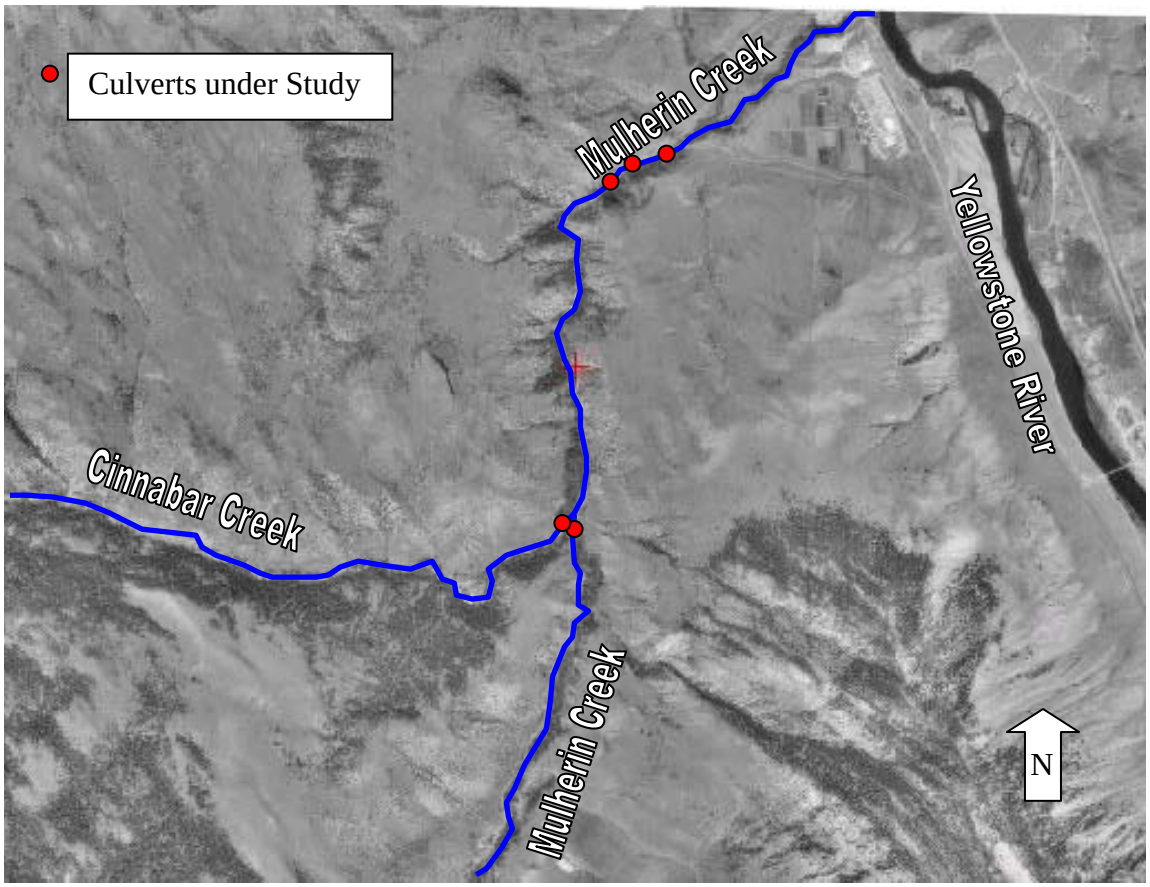
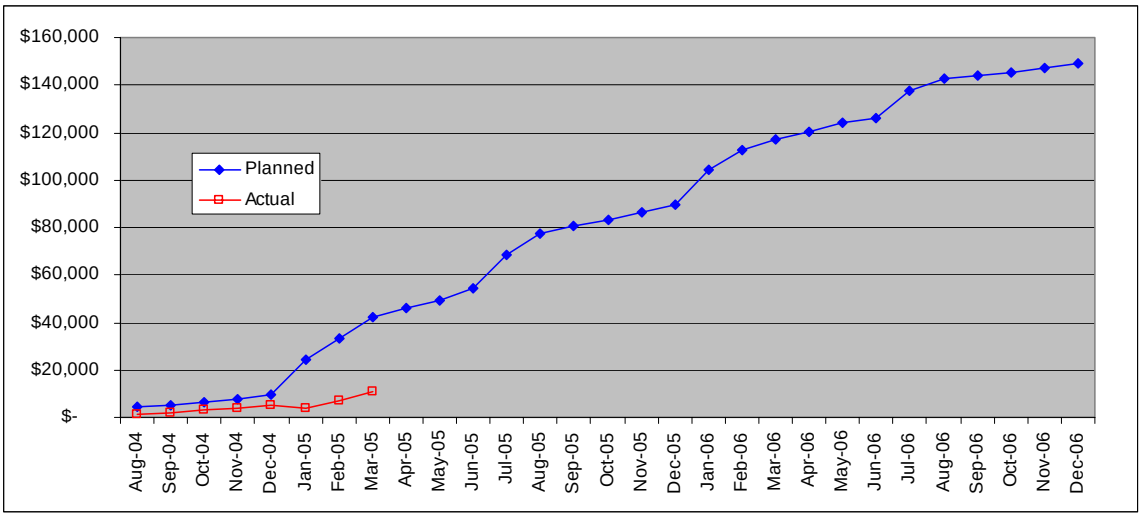


Figure 1. Approximate locations of study culverts on Mulherin Creek.

Methods: Direct assessment of fish passage through the culverts will be accomplished using continuously recording PIT technology. Small electronic "tags" are inserted into the fish. Each tag is unique, allowing identification of a unique fish. Antennae are installed at each culvert. The antennae record the occurrence and time of a "pass" as any tagged fish passes through the antenna loop. Data loggers collect and store this

information. Each of the five culverts will be equipped with an antenna at the inlet and outlet of the culvert, to help characterize not only passage success but passage attempts also. Our scientific collection permit will allow us to tag 100 Yellowstone cutthroat trout and track their movements over time. Culverts should be equipped by mid to late April and the data loggers will be maintained until freezing becomes an issue in the Fall. The antennae were assembled and tested in the hydraulics lab at MSU as shown in Figure 2.

Figure 2. Assembly and testing of PIT equipment in the hydraulics lab.

Budget

Actual expenditures to date lag planned expenditures because of intentional delays in equipment and supplies purchases. A single PIT tag set up was purchased and subjected to lab trials prior to purchasing the other nine units that will be deployed in the field. These lab tests are completed and the larger PIT tag purchase will now proceed. Expenditures to date largely consist of graduate student stipends and tuition expenses.