

E. coli in streams and cattle grazing

AT A GLANCE

Cattle contribute more to *E. coli* loading in streams when it is hot, but were not the major contributor.

The Situation

The Mink Creek Watershed, located just outside of Pocatello has been under scrutiny for *E. coli* stream contamination. This watershed has multiple land uses, including cattle grazing and recreation, with a majority of the watershed being administered by the Caribou-Targhee National Forest. In 2017, the Idaho Department of Environmental Quality (IDEQ) monitored seven locations in the watershed bi-monthly from June-October in order to determine if and when the levels of *E. coli* exceeded regulatory limits for fecal coliform bacteria. Levels at the Mink Creek Watershed at all but one location exceeded the regulatory limit in the IDEQ 2017 sampling. In the 2017 IDEQ report, livestock were assumed to be the principal contributor to the *E. coli* exceedances.

After extensive collaboration by the Caribou-Targhee National Forest, USFS Westside Ranger District and the Mink Creek Watershed Grazing Association, a project was undertaken by the University of Idaho to establish if livestock were in fact the major contributor to the problem. DNA sampling was conducted along with water sampling to help pinpoint the source of fecal contamination.



Nik Vishwanath, former U of I graduate student, obtains a water quality sample at Mink Creek Watershed near Pocatello.

Our Response

Funding (\$25,000) was obtained from the U.S. Forest Service, Region IV. A local University of Idaho connection was provided by Reed Findlay, county chair and Extension educator for both Bannock and Bingham counties. Technical expertise for water quality sampling and DNA analyses was provided by both the University of Idaho Soil and Water Systems Department and the Idaho Water Resources Research Institute. A graduate student was provided that led the sampling for this project (photo above).

We desired to measure *E. coli* levels before, during and after livestock entry into pastures bordering Mink Creek and its tributaries, and in addition, *E. coli* levels before and after major holidays. In addition to the

original IDEQ sampling sites, we established seven additional sampling sites and we obtained samples from the end of May until the middle of October (Figure 1). Duplicate samples were obtained for both *E. coli* and DNA samples at each location. The DNA sampling was robust, with triplicate samples run. In order for a DNA sample to be rated as a positive “hit” for cattle, human or other (i. e., wildlife, domestic canine, etc), two of the three replicates had to show that DNA profile.

Program Outcomes

From the sampling done, it was confirmed that 36 of the 98 water quality samples exceeded IDEQ regulations. Figure 2 shows that the major contributor to these exceedances was human at 59%, with the next highest being other (wildlife, canine, etc.) at 29%. Cattle were directly responsible for 6% of the exceedances and jointly responsible with humans for another 6% of exceedances. The greatest human impacts were when water temperatures were greater and water levels lower, such as the Labor Day weekend. The greatest occurrence for *E. coli* exceedances for cattle occurred on July 8, 2019, a time period in which daily ambient temperatures are elevated. When cattle are heat

stressed, we know that they seek out shade and water. Hence, larger streamside contributions to *E. coli* from cattle can be expected during these time periods. Many management options can be considered for addressing these time periods including herding, upslope water developments, using higher elevation pastures in the grazing rotation for summer grazing (cooler), improved trails, etc.

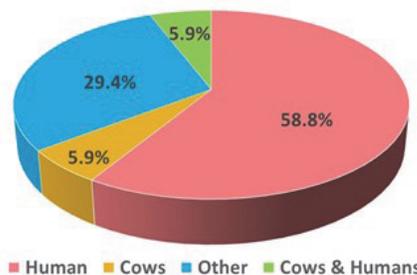


Figure 2. Source of exceedance of DEQ standard.

Cooperators and Co-Sponsors

Naveen Joseph, Jane Lucas, Nik Vishwanath (former student), Reed Findlay, Jim Sprinkle, Michael Stickland, Eric Winford and Alan Kolok (University of Idaho).

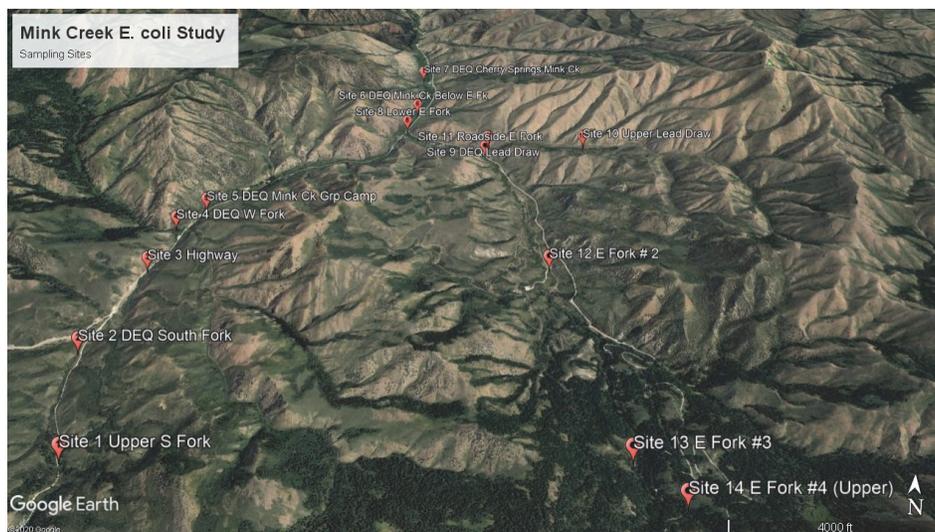


Figure 1. Mink Creek E. coli study sites.

FOR MORE INFORMATION

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