



**Aquatic Macroinvertebrates**

**RESOURCE BRIEF**

**Importance**

In the arid environment of Bighorn Canyon National Recreation Area (NRA), 33 known springs have been used and altered by animals and humans for thousands of years. Aquatic macroinvertebrates—animals without a backbone that are large enough to be visible with the naked eye—are used to monitor the health of these water sources because the species are often specialists with narrow environmental tolerances and their community structure may be affected by even slight changes in water chemistry or habitat quality.

**Status**

The first assessment of the fauna in Bighorn Canyon NRA's springs was conducted in May 2007, when David M. Stagliano, an aquatic ecologist with the Montana Natural Heritage Program, collected samples and habitat data from 21 perennial seeps and springs. To count organisms and identify them to the lowest taxonomic level, a 4-40X stereo-zoom microscope was used. Of the 146 taxa that were identified, Diptera (true flies) were the richest order (69 taxa), followed by Trichoptera (caddisflies) and Coleoptera (beetles).

The richest site was at Layout Spring (33 taxa), including 14 taxa found only at that site. Based on Environmental



The springhouse at Lockhart Spring, 2008.

Protection Agency rapid bioassessment protocols, Layout Spring, which has not been manipulated, was one of the 6 sites that had good to excellent habitat; 8 sites were fair, 5 were slightly impaired, and 2 (North Davis and Lockhart Stockpond) were moderately to severely impaired (Fig. 1). Most of the impairments were the result of in-stream sediment, bare ground, and/or bank trampling by cattle. Two non-native macroinvertebrates were identified: the wide-ranging amphipod, *Hyaella azteca*, found at one spring, and a snail, *Pseudosuccinea columella*, at three springs.

**Discussion**

The aquatic macroinvertebrate diversity and richness in Bighorn Canyon NRA springs is positively related to water flow and negatively related to the proximity to human impacts (e.g., water diversions and stream habitat degradation from cattle grazing). Although the ranches in the park are no longer operational, cattle may be trailed through designated portions of the park as they are moved between pastures on private land or public grazing land outside the park.

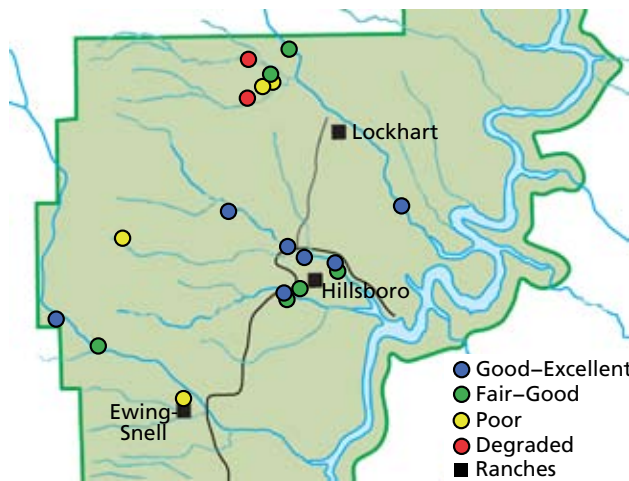


Figure 1. Habitat quality of 21 springs surveyed in the Montana portion of Bighorn Canyon NRA. Not included is the one site in the Wyoming portion (at the Mason-Lovell Ranch), which was found to have poor habitat quality. (Map adapted from Aquatic Macroinvertebrate Survey, Stagliano 2008.)



PHOTO BY DAVID STAGLIANO

Larva of a caddisfly species (*Rhyacophila verrula*) which the survey found only at Layout Spring (shown larger than life size).