

Hydrogeology Field Investigation at the Confluence of the Snake River and Deer Creek, Summit County Colorado

Introduction

This field site is located at the confluence of Deer Creek and the Snake River. The objective of today's exercise is to gain an understanding of the physical and geochemical hydrology of this system. Initially you should orient yourself on the topographic map by locating some major topographic features (Santa Fe Peak, Sullivan Mountain, Teller Mountain) and determining which stream is the Snake River and which one is Deer Creek. You will first make some initial observations, take notes and make a sketch map of the area by walking up the Snake River, Deer Creek, and downstream from the confluence. Pay particular attention to the characteristics of the stream bed. After your initial observations you will be divided into groups and each group will propose and test a hypothesis. Each student will submit a report with the following:

- 1) Your sketch map (include a scale, key, and north arrow)
- 2) Initial observations
- 3) A clearly stated hypothesis
- 4) The method your group proposed to test the hypothesis (include your sampling plan, type, and amount of data collect)
- 5) The data collected
- 6) Your conclusions

Background Geology & Hydrology

The study area lies within the Montezuma District of the Colorado mineral belt (see chapter 4). The Snake River drainage basin is underlain by the Idaho Springs Formation, composed of sillimanitic micaceous gneisses and schist. The Montezuma shear zone crosses the Snake River drainage basin. The Swandyke Hornblende Gneiss underlies the Deer Creek drainage basin. Mineralization of the Precambrian host rocks resulted from hydrothermal fluids associated with the intrusion of the Tertiary Montezuma Stock, composed of aplite and porphyritic quartz monzonite. Mineralization was concentrated along the major faults and shear zones. The hydrothermal vein fillings are predominantly pyrite, sphalerite, galena, quartz, Mn-carbonates, and barite.

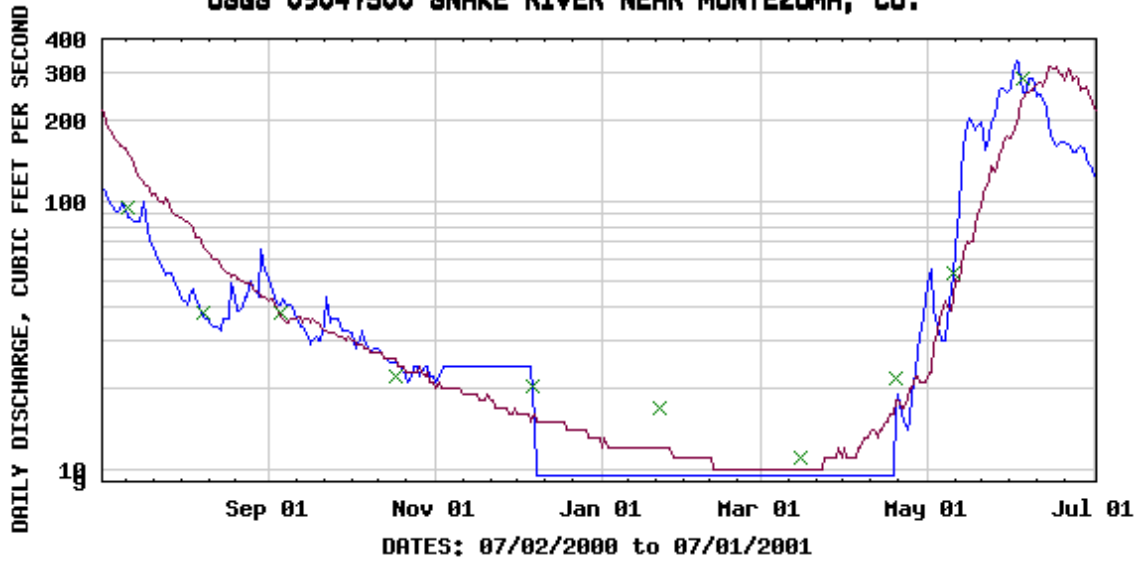
The discharge of the Snake River and Deer Creek is similar at this site and their drainage areas are 11.7 and 10.4 Km², respectively. The streams are covered with ice from December through early May, with a sudden increase in discharge following the spring snow melt. The streams discharge as much as 2 m³/s during May and June, but typically flow at 0.1 to 0.5 m³/s (Bencala and others, 1987).

References

- Bencala, K. E., D. M. McKnight, G. W. Zellweger, 1987, Evaluation of natural tracers in an acidic and metal-rich stream. *Water Resources Research*, V. 23, p. 827-836.
- Neuerburg, G. and T. Botinelly, 1972, Map showing geologic and structural control of ore deposits, Montezuma District, Central Colorado. USGS Miscellaneous Geologic Investigations, Map I-750.



USGS 09047500 SNAKE RIVER NEAR MONTEZUMA, CO.



EXPLANATION

- DAILY MEAN DISCHARGE
- MEDIAN DAILY STREAMFLOW BASED ON 52 YEARS OF RECORD
- × MEASURED DISCHARGE

Provisional Data Subject to Revision

