

Testing of Hydrologic Models for Estimating Low Flows in Mountainous Areas of Wyoming



Wyoming Water Development
Commission in cooperation with
University of Wyoming

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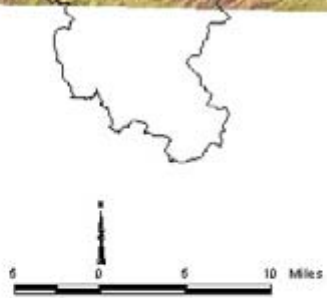
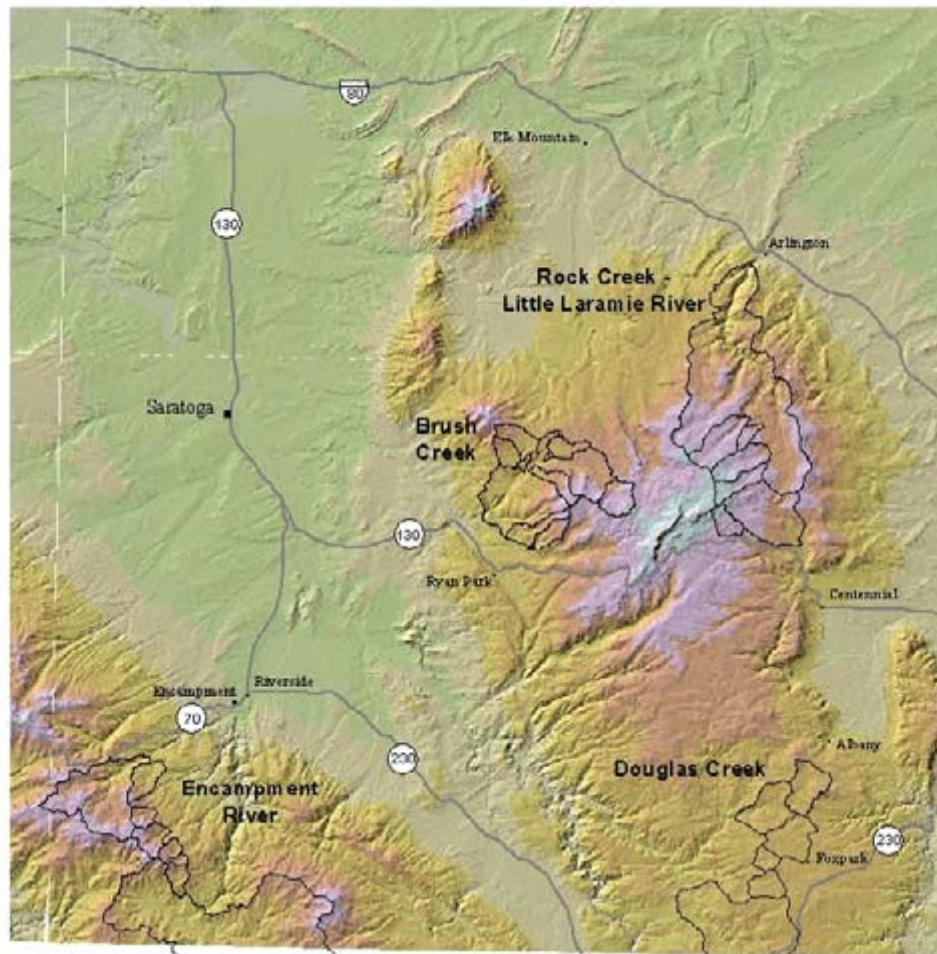
Justin Montgomery

Objectives

- **Test accuracy of estimating techniques**
 - **Miselis, Wesche, and Lowham, 1999**
 - **Lowham, 1988**
 - **Baseline: Concurrent discharge measurements**
- **Investigate methods for improving accuracy**
 - **Digital data of basin and climate features**
 - **GIS analysis**
- **Provide research experience -- UW students**
 - **Justin Montgomery**
 - **James Riley**

Approach

- **Measure monthly low flows**
 - **1st Year – Sites on Brush Creek**
 - **2nd Year – Added sites in other areas to provide greater diversity of basin characteristics**
- **Relate monthly flows to basin and climate features**



Map 1. -- Location of drainage basins selected for the project study.









**Measurement
of BC-9
January 16,
2001**

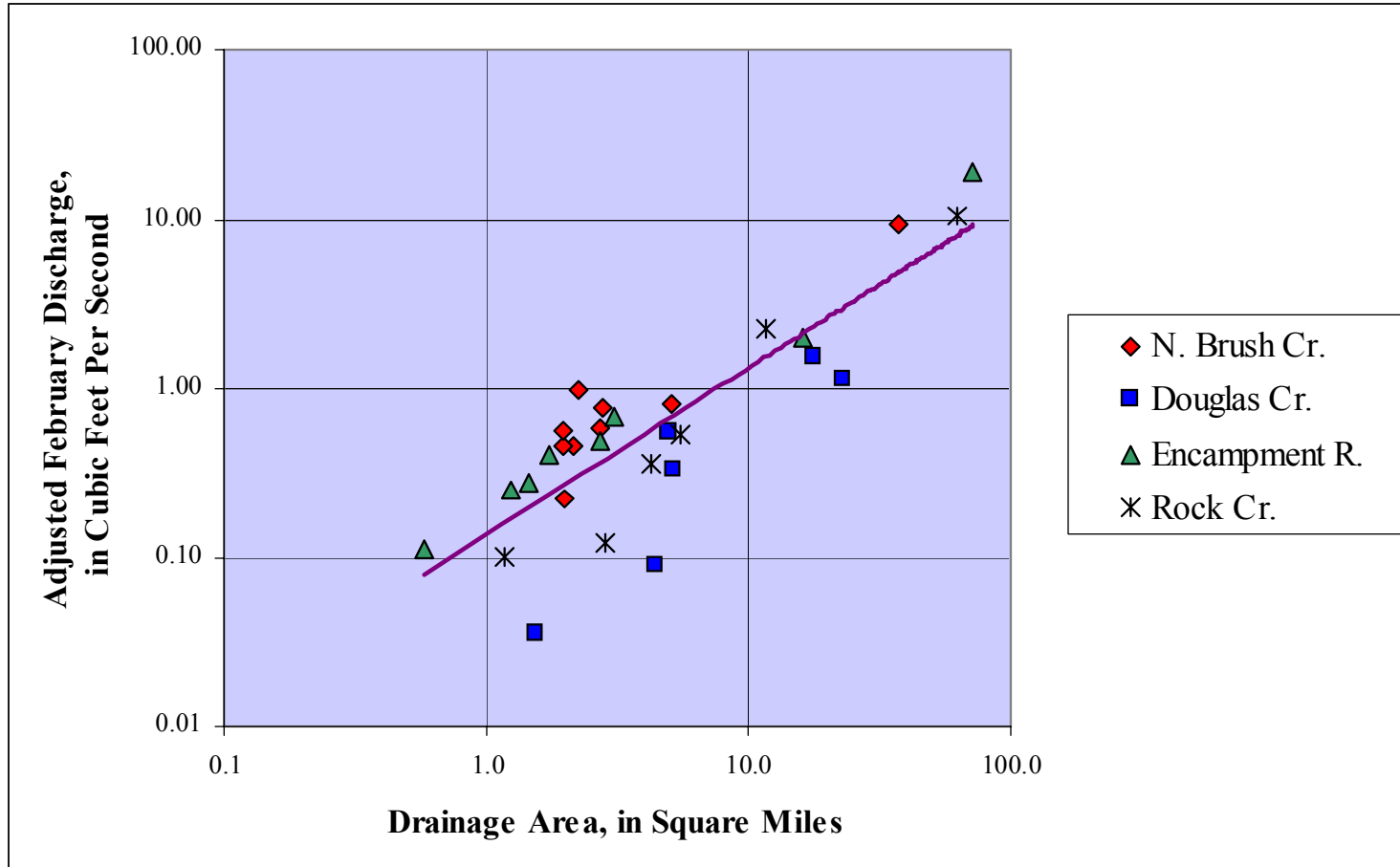


Brush Creek at site BC-9

July 15, 2002



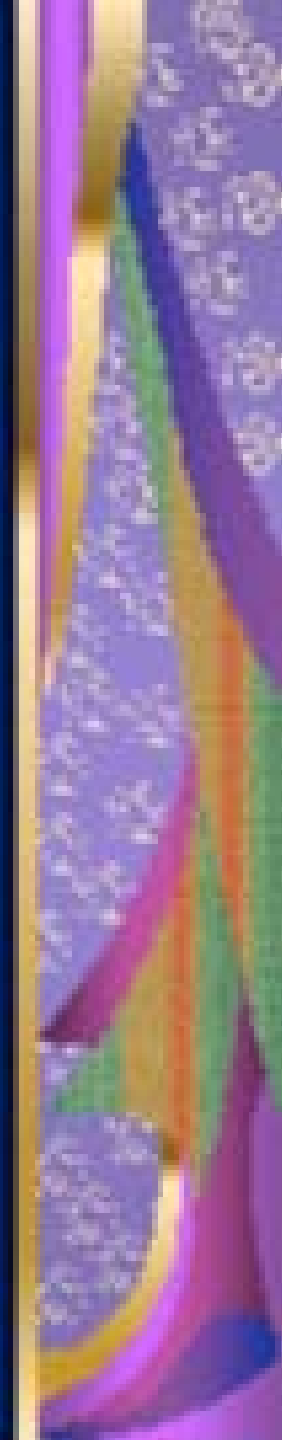
Analysis: Why are some sites more “productive” than others?



Analysis

GIS techniques to expand on database

- **Precipitation / Snow-water equiv:** Somewhat important in all basins
- **Areas forest vs. non-forest** (wetlands, clearcuts, meadows): Important in some basins
- **Surface and bedrock geology, soils, landcover:** No apparent effects

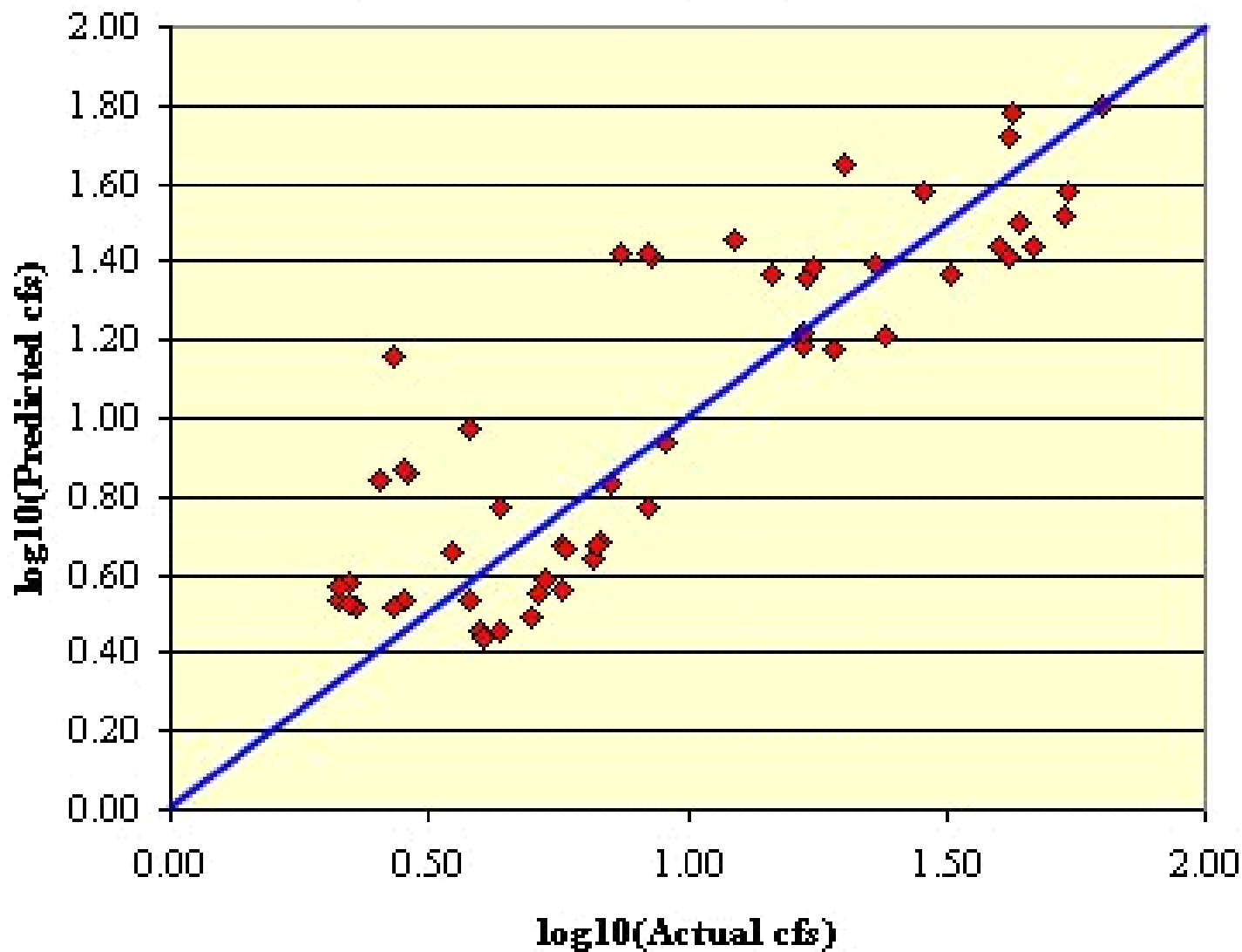


Results

New equation for estimating monthly winter discharge:

- Discharge = f (basin area, elevation range)

Log10 of Actual vs. Predicted Flow, 9 Basins
(blue line indicates perfect fit)



Log10 of Actual vs. Predicted Flow, 7 Basins
(blue line indicates perfect fit)

