

*color figures*

- A Day With Norman J. W. Thrower 76  
*Judith Tyner*
- The Effectiveness of Interactive Maps in Secondary Historical  
Geography Education 77  
*Whitney Taylor and Brandon Plewe*
- A Multi-scale, Multipurpose GIS Data Model to Add Named Features  
of the Natural Landscape to Maps 78  
*Aileen Buckley and Charlie Frye*
- Views of the Rivers: Representing Streamflow of the Greater Yellowstone  
Ecosystem 80  
*Erik Strandhagen, W. Andrew Marcus, and James E. Meacham*

# A Day With Norman J. W. Thrower Judith Tyner



Figure 1. Norman J.W. Thrower, Courtesy Norman J.W. Thrower.



Figure 2. Norman Thrower in raconteur mode, June 9, 2006, Photo by Gerald E. Tyner.

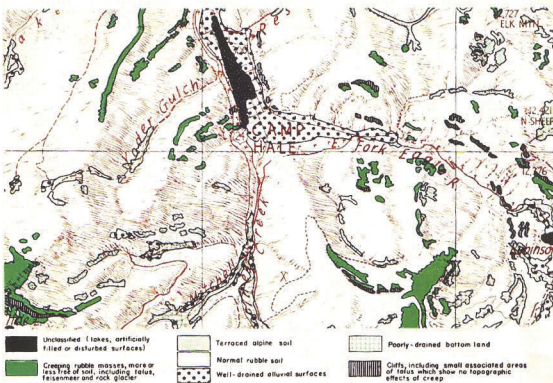


Figure 4. Camp Hale maps produced using parallel inclined traces for the United States Army, Courtesy Norman J.W. Thrower.

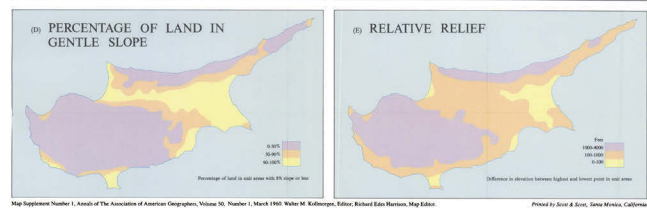
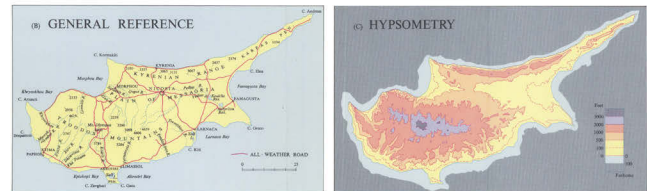
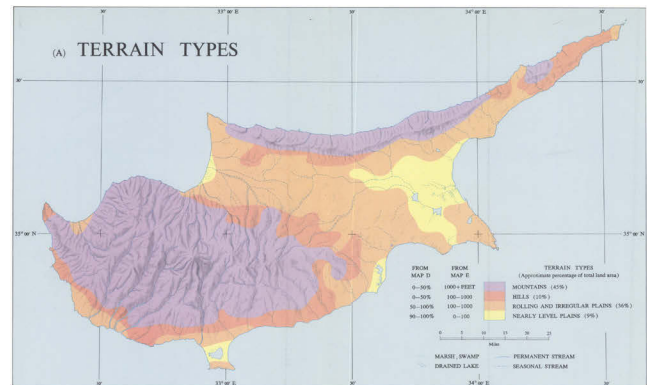


Figure 6. Annals Map Supplement # 1, vol. 50, no. 1, March 1960. Reproduced with permission of Annals of the Association of American Geographers, Blackwell Publishing.

# The Effectiveness of Interactive Maps in Secondary Historical Geography Education

*Whitney Taylor and Brandon Plewe*

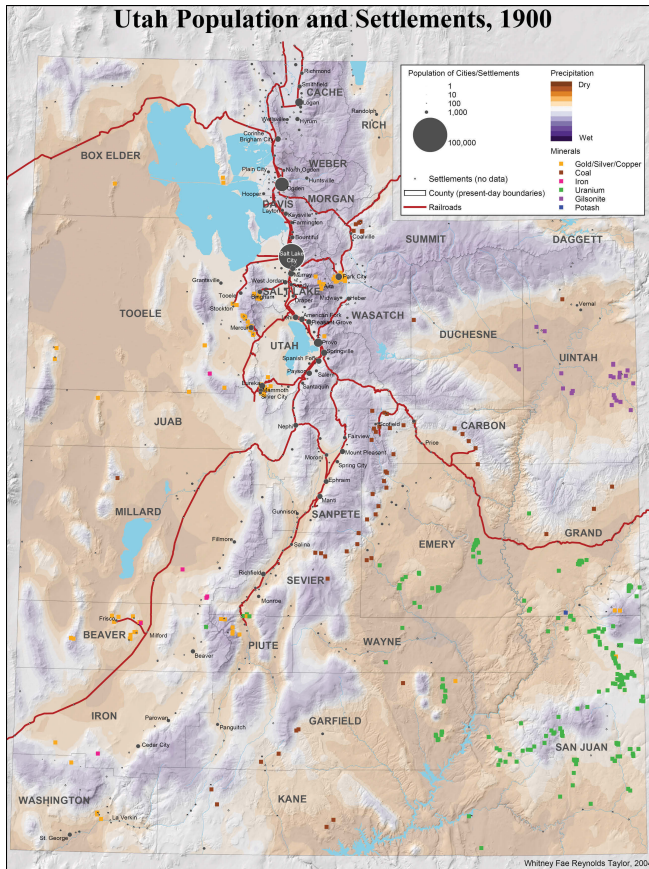


Figure 1. Sample paper map.

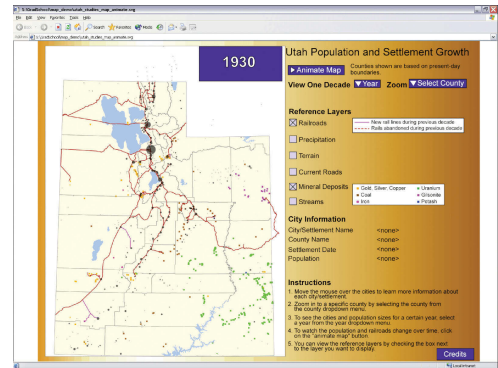


Figure 3. Toggling layers on and off in the interactive map.

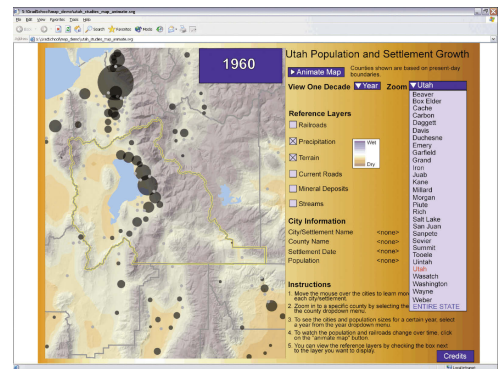


Figure 4. Zooming on a county in the interactive map.

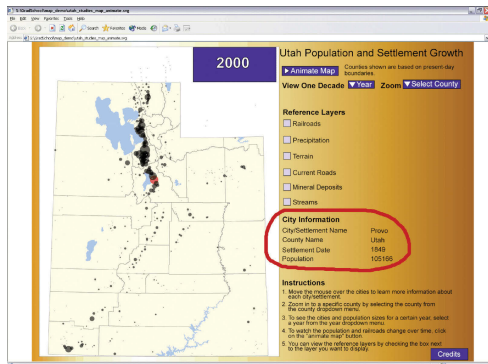


Figure 2. Brushing to view city data in the interactive map.

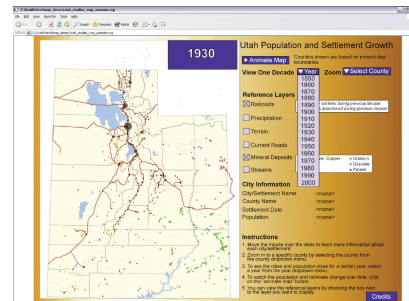


Figure 5. Selecting a year in the interactive map.

# A Multi-scale, Multipurpose GIS Data Model to Add Named Features of the Natural Landscape to Maps

*Aileen Buckley and Charlie Frye*

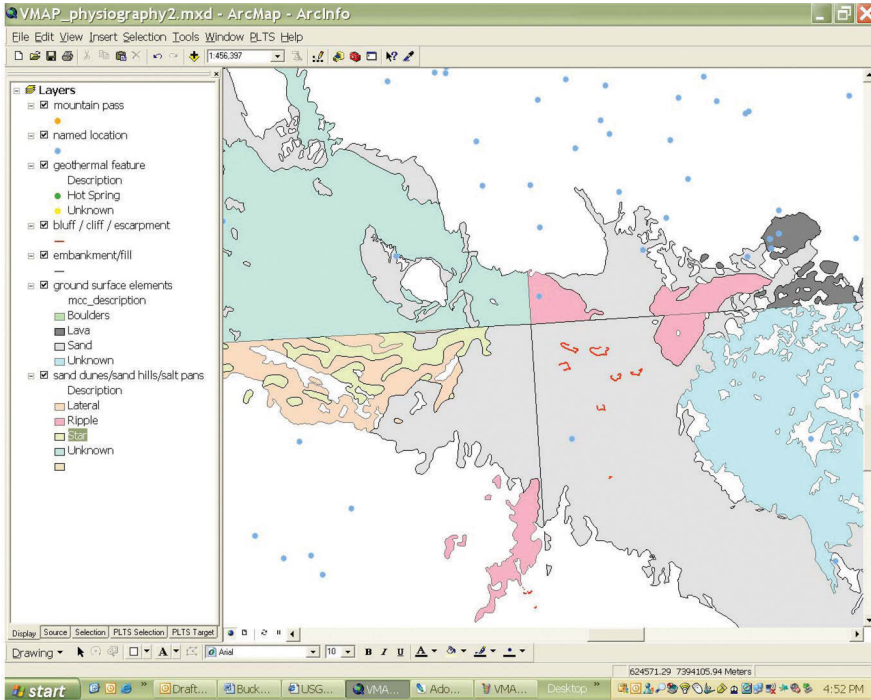


Figure 1. Physiographic features in the VMAP data are designated as points, lines or polygons. Obvious problems can occur at the boundaries of the map sheets that were used as the source documents. Not all names for these features are stored in the GIS dataset.

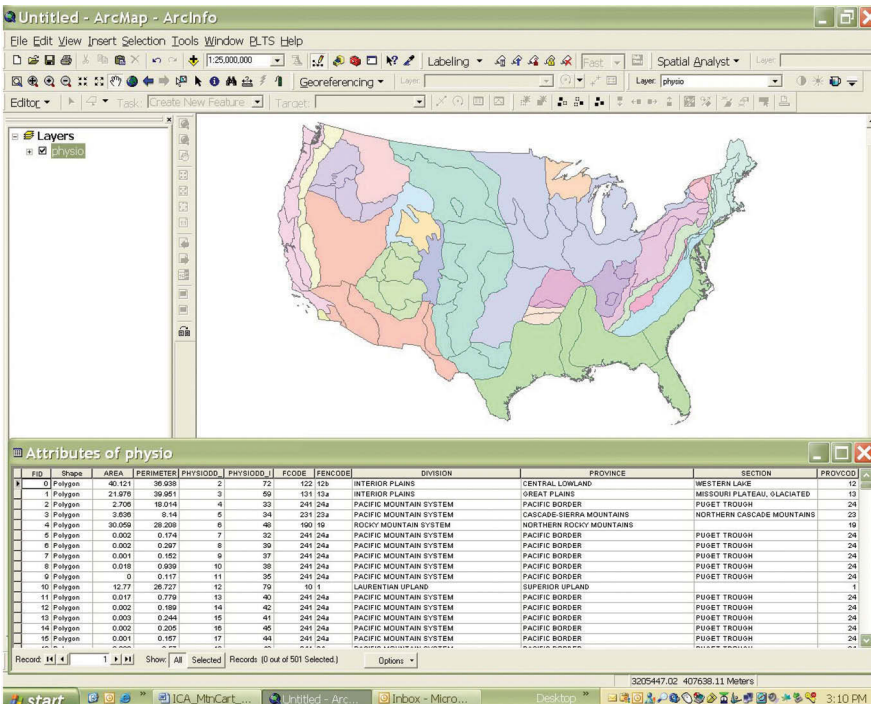


Figure 4. USGS dataset of physiographic regions and provinces for the conterminous United States.

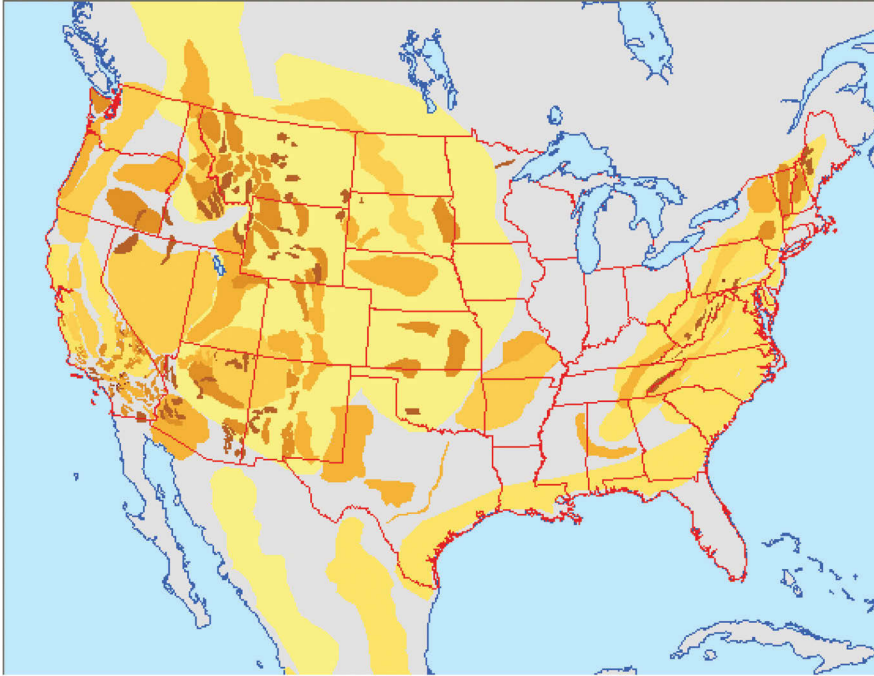


Figure 7. GIS representation of named physiographic features as polygons for a portion of North America. These GIS data do not represent a complete inventory of physiographic features in the area mapped.

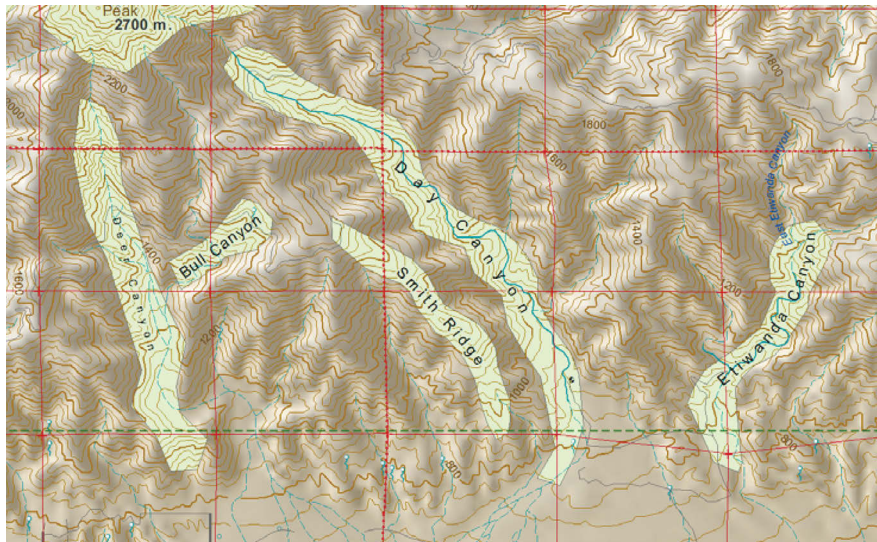


Figure 8. A portion of a 1:100,000 scale topographic map showing the GIS representation (as polygons) and the cartographic representation (as type) of several canyons in Southern California.

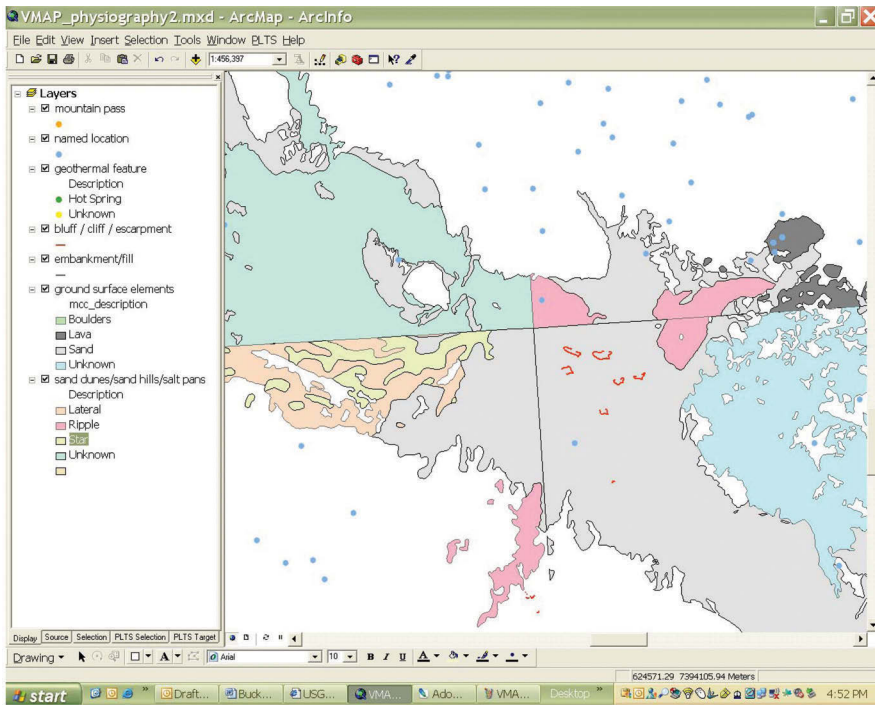


Figure 10. Features can be classified based on shape type which allows label classes to be created that are used to specify how the type is to be placed.

## Views of the Rivers: Representing Streamflow of the Greater Yellowstone Ecosystem

*Erik Strandhagen, W. Andrew Marcus, and James E. Meacham*

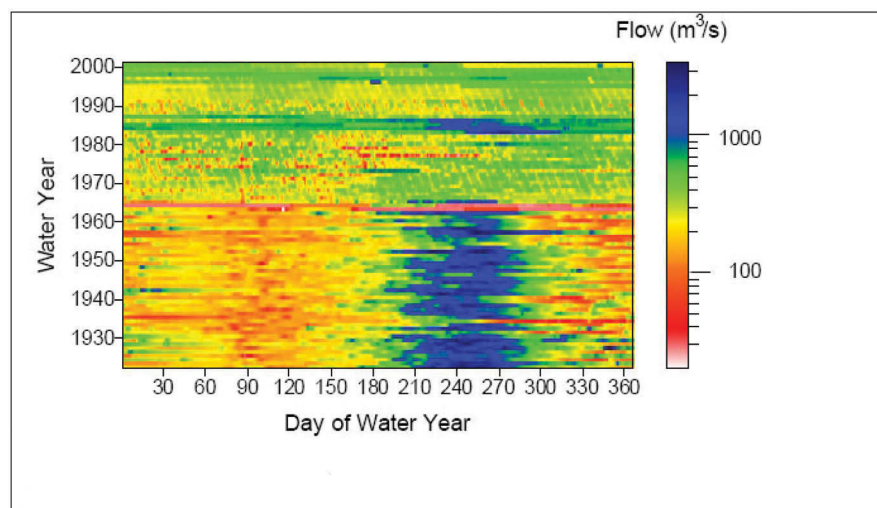


Figure 3. Raster hydrograph shows inter- and intra-annual variability simultaneously, Colorado River at Lees Ferry, AZ 1921-2002 (Koehler 2004:161).

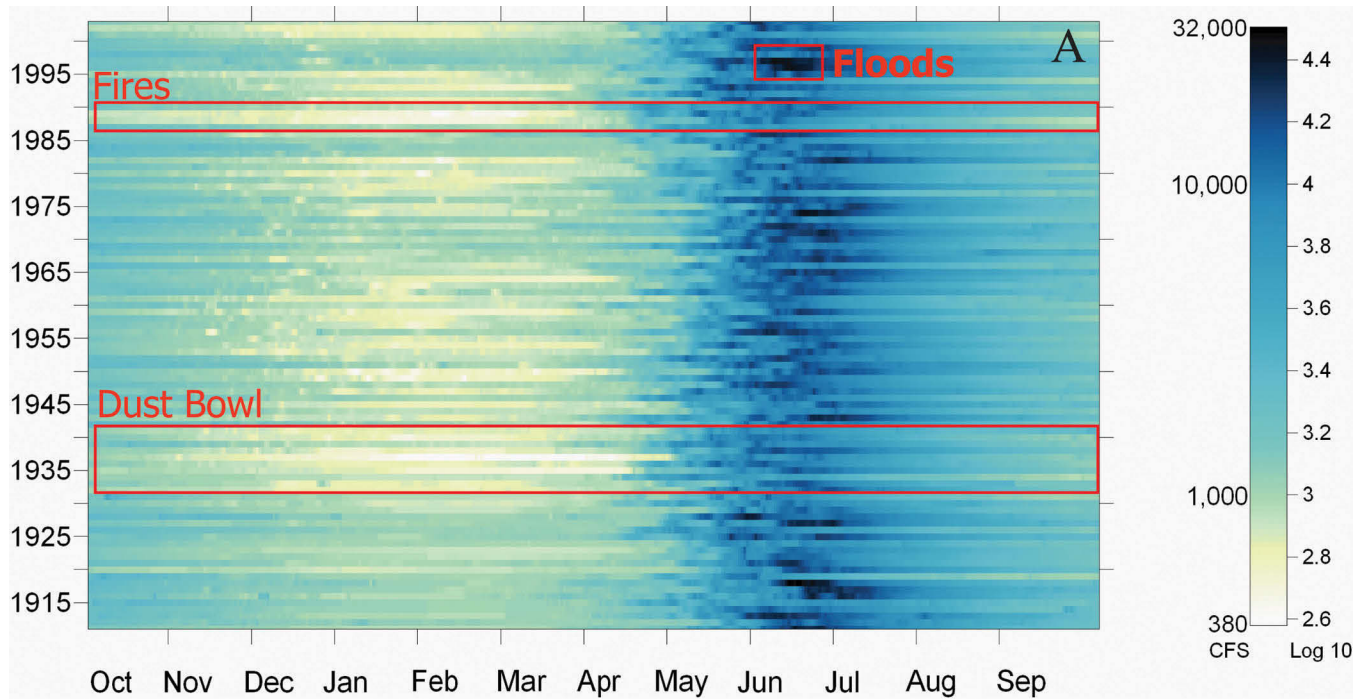


Figure 5a. Raster hydrograph for the Yellowstone River at Corwin Springs, MT.

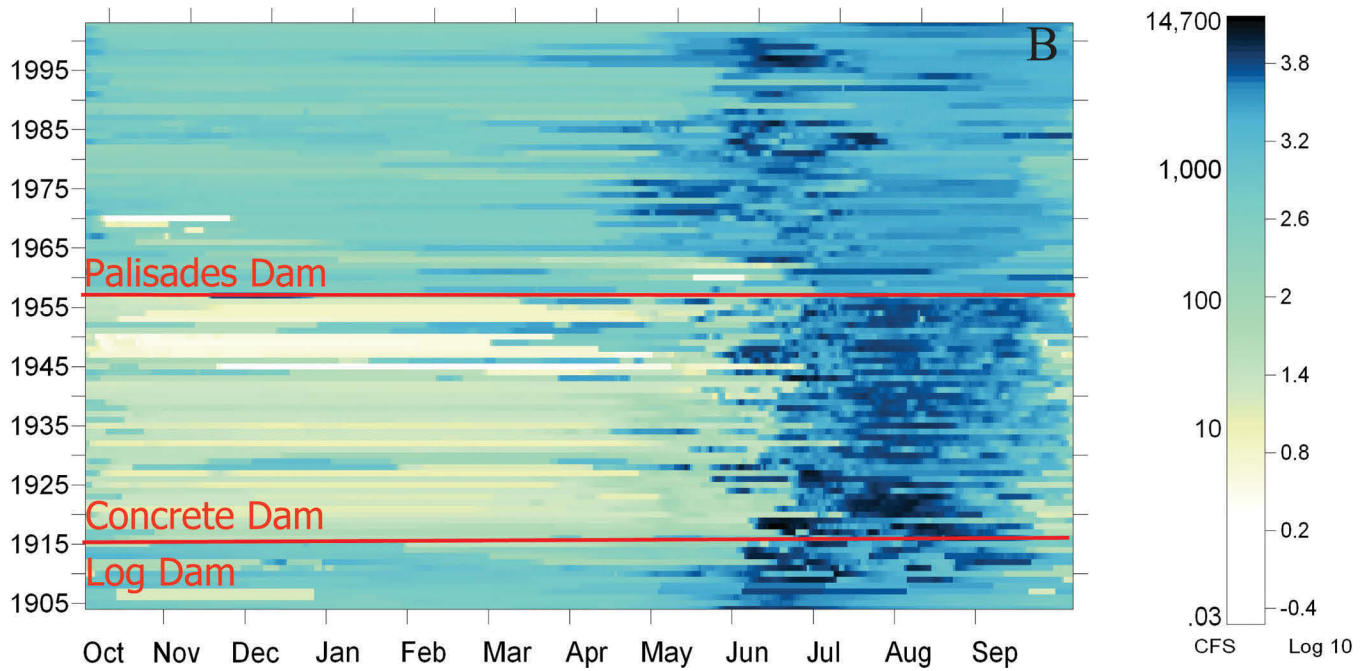


Figure 5b. Raster hydrograph for the Snake River near Moran, WY.

<5	10	10 - 25	25 - 50	50 - 75	75 - 90	90-95	>95

Figure 6. Percentile class breaks with corresponding multi-hue color scheme.

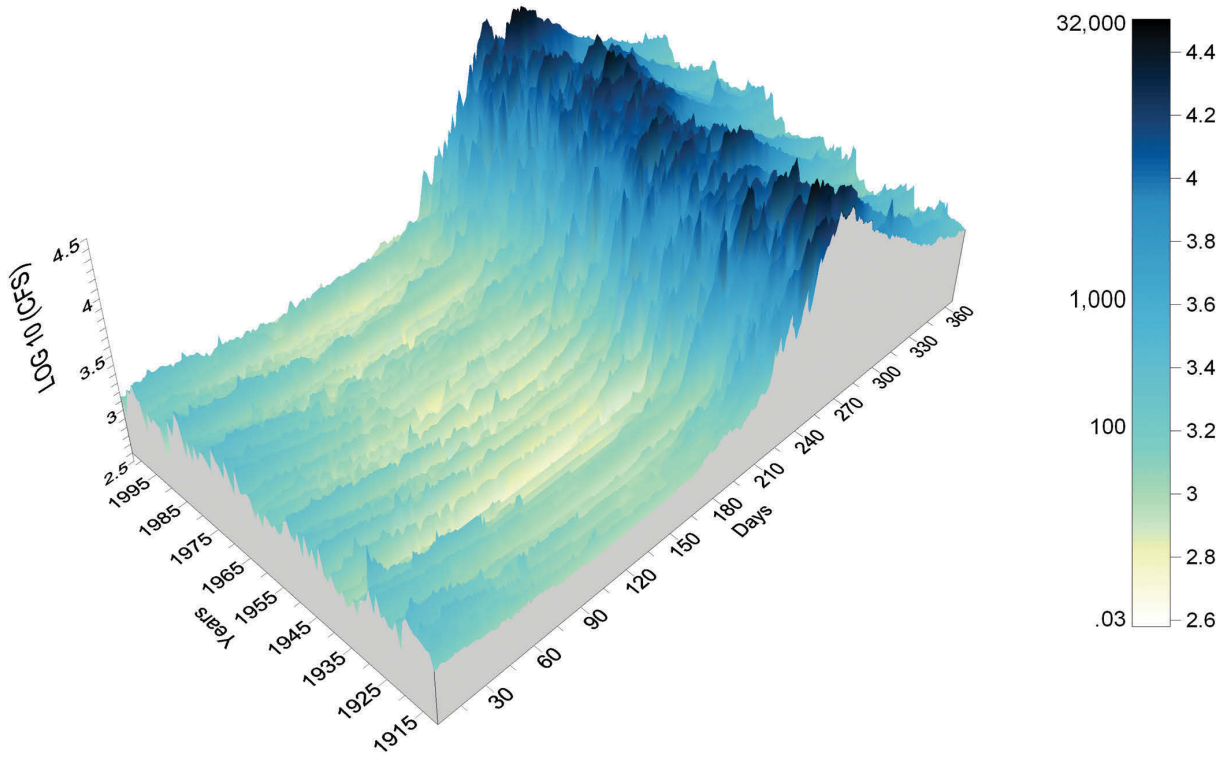


Figure 7a. Three-dimensional raster hydrograph for the Yellowstone River at Corwin Springs, MT.

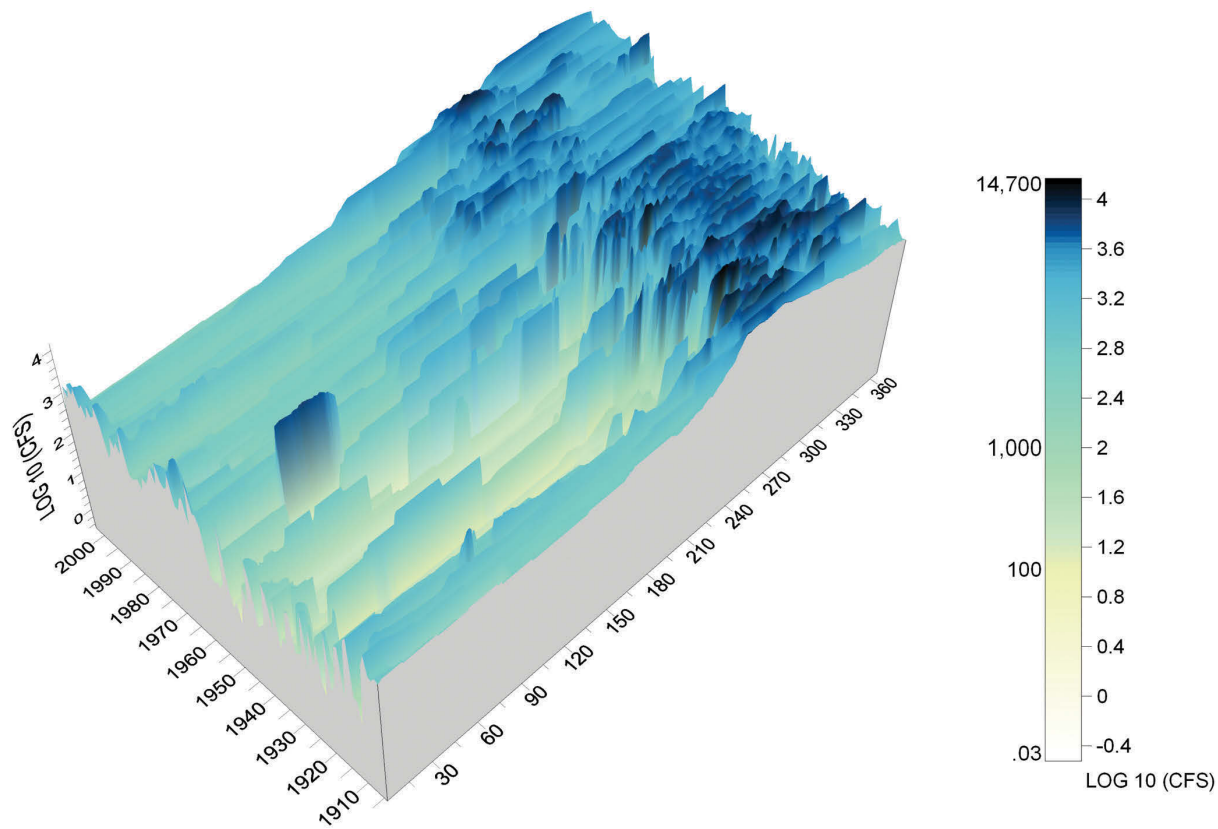


Figure 7b. Three-dimensional raster hydrograph for the Snake River at Moran, WY.



Flow Regimes

Maps of Streamflow

Mean daily flow raster hydrographs offer the ability to visualize the chronology of a river. Instead of latitude and longitude used on conventional maps, the raster hydrograph uses the temporal variables of day and year as coordinates to plot a map of streamflow over time. This approach creates a narrative map of a point along a river. Presenting the day and year dimensions of the data enhances the ability to visualize stream flow characteristics and to perceive change over time. For an alternative view of the data, the hydrographs are also displayed as a three-dimensional surface. The oblique perspective three-dimensional graphs use dual temporal axes like the standard raster hydrograph, but contain a vertical axis to represent streamflow volume as a surface.

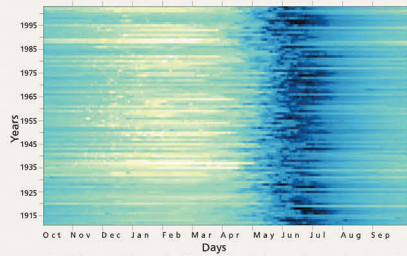
Investigation of the raster hydrographs for the Yellowstone River at Corwin Springs, Montana reveals smooth gradients in inter- and intra-annual flow patterns. These smooth transitions are a signature of a natural, unregulated river. However, within these smooth gradients, anomalies of floods and drought are apparent.

In contrast, examination of the raster hydrograph for the Snake River near Moran, Wyoming shows abrupt changes in inter- and intra-annual flow patterns. These sudden transitions in flow are indicative of a regulated river. Raster hydrographs offer a more complete understanding of river systems by increasing the ability to recognize fluctuations between low and peak flows, and flow regimes.

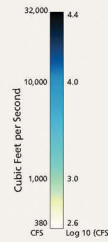


Natural Flow Regime

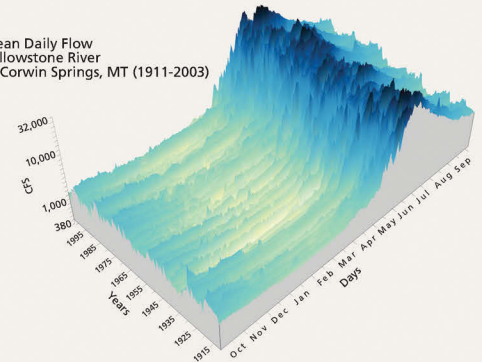
Mean Daily Flow  
Yellowstone River at Corwin Springs, MT (1911-2003)



The Yellowstone River station is located on the largest river leaving the park. Mean daily flow ranges from 380 to 32,000 cubic feet per second.

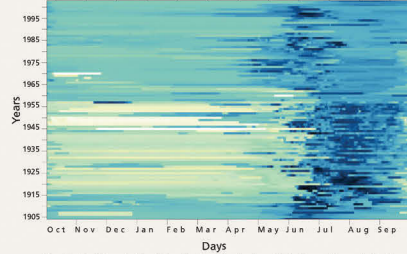


Mean Daily Flow  
Yellowstone River  
at Corwin Springs, MT (1911-2003)

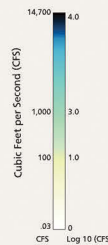


Regulated Flow Regime

Mean Daily Flow  
Snake River near Moran, WY (1903-2003)



The Snake River station is just below the Jackson Lake Dam. Mean daily flow ranges from 0.3 to 14,700 cubic feet per second.



Mean Daily Flow  
Snake River  
near Moran, WY (1903-2003)

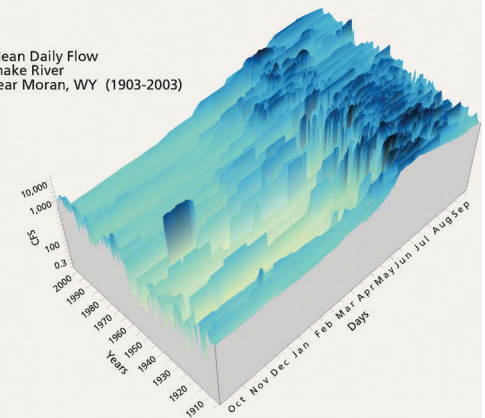


Figure 8. The Flow Regimes page pair.