

## Bear River Basin: Upper Watershed

### Watershed Description



Uinta Mountains-Source Unknown

The Upper Watershed of the Bear River Basin extends from the river's headwaters to Pixley Dam in Wyoming. This watershed encompasses about 5,200 square kilometers, making it the largest watershed in the Bear River Basin. The river's 240 kilometers journey begins in the High Uintas Wilderness Area in Utah and ventures north through narrow valleys in Utah to Woodruff Narrows Reservoir in Wyoming. Below the reservoir, the river continues through an open valley and crosses the Utah-Wyoming border

twice before reaching the Pixley Dam in Wyoming. This dam is a diversion structure on the Bear River between Cokeville and Sage Creek Junction in Wyoming. The highest point in the watershed is at Yard Peak (3,900 meters) in the Uinta Mountains. The lowest point is at Pixley Dam (1,890 meters).

### Tributaries and Reservoirs

Seventeen tributaries contribute to the Bear River as it moves through this watershed including:

- Mill Creek
- Sulphur Creek
- Yellow Creek
- Woodruff Creek
- Big Creek
- Twin Creek



Pixley Dam-Roger Hansen

There are 49 lakes and reservoirs, which are primarily used to supply water for irrigation.

Woodruff Narrows and Sulphur Creek Reservoirs also provide recreational opportunities. Woodruff Narrows Reservoir is the only reservoir in this watershed on the mainstem. It has a storage capacity of 70.5 million cubic meters. All other reservoirs are found on tributaries.

### Climate

Average annual precipitation varies throughout the watershed, ranging from 23 to 114 centimeters per year. Most of this precipitation falls as snow, with greater snowfall at higher elevations. Summer temperatures vary between 16-21°C in the higher elevations to 27-32°C in the lower elevations. Winter temperatures range from -18 to 4°C.

## Land Management and Uses

About half of the land is privately owned. The rest is publicly owned and managed by the Forest Service, Bureau of Land Management, and the states of Utah and Wyoming. Three-quarters of the land is used for grazing, with small areas of irrigated hay and small grain production in the valleys. There are also oil and gas production sites and areas of historic phosphate and coal mining.

## Water Quantity

Flows in the Upper Watershed of the Bear River Basin vary from year to year and from season to season. Near the headwaters of the Bear River at the Utah-Wyoming border, daily flows average 5 cubic meters per second, but have ranged from 0.4 cubic meters per second in 2003 to 76 cubic meters per second recorded in 1986. Average daily flows at the bottom of the watershed average 4 cubic meters per second, reflecting diversions within the reach. There are five major water diversions along the mainstem of the Bear River in the Upper Watershed, ranging from 810 million cubic meters per year to 31 million cubic meters per year.

## Water Quality



Woodruff Narrows Reservoir and Dam-Roger Hansen

Bear River: The headwaters are pristine, but the river picks up sediment, nutrients, and other pollutants as it travels through lower gradient lands. According to the Wyoming Department of Environmental Quality (DEQ), the river above Sulphur Creek is in good condition. From below this point to Woodruff Narrows Reservoir, channelization has caused excess sediment and resulted in a significant loss of trout habitat. Below Woodruff Narrows Reservoir in Utah, the river is impacted by low levels of dissolved oxygen and

excess sediment. According to the Utah Department of Natural Resources (DNR), these impacts are the result of return flows from irrigated agricultural land in Wyoming and Utah, which carry sediments, nutrients, animal wastes and agricultural chemicals into the river.

## Improvement Projects

Several projects have been completed to improve water quality on this reach of the Bear River:

- The Uinta County Conservation District formed a watershed steering committee and completed a watershed plan in 2006 to address the sedimentation problem.
- The Wyoming Game and Fish Department designated a stretch of river near Evanston as a riparian improvement project and will help mitigate habitat loss caused by highway development.
- The Utah Division of Water Quality created a watershed management plan for the section of river from the Wyoming border to Sage Creek Junction to improve dissolved oxygen levels

and reduce phosphorus concentrations. This management plan, known as a Total Maximum Daily Load (TMDL), calculates the maximum amount of a pollutant the river can receive and still meet water quality standards. The TMDL for this stretch of the river has been approved.

### Tributaries

**Sulphur Creek:** According to the Wyoming DEQ, Sulfur Creek's water quality is affected by bank erosion, heavy riparian grazing, rapidly fluctuating flows below Sulphur Creek Reservoir, and low seasonal flows in the upper stream channel.

**Twin Creek:** Monitoring indicates that Twin Creek carries excess sediment as a result of bank erosion, loss of perennial flows, encroachment along the stream channel, and erosion from phosphate mining-related activities in this watershed. Wyoming DEQ's Abandoned Mine Lands Division has been reclaiming the abandoned phosphate mines near Twin Creek's confluence with the Bear River since 2001. These reclamation efforts should result in decreased sediment and phosphorus deposits into the Bear River.

**Bridger Creek:** This creek contributed high levels of sediments and phosphates to the Bear River in the 1980s and early 1990s. Modifying grazing practices on BLM lands in this watershed has improved vegetative cover along the banks, resulting in decreased erosion and increased summer flows. Monitoring by Wyoming DEQ suggests that these changes may have improved water quality in this reach of Bridger Creek.

**Saleratus Creek:** From its headwaters to its confluence with Woodruff Creek in Utah, this creek is impaired due to low levels of dissolved oxygen. The state is considering changing the beneficial use designation for the creek. A TMDL for Saleratus Creek has been completed.

### **Vegetation and Wildlife**



Bear River near Evanston-Kevin Kilpatrick

A diversity of forest, wetland, and high elevation shrubland habitats in the Upper Watershed supports abundant wildlife. Two-thirds of land cover within the watershed is shrubland with smaller areas of grassland and evergreen forests. Terrestrial habitats in the Upper Watershed are home to a variety of game and non-game species, including elk, mule deer, cougars, and grouse. Forested areas in the headwaters of the Bear River Basin are part of a critical wildlife corridor for species migration in the western United States, offering the only major link between the Greater Yellowstone Ecosystem and the High Uintas Wilderness area.

The Woodruff Cooperative Wildlife Management Area, managed by the Utah Division of Wildlife Resources and the BLM, is a 16 km<sup>2</sup> high-desert site with sage and grassland habitat. Sage Grouse, Golden Eagle, antelope, Mule Deer, and elk are found here.

Aquatic habitat is abundant in this watershed, but water quality degradation in some reaches has resulted in a loss of Bonneville Cutthroat Trout habitat. The Wyoming Department of Game and Fish identified Sulphur Creek as a priority aquatic habitat. Restoration is needed to bring back native fish populations including the Bonneville cutthroat trout, Leatherside Chub, Mountain Sucker, Mountain White Fish, Redside Shiner, Speckled Dace and Utah Sucker.

## People

The watershed falls within parts of Lincoln and Uinta counties in Wyoming, and Summit and Rich counties in Utah. The largest municipalities in the Upper Watershed are Evanston, Wyoming; Randolph, Utah; and Woodruff, Utah. The largest employment sectors in the watershed are service, retail, trade, government and agriculture. Tourism also helps to sustain the local economic base.



Evanston, Wyoming- Jay Baker, USU

The current population in this watershed is relatively small (about 12,000). Most growth is expected to occur near the existing municipalities of Evanston, Randolph and Woodruff. Growth in this region is expected to be lower than in other parts of the Bear River Basin.

## Recreation

Recreational activities on lakes and reservoirs include boating, fishing, waterfowl hunting, water skiing, and swimming. Hiking, backpacking, fishing, horseback riding, snowmobiling, ATV-riding, and camping are popular in the higher elevations of the watershed, especially in National Forest areas.

The High Uintas Wilderness Area is Utah's largest wilderness area and includes Kings Peak, the state's highest peak. There are spectacular hiking opportunities among the numerous alpine lakes and meadows. Ridges divide the area into large, scenic watersheds interspersed with glacial moraines.

## Other Points of Interest

Mirror Lake Scenic Byway: Located in Wyoming south of Evanston, this segment of WY 150 provides views of Wyoming rangeland at its best. It offers expansive views, big sky, the sharp scent of sagebrush and mountains rising steeply in the south.

Randolph Historic Jail: This is a three-cell jail was built in 1880 of plank and five tons of spikes. The local chapter of Daughters of Utah Pioneers currently operates it.

Wilford Woodruff Home: Located in Woodruff, Utah, this log cabin includes artifacts and information about early Mormon leaders. Wilford Woodruff, the third president of the Church of Jesus Christ of Latter-day Saints, visited this homestead.



Bear River near Evanston-Dick Toth, USU

## Additional Information on this watershed:

Bear River Greenway (<http://bearrivergreenway.org/>)

Bear River Heritage Area (<http://www.bearriverheritage.com/>)

Bear River Watershed Council Conservation Corridor (<http://www.brwcouncil.org>)

Public Lands Information Center Utah Public Land Sites  
(<http://www.publiclands.org/explore/index.php?plicstate=UT>)

Public Lands Information Center Wyoming Public Land Sites  
(<http://www.publiclands.org/explore/index.php?plicstate=WY>)

United States Census 2000 Demographic Profiles (<http://censtats.census.gov/usa/usa.shtml>)

United States Fish and Wildlife Service. 2001. Status Review for the Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*). Portland and Denver: US Department of the Interior. Retrieved from [http://mountain-prairie.fws.gov/species/fish/bct/bct\\_status\\_review.pdf](http://mountain-prairie.fws.gov/species/fish/bct/bct_status_review.pdf).

Utah Division of Water Quality. 2005. Bear River Watershed Basin Description. Retrieved from: [http://waterquality.utah.gov/watersheds/bear/watershed\\_description.htm](http://waterquality.utah.gov/watersheds/bear/watershed_description.htm).

Wyoming Department of Environmental Quality. 2004. Wyoming's 2004 303(d) List of Waters Requiring TMDLs. Retrieved from: <http://deq.state.wy.us/wqd/watershed/Downloads/305b/4-0539doc.pdf>.

Wyoming Department of Environmental Quality. 2004. Wyoming's 2004 305(b) State Water Quality Assessment Report. Retrieved from:  
<http://deq.state.wy.us/wqd/watershed/Downloads/305b/4-0539doc.pdf>.

Wyoming Game and Fish. 2003. Green River Region Aquatic Habitat Priorities: Sulphur Creek. Retrieved from: <http://gf.state.wy.us/downloads/pdf/Priorities/GreenRiver/GRAHPriorities9.pdf>.

USU Water Quality Extension. 2006. Journey through the Bear River Watershed: Project WET International Foundation. Retrieved from:  
<http://extension.usu.edu/waterquality/files/uploads/Part%201%20%20and%20Part%202%20Final.pdf>

Bear River Project, Inc. (<http://bearrivergreenway.org/>)

### **Other sources of information for this fact sheet**

Ecosystems Research Institute. 1992. *Water Quality in the Upper Bear River, Problems and Mitigation*. Logan, UT: Ecosystem Research Institute.

Forsgren Associates inc. 2001. *Bear River Basin Water Plan: Final Report*. Cheyenne: Wyoming Water Development Commission.

**Natural Resource Conservation Service. 2001. "Twin Creek Initial Investigation Report." In *Wyoming's 2004 305(b) State Water Quality Assessment Report* by Natural Resources Conservation Service in cooperation with the Lincoln County Conservation District in Wyoming Department of Environmental Quality.**

Toth, R.E., J.B. Baker, C.L. Bryner, J. Evans, K.E. Hinman, K.R. Lilpatrick, and K. Seegmiller. 2005. *Alternative Futures for the Bear River Watershed*. Final Project Report No. 2005-1, College of Natural Resources, Utah State University, Logan, UT 84322-5200 USA.

Uinta County Conservation District, 2004. "305(b) and 303(d) Comment Letter, Uinta County Conservation District, February 13, 2004" In *Wyoming's 2004 305(b) State Water Quality Assessment Report* by Wyoming Department of Environmental Quality.

Utah Division of Water Resources. 2004. *Bear River Basin: Planning for the Future*. Salt Lake City: State of Utah, Natural Resource, Division of Water Resources.