

Bear River Basin: Middle Bear-Logan Watershed

Watershed Description

The Middle Bear-Logan Watershed does not include any of the mainstem of the Bear River. It is comprised entirely of the drainage areas of several major tributaries of the Bear River. The tributaries flow from the east and south into the shallow southern arm of Cutler Reservoir and drain 2,300 km². The highest point in the watershed is Mt. Logan (3030 meters). The lowest point is Cutler Reservoir (1340 meters).

Tributaries and Reservoirs



Cutler Reservoir-Jake Gibson, USU

The Logan River drains the eastern portion of the watershed. It originates as a high mountain stream in the Bear River Range in Idaho. It collects tributary waters from Beaver Creek, Temple Fork and Right Hand Fork as it travels through Logan Canyon in the Wasatch National Forest. When the river reaches the valley floor, it passes through the city of Logan and outlying agricultural areas. It converges with the Blacksmith Fork near the southeast end of Cutler Reservoir. The entire Logan River drainage area, including the Blacksmith Fork, encompasses

approximately 1,500 km² and contributes the largest volume of water to the Bear River in the entire Bear River Basin.

The Blacksmith Fork begins high up in the Bear River Range and drains the lands south of the Logan River. This river travels through Blacksmith Fork Canyon and collects waters from smaller tributaries such as Sheep Creek, Curtis Creek, Rock Creek, and Left Hand Fork.

The Little Bear River drains the southern end of the watershed. This river has two main subdrainages. The South Fork Little Bear originates in the Bear River Range, collects water from Davenport Creek, and drains the mountains on the extreme southern end of the watershed. The East Fork collects water from a large area of forested land in the Bear River Range.

The Middle Bear-Logan Watershed contains a total of 12 lakes and reservoirs. Porcupine Reservoir is located on the East Fork. Hyrum Reservoir is located on the Little Bear below the confluence of the South and East Fork. Both provide irrigation water to lands in the southern part of Cache Valley. Cutler Reservoir, with a maximum depth of 4.5 meters, no longer provides significant storage. It is used to generate hydropower during high water periods and provides wetland and aquatic habitat.

Climate

This watershed receives the highest amount of precipitation in the entire Bear River Basin. Average precipitation ranges from 43 to 150 centimeters per year, with most precipitation received as snow. Temperatures in the summer can reach 38°C in the valleys, but can be as low as 16°C in the mountains. Winter temperatures vary between -18 and -4 °C.

Side Bar: The second coldest temperature ever recorded in the continental United States of -69°F occurred in this watershed at Peter Sinks, located in the high elevations in Logan Canyon.

Land Management and Uses

About half of the Middle Bear-Logan Watershed is privately owned and half is managed by public agencies including the US Forest Service and the state of Utah. Over half of the land in the watershed is used as rangeland for grazing and about one-tenth is irrigated for crop cultivation and other agricultural practices.



Little Bear River, South Cache Valley-Nancy Mesner, USU

Water Quantity

Annual average flow rates in the Bear River increase from about 31 cubic meters per second as it enters Cutler Reservoir to 43 cubic meters per second at Cutler Dam. The Logan River, Blacksmith Fork River, and Little Bear River are primarily responsible for this increase, with Logan River supplying about half of the total input.

Diversions in this watershed occur along each of the major tributaries. The largest diversions are below Porcupine Dam and Hyrum Dam on the Little Bear River, and near the Forest Service boundary on the Logan River. These diversions, plus the additional sources of water that come from upstream releases at Bear Lake, allow more than 70 irrigation companies to irrigate over 485 km² of land in this watershed.

Water Quality

Cutler Reservoir: Cutler Reservoir is impacted by nutrients, which results in over-enrichment of its waters. It is also impacted by excess sediments that have filled in most of the original reservoir. Logan's wastewater treatment lagoons, which discharge into Swift Slough (a smaller tributary to Cutler Reservoir in this watershed), contribute over 20% of the total dissolved phosphorus entering the reservoir. Spring Creek, a small river that drains land between the Little



South Cache Valley-Kevin Kilpatrick. USU

Bear and the Blacksmith Fork watersheds, and the Little Bear River are other significant sources of nutrients and sediment to the reservoir, and ultimately, to the Bear River.

Logan River and Blacksmith Fork River: The Logan River and the Blacksmith Fork River have very good water quality as they depart Forest Service lands. Most of the pollution in this watershed is a result of runoff from agricultural areas and grazing lands, urban stormwater, and in-stream erosion due to poor riparian

conditions. Despite these pollutant inputs, both rivers maintain high water quality throughout their reach.

Little Bear River: The Little Bear River water maintains high water quality throughout most of the East Fork drainage and in the upper reaches of the South Fork. In the lower watershed, nonpoint pollution sources include runoff from dairies, grazing lands, and riparian areas with little or no vegetation. Several point sources also contribute nutrients to the river. Historically, a fish hatchery upstream of Hyrum Reservoir contributed high levels of phosphorus to the river, resulting in over-enrichment of the reservoir and subsequent winter fish kills. Since the hatchery closed in the late 1990s, the reservoir's water quality has improved and fish kills no longer occur.

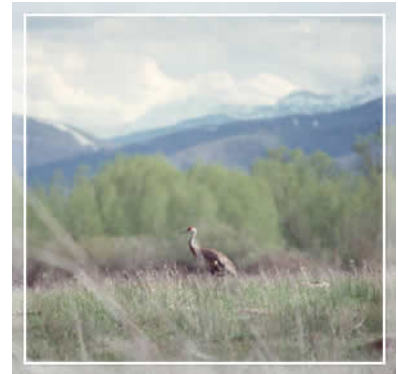
The Little Bear River watershed was designated a Hydrologic Unit Area in 1990. Considerable government funds were given to agricultural producers to implement best management practices to improve water quality. Over a ten-year period many of the non-point sources, such as dairy runoff and unstable stream banks, were addressed. A watershed plan, known as a Total Maximum Daily Load (TMDL), was approved in 2000. The upper part of the river was removed from the state's list of impaired water bodies in 2002, but the part of the river below Hyrum Reservoir is still considered to have degraded water quality. The river is being studied to determine the degree to which implementing best management practices improved water quality.

Spring Creek: Water quality of Spring Creek is impacted by bacterial contamination, excess phosphorus and nitrogen, increased temperatures, and low levels of dissolved oxygen. Non-point sources of pollution include runoff from animal feeding operations, urban runoff, and poorly functioning septic systems. Several point sources also contribute nutrients and other contaminants to the river. A TMDL for Spring Creek was approved in 2002. Improved management practices (e.g. reducing many of the nonpoint sources and upgrading the point sources) are being implemented to restore the stream's original beneficial uses.

Vegetation and Wildlife

Shrubland is the dominant vegetation, accounting for nearly half of the land cover in the watershed. Grassland and evergreen forest each account for one-sixth of the land cover. The remaining land cover is cropland, pastureland, and wetlands.

The Middle Bear-Logan Watershed has diverse land types, which provide different habitat for aquatic, riparian, and terrestrial wildlife. The Wasatch –Cache National Forest is part of the critical wildlife corridor for species migration (e.g. lynx and elk) linking the Greater Yellowstone Ecosystem and the lower Rocky Mountains. Hardware Ranch Wildlife Management Area provides protected habitat for elk and other game species. It also serves as a center for elk research. Deer, elk, and moose are common in the different canyons in this watershed.



Cutler Marsh-Jake Gibson, USU

Large wetland areas, especially those near Cutler Reservoir, provide important habitat for waterfowl and shorebirds. The White-faced Ibis, Franklin Gulls, Sandhill Cranes, and nesting Great Blue Herons are common here. The wetland and juniper habitats support many songbirds, birds of prey, upland birds, and waterfowl.



Upper Blacksmith Fork Canyon-Nancy Mesner, USU

The Logan and Blacksmith Fork Rivers and their tributaries are cold-water fisheries that provide excellent habitat for a variety of fish, including the Bonneville Cutthroat, Brown, and Rainbow Trout. The east fork of the Little Bear River has also been recently restored below Porcupine Dam and is stocked with several varieties

of trout species including brown trout.

The reservoirs provide additional habitat for fish. Despite its turbidity, Cutler's shallow, warm water environment is very productive and supports a diverse and abundant fish assemblage. Walleyes, Black Crappies, Channel Catfish, Common Carp, and Black Bullheads are common. Green Sunfish, Bluegill Sunfish, Largemouth Bass, Smallmouth Bass, Rainbow Trout, and Brown Trout are also found, but not in high numbers. The Utah Sucker is the only native fish found in Cutler. Utah State University's Fish Ecology Lab is assessing the fish populations in this reservoir.

People



Growth in Logan, near Dry Canyon-Kevin Kilpatrick, USU

This watershed sits entirely in the southern portion of Cache County. The largest municipalities include Logan, Hyrum, Providence, and Wellsville. Logan's population of over 50,000 accounts for about half of Cache County's entire population. About one-third of the population is employed in manufacturing and one-third in trade. Smaller percentages of the population are employed in government, agriculture and agriculture-related work. Utah State University is one of the largest single employers in the watershed, employing about 6,000 people. Substantial economic growth is expected to occur in the construction and management sectors.

This watershed is expected to see the highest rate of growth in the entire Bear River Basin. As the population is growing, a change in landscape is occurring--agricultural and open lands are being converted for urban, commercial and industrial development.

Recreation

The canyons that open onto the east side of Cache Valley offer a variety of recreational opportunities. In the winter, snowfall can exceed 1,000 centimeters per year in the canyon, offering spectacular recreational opportunities. Beaver Mountain Ski Resort offers downhill skiing and snowboarding. There are many places to snowmobile, backcountry ski, and cross-country ski. In the summer hiking, mountain biking, fishing, ATV riding, canoeing, bird-watching, rock climbing, camping, hunting, and horseback riding are just a few of the activities available in these canyons. A unique spot in Blacksmith Fork Canyon is Hardware Ranch Wildlife Management Area. Although the area is maintained for elk habitat, it is possible to hunt deer, moose, ruffed grouse, cottontail rabbits, and wild turkey in the management area.



Logan Canyon-Dick Toth, USU

Reservoirs in the watershed provide a variety of recreational opportunities. Hyrum Reservoir and Hyrum State Park offer fishing, motorized and non-motorized boating, camping, and picnicking. Cutler Marsh is located at the head of Cutler Reservoir. It was created by the shallow waters of the Bear River. Popular activities in the marsh include bird watching, hunting, motorized and non-motorized boating, and picnicking. The best views of the marsh are from the bridges where roads cross the marsh, from the boat docks, or from canoes. Porcupine Reservoir, located on the Little Bear River, provides excellent fly-fishing opportunities.



Heron in Cutler Reservoir-Source
Unknown

Parts of two wilderness areas are located in the watershed. Mt. Naomi Wilderness Area is in the Bear River Range to the east of Cache Valley. The Wellsville Mountains Wilderness Area is in the Wellsville Mountain Range on the west side of Cache Valley. It covers 96 square kilometers and has some of the steepest mountain terrain in the United States. Its rugged slopes rise to a peak elevation of 2850 meters at the summit of Box Elder Peak.

Other Points of Interest:

American West Heritage Center: This is a 0.6 km² living history center. The center offers hands-on learning about Native Americans, mountain men and pioneers of the area.

Cache County Courthouse: This is the oldest county building in Utah, still being used for its original purpose. It was built in 1883 and designed by Truman O. Angell Jr., who also designed the Logan Tabernacle and the Logan Temple.

Logan's Historic Downtown: Many beautiful turn-of-the-century homes and buildings are located in Logan. Fun places to visit include the Bluebird Cafe, the Logan Tabernacle, and the Episcopal Church. The Logan Center Street Historic District, which is listed on the National Register of Historic Places, includes homes, churches, and the old courthouse in Classical Revival, Prairie School and Late Victorian styles. It is roughly bounded by 200 North, 200 South, 200 East and 600 West,

Utah State University Campus: Utah State University was founded as a land grant agricultural college in 1888. It has developed into a major research university with renowned programs in agriculture, natural resources and space dynamics. The campus is filled with historic buildings and attractive landscaping.



USU Campus-Kevin Kilpatrick, USU

Additional Information on this watershed:

American West Heritage Center (<http://www.awhc.org>)

Bear River Heritage Area Website (www.bearriverheritage.com)

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

Bridgerland Audubon Wetland Maze in Cutler Marsh
(www.bridgerlandaudubon.org/wetlandsmaze/index.html)

Cache Valley Tourism (www.tourcachevalley.com)

Cutler Marsh (<http://www.utahbirds.org>)

Public Lands Information Center Website (www.publiclands.org)

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<http://www.waterquality.utah.gov/watersheds/lakes/MANTUA.pdf>

Utah Division of Water Quality. 2005. Bear River Watershed Basin Description. Retrieved from:
http://waterquality.utah.gov/watersheds/bear/watershed_description.htm.

Utah Division of Wildlife Resources Hardware Ranch Wildlife Management Area
(<http://www.hardware ranch.com>)

Utah Rivers Council: The Bear River (http://www.utahrivers.org/the_bear_river.html)

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

United States Fish and Wildlife Service Bear River National Migratory Bird Refuge
(<http://bearriver.fws.gov>)

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<http://extension.usu.edu/waterquality/files/uploads/Part%201%20%20and%20Part%202%20Final.pdf>

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