

## BEAR RIVER HYDROLOGY

- Total basin area of the Bear River is 7,400 square miles (Utah 3,200; Idaho 2,700; Wyoming 1,500). When the river enters Idaho at Border, it has a drainage area of 2,500 square miles, and an average annual runoff of 340,000 acre feet. About one half of the water entering Idaho is from the Smith's Fork drainage.
- At Stewart Dam the river is diverted into the Rainbow Canal into Mud Lake. From here water can be released into Bear Lake or sent into the Outlet Canal. Bear Lake has an active storage capacity of 1.4 million acft, and a total capacity of about 6.5 maf. Releases from the top 3 feet of Bear Lake can be made by gravity. Below this elevation, the Lifton pumping plant is used to draw the lake down.
- Because the storage capacity of the lake is over 3 times the average annual inflow, it can take several years to refill once it has been drawn down. It also can supply storage water during a succession of dry years, unlike most reservoirs in Idaho, which can be drafted completely in one year.
- The lake is operated to maintain an assured supply of irrigation water to contract holders, and for flood control.
- The Bear River gains flow from tributaries and ground water gain as it flows toward the Utah state line. Substantial diversions for irrigation are made from the river between Alexander and state line. The average annual discharge at the Idaho-Utah state line gage is about 850,000 acft. About half of this water originates in Idaho.
- Between the state line and Cutler Reservoir in Utah, the river gains a substantial amount of flow from the Logan, Blacksmith Fork and Little Bear rivers.
- Natural variability both in the hydrologic sequence (dry and wet years) and within each year (spring runoff vs July or August) mean that there are many periods when the flow in the river is completely appropriated.
- Aquifers in the basin are generally in hydraulic connection with the streams. The slope of the water table is, for the most part, toward the streams, and ground water is discharged from aquifers to the streams. Two exceptions to the interconnection are noted: The reach of the Bear River between Alexander and Grace is perched above the water table. Also, several investigators have noted a ground water

divide west of Alexander in the Gem Valley that separates the ground water water into two flow systems. North of the divide, ground water flows to the northwest out of the Bear River basin into the Portneuf River basin. South of the divide, the ground water flows south, discharging into Bear River as a series of springs in Black Canyon.

## BEAR RIVER COMPACT AND WATER MANAGEMENT

The Compact splits the basin into different divisions to enable water distribution across state lines, limits reservoir storage and depletion, outlines procedures for dispute resolution.

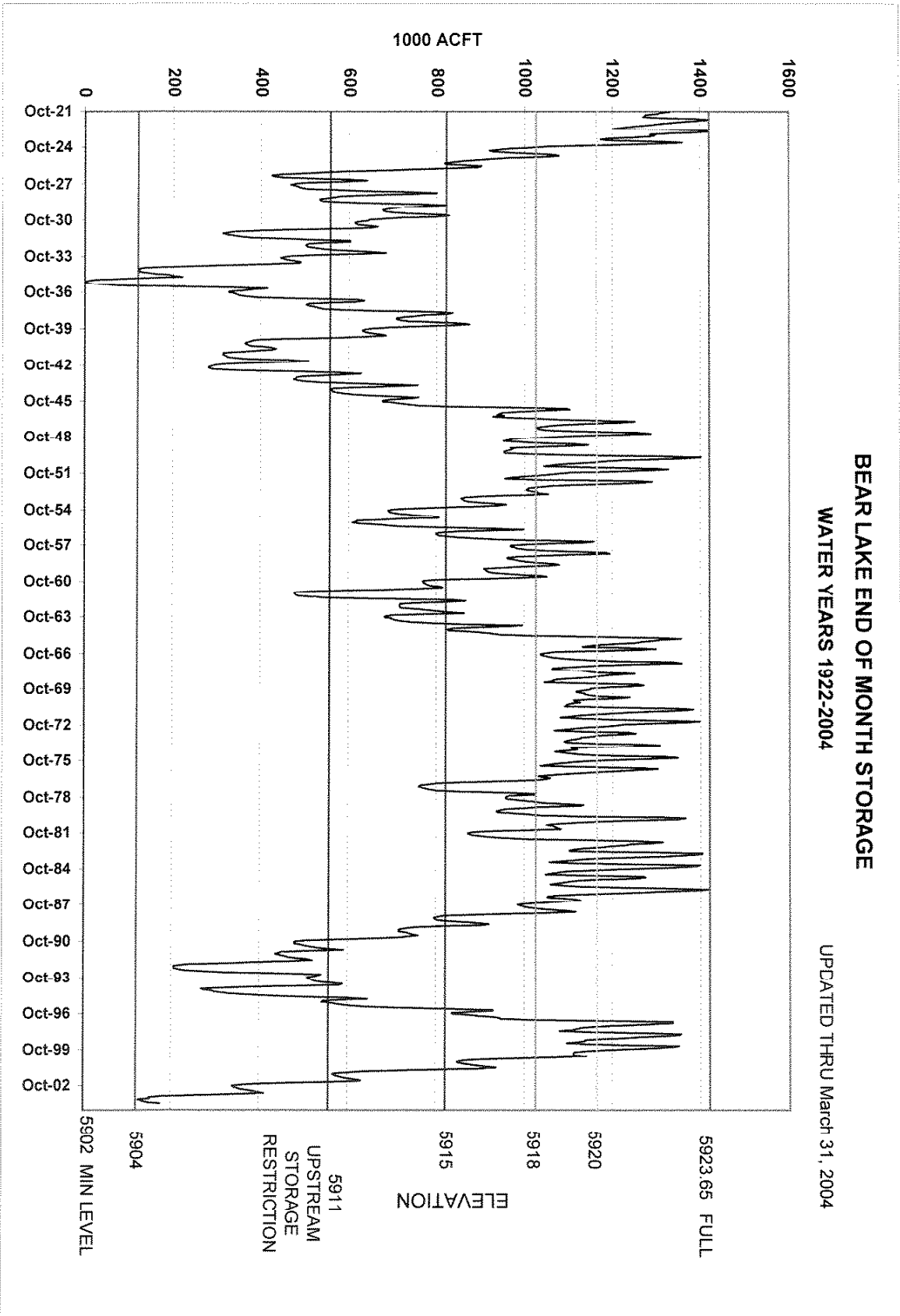
The Lower Division is from Stewart Dam downstream to Great Salt Lake. One important provision of the Compact is that for interstate delivery of natural flow by priority without regard to state line. Due to the complexity of the process, the writers of the Compact left the details of the process for later development. When Idaho began its computerized water right accounting in 1990, the allocation model only considered rights in Idaho. Utah developed a similar system, but because of its location on the river, it included both Idaho and Utah rights.

Water shortages in the 1992 drought year and concerns about Bear Lake management led to the examination of the interstate delivery provision. The states realized that a fair and accurate accounting had to include both states. Work was begun on including the Utah rights in the Idaho interstate model, and both states compared and modified their models to be as similar as possible. Since the 2000 water year Idaho has used the interstate model to determine stored water use. Now storage contract holders in both states are working from the same set of books regarding natural flow and stored water use.

# BEAR LAKE END OF MONTH STORAGE

WATER YEARS 1922-2004

UPDATED THRU March 31, 2004



# BEAR RIVER GROUND WATER MANAGEMENT AREA Ground Water Hydrographs

