

River Basin Accounting - Platte River Basin Report

By Chamois Andersen, Wyoming State Geological Survey (Winter 2014)

Future groundwater development in the Platte River Basin was evaluated as “fair to very good” in certain geologic aquifers, but new projects will need to comply with current water decrees and multi-state conservation plans.

The Wyoming State Geological Survey (WSGS) has completed a major study on the groundwater resources of the Platte River Basin, a project for the Wyoming Water Development Commission. Due to the complex geology of the basin, geologists took an aquifer-by-aquifer approach while assessing each geologic formation for its hydrological conditions.

“Groundwater quality in the Platte River Basin varies widely, even within a single hydrogeologic unit,” said Karl Taboga, WSGS geohydrologist. The aquifers that occur in the late Tertiary period through the early Paleozoic era showed the best potential for future groundwater development, he said.

“This report details and maps those areas where the best quality, quantity and highest aquifer recharge has occurred,” said Taboga, one of the lead authors of the report. “This information will be used for future development in the basin, so that water managers can be more strategic.”

The Platte River Basin is among the most important river drainages in Wyoming. It covers one quarter of the state’s surface area where more than 40 percent of the state’s population resides.

The 504-page color report covers all the major aquifers in the Platte River Basin with detailed analyses, from water quantity and quality, to potential aquifer contaminants and future opportunities for sustainable groundwater development projects. A downloadable are available on the WSGS website.

The Platte River is the major tributary to the Missouri-Mississippi River Basin, providing water for the states of Nebraska, Colorado, and Wyoming (southeastern and central). The river and the basin’s water resources are used for drinking water and recreation, while also providing vital habitats for aquatic life, plants, and wildlife species. The basin is also an area where significant energy and agricultural development has occurred.

“This publication represents an intensive collaborative effort among water resource professionals from the Wyoming State Geological Survey, the Wyoming Water Development Commission and the USGS,” Taboga said.

Additional contributors include the Wyoming State Engineer’s Office, the Water Resources Data System at the University of Wyoming, the Wyoming Department of Environmental Quality, and the Wyoming Oil and Gas Conservation Commission.

A large portion of this study is focused on characterizing the geology, water quality and production potential of the basin's major aquifers. WSGS research for this project involved documenting and mapping the geologic conditions of the groundwater resources in the Platte River Basin.

Scientists of the USGS and WSGS compiled data related to the hydrogeology of the Platte River Basin from nearly 500 governmental, consultant and academic papers and reports. Additionally, the USGS conducted statistical and graphical analyses of water quality data from over 2,100 wells.

Additional analyses include an evaluation of aquifer recharge to the basin's aquifers and a basin-wide water balance. Beneath the Earth's surface, groundwater is recharged naturally by rain and snowmelt. Estimating the recharge rates of the principal aquifers is important information that assists the WWDC in sustainable groundwater management. The annual recharge volumes estimated in this report were used to generate the basin-wide water balance, which will provide a better understanding of the ways in which human activities affect groundwater resources.

The Platte River Basin is the third report in a series of basin reports completed by the agency's geologists for the WWDC. Previously published reports include the Green River Basin and the Wind River/Bighorn basins. Each report includes text and analyses, maps, databases, metadata, tables and graphs. Reports scheduled for publication this year are the Bear River and Snake River basins.

A downloadable pdf copy of the report "Platte River Basin Water Plan Update Groundwater Study Level 1 (2009 – 2013)" as well as the Executive Summary are available on the WSGS website.