

# Characterization of Water Resources of Camas Prairie, Southern Idaho

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## Overview

Water resources in the Camas Prairie are utilized by domestic, municipal, agricultural, and industrial users and contribute fill to the Magic Reservoir but have not been comprehensively evaluated since the 1970s. The objective of this project is to provide an updated characterization of groundwater and surface water resources of the Camas Prairie by collecting groundwater level and surface water flow data and by developing an updated hydrogeologic framework and groundwater budget. This characterization will provide the Idaho Department of Water Resources (IDWR) with information to help address current water resources challenges in the Big Wood River Ground Water Management Area and will provide a foundation for the potential future development of a groundwater flow model. The following project components are proposed for a four-year Camas Prairie water resources investigation. They are listed in order of approximate work start as data from each component will guide design and interpretation in other components.

### 1. Hydrogeologic framework (years 1-3)

The U.S. Geological Survey (USGS) will develop a hydrogeologic framework, which is a conceptual model of groundwater occurrence and flow in hydrogeologic units of the Camas Prairie (Figure 1). The hydrogeologic framework will be based on literature review and compilation of existing research and data, including pertinent previous studies, geologic maps, well drillers logs, geophysical data, and groundwater level data. The hydrogeologic framework will include a digital borehole database and 3-dimensional hydrogeologic framework model. Specific objectives of the hydrogeologic framework include the following:

- Describe hydrogeologic properties, spatial extent, and depths of key hydrogeologic units.
- Describe groundwater occurrence, levels, and flow directions in shallow and deeper aquifers (based in part on the results of the groundwater level synoptic, described below).
- Conceptually describe components of aquifer recharge and discharge in the basin.

The results of the hydrogeologic framework will be published in a USGS Scientific Investigations Report, and the supporting data will be published in the USGS National Water Information System database and/or in a data release. The main goal of the hydrogeologic framework is to provide a conceptual model for groundwater occurrence and flow in the Camas Prairie, which will help IDWR make decisions associated with water rights administration in the basin.

### 2. Groundwater level synoptic events (years 2-3)

The USGS will conduct two groundwater level synoptic measurement events in the Camas Prairie during pre- and post-irrigation season conditions. These mass measurement events will include wells currently being monitored along with additional wells included for this investigation. The multi-season groundwater level synoptics and historic groundwater level data will assist with defining groundwater occurrence and movement in the basin by enabling the USGS to create numerous, high-resolution potentiometric-surface maps. The groundwater level synoptic events will target water-level

measurements in both the shallow, unconfined aquifer(s), and deeper confined aquifer(s). Specific objectives of the groundwater level synoptics include the following:

- Develop high-resolution potentiometric-surface maps for both the shallow, unconfined aquifer(s), and deeper, confined aquifer(s).
- Describe groundwater potentiometric-surfaces and flow directions in the basin and relative to Camas Creek and Magic Reservoir.
- Describe seasonal and long-term changes in groundwater levels in both the shallow, unconfined aquifer(s), and deeper, confined aquifer(s).

The results of the groundwater level synoptics will be published in the hydrogeologic framework report, and the supporting data will be published in the USGS National Water Information System database. The main goal of the groundwater level synoptics is to describe groundwater levels and flow in the basin, including seasonal and long-term changes and relative to water surfaces in Camas Creek and Magic Reservoir.

### **3. Seepage study (years 2-3)**

The USGS will conduct two surface-water flow measurement events (collectively, the seepage study) during pre- and post-irrigation conditions on lower Camas Creek and select tributaries (Elk, Willow, and Camp Creeks). The seepage study will use differential gaging, or other appropriate methods, to calculate groundwater contributions to Camas Creek and evaluate seasonal variability in groundwater-surface water interactions. Specific objectives of the seepage study will include the following:

- Calculate stream gains from and/or losses to groundwater along Camas Creek.
- Evaluate seasonal variability in surface water-groundwater interactions.

The results of the seepage study will be published in a USGS Scientific Investigations Report, and the supporting data will be published in the USGS National Water Information System database and/or in a data release. The main goal of the seepage study is to improve understanding of how Camas Creek interacts with the underlying aquifer.

### **4. Groundwater budget (years 2-4)**

The USGS will develop a groundwater budget for the Camas Prairie for a wet year, a dry year, and an average year. The groundwater budget will be based on literature review and existing data, including compilation of previous water budgets; streamflow, reservoir, and canal records; precipitation and evapotranspiration data; and groundwater pumping records. The specific objectives of the groundwater budget will include the following:

- Develop quantitative estimates for aquifer recharge, discharge, and residuals for a wet year, a dry year, and an average year.
- Determine the magnitude of consumptive groundwater use relative to aquifer discharge from the basin.

The results of the groundwater budget will be published in a USGS Scientific Investigations Report, and the supporting data will be published in the USGS National Water Information System database and/or in a data release. The main goal of the water budget is to develop quantitative estimates of aquifer recharge, discharge, and residuals and to inform a potential future groundwater flow model.

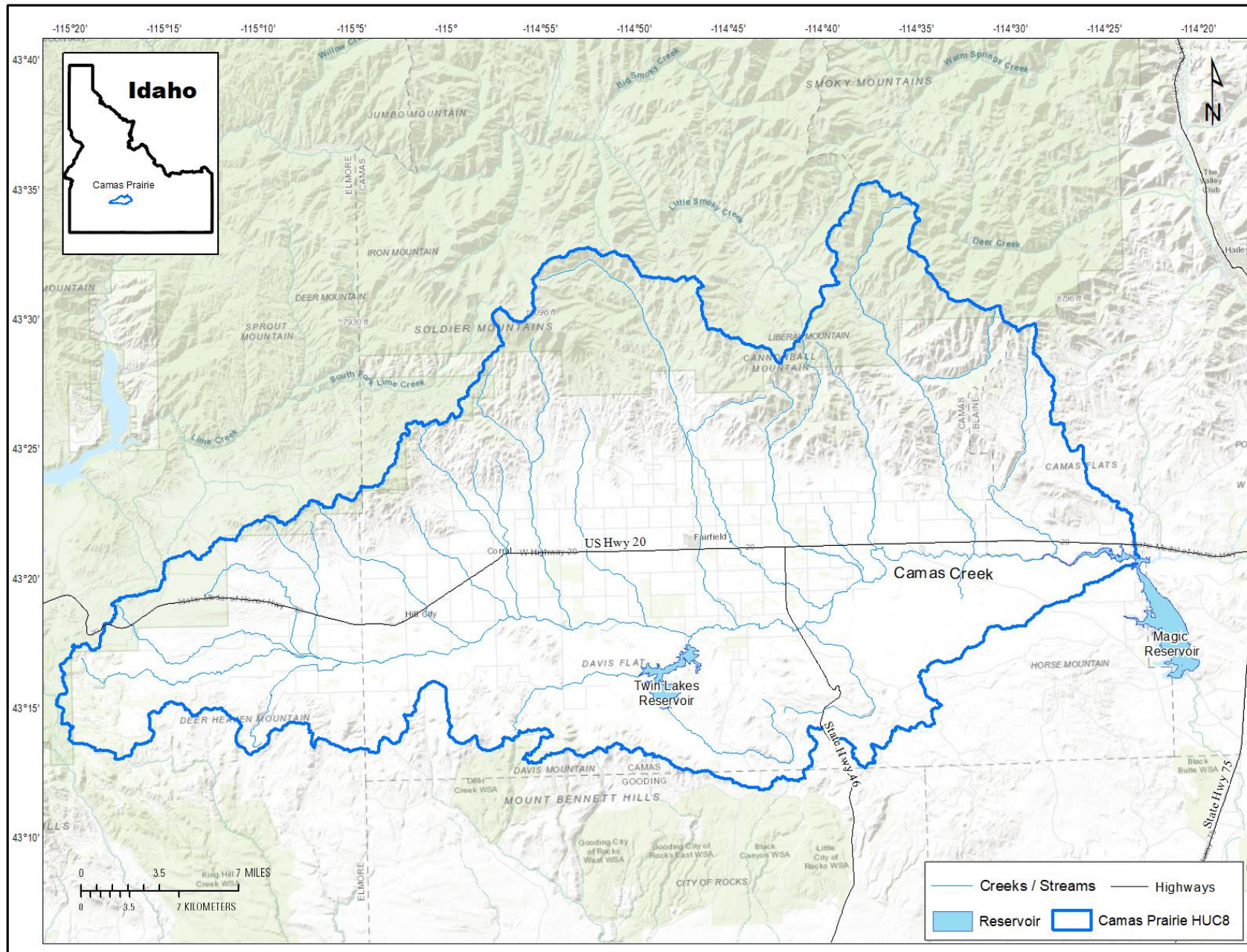


Figure 1. Study area, Camas Prairie, Idaho.