
Technical Memorandum

Subject: **Powder/Tongue River Basin Plan
Domestic Water Use
Task 2B**

Date: February 2002

Prepared by: HKM Engineering Inc.

INTRODUCTION

The purpose of this Technical Memorandum is to provide information regarding Domestic Water Use in the Powder/Tongue River Basin. Under this project, domestic water is defined as water supplied for rural homes, subdivisions, small trailer courts, commercial establishments, parks, campgrounds, rural schools, coal mines (domestic uses at the mines), and other small water users. Municipal water supplies or rural users that obtain their water supply from a municipal source (including Joint Powers Boards (JPBs), Districts and Water Users Associations), are not included in this category. Their water use is addressed under the Technical Memorandum relating to Municipal Water Use. Water usage by the majority of the industries throughout the basin is addressed under the Technical Memorandum for Industrial Usage.

Domestic water use is almost exclusively obtained from groundwater wells. Surface water diversions are not a significant issue for domestic water use. Limited irrigation of lawns and gardens from a surface water source is practiced by many rural homes where a surface source is available.

METHODOLOGY

The existing county population within these river basins was used as the basis for estimating domestic water use. Year 2000 census information was obtained from the US Bureau of Census, and was the source of these population estimates. Estimates of population served by municipal systems (including JPB's, Districts, and Water Users Associations) covered under the Municipal Memorandum are subtracted from the total county population, to estimate the number of domestic users. Also subtracted is the estimated population of the portion of any counties that are not included in these river basins (e.g., portions of Natrona and Campbell Counties).

Year 2000 census information is broken out by county, and further broken out by census districts or portion of the county. These districts were used to split the population of a county when the county is not totally within the basin. Campbell County is split between both the Northeast Wyoming River Basins and Powder/Tongue River Basin. The locations of municipal water systems that are covered under the Municipal Water Use Profile within the county or census district, were then considered. Population served by municipal systems was subtracted from the total population for the area, resulting in the population not served by municipal systems. This is the population that is included in this Domestic Use Memorandum.

The Powder/Tongue River Basin include: Sheridan, Johnson, the northern and western portions of Campbell County, and the northern portion of Natrona County. Since the majority of the City of Gillette is in the Northeast Wyoming River Basins, it is included in the calculations for domestic use within those basins.

This memorandum also considers the subdivisions, small trailer courts, commercial establishments, parks, campgrounds, rural schools, coal mines (domestic uses at the mines), and other small water users, as mentioned above. The Environmental Protection Agency Region 8 Office in Denver was contacted for a listing of the public water systems in these basins. Their records contained 37 public water systems in the basin, other than the systems covered under the Municipal Use Memorandum. A public water system is a

system that regularly serves at least 25 people. These systems include community systems (the people live on the system such as a trailer court), a non-transient non-community system (the people don't live there but return there every day such as a rural school or a coal mine), and a transient non-community system (different people use water from the system each day such as restaurant or campground).

While these systems were identified, only a limited amount of additional water use will be included for them. The users of non-transient non-community systems reside on a municipal system or domestic well that is included under one of those categories, and non-community systems generally only supply a relatively small amount of water to their users. The small community systems will have per capita use similar to municipal or domestic uses, but these are in the minority for the 37 systems. The population served by the systems listed by EPA was 4040. An estimated per capita usage rate of 75 gallons per day will be applied for a total of 303,000 gallons per day, or 339 acre-feet per year.

Water rights for domestic wells were aggregated, tabulated, and included on a layer in the basin GIS.

CONCLUSIONS

The following tables summarize the estimated rural population for each county using the methods described above.

Table 1
Sheridan County

Municipality	Population
Arvada WD	-- (individual wells)
Clearmont	125
Dayton	678
Ranchester	701
Sheridan	18,500
Soldier Creek	400
Total Municipal Population	20,404
Total County Population	26,560
County Domestic Use	6,156

Table 2
Johnson County

Municipality	Population
Buffalo	3900
Kaycee	300
Lynch Utility	20
Total Municipal Population	4220
Total County Population	7075
County Domestic Use	2855

**Table 3
Campbell County**

Municipality	Population
Cook Road WD	225
Means WD	300
Prairie View/Champion	-- (individual wells)
Anderson I&SD	250
Country Side	250
Eight Mile Subdivision	90
Green Valley Estates I&SD	72
Heritages Village WD	700
Pine Butte I&SD	100
Total Municipal Population	1987
Total County Population	2161
County Domestic Use	174

**Table 4
Natrona County**

Municipality	Population
Edgerton	230
Midwest	495
Total Municipal population	725
County population in Basin	3478
County Dom. use in Basin	2753

The total domestic or rural population for the Powder/Tongue River Basin is estimated to be 11,938. This population is assumed to be served by domestic groundwater wells and to be independent of the population served by municipal water systems covered under the Municipal Use Memorandum. It is assumed this population consumes between 150 and 300 gallons per capita per day. This results in an estimated total domestic water use for the Powder/Tongue River Basin of between 1.79 and 3.58 million gallons per day, or 2006 and 4012 acre-feet per year. This population represents approximately 30% of the total population within the basin.

**Table 5
Estimated Existing Domestic Use
Northeastern Wyoming River Basins**

Supply	Population	Estimated Use
Individual Domestic Wells	11,938	2010 to 4010 ac-ft/yr
Rural Public Water Supplies	4040	340 ac-ft/yr
Total	15,978	2350 to 4350 ac-ft/yr

WATER RIGHTS

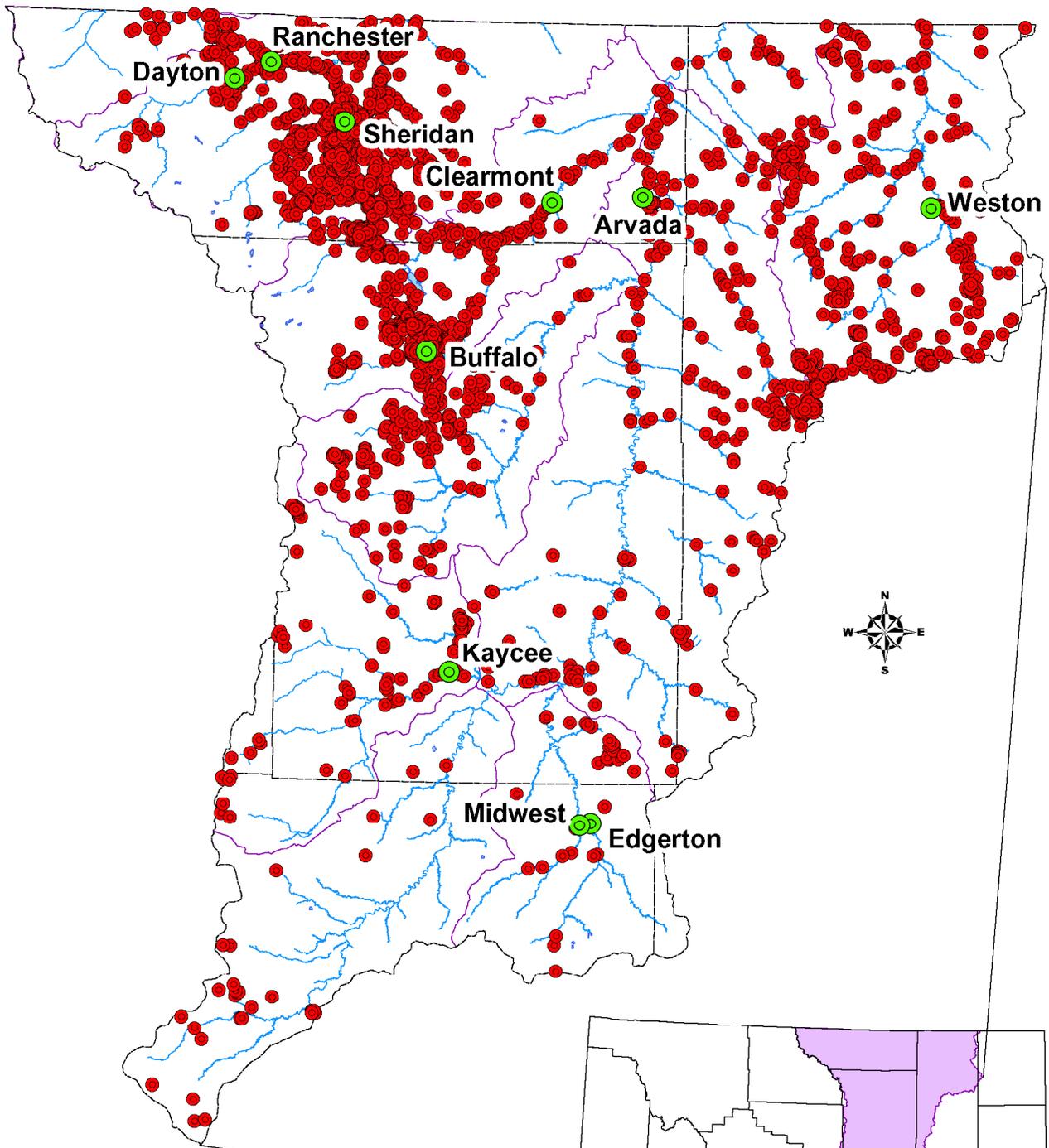
The State Engineer Office's (SEO) data base for permitted wells was accessed for information on domestic wells. Data on these wells are included in the GIS for this basin, which may be accessed for information on each well. This data base will be updated periodically. The data fields for these wells contained within this data base include: location (township, range, section, quarter/quarter section), permit number, status, use, applicant name, facility name, whether this is an enlargement of a previous

appropriation, priority date, completion date, yield (maximum, actual, claimed), depth, static level, and depth of water bearing zone. Information within these fields is available as provided by the applicant.

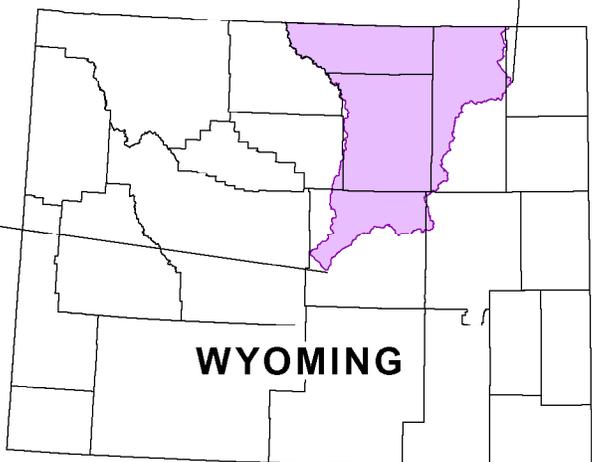
The attached figure illustrates the number and location of domestic wells filed in the SEO throughout the Powder/Tongue River Basin. Each well is placed on the GIS data layer at a representative location. The dot representing the well may be “clicked” on to access the information available from the SEO.

Permitted well capacity should not be used as an estimate of domestic water use, as the existence of a water right or capacity in the well does not necessarily relate to water use. Typically a well is used only periodically, so the total water pumped in the course of a year is considerably less than it could produce if it was pumped on a continual basis. Also, it might be assumed that a portion of filed water rights such as this are inactive.

The permitted capacity establishes the allowable pumping rate, or resulting total amount of water available by continuous pumping. This is not particularly meaningful, since the wells will not normally be operated in this manner. Using the estimated rural population served by wells with estimated per capita usage rates, is believed to be a more reasonable approach for estimating domestic use within this basin.



- Domestic Wells
- Communities



Domestic Wells



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Figure 1