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**TECHNICAL MEMORANDUM**

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SUBJECT: Green River Basin Plan  
***Basin Water Use Profile-Domestic***

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**Introduction**

The purpose of this technical memorandum is to provide information regarding domestic water use in the Green River Basin. For purposes of this memorandum, domestic water is defined as the water supply for rural homes, subdivisions, commercial establishments, parks, campgrounds, and other smaller water uses. Subdivisions or public water supplies that obtain water from municipalities or joint powers boards are not included in this category, as their water use was addressed in the technical memorandum relating to existing municipal water use in the Green River Basin (Purcell, 2000b). Most of the remote industries in the basin use a portion of their supplies for domestic use. However, as this water use was included in the estimated industrial water use for the basin (Purcell, 2000c), this water use is not considered domestic water use in this technical memorandum.

Domestic water use is typically supplied from groundwater wells. The typical domestic water user cannot afford to divert, pipe and treat surface water.

**Methodology**

Existing county populations within the Green River Basin are used as the basis for estimating domestic water use. As county populations, as provided by the Wyoming Department of Administration and Information, include the service areas of the municipal water suppliers, it is necessary to subtract the populations of the municipal service areas to obtain the rural populations or domestic water users.

As previously noted, this memorandum considers domestic water use to include individual homes and ranches as well as subdivisions, commercial establishments, parks, campgrounds, and other smaller water uses not included in the basin profiles for municipal and industrial water use in the Green River Basin. A listing of public water supply systems, obtained from the Environmental Protection Agency, was used to estimate the percentage of domestic use for subdivisions, commercial establishments, parks, campgrounds, and other smaller water uses. Water rights for domestic wells were tabulated and are discussed.

## Conclusions

### A. Rural Population

Rural population is the best indicator of domestic use. The following table depicts the existing populations in the study area by county as calculated by Gary Watts of Watts and Associates, Inc., in the technical memorandum entitled, "Green River Basin Plan, Population Projections" (Watts, 2000). Mr. Watts based his estimates on county population estimates obtained from the Wyoming Department of Administration and Information.

The populations of the service areas of the municipal water suppliers are deducted from the county populations in order to estimate the rural populations by county within the Green River Basin:

Table 1. Rural Population-Green River Basin

<u>County/Municipality</u>	<u>Existing Population</u>
Carbon	923
Baggs	300
Dixon	<u>75</u>
Rural Population	548
Lincoln	7,604
Kem./Dia. JBP	3,950
LaBarge	490
Opal	<u>100</u>
Rural Population	3,064
Sublette	5,457
Big Piney	496
Marbleton	635
Pinedale	<u>1,480</u>
Rural Population	2,846
Sweetwater	39,540
Bairoil	250
Granger	170
RS/GR/SC JPB	36,500
Superior	300
Wamsutter	<u>310</u>
Rural Population	2,010
Uinta	7,556
Bridger Valley JPB	<u>4,500</u>
Rural Population	3,056

Total Basin	61,080
Total Mun. Service Areas	<u>49,556</u>
Total Rural Population	11,524

The estimated existing population of the areas outside of the service areas of municipal water suppliers is 11,524. For purposes of this estimate, it is assumed that this is the population that is served by domestic groundwater wells or independent public water supply systems. If it is assumed that this population consumes between 150 and 300 gallons per capita per day, the resulting estimated total domestic water use would range between 1,936 and 3,872 acre feet per year in the Green River Basin.

#### B. Existing Public Water Supply Systems

The Environmental Protection Agency (EPA) and the State of Wyoming considers all systems which have at least fifteen (15) service connections or regularly serves at least twenty-five (25) individuals to be a "public water supply". These populations of 25 individuals or more do not necessarily equate to a permanent population. For example, convenience stores, restaurants and bars that serve more than 25 customers are considered public water supplies. Public water supply systems must comply with the federal safe drinking water standards and other federal mandates.

A printout of the public water supply systems in Wyoming was obtained from the EPA database. The following table depicts the number of public water supply systems within the Green River Basin, county. The systems included in the municipal and industrial water use categories are subtracted from the total number of public water supply systems to estimate the systems within the study area that have their own independent water supplies:

Table 2. Public Water Supply Systems

<u>County</u>	<u>Public Water Supply Systems</u>	<u>Independent Supply Systems</u>
Carbon	2	0
Lincoln	13	4
Sublette	25	22
Sweetwater	86	23
Uinta	<u>12</u>	<u>6</u>
Total	138	55

The above table indicates that eight-three (83) of the EPA-designated public water supply systems obtain their water from municipal or industrial water supplies. For example, the Rock Springs/Green River/Sweetwater County Joint Powers Board provides treated water to forty-eight (48) public water supply systems in Sweetwater County.

The fifty-five (55) independent public water supply systems, in all likelihood, obtain their

water from groundwater wells. The water rights for this purpose are issued for "miscellaneous" use rather than domestic use.

While the EPA designation suggests a minimum population of 25, as previously noted, this population may not be permanent, as customers are considered in the designation. If it is assumed that each of these public water supply systems serve a permanent population of 30, 1,650 people of the total estimated rural population of 11,254 are served by independent public water supply systems. If it is assumed that this population consumes between 150 and 300 gallons per capita per day, the resulting estimated domestic water use in these independent public water supply systems would range between 277 and 554 acre feet per year.

### C. Water Rights

Frank Carr of Water Rights Services tabulated the domestic water rights for the study area by water districts and provided the information in a notebook entitled, "Domestic Wells, Green River Basin and Great Divide Basin". In addition, the permitted capacities of the water rights were added for each year since the first year that a water right was issued in the district through the year 1999. All water rights which include domestic use as a permitted purpose are included. Many water rights include domestic use as a permitted use even though that is not the primary use of the water right. For example, water rights for stock wells are typically issued for stock and domestic purposes. Table 3 summarizes the tabulations by providing the total permitted capacities of the water rights, that include domestic use as a permitted purpose.

Table 3-Domestic Water Rights-Groundwater

<u>District/Drainage</u>	<u>Water Rights (GPM)</u>
Dist. 8/Little Snake Drainage (Div. 1)	3,181
Dist. 11/Green River-Reach 1	6,248
Dist. 10/Green River-Reach 2	4,805
Dist. 5/Green River-Reach 3	1,775
Dist. 1/Green River-Reach 4	8,777
Dist. 3/Green River-Reach 5	7,796
Dist. 6/Big Sandy	2,913
Dist. 7/New Fork	13,614
Dist. 9/Ham's Fork	2,555
Dist. 14/Henry's Fork	575
Dist. 15/Black's Fork	5,208
Great Divide Basin	<u>942</u>
Totals	58,389

The permitted capacity of domestic wells totals 58,389 gpm, which equates to approximately 94,180 acre feet/year. Obviously, these numbers should not be used as an estimate of domestic water use as the existence of water rights does not necessarily relate to water use. On a statewide basis, it is a reasonable assumption that fifty percent (50%)

of the water rights are active. If this is the case relative to domestic water rights in the Green River Basin, the total permitted capacity of active domestic water rights would be 47,090 acre feet per year.

The permitted capacity establishes the allowable pumpage rate and the resulting volumetric limit from continuous pumping at that rate is not particularly meaningful. For example, the typical permitted capacity for a domestic well is 25 gpm, which if pumped continuously for 24 hours, would be 36,000 gallons per day. A family of four would typically use between 600 and 1,200 gallons per day or approximately 2-4% of the volumetric permitted capacity of the typical domestic well.

Using the estimated rural population being served by wells permitted for domestic use is a more reasonable approach to estimate use. As previously noted, water rights for public water supply systems are designated miscellaneous use. Therefore, to estimate the population served by domestic wells, it is necessary to subtract the estimated population of those served by the public water supply systems (1,650) from the total estimated rural population (11,524). This would indicate that a population of 9,874 is served by wells permitted for domestic use. If it is assumed that this population consumes between 150 and 300 gallons per capita per day, the resulting estimated domestic water use from these domestic wells would range between 1,659 and 3,318 acre feet per year.

#### D. Summary

For purposes of this technical memorandum, domestic water use includes the use of rural homes served by groundwater wells permitted for domestic use and public water supply systems that serve rural subdivisions, commercial establishments, parks, campgrounds and other smaller uses that have water supplies independent of municipal and industrial water supply systems. Table 4 summarizes the estimated domestic water use in the Green River Basin based on the above described data and assumptions:

Table 4- Existing Estimated Domestic Use-Green River Basin (AF/YR)

<u>Supplies</u>	<u>Population</u>	<u>Estimated Use</u>
Rural Public Water Supply Systems	1,650	280-560
Individual Domestic Wells	<u>9,874</u>	<u>1,660-3,320</u>
Total	11,524	1,940-3,880

**References**

Carr, Frank, Water Right Services "Domestic Wells-Green River Basin and Great Divide Basin", April, 2000.

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draft dated May 16, 2000.

Wyoming Department of Environmental Quality, "Wyoming Environmental Quality Act and Industrial Development Information and Siting Act", 1998 Edition.