

Exempt Well Water Use

Aspect Study and DOE Recommendation

Aspect Water Withdrawal Study 2011

Based on these evaluations, we recommend using the following values for establishing total water use associated with a single parcel served by an exempt well:

- Indoor use of 200 gpd, year round.
- Maximum month outdoor water use to irrigate 0.10 acres of about 760 gpd occurring in July. On an annual basis, the average total outdoor use rate is about 185 gpd.
- Summer season stock water use of 30 gpd, with an annual average use of 15 gpd.

Combined, these values result in a maximum month total water withdrawal rate of about 1,000 gpd per exempt well connection, with an annual average rate of about 400 gpd. These total use rates are consistent with data from the Group A water systems, which averaged between the different systems show a maximum month use of about 1,090 gpd and an average annual use of about 450 gpd. These compare to the estimated annual average and maximum month and residential total water use rates of about 600 gpd and 1,200 gpd, respectively, presented in the *Methow Basin (WRIA 48) Watershed Plan* (Methow Basin Planning Unit, 2005).

Aspect Water Withdrawal Study 2011

Only a portion of the total water withdrawn is consumptively used; the remainder will return to the groundwater system via septic or irrigation return flows. In establishing water withdrawal impacts to surface water flows in the Methow River only the consumptive quantity should be considered. We recommend using the following values for establishing typical consumptive water use associated with a single parcel served by an exempt well:

- Applying a consumptive use factor of 15 percent to total indoor use as recommended in the *Background Information and Recommendations for Evaluating Consumptive Water Use* (Aspect, 2010), consumptive use for indoor residential purposes is about 30 gpd, year round.
- Using the published pasture and turf irrigation requirements for Winthrop, the maximum month consumptive use for irrigation of 0.10 acres is about 650 gpd in July. On an annual basis, the average consumptive use rate for outdoor irrigation is about 160 gpd.
- Assuming stock water use is entirely consumptive, the maximum month and average annual stock water consumptive uses are 30 and 15 gpd, respectively.

Combined, these values result in a maximum month (July) consumptive water use rate of about 710 gpd per residence served by an exempt well. The average annual consumptive use is about 205 gpd.

DOE Recommendations for Water Use Estimates

A. Consumption due to Indoor Water Use

- To estimate the impacts of indoor water use, the population to be served by future permit-exempt domestic wells can be multiplied by assumed water use. A 2016 study by the Water Research Foundation (DeOreo, et al., 2016) determined an average per capita water use of 59 gallons per day (gpd) in homes provided municipal water in 23 areas across the U.S. and Canada. This result is based on actual flow monitoring and survey responses from 737 homes. The 59 gpd average is down 15.4 percent from results found during a 1999 American Water Works Association Research Foundation study (Mayer and DeOreo, 1999). Some homes supplied by Tacoma Water were monitored for the 2016 report, producing an average 51 gpd per capita indoor water use. Bearing in mind that homes supplied municipal water are more likely to be fitted with water saving appliances, an assumption of 60 gpd per capita seems reasonable when estimating water use for permit exempt wells.

Household Consumptive Outdoor Water Use (HCOWU):

- To estimate consumptive outdoor water use per household, domestic lawn/garden irrigation requirements can be estimated using information for a nearby station found in Appendix A of the Washington Irrigation Guide (WAIG) (U.S. Department of Agriculture, 1997). For a hypothetical pasture/turf grass example, the WAIG irrigation requirements (inches) might look something like:

Irrigation requirements (inches)	May	June	July	August	September	Total
	.63	2.72	4.11	2.75	0.9	11.11
- The irrigation requirement can then be divided by 12 to convert from inches to feet, then multiplied by an assumed outdoor watering area, which for this example is 0.4 acre:
- Irrigation Requirements (in.) = 11.11 inches/12 inches per foot X 0.4 acres = 0.37 AF/YR

Household Consumptive Outdoor Water Use (HCOWU):

- When consumptive water use for irrigation is calculated in accordance with Water Resources Program Guidance 1210, it includes a step to account for water lost during the water application process (e.g. water sprayed on a sidewalk instead of a lawn). So for this example if the efficiency for a residential pop-up sprinkler system is assumed at 75 percent, the required water amount would be:
 - $0.37 \text{ acre-feet} \div 75\% \text{ application efficiency} = 0.49 \text{ acre-feet}$
- The method in Guidance 1210 then subtracts out the amount of water that is not consumed and returns to groundwater or the surface water system. So for this example assuming the consumptive loss associated with outdoor water use is 80 percent, the estimated total consumptive outdoor water use per house during the irrigation season would be:
 - $0.49 \text{ acre-feet} \times 80\% \text{ consumed (20\% return flow)} = 0.39 \text{ acre-feet}$
- So under this scenario Household Consumptive Outdoor Water Use (HCOWU) equals 0.39 acre-feet.