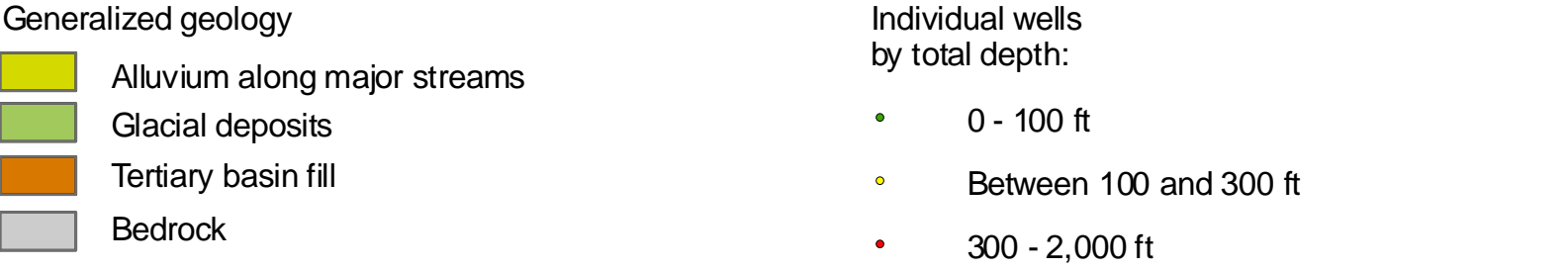


Ground-Water Resource Development in the Upper Clark Fork River Ground-Water Characterization Area, Deer Lodge, Granite, Powell, and Silver Bow Counties, Montana

by Kirk B. Waren and Thomas W. Patton

Sheet 2. The number of wells per section that are ≤ 100 ft deep and wells within 1 mile of major streams.

Legend: Maps B through F



Explanation

The number of wells per section shown in Map A is for January 1, 2005, so the data are comparable to Maps E and H on Sheet 1. The data for Maps B through F were retrieved from the Montana Ground-Water Information Center (GWIC) database in September 2006. Consequently, the total number of wells in the Upper Clark Fork River Ground-Water Characterization Area is shown as 6,909 wells (Table 1, far right), compared to the earlier total of 6,828 wells shown for January 1, 2005 on Sheet 1, Map E. Map A illustrates the number of wells ≤ 100 ft deep per Public Land Survey System (PLSS) section within the study area. Maps B through D illustrate individual wells of specific depth intervals located within 1 mile of major streams. Maps E and F show the distribution and depths of irrigation, commercial, industrial, and public supply wells located within 1 mile of major streams.

Sixty-three percent of the 6,909 well records for the Upper Clark Fork Ground-Water Characterization Area are for relatively shallow wells, ≤ 100 ft deep (Map A). Seventy-six percent of all well records are within 1 mile of a major stream (Maps B through D). Fifty-two percent of all well records are both shallow (≤ 100 ft deep) and within 1 mile of a stream (Map B). The numbers of higher yield wells for uses such as irrigation, commercial, industrial, and public water supplies that are within 1 mile of streams are modest compared to similar numbers for all water uses (Maps E and F).

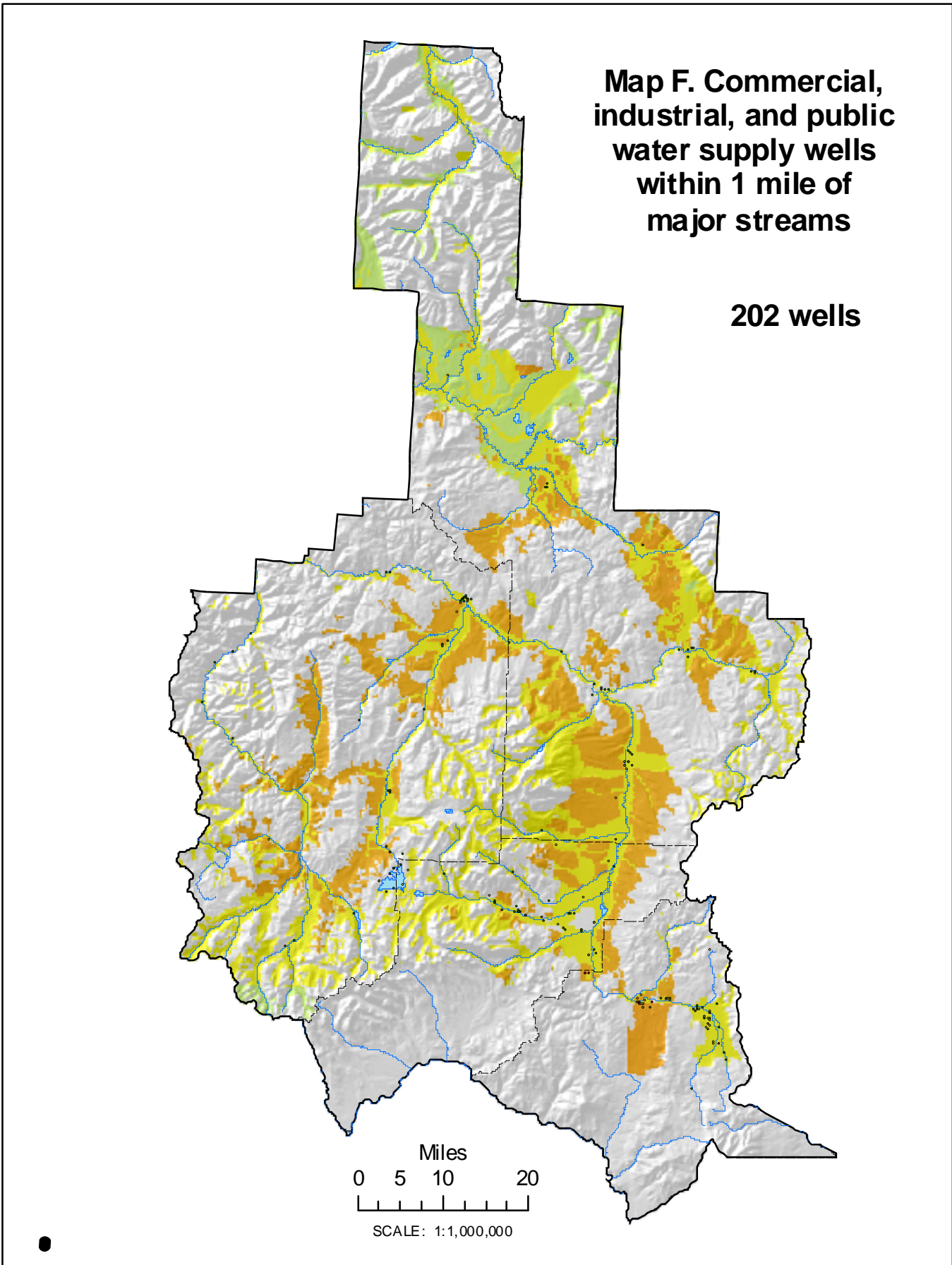
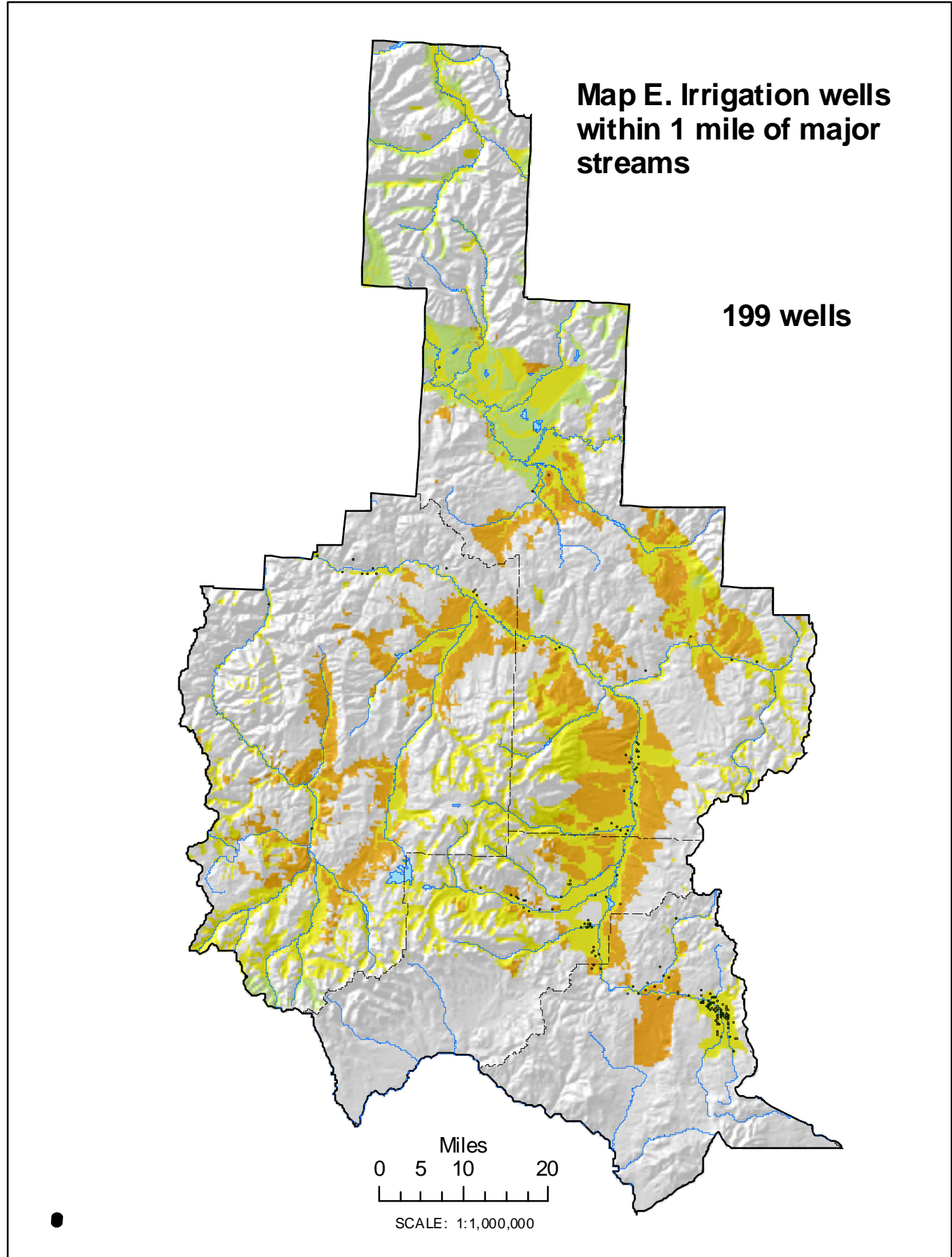
Eighty-five percent of well records in the Upper Clark Fork Ground-Water Characterization Area are for domestic use wells (see the statistics at far right). Estimates of consumptive use by the US Geological Survey provides another perspective. The total estimated consumptive use of ground water for Deer Lodge, Granite, Powell, and Silver Bow Counties is about 4,730 acre-ft per year. The total amount of water withdrawn from both surface and ground-water sources annually in these counties is about 544,170 acre-ft. For comparison, the average annual runoff of the Clark Fork River below Missoula is about 3,870,000 acre-feet. Further work might combine water use estimates with specific well locations to determine areas where streamflow may be significantly impacted by ground-water use, and whether such impacts conflict with other uses.

References

Montana Ground-Water Information Center, Montana Bureau of Mines and Geology, Montana Tech of The University of Montana (<http://mbmggwic.mtech.edu/>).

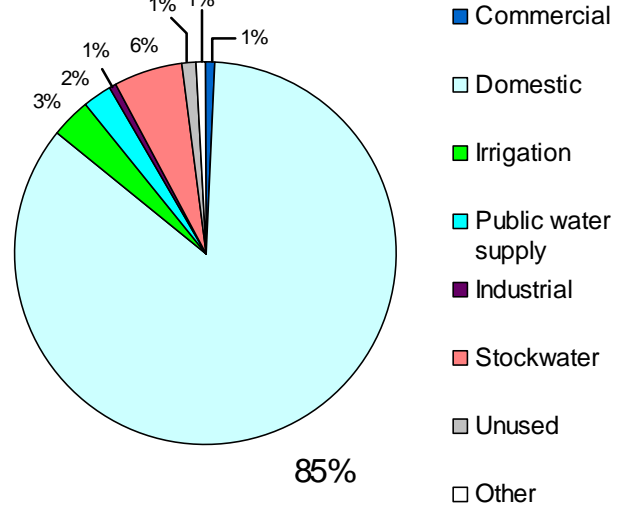
Natural Resource Information System, Montana State Library, for base map coverages (<http://nris.mt.gov/>).

Cannon, M.R., and Johnson, D.R., 2004, Estimated water use in Montana in 2000: US Geological Survey Scientific Investigations Report 2004-5223, 50 p.



Statistics for Wells in the Upper Clark Fork River Ground-Water Characterization Area

General distribution of wells by use



Estimated consumptive use of ground-water (Acre-ft per year, Deer Lodge, Granite, Powell, and Silver Bow Counties) Source: Cannon and Johnson, 2004

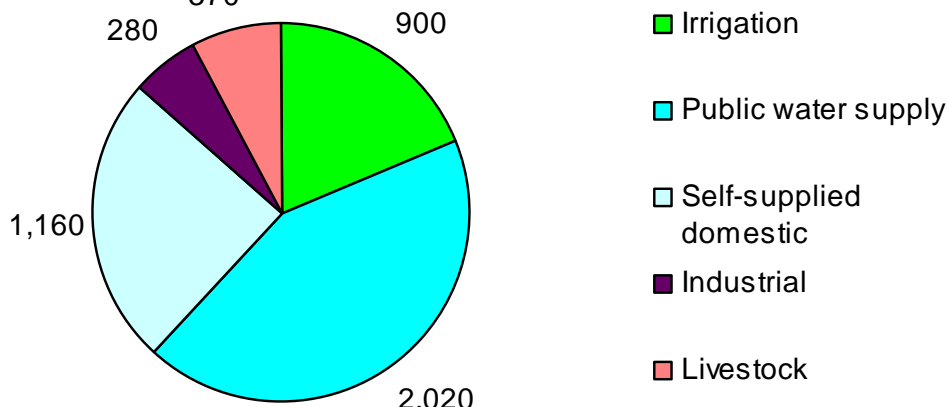


Table 1.

Number of wells by selected use, proximity to streams, and depth

	All wells	Wells within 1 mile of major streams	Wells within 1 mile of major streams and less than or equal to 100 ft deep
All uses	6,909	5,228	3,562
Commercial	47	40	29
Domestic	5,702	4,316	2,915
Irrigation	233	199	130
Public water supply	159	127	91
Industrial	47	35	23
Stockwater	375	223	172
Unused	75	54	34
Other	64	54	44