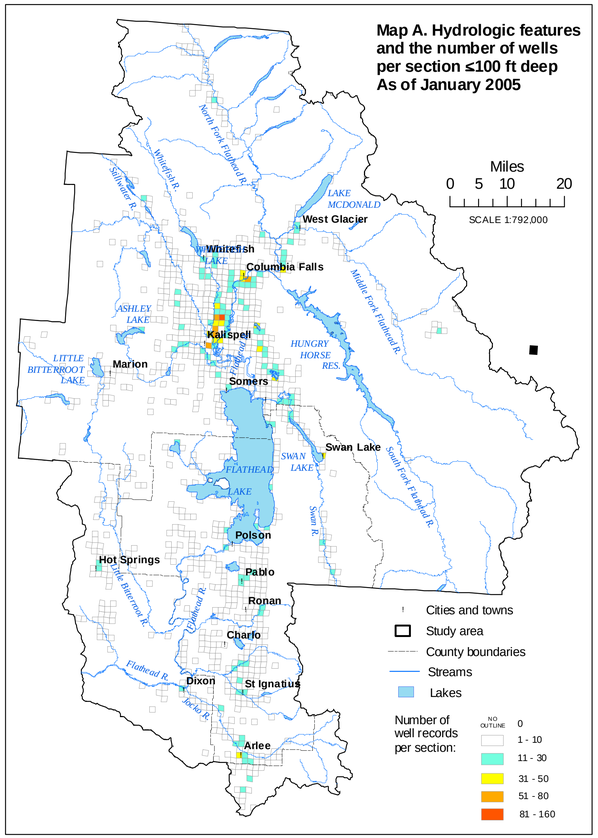
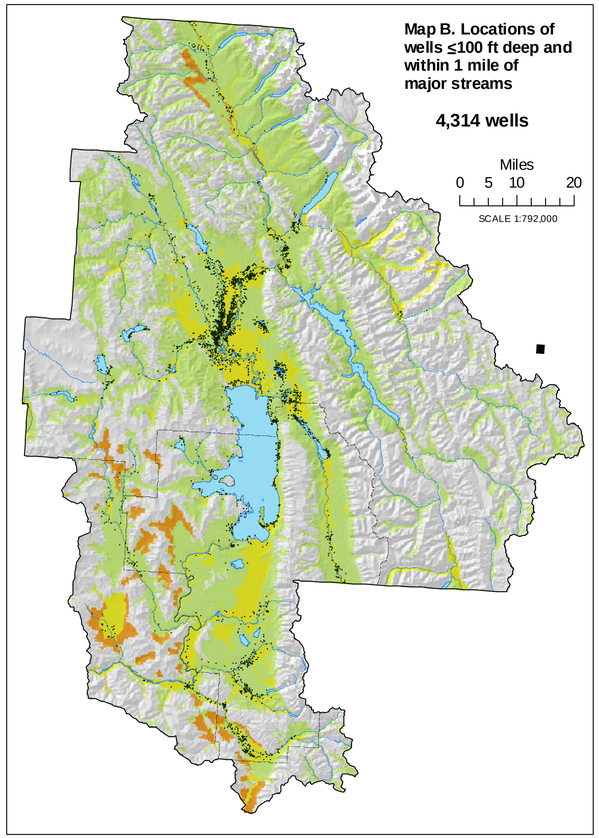
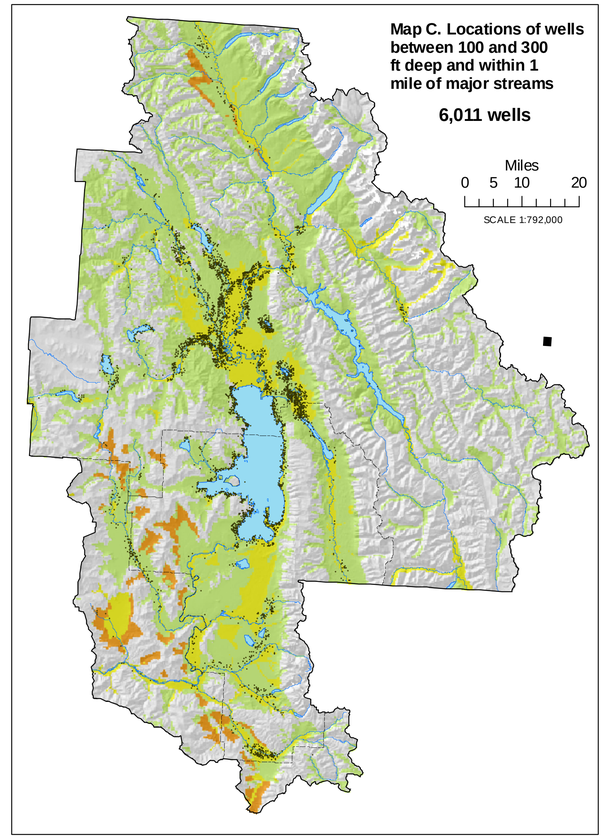
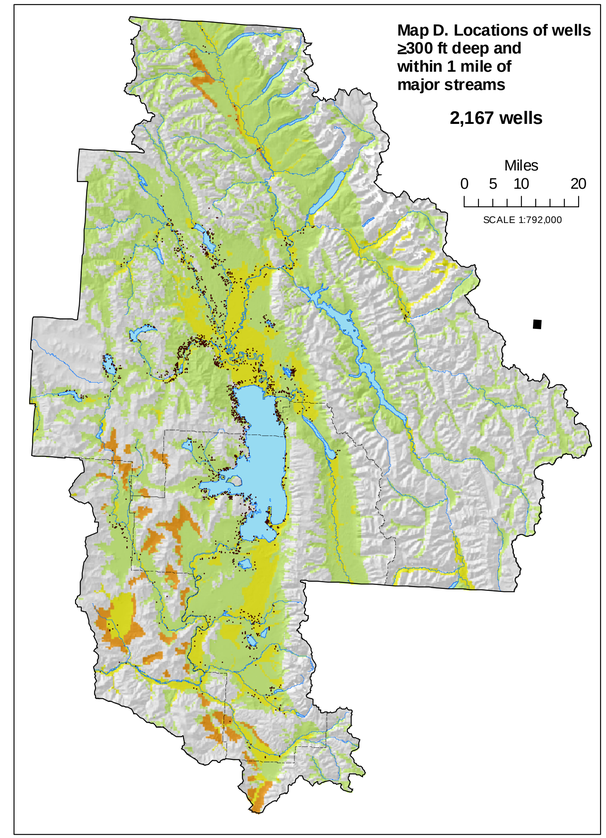








Ground-Water Resource Development in the Flathead Lake Ground-Water Characterization Area, Flathead, Lake, Missoula, and Sanders Counties, Montana

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

Generalized geology

- Alluvium along major streams
- Glacial deposits
- Tertiary basin fill
- Bedrock

Individual wells by total depth:

- 0 - 100 ft
- Between 100 and 300 ft
- 300 - 2,000 ft

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 Flathead Lake Ground-Water Characterization Area is shown as 21,219 wells (Table 1, far right), compared to the earlier total of 18,327 wells shown 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.

Thirty percent of the 21,219 well records for the Flathead Lake Ground-Water Characterization Area are for relatively shallow wells, ≤100 ft deep (Map A). Fifty-eight percent of all well records are within 1 mile of a major stream (Maps B through D). Twenty 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).

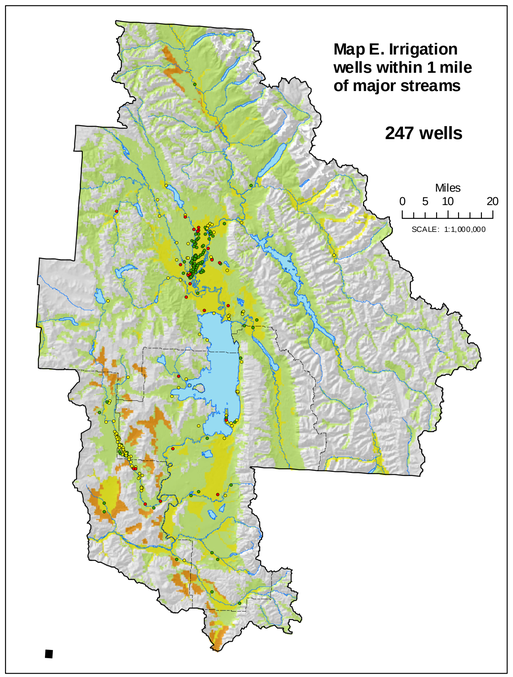
Eighty-six percent of well records in the Flathead Lake Ground-Water Characterization Area are for domestic use wells (see the statistics at far right). Estimates of consumptive use by the US Geological Survey provides another perspective. The total estimated consumptive use of ground water for Flathead and Lake Counties is about 15,200 acre-ft per year. The total amount of water withdrawn from both surface and ground-water sources annually in these counties is about 661,000 acre-ft. For comparison, the average annual discharge of Flathead River at Polson is about 8,360,000 acre-ft. 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.

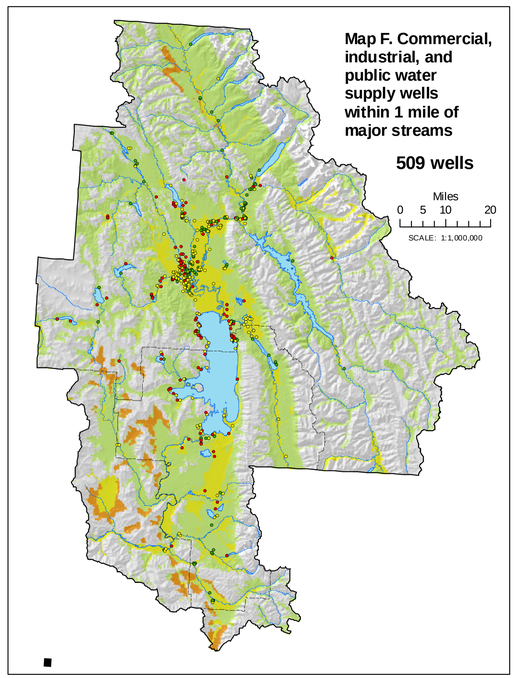
References

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/).

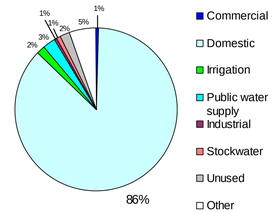
Cannon, M.R., and Johnson, D. R., 2004, Estimated water use in Montana in 2000: US Geological Survey Scientific Investigations Report 2004-5223, 50 p.





Statistics for Wells in the Flathead Lake Ground-Water Characterization Area

General distribution of wells by use



Estimated consumptive use of ground water
(Acre-ft per year, Flathead and Lake Counties)
Source: Cannon and Johnson, 2004

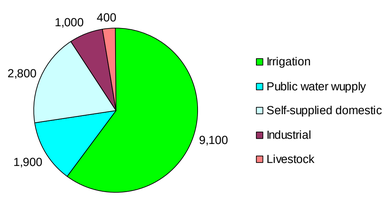


Table 1
Number of wells by selected use, proximity to streams, and depth

	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	21,219	12,492	4,314
Commercial	114	83	43
Domestic	18,376	10,717	3,526
Irrigation	382	247	119
Public water supply	536	370	94
Industrial	75	56	18
Stockwater	225	100	47
Unused	365	202	145
Other	1,146	717	322