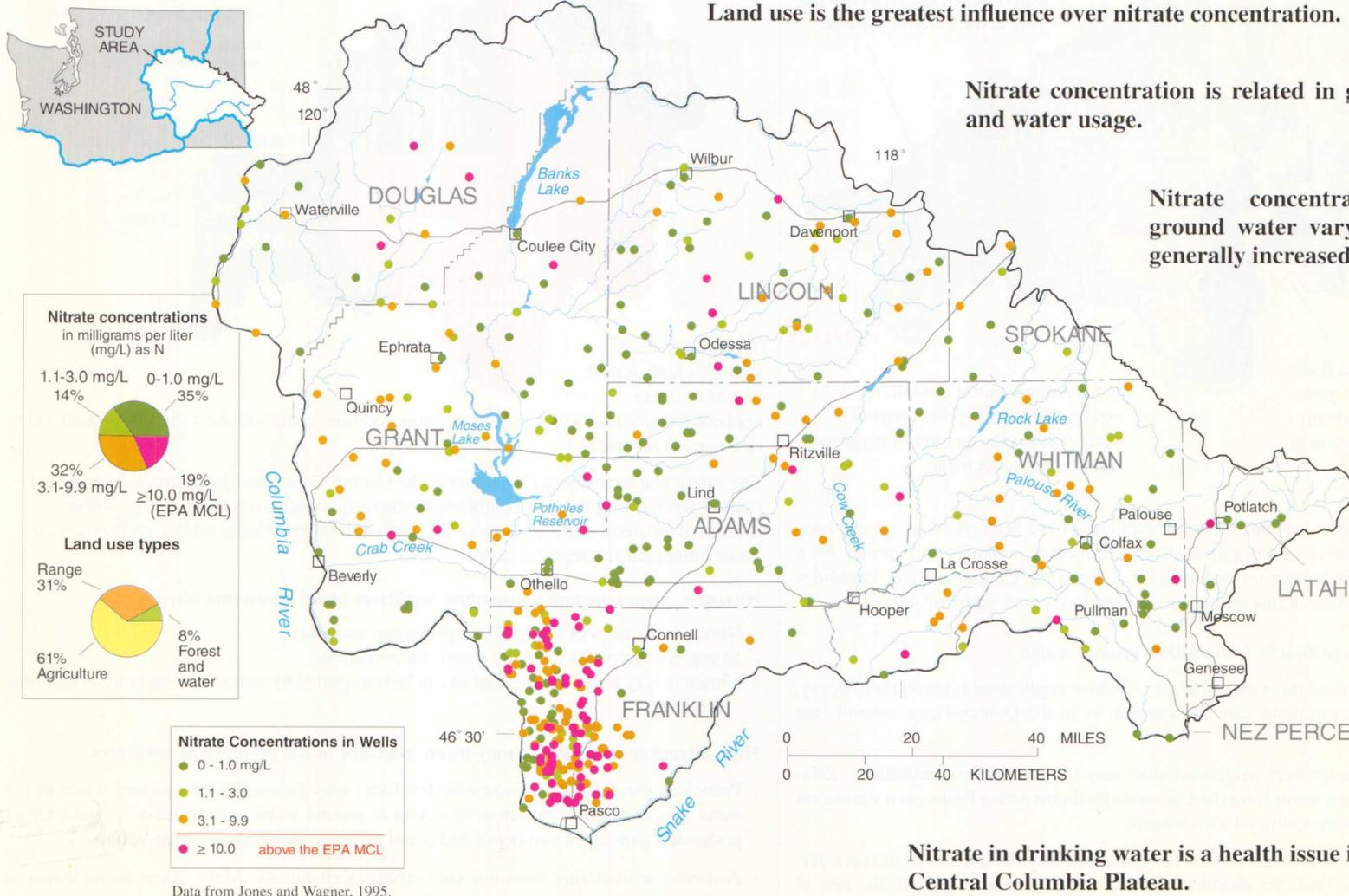


Nitrate Concentrations in Ground Water of the Central Columbia Plateau

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The U.S. Geological Survey (USGS) National Water-Quality Assessment (NAWQA) Program is designed to assess the status of and trends in the quality of the Nation's water resources, and to gain a better understanding of the natural and human factors that affect water quality. The Central Columbia Plateau is one of 60 NAWQA study units (major river basins and parts of aquifer systems) located throughout the Nation. In the Central Columbia Plateau, nitrate concentrations for 19% of the 573 wells shown below exceed the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) for drinking water. These concentrations include USGS samples from 1942-94, although 93% of the data are from 1980-94. Where more than one analysis was available for a well, this document refers to the mean concentration as the nitrate concentration for the well.

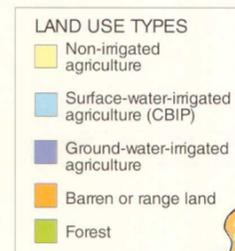


LAND USE practices are the dominant influence over the distribution and concentration of nitrate in ground water.

Nitrogen fertilizers applied to fields are the primary source of nitrate in shallow ground water. Nitrogen fertilizers not used by crops can be carried to the underlying aquifer by water percolating through the soil. In the arid Central Columbia Plateau, irrigation water carries nitrate into shallow ground water. Irrigated agriculture is consequently associated with high nitrate concentrations and high frequency of contamination of ground water in the study area.

County**	Domestic and public supply* wells	All wells
Adams	18%	8%
Douglas	30%	14%
Franklin	33%	33%
Grant	9%	7%
Whitman	4%	5%
Palouse	4%	6%
Quincy-Pasco	29%	28%
North-Central	15%	9%
Study area	21%	19%

*Percentages are similar for Washington Department of Health Class A public supply wells.
**Percentages were not calculated for Latah, Lincoln, Nez Perce, and Spokane Counties, which fall partly outside the study area.



Data from Jones and Wagner, 1995.

Agriculture covers 8,000 square miles, or 61%, of the study area.

Range land covers an additional 4,000 square miles (31%) of the study area. The remaining 1,000 square miles (8%) is largely forest or water (see map below).

Patterns in land use, climate, geology, and hydrology divide the study area into natural subunits suitable for comparison. Different land uses and irrigation practices in each subunit account for much of the variation of nitrate concentration across the study area (see table at right).

Quincy-Pasco subunit

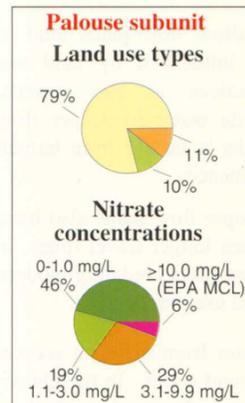
The Quincy-Pasco area is one of the most productive agricultural areas in the country. 99% of water used in the study area supports agricultural irrigation in the dry southwestern region -- mainly in Grant, Franklin, and Adams Counties.

CBIP influence

The Columbia Basin Irrigation Project (CBIP) brings more than 2,500,000 acre-feet of water per year from the Columbia River, through Banks Lake to the Quincy-Pasco subunit.

Palouse subunit

Hills of fine-grained wind-blown sediments, and a relatively moist climate, support non-irrigated agriculture across much of the Palouse.



North-Central subunit

This subunit is characterized by channels of exposed basalt and thin, poor soil. The climate is arid, and deep ground water is the only source of irrigation water. Non-irrigated agriculture in this subunit is much like adjoining areas of the Palouse subunit.

The North-Central subunit's deep water table makes pumping expensive, but irrigated agriculture is possible in the more arable lands bordering the CBIP. High nitrate concentrations appear in the shallower ground water surrounding the CBIP.

