# Ground-Water Quality and Levels, and Surface-Water, Meteorological and Other Environmental Data Collected at Two Storm-Water Retention Basins Near DuPont, Washington, Water Years 1998-2000

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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
TECHNICAL REPORT

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## CONVERSION FACTORS

| Multiply | By | To obtain |
|---|---|---|
| acre | 4,047 | square meter |
| foot (ft) | 0.3048 | meter |
| kilopascal (kPa) | 0.01 | bar |
| | 0.1450 | pound per square inch |
| inch (in.) | 25.4 | millimeter |
| joule (J) | 0.2388 | calorie |
| miles per hour (mi/h) | 0.4470 | meter per second |
| micrometer (µm) | $3.937 \times 10^{-5}$ | inch |
| mile (mi) | 1.609 | kilometer |
| milligram (g) | $3.527 \times 10^{-5}$ | ounce, avoirdupois |
| square meter ($m^2$) | 10.76 | square foot |
| watt (W) | 0.2388 | calorie per second |

Temperature in degrees Celsius ($^oC$) may be converted to degrees Fahrenheit ($^oF$) as follows:

**$^oF=1.8\ ^oC+32.$**

Temperature in degrees Fahrenheit ($^oF$) may be converted to degrees Celsius ($^oC$) as follows:

**$^oC=(^oF-32)/1.8.$**

Chemical concentrations in water are given in milligrams per liter (mg/L) or micrograms per liter (µg/L). Milligrams per liter is a unit expressing the solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter. For concentrations less than 7,000 mg/L, milligrams per liter is equivalent to "parts per million" and micrograms per liter is equivalent to "parts per billion."

Specific conductance is given microsiemens per centimeter at 25 degrees Celsius (µS/cm at $25^oC$).

## VERTICAL DATUM

**Sea level**: In this report "sea level" refers to the North American Vertical Datum of 1988.

**Altitude**, as used in this report, refers to distance above or below sea level.

## BRAND NAME DISCLAIMER

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## ABSTRACT

Hydrologic, meteorological, and other environmental data were collected from water years 1998 to 2000 near two recently constructed storm-water retention basins near DuPont, Washington. A mixture of gypsum, grass seeds, and mulch was added to soils of one of the basins to slow infiltration by water. Six monitoring wells were installed in May 1997 near the two retention basins: one upgradient of the basins, four adjacent to the basin without gypsum, and one near the basin with the gypsum soil amendment. Water-quality samples were collected to monitor possible changes in ground-water chemistry. Ground-water levels in selected wells were measured both manually with a steel tape and with automatic monitoring systems. Water level of an intermittent pond in the gypsum-treated basin was monitored, as were selected meteorological and other environmental variables. The hydrologic, meteorological, and other environmental data are presented in this report.

## INTRODUCTION

Storm-water runoff from highways and urban areas can be a source of contamination to ground water (Hoos, 1990; Granato, 1996). Retention ponds for storm-water runoff from highways commonly are constructed to minimize runoff, erosion, and flooding, and potentially, to reduce amounts of contaminants in water recharging underlying ground-water systems. Possible mechanisms of contaminant reduction in water flowing through retention basins include volatilization and physical and biological breakdown of some contaminant organic compounds, and sorption of some contaminants, particularly trace metals, to sediments that then remain in the basin.

To better understand effects of storm-water retention basins on ground-water quality, the U.S. Geological Survey (USGS), in cooperation with the Washington State Department of Transportation, began an investigation of two storm-water runoff retention basins along Interstate 5 at DuPont, Washington (fig. 1). The study, which began in 1997, included laboratory-based assessments of effects of selected infiltration media on infiltration rate and water quality, and field-based investigation of effects of the two retention basins on infiltration rates and ground-water quality. Results of the laboratory-based assessments have been published (Ames and others, 2001). The field-based investigation was terminated due to the poor hydrologic performance of the retention basins. This report describes the methods of data collection for the field-based investigation and it presents data for ground-water quality and levels, and surface-water, meteorological, and other environmental data collected at the retention basins during water years 1998 to 2000. The water year ends on September 30 and is named for the calendar year in which it ends.