

## Current Status of the Ground Water Quality in the Treasure Valley – July, 2001

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The Idaho Department of Water Resources is responsible for the Statewide Ambient Ground Water Quality Monitoring Program (Statewide Program). The Statewide Program is currently made up of over 1,400 monitoring sites (wells and springs) throughout Idaho. The goals of the Statewide Program are:

1. Determine the overall ground water quality in the major aquifers throughout Idaho.
2. Detect changes and trends in ground water quality.
3. Identify areas of existing or emerging ground water quality problems.

Each monitoring sites is sampled according to a specific time schedule. All of the active sites have been sampled at least two times since 1991; most of them were sampled on a once-every-four-years rotation. As of 2000, the sampling schedule was switched to once every five years for most sites so that about 300 new sites could be added to the network. About 100 sites are sampled every year. These sites, which are called Annual Sites, help provide trend data more quickly than the sites that are sampled less frequently. The types of wells that are sampled include domestic, irrigation, stock, public supply, industrial, and a few other less common uses.

Each monitoring site has been sampled for a wide variety of constituents, such as **common ions** (calcium, magnesium, chloride, sulfate, etc.), **nutrients** (nitrate, ammonia, etc.), **trace elements** (arsenic, copper, iron, zinc, etc.), **radioactive elements**, **volatile organic compounds** (benzene, perk, etc.), **bacteria**, and **pesticides**.

**The drinking water aquifers in the Treasure Valley are grouped into two hydrogeologic systems.** The **Treasure Valley Shallow system** consists of those aquifers that are generally within 250 feet of the land surface and above a distinct layer in the earth known as the “blue clay”. The Treasure Valley Shallow system is made up of gravels and sands with some thin layers of clay between them in some places. The **Treasure Valley Deep system** consists of the aquifers that are generally deeper than about 250 feet and are below the blue clay. These aquifers are made up fine-grained sands that are usually separated by thick layers of clay whose color is often blue or gray.

The ground water quality in the Treasure Valley based on the Statewide Program was documented in a report published by the Idaho Department of Water Resources in 1998. The report indicated that the **ground water at most of the Statewide Program sites was**

**suitable for human consumption.** However, 49 of the 281 sites (**17 percent**) had one or more constituents with concentrations that **exceeded the primary Maximum Contaminant Levels (MCLs)** as established by the Environmental Protection Agency for public drinking water supplies. **Arsenic, bacteria, fluoride, gross alpha, gross beta, nitrate and some volatile organic compounds were the constituents detected above existing MCLs.**

Nitrate levels in ground water are one of the highest concerns in the Treasure Valley. **Why is nitrate a concern?** In infants who are 6 months or younger, nitrate can cause a potentially fatal condition known as methemoglobinemia. Nitrate may also cause miscarriages, contribute to the risk of non-Hodgkin's lymphoma, and affect elderly people who have other infirmities.

**Where does nitrate come from?** Nitrate in ground water comes from nitrogen sources such as septic waste, animal waste, commercial fertilizer, organic materials in the soil, and a couple other minor sources (Figure 1).

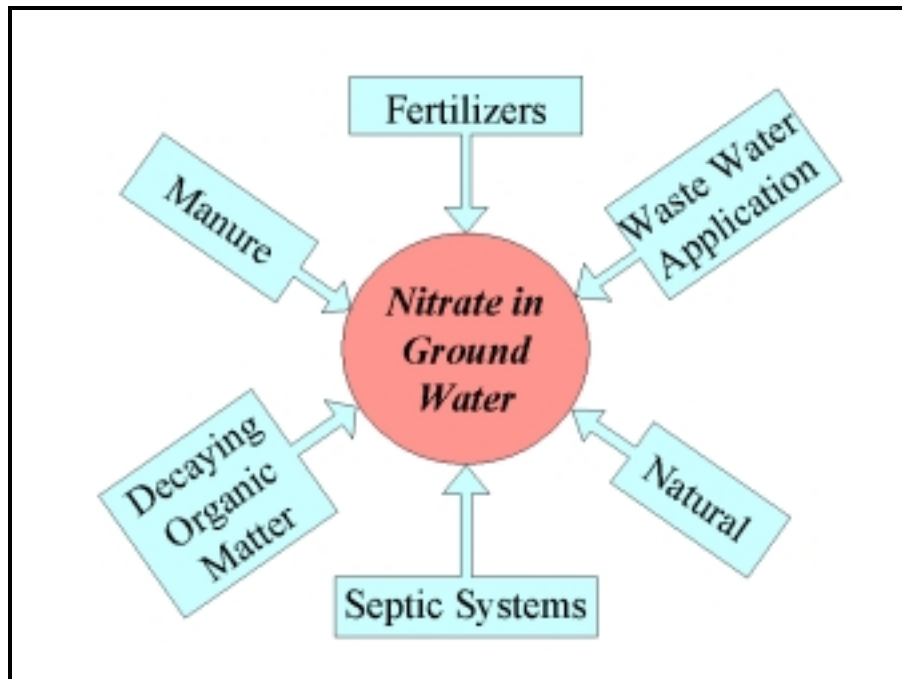
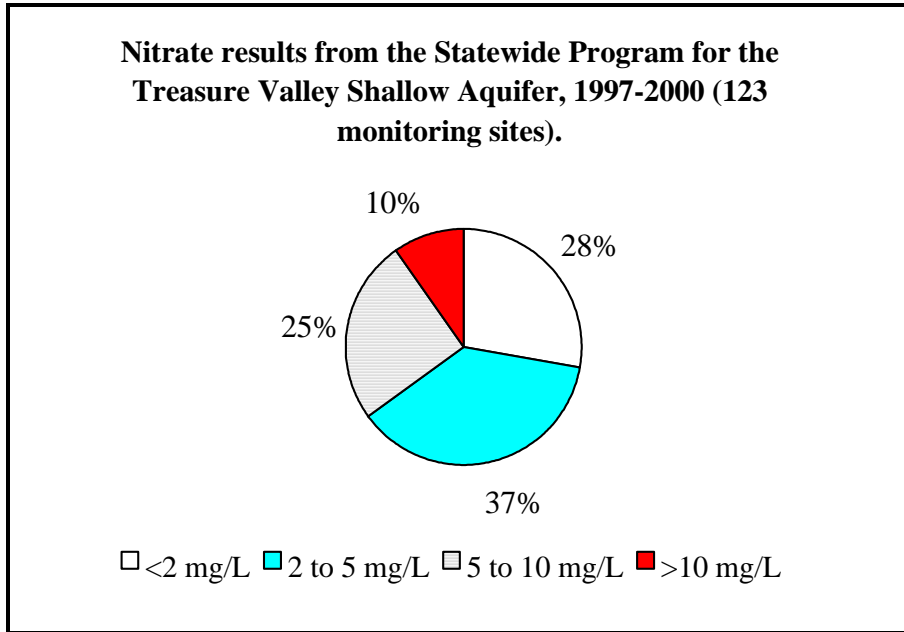


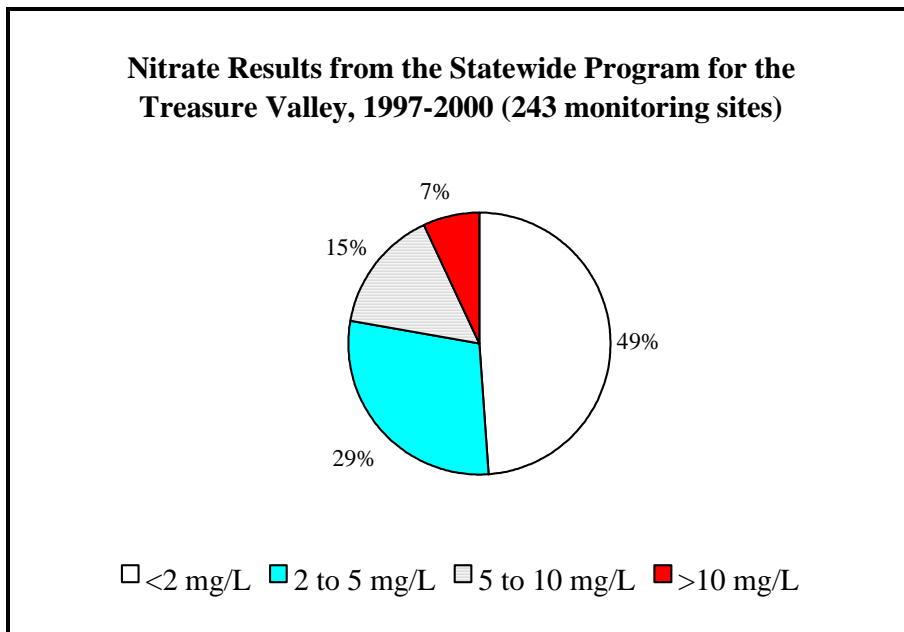
Figure 1. Sources for nitrate found in ground water.

**Which aquifer system is more affected?** In the 1998 report, it was noted that the Treasure Valley Shallow system had considerably higher nitrate values than the Treasure Valley Deep system. This observation shows that the shallow aquifers are more vulnerable to contamination from land surface activities than the deeper aquifers, which are often protected by thick layers of clay that can prevent or impede the flow of contaminants to them. The most recent data (1997-2000) show that **35 percent of the Statewide Program wells in the Treasure Valley Shallow system had nitrate levels equal to or greater than 5 milligrams per Liter** (milligrams per Liter is equivalent to

parts per million). Ten percent of the Statewide Program sites in the Treasure Valley Shallow system had nitrate concentrations over the MCL of 10 milligrams per Liter (Figure 2). For all of the sites (both the Treasure Valley Shallow and Treasure Valley Deep),

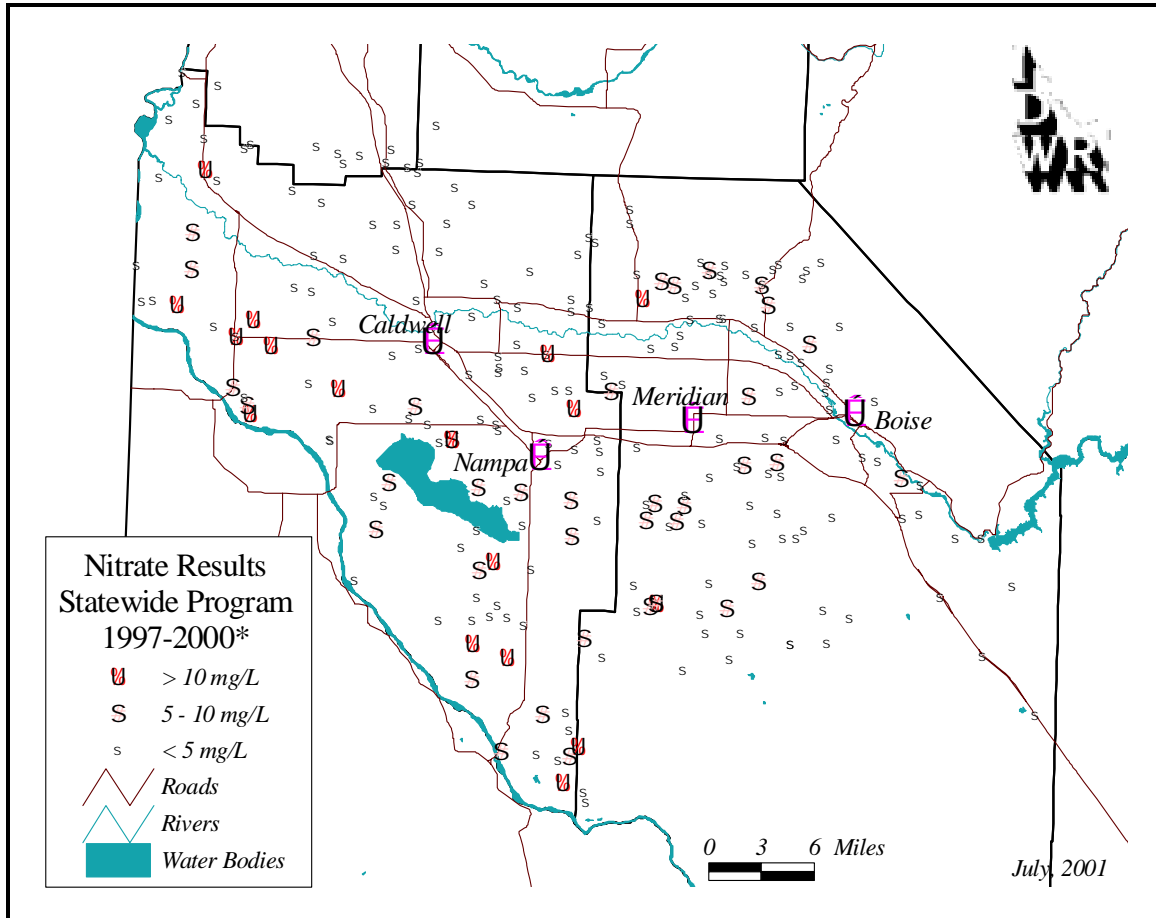


**Figure 2. Nitrate results for the Treasure Valley Shallow Monitoring sites sampled in 1997-2000 (Data are from the Statewide Ambient Ground Water Quality Monitoring Program).**



**Figure 3. Nitrate results for all of the Treasure Valley Monitoring sites sampled in 1997-2000 (Data are from the Statewide Ambient Ground Water Quality Monitoring Program).**

**Where do the high nitrate values occur?** Most of the wells with nitrate over 10 milligrams per Liter are in Canyon County. The nitrate levels are higher south of the Snake River in both Ada and Canyon Counties. In some parts of the two counties, clustering of sites with high nitrate levels are visible (Figure 4).



**Figure 4. Nitrate in ground water for the Treasure Valley, 1997-2000 (Data comes from the Statewide Ambient Ground Water Quality Monitoring Program).**

**How does the Treasure Valley compare with the rest of the state?** In general, the nitrate levels in the ground water are considerably higher in the southern part of the state as compared to the central and northern areas. Ada and Canyon Counties ranked 3<sup>rd</sup> and 4<sup>th</sup>, respectively, in median nitrate levels for the 30 counties in the Snake River Basin area (1995 – 1998 data) (See IDWR’s website: <http://www.idwr.state.id.us/usbr/default.htm>). Twin Falls and Caribou Counties were the only counties in the Snake River Basin with higher median nitrate values during this time period.

**Should the current nitrate levels be alarming?** Certainly, when 10 percent of the sites tested exceed the MCL for nitrate, there is cause for concern. If this study is representative for the entire Treasure Valley, then there could be a lot of shallow private wells with nitrate levels above the MCL. The IDWR recommends that everyone with a private domestic well have it tested for nitrate. If the test results come back high for nitrate, we recommend regular testing (once a year) to see if the concentrations are

increasing. If the nitrate level is above 10 milligrams per liter, the IDWR recommends that the well owner contact the local Health District for information about treatment options.

**Is the nitrate problem in the ground water of the Treasure Valley getting worse?**

That is a difficult question to answer. Some of the results indicate that the nitrate levels may have increased in the last few years. For example, there were over twice as many sites with increases of 1 milligram per Liter than there were sites with decreases of 1 milligram per liter when comparing the data from 1993-1996 to the data from 1997-2000. Also, the number of sites with nitrate concentrations over 10 milligrams per liter increased from 12 to 18 from the 1993-1996 interval to the 1997-2000 interval. However, more data are needed before it can be determined for certain if the changes are part of a long term.

**What other ground water constituents are of concern in the Treasure Valley?** About 9 percent of the sites tested positive for Fecal Coliform bacteria. The results from this particular test indicate that fecal material (human or animal) is in the water. Some types of bacteria, such as E. Coli., can cause serious illness or death. Therefore, the IDWR re-tests the wells with positive detections as soon as possible, and works with the homeowners to eliminate the bacteria, if the well is used for culinary purposes. The IDWR recommends that all owners of domestic wells have their water tested for Coliform Bacteria twice a year. If the test results are positive for bacteria, a second test may be necessary to confirm the presence of bacteria, and the well may need to be sanitized with chlorine bleach.

**Anything else to be aware of?**

In Canyon County, there were some wells with high **arsenic** levels. The EPA is reviewing the MCL for arsenic which is currently 50 micrograms per Liter (equivalent to 50 parts per billion). If the MCL is lowered (as has been proposed), there may be significant implications for public systems and private owners in the Treasure Valley.

**Radioactivity**, as detected through gross alpha, gross beta, uranium and radon tests, is present in the ground water of the Treasure Valley. Some sites in the Treasure Valley had concentrations over the existing or proposed MCLs. The existing and proposed MCLs for these constituents are complicated and difficult to understand. Please contact the IDWR for more information about the occurrence of radioactivity in the ground water, health implications, and testing.

**Pesticides** have been detected throughout the ground water of the Treasure Valley. About 53% of the Treasure Valley Shallow sites had one or more pesticides detected in the ground water; about 31% of the Treasure Valley Deep sites had pesticide detections. Fortunately, the vast majority of the detections were very low in concentration, and well below any known levels for health concerns.

**Volatile organic compounds** occur in the ground water in some areas. Generally, these occurrences are limited in areal extent and associated with a release from a single point. However, in some cases like the perk plume near the Town Square Mall, the gasoline spill near Curtis Road, and the pesticide contamination northwest of Eagle, the contamination is more widespread and poses some serious problems. If a chemical odor or a chemical sheen is noticed in the water, please contact the Idaho Department of Environmental Quality or the local Health District as soon as possible.

In summary, the ground water quality in the Treasure Valley is good, although there are some problems, such as nitrate, bacteria and others, that citizens need to recognize in order to protect their health.