

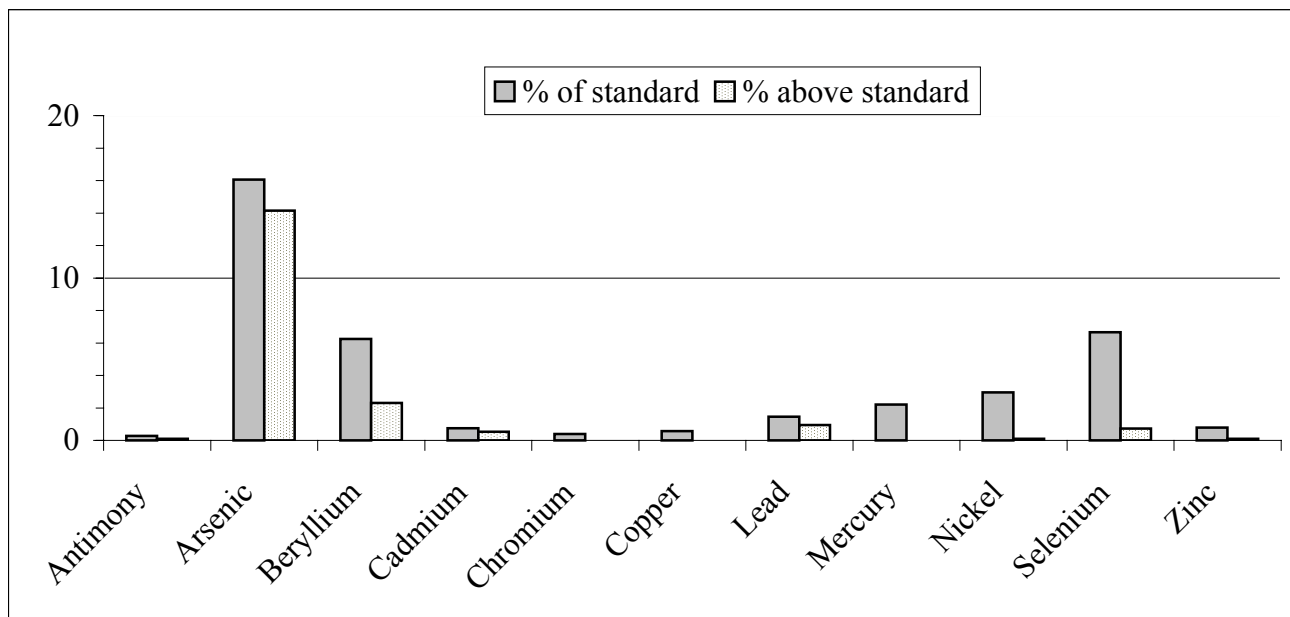
### PBTs in Ground Water

Persistent Bioaccumulative Toxic (PBTs) chemicals are an environmental concern because they are toxic, persist in the environment, often move through different environmental media, and in some cases, biomagnify up the food chain. EPA has put together list of 53 priority PBTs

(<http://www.epa.gov/rgytgrnj/specinit/p2/wmpbt119.htm>;  
<http://www.pprc.org/pprc/pubs/topics/pbt.html>).

Many PBTs have been banned (DDT). Many are the focus of assertive pollution prevention efforts (hexavalent chromium). An important historical source of PBTs was disposal of toxic wastes. Programs such as Superfund and RCRA have diminished the importance of this source. Nonpoint sources are important for some PBTs, particularly pesticides. Air emissions are probably the most important source today. Specific sources for air emissions include industry, open burning, mining, landfills, and vehicles (<http://recetox.chemi.muni.cz/PBTs/content.htm>).

Between 1992 and 1996, GWMAP sampled 954 private wells statewide. PBTs sampled included 11 trace inorganic elements and 8 VOCs. The attached table shows arsenic is the chemical of greatest concern, followed by beryllium, selenium, lead, and cadmium. The median arsenic concentration in the samples was about 16% of the drinking standard, while about 14% of samples exceeded the standard. Chloroform (a VOC) was detected in 4.9% of samples, with a median concentration that was only 0.5% of the drinking standard. The only other organic PBT detected was Naphthalene in one sample.



Our St. Cloud land use study provides information on the distribution of PBTs in shallow ground water. Concentrations of inorganic trace elements were not higher in shallow ground water compared to the private wells sampled during the baseline study. The

presence of these inorganic trace elements is therefore assumed to be associated with natural sources. Nevertheless, we observed higher concentrations of antimony, arsenic, lead, and zinc under urban land uses compared to agriculture or undeveloped land use. VOCs were prevalent in shallow ground water under urban areas, occurring in all samples collected from industrial areas and most samples from sewered residential areas. About 80% of the VOCs detected were chlorinated hydrocarbons. Not all of these are listed as PBTs, although they are persistent and toxic and probably will eventually make the list. We did not detect PAHs (10 are listed as PBTs) in shallow ground water.

Most of the remaining PBTs are relatively immobile in the environment and would not be expected in ground water, although chlorinated insecticides are often found in shallow ground water from depositional areas (e.g. rivers). Phthalates, phenols, and nitrobenzene are possible exceptions, since these are more mobile. USGS is currently doing some sampling for PBTs and endocrine disrupters in the Midwest, although most of their work focuses on surface water.

For more information, read our draft fact sheet on PBTs.

[OCCURRENCE OF PERSISTENT, BIOACCUMULATIVE TOXIC \(PBTs\) IN GROUND WATER](#)