

What Did TCEQ's Monitoring Program in Urban Areas Find in the Groundwater ?

The Texas Commission on Environmental Quality's (TCEQ) Public Drinking Water Section and the United States Geological Society (USGS) have conducted pesticide monitoring in Texas for many years. In 1999, TCEQ began using a method of analysis called immunoassay which is capable of measuring much lower levels of pesticides in water than previous analytical procedures. TCEQ used this method to screen groundwater samples in the first statewide screening program for atrazine, a widely used herbicide.

In 2000, another herbicide called metolachlor was added to the statewide aquifer screening program. In coordination with the Texas Water Development Board (TWDB) and individual Groundwater Conservation Districts (GCDs), TCEQ analyzed samples for these herbicides quarterly over a five-year period. The immunoassay screening detected mostly very low concentrations of atrazine and metolachlor (less than 0.05 parts per billion, or about 0.05 ounces in 31,000 tons). However, this screening was also able to identify a clustering of low atrazine detects in the central Panhandle. Most of the atrazine concentrations were below drinking water standard Maximum Contaminant Levels (MCLs). The data from certain water wells triggered Texas State Pesticide Management Plan activities, so the Texas A&M AgriLife Extension Service (AgriLife Extension) worked with crop producers and water well owners to provide education and outreach in the High Plains region of the state. TCEQ used the data results to focus these educational and outreach efforts, as well as additional monitoring in this one area of the state, rather than spreading limited resources throughout a state-wide aquifer system.

In the summer of 2007, TCEQ worked with local authorities to screen groundwater for pesticides in the San Antonio and Austin urban areas. TCEQ used the immunoassay analysis to test for several pesticides. These were atrazine, the pyrethroids, several organophosphates, such as chlorpyrifos and diazinon, and several carbamates. These chemicals were commonly used in lawn care and for homeowner insect control. The results were encouraging, as detections were few, and all were in low concentrations. TCEQ continued urban pesticide monitoring through 2010. These most recent efforts expand upon the number of wells and springs, additional pesticides analyzed that were not monitored previously, and also began monitoring golf courses in 2010. Additionally in 2010, TCEQ monitored the primary cotton crop area in the southern and central portions of the Panhandle. All of these most recent efforts indicate limited impact of pesticides to groundwater, with very few detections of atrazine and diazinon at very low concentrations, and even more rarely trace detections of 2,4-D and alachlor.

Through such programs and investigations, TCEQ has identified and characterized several issues concerning pesticides and groundwater:

- Most sites where agricultural pesticides were detected in groundwater appear to result from mixing and loading of pesticides in facilities located near water wells;
- Several of the investigated wells were (or were near) old, corroding water wells that were abandoned or improperly plugged; and,

- A number of detection sites were also associated with seasonal surface water features such as playa lakes and intermittent creeks.

Once well owners and pesticide applicators are aware of problems and ways in which pesticides can migrate into groundwater, it is easier for them to make corrections and avoid or minimize potential contamination in the future. The most common ways to avoid contaminating a water well and/or groundwater are:

- Follow best management practices and the pesticide's label instructions when locating a domestic water well near crop land or gardens.
- Locate pesticide storage, mixing, loading, and cleanup areas using the pesticide's label instructions and best management practices the recommended distance from a water well, and build a secondary containment structure to prevent spills from draining into the well and wellhead area.
- Avoid creating conduits that allow surface water to enter groundwater (i.e., do not locate trenches, burn pits, excavations, tailwater ponds, or septic systems in close proximity to a water well).
- Read and understand the pesticide label for proper use. If you have questions, contact your County AgriLife Extension Agent or pesticide distribution/sales representative for clarification.
- Create (or seek assistance in preparing) a pesticide management program by identifying:
 - The location of your water well(s) and any nearby underground conduit locations, surface drainage, or ponding areas;
 - Your water well's age, depth, diameter, screened interval, water table depth, pump information, etc.;
 - The location of any other nearby wells, especially any abandoned water wells, petroleum production wells, exploration wells, or disposal wells;
 - Typical signs of wellhead or casing deterioration;
 - Former land use and the location of potential sources of contamination, both on your property and on adjacent properties;
 - The location of crop or garden areas and other pesticide application areas;
 - Your soil type, underlying aquifer(s), and local topography (i.e., the lay of the land that would indicate the source and direction of runoff);
 - Non-pesticide alternatives, such as hand weeding and beneficial insects; and,
 - Contact information (names, phone numbers, and websites) related to pesticides, water wells, water quality, and the closest GCD (for information regarding your aquifer characteristics and limitations).

Water well owners may easily obtain some of this information while other details may require more effort or assistance to collect. However, in general, the use of best management practices and the pesticide's label instructions can help ensure your family's health, protect what may be your only source of drinking water, and safeguard the state's groundwater resources. Additionally, for areas where groundwater may eventually discharge into creeks or springs, these efforts will also protect the environment for animal and plant life. Your state and local agencies are working hard to protect the state's water resources and water quality for the present and the future. With the help of educated,

caring citizens, together we can protect, conserve, and ensure clean drinking water for generations of Texans to come.

References:

- Texas State Management Plan for Prevention of Pesticide Contamination of Groundwater (TCEQ SFR-070/01), http://www.tceq.texas.gov/assets/public/comm_exec/pubs/sfr/070_01.pdf
- Landowner's Guide to Plugging Abandoned Water Wells (TCEQ RG-347), https://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg-347.pdf
- Capping of Water Wells for Future Use (AgriLife Extension L-5490), <http://www.agrilifebookstore.org/Default.asp>
- Solving Water Quality Problems in the Home (AgriLife Extension L-5450), in Spanish (AgriLife Extension L-5450S), <http://www.agrilifebookstore.org/Default.asp>
- Protecting the Environment Using Integrated Weed Management in Lawns (AgriLife Extension L-5324), <http://www.agrilifebookstore.org/Default.asp>
- Water Conservation Best Management Practices Guide (TWDB 362), http://www.twdb.texas.gov/publications/reports/numbered_reports/doc/r362_bmpguide.pdf

Websites:

- Texas Groundwater Protection Committee, <http://www.tgpc.texas.gov>
 - Agricultural Chemicals Subcommittee, <http://tgpc.texas.gov/tgpc-subcommittees/tgpc-agricultural-chemicals-subcommittee/>
 - Pesticides, <http://tgpc.texas.gov/pesticides/>
- Texas Department of Agriculture Pesticide Program, http://www.agr.state.tx.us/agr/program_render/0,1987,1848_5319_0_0,00.html?channelId=5319
- TCEQ Pesticides and Groundwater, http://www.tceq.texas.gov/permitting/water_supply/groundwater/pesticides.html
- Texas Water Resources Education, <http://texaswater.tamu.edu/>
- Texas Department of Licensing and Regulation,
 - Abandoned and/or Deteriorated Wells, <http://www.license.state.tx.us/wwd/wwd.htm#adw>
 - Abandoned Well Determination Checklist, <http://www.license.state.tx.us/wwd/Abandoned%20Well%20Determination%20Checklist.pdf>
- Texas Alliance of Groundwater Districts, <http://www.texasgroundwater.org/>
- Texas A&M AgriLife Extension Service, <http://agrilifeextension.tamu.edu/>
- Tex*A*Syst website, <http://blackland.tamu.edu/decision-aids/texasyst/>
- Tex*A*Syst publication (especially B-6025), Tex*A*Syst: Reducing the Risk of Ground Water Contamination by Improving Pesticide Storage and Handling, <http://blackland.tamu.edu/decision-aids/texasyst/reducing-contamination-by-improving-pesticide-storage-and-handling/>
- TWDB Water Information Integration & Dissemination (WIID) online database, <http://www2.twdb.texas.gov/apps/WaterDataInteractive/GroundWaterDataViewer>

For additional Frequently Asked Questions (FAQs) related to groundwater quantity, groundwater quality, septic systems, water wells, administrative entities, and publications, visit the Texas Groundwater Protection Committee's FAQ webpage at <http://tGPC.texas.gov/frequently-asked-questions-faqs/>.