Picturesque windmills that dot Nebraska's landscape can hide some dirty little secrets.

"We all like to see windmills, but few of us stop to think they can contribute to groundwater contamination," said Dave Shelton, a University of Nebraska-Lincoln Extension agricultural engineer.

It's not the windmills themselves, but the old water wells beneath them that can contribute to groundwater pollution.

"Often, these wells are deteriorating and no longer used, but the well shaft is still a direct connection from the ground surface to the underlying aquifer. This can allow surface runoff to flow directly to the aquifer, often carrying organic wastes, fertilizers and other chemicals such as pesticides and petroleum products into the groundwater.

"Small animals can fall into these wells, further adding to the contamination," Shelton said.

Contaminants entering old, out-of-service wells can migrate to in-service wells and other water supplies as well and once groundwater is contaminated, it is difficult to impossible to clean up and the process is always expensive.

Unused wells, especially those in disrepair, or that do not meet current standards as an inactive well, pose a major threat to groundwater quality and represent a serious threat to human health and safety. State law defines these as illegal wells, Shelton said.

There are thousands of these wells across Nebraska. Over many years, farm consolidation, rural electrification and general modernization took many of them out of service.

"Throughout the years when a new well was drilled, the owner often neglected to properly decommission the old well," Shelton said.

Not all out-of-service wells are on farms or ranches. Many more are located in communities throughout the state.

"When communities were developing, most households and businesses had an individual well. Most of these have since been replaced by public water sources, but in some cases, the old wells were not properly decommissioned," Shelton said.

State law requires illegal wells be properly decommissioned. With only one exception, for certain types of driven sandpoint wells, well decommissioning must be carried out or supervised by someone holding a Nebraska Water Well Standards and Contractors' license. The process includes removing well equipment such as pumps, piping, etc., disinfection, sealing, filling, capping and reporting.

Cost depends on several factors including accessibility, construction technique and materials, diameter, depth, condition of the well and contractor expenses.

"Generally it's not particularly expensive. For example, in conjunction with a special water quality educational program in the Shell Creek watershed, 27 out-of-service wells were decommissioned from 2005 to 2007 at an average cost of $388 per well. Most of these were small-diameter domestic and livestock wells, although at least two were deeper, larger-diameter wells that cost approximately $850 and $1,100 each," Shelton said.

To help with these costs, most of Nebraska's Natural Resources Districts offer an incentive to assist owners with these expenses.

More information on well decommissioning, links to the NRDs, and other water-related topics can be found online at http://water.unl.edu.