

Unregulated water sources on the Navajo Nation: Opportunities for public health protection and student involvement in STEM disciplines

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Unregulated water supplies on the Navajo Nation are primary sources of household water for some rural areas. Although these sources might not provide water that is safe for human consumption, some residents of the area have no good alternative. Unregulated supplies were developed primarily for livestock. Accordingly, water quality, especially as it affects human health, has received little attention.

Dine College, the community college system of the Navajo Nation, has a total annual enrollment of about 4,000 students. The system has eight campuses in New Mexico and Arizona. The Dine Environmental Institute on the Shiprock campus offers students the opportunity for summer experiences with environmental data collection and interpretation. The summer classes and internships focus on issues

important to the Navajo people, including water quality.

The Region 9 water quality coordination project provided technical support and instruction for evaluating water quality in unregulated supplies in the northern Navajo Nation. The project paired faculty and students from the University of Nevada and Dine College. The project involved repeated sampling of unregulated water supplies for a range of contaminants, including E. coli, uranium, arsenic, and fluoride. Students from the two institutions travelled throughout the northern region of the Navajo Nation to locate unregulated supplies, measure physical characteristics of water, and inspect each site. The work began in 2007, and the teams have sampled about 98 wells in three sampling seasons. This provides a substantial

addition to information about quality in these supplies, especially because about 15 unregulated water supplies have been sampled in three consecutive years.

Sampling showed that water exceeded federal standards for arsenic (30 percent of those sampled), uranium (11 percent), and fluoride (3 percent). Also, 15 percent of supplies tested contained E. coli.

This information was used to support educational efforts and further testing, and to extend public water supplies to rural portions of the Navajo Nation. However, the most profound impact has been on the Navajo students involved in the program who have developed interests in STEM disciplines and skills that qualify them for technical work focused on water quality



Students from Dine Community College carry out field measurements at the discharge pipe for an unregulated water supply on the Navajo Nation, with Dr. Mark Walker.