

EDUCATION

Finding NEMO: Integrated Watershed Management and Educational Outreach

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Rural Arizona communities and watershed partnerships are finding mapping support, hydrologic watershed modeling, and land-use planning resources through the Nonpoint Education for Municipal Officials (NEMO) Program of the University of Arizona's Cooperative Extension.

Nonpoint-source water pollution—pollution that originates from a broad or diffuse area—results from a variety of human land uses, such as increased urbanization, agricultural practices, abandoned mine sites, forestry activities, home septic system failure, and construction site activities. These pollution sources cannot always be controlled at a single location and can only be curbed by implementing land management practices at multiple levels. Arizona NEMO integrates watershed management and planning with research-based, professional education in order to engage stakeholders and foster better land-use decisions. Emphasis is on the linkages between water supply and quality. In addition, NEMO supports the use of geographical information systems (GIS) to simulate and predict the impact of land-use changes.

Educational outreach is an important aspect of the NEMO program. Arizona NEMO organizes stakeholder-group workshops, publishes watershed-based planning documents on its Web site, and is developing a toolbox of Arid Region Best Management Practices. Arizona NEMO partners with and is funded by the Arizona Department of Environmental Quality (ADEQ).

Watershed-based plans include the identification of subwatershed areas susceptible to water quality problems and pollution, nonpoint-source pollution

to control, and management measures needed to protect or improve water quality. In Arizona, excessive sediment is the principal nonpoint-source pollutant in 36 percent of the 409 stream miles classified as impaired. The impact of nonpoint-source sediment pollution is over three times greater than impairment caused by the next leading constituent, dissolved and particulate metals from abandoned mine sites. To identify subwatershed areas within the Bill Williams, Verde, and upper Gila watersheds that are at elevated risk of nonpoint-source sediment and abandoned mine-site related pollutants, NEMO applied GIS mapping and modeling tools to identify locations where implementation of management measures would optimize water quality improvement.

For example, for the Upper Gila Watershed Partnership, a NEMO project included hydrologic modeling to prioritize the location of stream restoration projects. The Automated Geospatial Watershed Assessment–Soil Water Assessment Tool (AGWA-SWAT) was used to illustrate the effects of land-use change on runoff and erosion across the Upper Gila watershed from the New Mexico border, and identified several subwatershed areas

vulnerable to water quality degradation due to nonpoint-source sediment. Projects were identified within areas of concern and the partnership received two competitive grant funds totaling \$182,600 from ADEQ's Water Quality Improvement Grant Program. Another NEMO project included extending and improving road drainage culverts and stream bank protection structures to preserve, protect, and improve water quality by reducing sediment discharge and excess organic input to the San Francisco River. The Central Detention Dam Rehabilitation Project focused on debris and sediment clearing and invasive vegetation removal.

The arid climate and unique stormwater hydrology of Arizona, coupled with increased urbanization and development, will only exacerbate nonpoint-source water pollution. To ensure the sustainability of water resources, careful water management practices and wise land-use decisions are critical. Arizona NEMO is becoming an important partner for land-use decision makers, resource managers, and watershed groups across the state.

Visit Arizona NEMO at www.srn.arizona.edu/nemo/ and the national program at www.nemo.uconn.edu. Contact Kristine Uhlman at kuhlman@ag.arizona.edu or 520-621-5951.

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