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Section 2: Non-Point Source Pollution: Modeling Water Quality Impacts of On-Site Wastewater Treatment Systems

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SECTION 2: NON-POINT SOURCE POLLUTION: MODELING WATER QUALITY IMPACTS OF ON-SITE WASTEWATER TREATMENT SYSTEMS

Dr. Mengistu Geza of the Colorado School of Mines, gave a presentation about a new computer modeling program that he has been working with to model water quality impacts of on-site wastewater treatment systems, typically seen in septic tanks in rural communities. The modeling program, called the Watershed Analysis Risk Management Framework ("WARMF"), differs from other modeling systems in that it takes into account pollution created by on-site wastewater treatment systems; other programs typically ignore this source of pollution.

On-site wastewater treatment systems serve about twenty-five percent of the population of the Unites States, and nationally treat fifteen billion liters of wastewater daily. These systems treat wastewater at the site of the use, either through a septic tank or a septic tank and media filters such as sand, before delivering the treated water into the soil and, subsequently, into adjoining ground water systems. On-site wastewater treatment systems release various contaminants into water systems including: organic contaminants, such as solvents, fuels, pharmaceuticals, and personal care products; inorganic contaminants, such as nitrates, phosphates, and metals; and microbial contaminants such as viruses, protozoa, and bacteria.

Most modeling systems ignore these inputs and instead focus on meteorological conditions, managed flows, point source pollution and watershed characteristics, such as land use and soil layers. However, while WARMF takes these inputs into account, it also accounts for pollution created by on-site wastewater treatment systems, thereby providing a more comprehensive model of contaminant pollution in waters. WARMF consists of five modules, all of which allow for inputs at various stages during the development of the model: (1) engineering, (2) knowledge, (3) data, (4) TMDL, and (5) consensus. In the engineering module, the user inputs different land use practices, conversion of septic systems to sewer systems, and application of best management practices. In the knowledge module, the user can store data on laws, regulations, and case studies, as well as cost benefit information. In the data module, the user inputs time series information, such as diurnal and seasonal flows. The TMDL module calculates TMDLs based on water quality criteria and whether pollution is either point or non-point source. The consensus module allows stakeholders to participate in the decision-making and modeling processes.

Additionally, WARMF has the capability to account for nutrient removal achieved by on-site wastewater treatment systems to evaluate the efficiency of such wastewater treatment systems in comparison with wastewater treatment plants. This information will allow communities primarily served by on-site wastewater treatment systems to more effectively analyze their need to convert to wastewater treatment plants.

Dr. Geza stated that his work has shown that WARMF is a more suitable tool for watershed studies in areas that use on-site wastewater treatment systems than other computer models. He further stated that WARMF is a decision-making tool to evaluate whether using an on-site wastewater treatment system or a traditional centralized sewer system will create more pollution to a certain body of water.

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SECTION 3: TEMPERATURE REGULATION—GENESIS

Mr. William C. Allison, V of the Colorado Attorney General's Office focused on the Colorado Water Quality Control Commission ("CWQCC"); the agency in charge of setting water quality standards, and the Water Quality Control Commission ("WQCC"), the agency charged promulgating temperature standards. The existing standards for temperature regulation were established in 1978 and remain unchanged. In 2001, the WQCC undertook to change the standards. His presentation discussed the issues that must be resolved in the promulgation of the new standards.

Mr. Allison began by outlining CWQCC's authority of the granted by the Clean Water Act ("CWA"). Section 101 authorizes the regulatory authority of the state, in this case the CWQCC, to oversee the biologic integrity of water, including heat pollution. Mr. Allison emphasized that not all temperature fluctuations are considered pollution, and spoke of the important role that natural fluctuations play in the aquatic community. The temperature fluctuations that the CWQCC and the WQCC are concerned with regulating are "man-made" or "man-induced" changes from activities such as water treatment discharges, power plants and other industrial uses of water, and water management activities. Mr. Allison stated that the temperature control standards must be protective, as the temperature of a water body provides a barometer of its overall health.

The existing standards consist of a numeric temperature limit, as well as a narrative description of the of the temperature standard. Stakeholders have criticized these standards as containing no clear basis, encouraging inconsistent application, and creating disagreements regarding attainment of the standards. Because of these problems, the WQCC convened a workgroup made up of stakeholders to address new standards. At the June 2005 rulemaking hearing, the stakeholders could not reach a consensus regarding the new standards. The stakeholders diverged in their recommendations as to whether the new standards should be numeric only, narrative only, or some combination of the two. Consequently, the WQCC scheduled a rulemaking hearing for January 2007.

Mr. Allison next addressed the central temperature criteria concepts that the WQCC must address in order to best protect the water body. These include the reproductive functions of organisms living in