WATERS Network: An Environmental Observatory Initiative of the U.S. National Science Foundation Engineering and Geosciences Directorates

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Degradation of U.S. water resources is occurring at an unprecedented rate as a result of changes in the ways in which we interact with our environment. Until now engineers and policy makers have been hampered in their ability to respond to these rapid environmental changes by deficiencies in our current scientific understanding of the dynamics and spatial variability of environmental processes, and how long-term environmental phenomena and human activities interact to influence these processes. However, with recent advances in information technology and environmental sensors, researchers are now in a position to answer questions about multiscale, spatiotemporally distributed hydrologic and environmental phenomena through the use of remote and embedded networked sensing technologies. The **WAT**er and **E**nvironmental **R**esearch **S**ystems Network (WATERS Network), a new joint initiative between the hydrologic and environmental engineering research communities and funded by the National Science Foundation Engineering and Geosciences Directorates, will be an integrated real-time observing system that will enable academic and government scientists, engineers, educators, and practitioners to advance effective management of U.S. water resources by understanding human interactions with water and the natural and built environment. The network will consist of the following elements:

1. A **network** of highly instrumented field facilities for acquisition and analysis of environmental data

2. An environmental **cyberinfrastructure** that provides data archives, collaboration and networking among community members, and information technology

for engineering modeling, analysis, and visualization of data

3. **Multidisciplinary synthesis** of research and education to exploit instrumented sites and networked information; formulate engineering and policy options to protect, remediate, and restore stressed environments and promote sustainable environmental resources

4. A **measurement facility** that assists with and provides training on sensor deployments, measurement campaigns, and sensor development

Once completed, the WATERS Network will enable multi-scale, dynamic predictive modeling for water, sediment, and water quality, including the real- or near-real-time assimilation of data and point- to national-scale predictions. This presentation will provide an overview of the WATERS Network vision, conceptual design, and planning activities.