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On behalf of the National Institutes of Water Resources (NIWR) to the
House Committee on Natural Resources, Subcommittee on Water and Power
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Madame Chairwoman:

My name is Deborah Swackhamer, and I am a Professor at the University of Minnesota, Minneapolis and Co-director of the University's Water Resources Center, one of the Water Resources Research Institutes under discussion as part of today's hearing. I am testifying today on half of the National Institutes of Water Resources, the organization that collectively represents the state water resources research institutes. I serve as President-elect of this organization.

I am here to testify in support of H.R. 5487, the Water Resources Research Amendments Act of 2010. This bill has been introduced by Congresswoman Napolitano to amend the Water Resources Research Act of 1984 to reauthorize grants for, and require applied water supply research, the Water Resources Research Institutes established under this Act.

The Water Resources Research Act establishes a federal/state/university partnership in water resources research, education, and information transfer and dissemination. There are a total of 54 Water Resources Research Institutes created by this act, located at the land grant universities of the 50 states, as well as in the District of Columbia, the Virgin Islands, Puerto Rico, and Guam. The Act authorized a state-based network of institutes dedicated to solving problems of water supply and water quality in partnership with universities, local governments and the general public. It is the only federally mandated research network that focuses on applied water resources research, education, training and outreach. These institutes provide a direct and vital link between federal water interests and needs, and the academic expertise located within the states' research universities. This Act provides a mechanism for ensuring state, regional, and national coordination of water resources research, the education of future water professionals, and the transfer of results and outcomes to state and federal water professionals. The matching requirements of the program ensure that states invest in water research and training.

This bill reauthorizes the two grant components of the Water Resources Research Institutes program (Section 104(f)). The first component is the base grant program which is divided up equally among the institutes. There is a requirement that each federal dollar must be matched by 2 non-federal dollars, and that federal funds cannot be used to pay indirect costs at the universities. This is the strictest match requirement of any federal research program. Each Institute uses these funds to leverage research and/or student training through a state-wide competitive grants process. In FY2010, each Institute received $92,335, or a total appropriation for the base program of $5.2 million. H.R. 5487 would authorize up to $12 million through FY2016.

The second grant component is a national competitive grants program that has the objective of supporting research on water resources problems that are regional or national in nature. This program typically receives 50-60 applications annually, which undergo rigorous peer review from a national panel. This panel selects 7-8 projects for funding, making it as competitive and as rigorously peer-reviewed as other federal research programs. H.R. 5487 recommends authorization of this program at $6 million through FY2016.

The National Institutes of Water Resources supports both of these recommendations.

In addition, this bill will require “a careful and detailed evaluation of each institute at least once every 5 years”. We welcome and endorse such scrutiny and evaluation of our processes, our quality, our effectiveness, and our ultimate impact on water resources resulting from our research. We strongly endorse the 5 year time frame of this evaluation cycle, given the time necessary to demonstrate those impacts. There are process components that can be evaluated on short time frames, using metrics such as funds leveraged, numbers of papers published, numbers of grants awarded, numbers of students trained, and the like. But what matters most, to us and to you, is the impact of our program through its contributions to improving water supply reliability, addressing other water quality and supply problems, producing new water professionals for the work force, and disseminating our results to water managers and decision makers. To evaluate these impacts, one must be able to evaluate both the *outputs* (e.g. number of papers published or students trained) and the *outcomes* or impacts (how the results were used by decision makers, or how the student has used their training to establish a successful career).

The outcomes may take several years to manifest themselves – consider this very typical scenario. A two-year grant is awarded in year 1, the research is completed in year 3, the paper and outputs are available and disseminated in year 4, and the implementation of these results would not be until year 5 or even later. And for grants awarded in years 2 or 3, one can see that the research would not be in a condition to be evaluated for effectiveness by year 5. Thus the National Institutes of Water Resources supports the 5 year evaluation time period. I wish to emphasize that we are accountable to the US Geological Survey with an annual reporting requirement that addresses what I referred to above as outputs – this includes the grants we have awarded, the students we have trained, the papers we have published, and how we have disseminated our results, in additional to financial reporting. Thus the annual reporting to the US Geological Survey in combination with the 5 year external evaluation by the Secretary of the Interior will be very complimentary and efficient to ensure that our programs are of high quality and high impact.

Let me address the effectiveness of this program, and do this from my perspective as an academic researcher, and as one of the Institute directors. Let me share with you some personal stories from the University of Minnesota's Water Resources Center. First, let me talk about research quality and impact. The Water Resources Center awards approximately 3 grants per year, and with the leveraging requirement, we are able to sponsor research that is valued at three times the federal investment. The impact of our research has been felt across a range of water issues, from storm water management to agricultural practices to the development of wireless monitoring technologies. Our research results have been used by the state environmental and natural resource agencies to improve Total Maximum Daily Load studies in the state, identify pollutant sources affecting water quality, and to identify priorities for the state in terms of water management. Currently, we are working with the state agencies, the state Legislature, the local and regional water management organizations, and the general public to develop a 25 year Water Sustainability Framework – a long-term roadmap for the state to follow to ensure adequate water supply and quality for human and ecological uses for all future generations (see http://wrc.umn.edu/watersustainabilityframework/). The request from the Minnesota Legislature specifically to our Center is a huge testament to the trust and confidence we have established with them based on our past successes and contributions. Several other of our sister Institutes are also engaged in state-wide water planning.

The Minnesota Water Resources Center sponsors an annual conference for water professionals, managers, and researchers. The attendance has grown to more than 700 professionals, from the state agencies to water organizations to private consultants to college and university researchers. It is a highly successful event that greatly contributes to information transfer and dissemination, in that it brings these different audiences together for two days of presentations, workshops, and national plenary speakers. It is the one time of year that the entire water resources community comes together under one roof. We also have an extensive website, hold 75 or more training and education workshops a year, and have begun to include social media platforms (Facebook, Twitter) in our dissemination activities. Like most Institutes in the program, we produce a newsletter and distribute it to thousands of readers, both electronically and in print.

Minnesota has a highly successful graduate education program in Water Resources Science, inspired by the Water Resources Research Institute program. Masters and PhD students must take a rigorous, interdisciplinary curriculum that prepares them for any and all aspects of water resources-related careers, including water chemistry, biology, engineering, and policy. We have over 100 faculty that assist in teaching and advising within this program, and have approximately 80 active students from around the country and the world. We have graduated approximately 100 MS students and 30 PhD students since this program began 14 years ago, and they are making an impact in positions within federal agencies, state agencies, private industry, consulting firms, non-governmental organizations, and academia. The training of students is a critical role for our Institutes, to provide future professionals to invigorate and backfill a water resources workforce that is constricting as the "baby-boomer" professionals retire.

The Water Resources Center at Minnesota takes this valuable appropriation from the US Geological Survey, and leverages institutional support, and research support through the 2:1 matching requirement. Institutionally, the University of Minnesota recognizes the value and

continuity of this federally authorized center, and invests in it through my salary and a staff administrator. The University of Minnesota Extension has developed joint programs with our Center, and we are a large part of their water outreach and public engagement, especially on small community septic systems and on agricultural best management practices to protect water quality. Because of the institutional support and the foundation that the WRRI platform provides, we are successful at competing for funds to do additional research, education and outreach. We receive a little more than $92,000 from our Congressional appropriation annually, and turn this into a $3 to $4 million dollar budget, resulting in an investment ratio of 30 or 40 to one. Our sister institutes are also effective at utilizing the USGS investment to make a difference in their states, with an overall program ratio of about 19 to 1. As a result, this is one of the most cost-effective, cost-shared national research programs in the country. We take a trickle, and turn it into a river – with results and impacts to match.

Let me present another example. As Chairwoman Napolitano saw in May on her recent visit to the Colorado State University, the Colorado Water Institute is involved in research projects that address water supply and energy issues across states and river basins. The Colorado Water Institute staff briefed the Chairwoman and Representative Markey on a 17 western state evaluation of public attitudes and values surrounding our water resources (report found online at http://westernwatersurvey.colostate.edu/index.html). She was also briefed on projects that explore the linkages between energy and water as she toured their energy conversion labs. The Colorado Water Institute currently is funding a project to evaluate tradeoffs associated with biofuels production and water in the over-appropriated South Platte basin of Colorado. Additionally, the Colorado Water Institute is funding a research project to reconstruct the hydrology of the lower Colorado River at the Yuma gauge, to better understand the long-term flows of this critical river. Like many or our sister Institutes, the Colorado Water Institute is also actively engaged in education and outreach. One example is the community of practice the Colorado Water Institute is building around information needs on agricultural water conservation through the so-called Ag Water Conservation Clearinghouse, a national resource for information on this important topic (found at http://agwaterconservation.colostate.edu/).

The Act places the Institutes at land-grant universities, where in coordination with their Extension services, they specialize in identifying problems within their states, developing solutions to those problems, and engaging with the public to implement those solutions. One of the Institute program's greatest strengths is that the research funded by each Institute is tailored to that state's needs, based on priorities set by consultation with an advisory panel.

For more than 4 decades the Water Resources Research Institutes have provided research results and impacts to our nation, and proved successful at bringing new water professionals into the work force. I thank you on behalf of all the Institute directors for the opportunity to testify to this Subcommittee, and for your past support of this program. I ask for your continued support, and for passage of this bill as written. Thank you.