Testimony of Karl Wood

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On behalf of the

National Institutes for Water Resources

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Mr. Chairman:

My name is Karl Wood and I am Director of the New Mexico Water Resources Research Institute at New Mexico State University. I am testifying on behalf of the National Institutes for Water Resources, the organization representing the state water resources research institutes.

I want to thank the Subcommittee for holding today's hearing on the reauthorization of funding for the Water Resources Research Act for an additional five years.

There are two bills pending before the Subcommittee. The first is H.R. 4588 which was introduced by Representative John Doolittle of California and is the subject of today's hearing. I would like to note that Representative Doolittle, who used to chair this Subcommittee, led efforts to reauthorize the Water Resources Research Act in 1996 and 2000. We are proud to have his continued leadership on behalf of the water institutes program. A second bill to extend the authorization this program, sponsored by Senator Chafee and others, passed the Senate unanimously on September 27, 2005.

The Water Resources Research Act establishes a federal/state partnership in water resources, education, and information transfer through the state water resources research institutes. There are 54 institutes located at the land grant university in each of the 50 states, the District of Columbia, the Virgin Islands, Puerto Rico, and Guam. These institutes are a primary water research link between the academic community and water-related personnel in federal and state government and the private sector. The institutes provide a mechanism for promoting state, regional, and national coordination of water resources research, education and training of our Nation's future water professionals, and a network to facilitate research coordination and information transfer to those who manage or used the Nation's water resources. With their matching requirements, they are a key mechanism for promoting state investment in water research and training.

This legislation reauthorizes appropriations for the two grant components in the program. The first component is a base grant program in which funding is divided equally among the states and territories participating in the program. In fiscal year 2006, each institute received a base grant of $92,335. There is a matching requirement: each dollar of the federal grant must be matched with two dollars from non-federal sources. The institutes in the Virgin Islands and Guam are not required to match. Federal funds cannot be used to pay indirect costs. H.R. 4588 authorizes $12,000,000 annually through fiscal year 2010 for the individual institutes. The National Institutes for Water Resources supports continuation of the authorization at this level.

The second grant component, a national competitive grant program, is designed to support research on water resources problems of a regional or interstate nature. Research priorities are set jointly by the institutes and the U.S. Geological Survey. In 2005 forty-nine proposals were submitted for the national grants competition and eight were selected by the review panel. This year sixty-one proposals have been submitted for consideration.

Representative Doolittle's bill recommends authorization of the national competitive grants program at $6,000,000 annually through fiscal year 2010. NIWR supports this recommendation.

In both the state and national research programs, projects are selected for funding on a competitive basis, relying on peer review. The performance of each institute is evaluated every five years by an independent, USGS-appointed panel. The most recent evaluation report, from 2004, stated "The vast majority of institutes are strong and thriving and a significant subset is very strong and distinguished …the institute program, with its federal-state matching requirement, is an important and significant part of the nation's water resources research infrastructure." A copy of the 2004 letter from the evaluation panel

to the USGS Director is attached to my statement.

The water institutes are located at land grant universities, schools that specialize in identifying problems within their states, developing solutions, and conducting technology transfer. The institutes' research and outreach are well tuned to state needs, because the institutes are required to consult with panels of advisors representing the water interests and stakeholders in their states in setting research and other priorities. Regional and national priorities are addressed when the institutes collaborate on larger projects.

As I noted earlier in my testimony, the water institutes must match each federal dollar from their base grants with two non-federal dollars. I believe this is the highest match requirement of any federal research program. (The national competitive grants program requires a 1 to1 match.) The overall leveraging ratio for all of the institutes, counting funding from all sources, is more than 19 to1. In 2005 the institutes supported more than 1300 student researchers, at an average cost of less than $10,000 each. By comparison, student stipends funded by the National Science Foundation average more than $20,000 per year. The Water Resources Research Act Program does not allow for university administrative costs, and USGS administrative costs are less than 5%.

To achieve maximum efficiency, the Act requires the institutes to leverage the federal appropriation. However , the institutes cannot attract the state and private sector funding to water resources research as effectively without federal participation. It is the ongoing federal support, the Congressional designation as a focal point of water investigation and outreach that enables the institutes to augment their base grants from other funding sources.

In fact, a significant number of the institutes receive no base funding from their states or universities at all. Some of these would cease to exist without the federal base grant. Others would greatly curtail their activities; in particular, they would no longer disburse research seed grants, formally consult with water-user groups, collaborate with other universities in their states, or conduct outreach to water managers.

H.R. 4855 makes several additional changes in the statutory charter of the water resources research institutes program. I would like to discuss three specifics matters.

1) Section 2(a) of the bill would modify the scope of research authorized by the Act, limiting it to matters of water supply. One of the water institute program's great strengths is that the research funded by each institute is tailored to that state's needs, based on priorities set by the institute's advisory panel. This is appropriate since the state or other non-federal sources are providing two-thirds of the funding. Water quality, for example, may be a focal point even where water supply is the predominant issue, such as in the West. In fact, poor quality water effectively limits the quantity of water available. The quality of reclaimed water is a good example of this.

Other research areas currently underway at water institutes that may not be defined as "water supply" include agricultural water quality; aquatic fish and wildlife, including invasive species; economics and management of drinking water, wastewater, storm water, waste cleanup, and agriculture; water treatment technology; and water institutional issues such as law, regulation, marketing, etc.

Generally, most research sponsored by the water institutes has been applied research. Applied, problem-solving research attracts funding support from both governmental and non-governmental sponsors. However, a 2001 National Research Council report noted that "Investment in basic science has been the foundation on which scientific advancements in management of water resources and the attendant economic growth are built." In practice, the distinction between "applied research" and "basic research" in water fields is not sharply drawn.

Similarly, education and training of future water professionals is a vital program component. No other federal program specifically fosters this education and training. As the U.S. population and demands on water resources grow, "baby-boom-generation" water professionals and managers are beginning to leave the workforce. The water institutes are crucial to replacing them. The program does educate and train the next generation of water scientists (Masters and PhDs), but, just as important, it produces many young men and women who are the next generation of water professionals needed to manage irrigation and water supply systems throughout the country. It is important to keep this education and training function as a priority for facilitating the entry of new scientists into fields of water resources.

2) The Act requires "a careful and detailed evaluation of each institute at least once every 5 years to determine the quality and relevance of its water resources research and its effectiveness as an institution for planning, conducting, and arranging research." This evaluation is conducted by a panel appointed by the Director of the U.S. Geological Survey. The evaluation provides information that describes the quality and relevance of the institute's research, its effectiveness in planning, conducting, and arranging for research, its performance in making the research results available to the users of

the research, and its record in providing for the training of students.

The evaluation's costs are modest but the effort involved in the process is not insignificant. Section 2(b) of H.R. 4588 would change the evaluation cycle to three years from five years. Three years may be too short a period for the research results and ramifications of each project to become clear. The program currently requires rigorous accountability for relatively small grants. Having to extensively document program accomplishments every three years instead of every five years would be far more stringent than requirements of other federal research programs that I am familiar with.

3) Section 2(e) of H.R. 4588 requires the Interior Secretary to submit an annual report to Congress on the Act's program activities. The metrics for the proposed reporting requirements are fairly general and may be difficult to assess with confidence. Better measures would be, for example: numbers of program-supported students taking their places as junior water professionals, publications resulting from research projects, ordinances enacted or amended on the basis of research results, and estimated cost savings realized by water users. The Interior Department may be better qualified to identify and implement meaningful measurements.

Attached to my statement are suggestions for how these three provisions might be modified to be more effective.

At this point, I would like to cite some examples of the productive activities of these institutes and the program:

- Last month, several of the institutes collaborated with federal agencies and agricultural organizations in a regional workshop to explore turning energy production wastewaters to beneficial uses in the western states.

- A national conference will convene in Santa Fe in July to focus on increasing freshwater availability for human uses through all practicable means, from emerging desalination technologies to artificial recharge to conservation programs based on changing human behavior.

- A new collaboration has been established between the water institutes and the American Water Works Association to place undergraduate interns with municipal water utilities.

- The Arizona Water Resources Research Center, in collaboration with the Bureau of Reclamation, is working on a multi-pronged approach to enhancing the reliability of the water supply from the Colorado River for Arizona. The project is assessing the Bureau of Reclamation's use of climate information in water resources modeling, identifying strategies to better utilize historic climate records and climate forecasts to improve water supply predictions for the lower Colorado River and Central Arizona Project; evaluating existing management tools to translate improved predictions into enhanced supply reliability for water users; and developing practical supply reliability strategies for use by cities, farmers, and other water users. Improved water availability predictions will improve management of the Colorado River by the Bureau of Reclamation and will allow water users to make better water use decisions.

- Winter snow pack in is a major source of available water in California. Accurate and comprehensive estimations of the annual available yields are critical to the management of water. The University of California Center for Water Resources are supporting projects that use space age remote sensing and data processing technologies to track the development and depletion of snow packs across northern and central California to reduce the need for cumbersome, time consuming, and less reliable direct probing techniques. The technologies may link together water in snow packs, inland water bodies, groundwater basins and general surface soils, allowing the development of intelligence networks from which water budgets in the State may be tracked in real time.

- With rapid development and population growth in the foothills and mountainous areas of Colorado, the degradation of water quality from septic system discharges has become a pressing issue. The Colorado Water Resources Research Institute has prioritized this issue for research to determine best practices to protect ground water in fractured rock aquifers typical of mountain systems in the West. Faculty and graduate students at the Colorado School of Mines have recently conducted two studies using funding from the Institute. The first study used geophysical methods and chemical fingerprinting to track the movement of septic effluents in ground water and determine the likelihood that they are impacting streams and down-gradient wells. A second study currently in progress is evaluating the fate and occurrence of pharmaceuticals and personal care products in septic system effluents. The results of these studies are available to county and state agencies for use in establishing appropriate waste disposal codes and for understanding the impact of new subdivisions in mountain regions of the West.

- The Seymour Aquifer Water Quality Improvement Project of the Texas Water Resources Institute is providing water quality education to increase farmers' awareness and use of irrigation and nutrient management BMPs to help reduce nitrate levels in the aquifer. This project is also estimating the reductions in nitrate concentrations resulting from ongoing BMP efforts

and providing an analysis of additional measures needed to achieve water quality standards in the aquifer.

- The State of Washington Water Research Center and the Idaho Water Resources Research Institute, in collaboration with the USGS and the states of Washington and Idaho, working on the Spokane Valley – Rathdrum Prairie Aquifer project, a bi-state sole source aquifer providing water for the Spokane area. The broad objective of this study is to develop a better understanding of the Spokane Valley-Rathdrum Prairie (SVRP) ground-water flow system and the interaction between the aquifer and the Spokane River. The result of this collaborative effort will be a water supply model of the SVRP aquifer capable of determining the affects of groundwater pumping on the 7-day low flow in the Spokane River. By have multiple groups in both states working jointly on the model along with national USGS expertise; the final product will be acceptable to all parties in both Idaho and Washington.

- The West Virginia Water Research Institute (WRI) is working in coordination with the West Virginia Department of Environmental Protection (DEP) to help implement the West Virginia Water Resource Protection Act of 2004. In the first year of the project, WRI mapped flood and drought patterns and identified social factors that exacerbated natural flood and drought events in the state. This research was coordinated with policy research on prevailing water resource management policies in the mid-Atlantic region. Data were analyzed by county and by watershed. Drought factors considered included precipitation, soil moisture, stream flow, groundwater, and reservoir levels.

- The Louisiana Water Resources Research Institute has a history of conducting work on the vulnerability of New Orleans to hurricanes, which put it in position to make significant contributions during the response to Hurricane Katrina. The Institute led water sampling teams into the New Orleans area as early as September 3, 2005 and collected the first water quality data on the floodwaters. The Institute also facilitated researcher access to New Orleans and organized research exchanges with the Louisiana State University Hurricane Center. The Institute was invited to the National Academy of Science workshop on “Strengthening the Scientific and Technical Response to Hurricane Katrina”, which was held in November 2005.

Mr. Chairman, let me say in closing that water management is recognized as a state responsibility. The states are in a better position than the federal government to determine the kind of information needed to support water management. Scientific expertise related to water management, for the most part, resides in the states’ colleges and universities. The water institutes play a pivotal role in providing that needed scientific expertise.

Federal regulations and programs designed to solve water problems have their primary impact at the state and local level. Water users and state and local governments are in a far better position to tailor solutions to local water problems than the federal government. Funding the water institute program is an efficient way to conduct research and solve problems. This is a program that has proven itself by providing essential water information to industry, local and state governments, federal agencies and agriculture. And it is a vital link in the training of our Nation’s future water professionals. It assists state and local decision makers in providing vital water related information to solve state and local water issues.

Without continued federal support, the efforts of these institutes, individually and as a network, to conduct state-based investigation and provide information to the users of that information in a timely manner, and to train our future water professionals will be severely impaired. Our ability to meet the future demands on water in our state and throughout the Nation will be strongly curtailed if not eliminated without the continuation of this important program.

The water institutes have been on the job nationwide for more than 40 years, and they’re well-prepared to play a key role in assuring our Nation’s water security in the 21st century. But from one year to the next they are absolutely reliant on federal seed funding to mobilize the resources they need to tackle contemporary water problems. I thank you and the members of the Subcommittee for this hearing and for your past support, and hope that the institutes have earned your continued confidence.