
TESTIMONY PRESENTED

before House Appropriations Subcommittee

February 27, 1991

The Honorable Sidney R. Yates, Subcommittee Chairman

UCOWR board members **Howard S. Peavy**, **Robert D. Varrin**, and **Jon F. Bartholic** testified before the House appropriations Subcommittee on Interior and Related Agencies, which is chaired by the Honorable Sidney R. Yates. They testified on behalf of NAWID, NASULGC, and UCOWR respectively in regard to Section 105 of the Water Resources Research Act, Public Law 101-397.

Testimony presented by

Howard S. Peavy

Chairman, National Association of Water Institute Directors

Mr. Chairman and Members of the subcommittee: I am Howard S. Peavy, Professor of Civil Engineering at Montana State University and Director of the Montana University System Water Resources Center. I am also Chairman of the National Association of Water Institute Directors (NAWID). Thank you for the opportunity to appear before you today to address a critical issue with regards to the water resources of this nation.

My testimony today is on behalf of the fifty-four water resources research institutes that, collectively, constitute NAWID. These institutes are located nation-wide, one in each of the fifty states, the District of Columbia and three U.S. Trust Territories. These institutes were first authorized by the Water Resources Research Act of 1964 and, most recently, reauthorized by the last Congress as PL 101-397. This Act reauthorized the Water Resources Research Institute Program and authorized appropriations for its support. Today I wish to speak to the subject of financial support of this Program.

The Water Resources Research Institute Program

The objectives of the Water Resources Research Act of 1964 were stated as follows: 1) To develop through research new technology and more efficient methods for resolving local, state and national water-related problems; 2) To train water scientists and engineers through on-the-job participation in research; and, 3) To facilitate water research coordination and the application of research results by means of information dissemination and technology transfer. Through several amendments and reauthorizations, these three objectives have remained the cornerstone of the program.

Current Activities. Over the years, the water institutes have embraced these three objectives and have developed and refined programs that have made significant contributions in all three areas. Currently, the Institute Program is supporting over 250 research projects at over 100 university campuses around the country. Many of these projects are "seed money" projects that are either assisting young research professionals to get started on a water research career, or assisting established researchers to open up a new line of water research. We are currently employing over 300 graduate students on these projects who will become a significant part of the next generation of water professionals in this country.

In addition to the hands-on training of students through the research program, many of the institutes have initiated educational programs focusing on water resources. These programs are targeted to public

school students grades K through 12 and to adults who are involved in the use and/or management of the nation's waters. Additionally, virtually all of the institutes have information dissemination programs that place new information and technology into the hands of the water resources professionals in a timely fashion. Over forty of the 54 institutes publish newsletters informing their readership of significant events in the local water community. Three-fourths of the institutes sponsor conferences, symposia, and workshops which foster discussions of water issues. Over sixty percent of the institutes maintain lending libraries of water-related materials, much of which is "grey" literature that is difficult to obtain through regular libraries and impossible to obtain through the professional journals.

Mr. Chairman, the membership of NAWID takes considerable satisfaction in its accomplishments to date. We are not, however, content with the status quo. Although we must continue many of our current activities because of commitments required by the non-federal match, we are interested in moving into new areas of endeavor. We are very interested in expanding our activities at the national level and have positioned ourselves to do this.

Future Opportunities. There will be many opportunities for contribution by the water institutes in the coming years. For instance, major programs are currently being undertaken to clean the environment of past excesses and mistakes of our society. The Environmental Protection Agency and the Departments of Energy, Defense, Interior and Agriculture have all had their programs expanded in the areas of environmental management and restoration. In the coming years, many billions of dollars will be spent on these activities and much of this effort will focus on the water environment.

Additionally, the quantity of water available for human use has been impacted by extremes in climatic conditions and by over-allocation of supplies. Competing demands for an inadequate supply are now causing concern in many parts of the country. These conditions will be greatly exacerbated if the global climate change that many scientists are predicting does, indeed, come to pass. With regards to allocation of water in times and places of scarcity, the Water Institutes have access to a wide array of economists and social scientists that most of the federal agencies and departments lack.

New technology developed through research may well be required to address these efforts and issues. They will most assuredly require additional water scientists, engineers and technicians. The Institute Program is well positioned to be of immediate service in these efforts.

The Network of Water Institutes

The structure of the individual water institutes and their organization under the NAWID umbrella creates a network that is unique and lends itself very well to addressing problems at the state, regional and national levels.

State level. The institutes are mandated by legislation to maintain ties with all research universities within their state and to foster cooperation and coordination between the university and water user/manager community within their state. The benefits of these requirements are two-fold. First, each institute has access to virtually all water research faculty in the nation's universities. In turn, these faculty have access to laboratories and equipment owned by the universities. Thus, the institutes can tap a tremendous resource in terms of both professional expertise and capital equipment.

Secondly, the institutes have developed close working relationships with personnel from state and

federal water agencies, and with water users and managers within the private sector. Over the years, this relationship has built a “grass roots” approach to identifying and solving problems. This grass roots relationship can be tapped at the regional and national level through the NAWID structure.

Regional level. The water institutes are organized into eight regions based to the extend possible on hydrologic units. These regional groupings are shown in Figure 1. The institutes in each region share information regarding their programs and jointly identify priority areas of research within the region. The regional associations also provide an administrative structure for regional project proposals. A recent example of a successful regional project is a severe sustained drought study undertaken by a multidisciplinary group of faculty at universities in the seven Colorado Basin states. This study, which is still in progress, is focused on identifying a broad range of mechanisms for coping with the worst drought known to have occurred in the region since the fifteenth century.

National level. Each region elects a Director to the NAWID Council of Representatives which serves as a Board of Directors for NAWID. An Executive Committee composed of a Chair, Chair-Elect, Past-Chair and Secretary-Treasurer, under the guidance of the Council, sets the national agenda for NAWID. This structure is designed to provide continuity to the programs of NAWID and with other water-related organizations and agencies.

This network of 54 state institutes, united through both regional and national organizations, provides an excellent opportunity for the federal agencies and departments to access researchers in the universities and the grass roots water regulators, users and managers throughout the country.

The Battle of the Budget

The current financial status of the Water Institute Program does not match its potential service. As shown in Figure 2, appropriations have been essentially flat at approximately \$100,000 per Institute for the last twenty-five years. Inflation has eroded the value of these funds to approximately one-fourth of the 1965 value. Although non-federal funds required to meet the increased matching requirements have off-set some of the effects of the inflation, total funding is still at a virtual subsistence level. While the federal dollars may be an insignificant part of the budget of some of the larger institutes, it is the lifeblood of some of the smaller institutes and provides the means by which they leverage state and university dollars into the program.

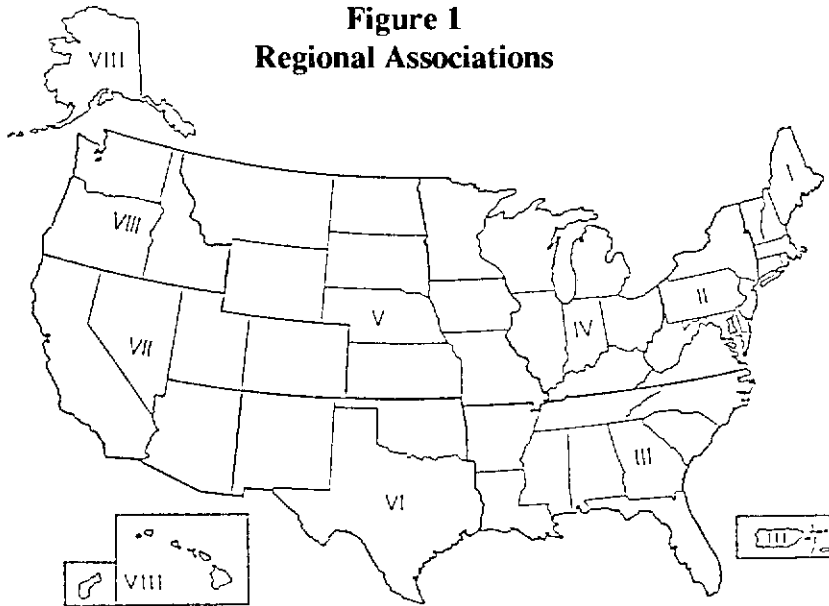
Perhaps more importantly, the federal appropriation is the “glue” that holds the water institute network together. The current year appropriation of \$100,000 is, I believe, the absolute minimum at which this glue will hold. Below this amount it is virtually certain that some of the smaller institutes would close, and I think it very likely that some of the larger institutes would deem the federal funds insufficient for the added efforts of administration and reporting that their acceptance requires.

My request to you today on behalf of all of the 54 institutes of NAWID is two-fold. First, we respectfully request that you restore the appropriations under Section 104(b) to the level of your support in past years. Second, we ask you to consider a phased increase in 104(b) by the expiration of the authorization in FY 1995. This would require an additional appropriation of \$1. 133 million per year for the next four fiscal years. Thus, we are requesting an appropriation of \$6.6 million for the Institute Program in FY 1992 as compared to \$5 .467 million appropriated in FY 1991 and the \$2.875 that is in the Administration’s budget for FY 1992.

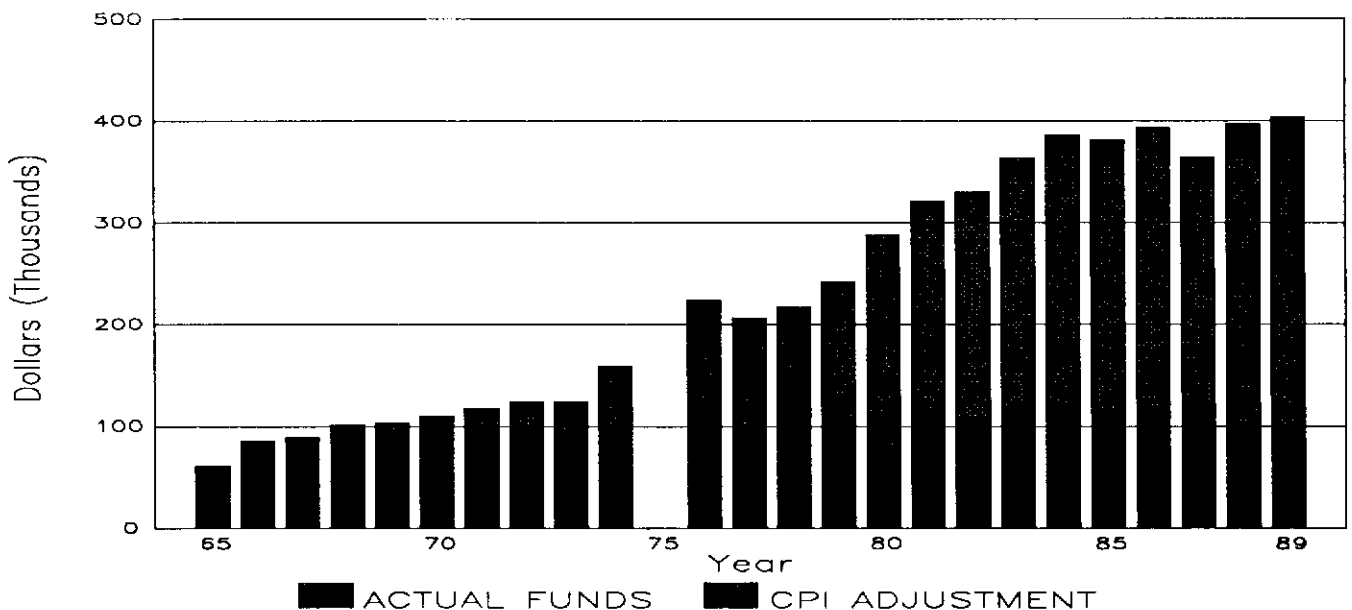
I think it is important to note that any increase in appropriations will increase the total amount of funds in the program three-fold due to the two-to-one matching requirement of the program. With the exception of the Institute of the Arts Program, I know of no other federal program that enjoys this level of non-federal participation.

On behalf of the membership of the National Association of Water Institute Directors, I thank you for the opportunity to discuss these issues with you this morning, and for your careful consideration of this important issue.

**Figure 1
Regional Associations**



**Figure 2.
Water Resources Institute Program:
Effect of Inflation on Program**



**Testimony Presented by
Robert D. Varrin
Chairman, Water Committee
National Association of State Universities and Land Grant Colleges**

Good afternoon. Thank you for the opportunity to testify before this committee with regard to Public Law 101-397, legislation that extends the authorization of appropriations for the Water Resources Research Act of 1984 through the end of fiscal year 1994.

I am Robert Varrin, associate provost for research at the University of Delaware. My testimony is on behalf of the National Association of State Universities and Land Grant Colleges (NASULGC). The 149 members of NASULGC enroll more than 2.6 million students and award about 468,000 degrees yearly, including 60 percent of all U.S. doctorates. The organization's mission is to support high-quality public education by enhancing the capacity of its members to perform their roles in teaching, research, and public service. Scientists, engineers, educators, and administrators at NASULGC institutions are concerned about water resources research and education, and NASULGC continues to strongly support the Water Resources Research Institute program, which was created by federal legislation in 1964.

In recently concluded reauthorization proceedings, it was gratifying to observe the overwhelming bipartisan support demonstrated for this program in both the House and the Senate. Encouraged by this expression, the network of institutes has been working with the U.S. Geological Survey to develop new initiatives to foster interaction between university and survey researchers and to promote faculty, graduate student, and staff involvement. Our statement today is indicative of the importance that the university community places on waterresources research education and of the crucial role that we believe the federal government should play in this area.

Need for Water Research

Research on water will never be finished. In fact, the need for new information on our most valuable resource will only increase as the population grows and as threats to water quality increase.

You and I each draw about 87 gallons a day – 24 for flushing, 32 for bathing, laundry, and dishwashing, and 25 for swimming pools and watering the lawn. We use only 2 gallons for drinking and cooking—the only water we need for our own physical survival. When we add the indirect uses of agriculture and industry, our daily need soars to about 2,000 gallons each (National Geographic, August 1980).

Water must be viewed in a much broader context than personal use, however. Problems or deficiencies in the water supply can directly threaten our nation's economic health. The California drought is curtailing much more than car washing and swimming pool refills; along with agricultural losses, the state's vital manufacturing industries are beginning to ration water as the rain clouds continue to bypass the area.

As a nation we have spent billions of dollars finding, delivering, and managing our water supply, but we allocate little for keeping it safe in the long term. In the opinion of most water managers and planners, water doesn't get the research attention it deserves. As a research topic, water doesn't have

the novel appeal of the human genome project or the cutting-edge attraction of the superconducting super collider. A stable water supply is fundamental for economic growth, however, and we must stop taking it for granted.

The needed research on water is varied. We must find out how to keep pesticides, petroleum, and other dangerous compounds out of our surface and underground supplies. We have to discover ways to clean up supplies that are already contaminated. The truth about regional and global climate change and the potential effects on water has to be learned. We need to investigate newly recognized water-borne health threats. And countless other studies must be carried out to keep our most vital resource fresh and flowing.

The State Water Research Institute Program

As you know, a federal-state-university partnership in water-related research and education was established 27 years ago through the first Water Resources Research Act. Through the program, water resources institutes were established in each of the 50 states, the District of Columbia, the Virgin Islands, Puerto Rico, and Guam, creating a water research network that reaches every corner of the country and addresses the entire range of water issues.

As director of Delaware's institute since its inception in 1965,¹ I have witnessed the growth of this program—growth not in the amount of money awarded for research, but in water expertise: the researchers associated with our institutes have become the central core of water scientists in the United States. And a key part of the institutes' mission continues to be the training of new researchers to add to their ranks.

The scientific accomplishments of the institutes are registered in the countless books and journals that chronicle the advances we have made. State by state we have addressed the water problems of the day and have contributed to their solution. And we must continue to do so: Delaware, like every other state, has water issues that are its own. But we have also recognized that some of our problems need broader consideration.

Need for a regional approach to research

Water has never recognized political boundaries, and water resources management is increasingly linked over larger and larger areas. Today, for example, the water supplies for southern California, central Arizona, and southern Nevada are interlinked with those for Denver, Salt Lake City, and San Francisco in one vast system. Most of our watershed systems, in fact, spread beyond the boundaries of a single state.

Section 104(g) of Public Law 101-397 establishes a program to fund research on water problems of a regional or interstate nature. Five million dollars is authorized for this program, to be matched on a not less than dollar-for-dollar basis by funds from states or other non-federal sources.

Section 104(g) research priorities

As required by section 104(g), priorities have been determined by the U.S. Geological Survey and the State Water Research Institutes for the research to be conducted. The five areas identified as the greatest need for regional attention are the following:

1. **Developing capabilities for dealing with water resource management issues at the megasystem level**

The institutions and political entities that built individual water projects now find that their various policies are linked in a system of water allocation among the states and water rights within states. None is positioned to consider the collective interests of the system's users. These regional systems are threatened from two sides: abnormal weather or climate change has brought droughts that are longer and more severe, reducing the supply, and growth of the service area has increased demand.

Thus, it has become increasingly important that these vast water resource infrastructures, which evolved piecemeal, be able to respond to their combined needs. We must develop tools to use in planning and incentives to encourage water management organizations to use the tools effectively.

2. **Restoration and protection of watershed systems**

The watershed is a logical unit for water resource planning and management, but few watershed management approaches exist in practice. Multi-state centers involving multiple disciplines and broad expertise could develop generalizable watershed management systems to improve water use on a regional level. These multi-state consortia of universities with critical input from industry and state and local government will provide an integrated system for protecting our society's vital surface- and ground-water resources.

3. **Wetlands and riparian stream zones**

Wetlands and riverbank zones provide benefits that are critical to our well-being but whose value has not been fully recognized. These regions store flood waters, preserve water quality by removing nutrients, protect against soil erosion, and trap dangerous heavy metals in bottom sediments. They provide habitat and nursery areas for many species of waterfowl, fish, shellfish, and other wildlife and produce commercially valuable crops of timber, peat, blueberries, cranberries, wild rice, and hay.

A watershed approach is needed to protect and manage watershed and riparian zones. Research must seek new ways to optimize flood control, water quality, and regionally important habitat. It must provide a scientific and regionally integrated plan for identifying valuable wetlands and devising ways to optimize the natural and cultural demands on regional river systems.

4. **Intermedia transport of pollutants**

The transfer of elements between environmental media can result in widespread dispersion of contaminants. For example, airborne particulates and gases may travel hundreds of miles from their source to contaminate a water supply. Pesticides and fertilizers in soil show up in ground-water supplies great distances away. Regional cooperation, combining expertise from multiple disciplines and institutions, can address certain of these problems more effectively than a single-state project.

5. Regional aquifer studies

Ground-water bodies often transcend boundaries of both surface watersheds and political entities. The Ogallala aquifer, for example, provides water to the eight states of the high plains region: Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming. Management methods in one area may cause a problem in another distant location. In drought periods, this problem is exacerbated as ground water must supplement surface supplies. A plan based on the extent of the aquifer rather than on a single state's use of it is the logical way to approach aquifer management.

Recommendations

We request \$10 million in FY 1992 for the Institute Program (Section 104(b) of P.L. 101-397) to provide each institute with \$185,000 to continue the federal-state cooperative effort that has been productive for 27 years.

Five million dollars is requested for a new competitive institute-USGS focused research program (Section 104(g) of P.L. 101-397) on critical regional water problems like ground-water contamination and watershed management.

We request \$10 million for the Section 105 program. About \$40 million is requested annually by proposals to this program; many worthwhile and needed studies remain unfunded.

We request \$800,000 for USGS administration of the program.

I hope you are persuaded of the value of the regional research program in water resources. Joseph Cragwell, former chief hydrologist for the U.S. Geological Survey summarized the need for cooperation well: "More and more, we will face problems of water management . . . but we'll have to work together, because they're not making any more of it."

Testimony Presented by Jon F. Bartholic, President Universities Council on Water Resources

On behalf of the Universities Council on Water Resources (UCOWR), I appreciate this opportunity to provide testimony in support of water quality research and education activities conducted under Section 105 of the Water Resources Research Act (P.L. 101-397). UCOWR represents over 100 publicly and privately supported member universities from nearly every state as well as several affiliate memberships from foreign countries. These universities are committed to strengthening our understanding of technological options available not only to protect but also to improve our nation's water resources. This should be one of our highest priorities. Meeting the challenge of protecting our water resources is becoming more difficult. Unless we are very careful to prevent it, the potential for increasing pollution is very great because of our growing population. At the same time, in these days of dwindling finances and resources, reclamation of fouled natural resources is going to be more expensive.

The Section 105 grants programs are open to scientists from all universities in the United States.

A two-step evaluation process assures that only the very best proposals are funded. The first step requires a peer review by scientists who examine the methodology and scientific rigor of the proposed research. The second step considers whether the research addresses identified national water resource research needs. During FY 1990 approximately 250 Section 105 proposals were received in the physical, engineering, social and biological sciences. However, it was only possible to fund 40 with the monies appropriated. These proposals represented only a fraction of those that passed the rigorous selection procedure and so would have made beneficial contributions to water quality research.

Even so, the monies administered through this program provide some scientists throughout the country with the opportunity to generate, and in some cases, to implement the original, creative and innovative research needed to solve water quality problems. The areas of supported research have been very diverse and innovative. They have included such topics as: methods for enhancing microbial degradation of toxic chemicals, the cycling and fate of soil associated organics, irrigation and its impact on water quality and quantity, the effects of global warming on surface water systems, economic impacts of pesticide regulations to protecting groundwater, improved methods of coping with the sustained, severe drought conditions in the southwestern United States, and protocols for the containment of genetically engineered microbial organisms after application to subsurface environments. This broad list still only includes a limited representation of the research opportunities that should be attended to.

This year, 315 proposals were submitted to the Section 105 program compared with the 250 last year. However, funds are so limited that only about 40 proposals will be funded, the same number as last year. Clearly, a tremendous pool of excellent proposals that combine scientific expertise and innovative ideas will be left unsupported. With proper funding they would provide knowledge to assist not only in the wise management of our present water resources but also in developing new methods to clean up our contaminated waters economically. Congressional support for the Section 105 program is extremely crucial and very cost effective in the long run. In the past, small investments made in this program have led to important discoveries. Future program discoveries, especially concerning toxic waste cleanup, could save billions of dollars. For example, the estimated costs just to clean up the toxic wastes discharged from the federal governmental facilities has been estimated at more than \$100 billion. Clearly, new technologies are vital to provide more effective and economical methods for the cleaning up of our Nation's water resources and to develop more proactive protective strategies and measures to minimize or eliminate further contamination. By increasing the Section 105 program funding to \$10 million, Congress will become a stronger partner in expanding scientific research desperately needed to produce the new knowledge. In addition, this economically sensible investment would facilitate the training of tomorrow's scientists and engineers.

UCOWR provides a balanced and multi-faceted approach addressing the Nation's water research and education needs. Thus, we enthusiastically support Section 104(b) of P.L. 10 1-397 that would fund the Water Resources Research Institute at a level of \$185,000. This would improve and enhance their technology transfer programs, matching funds for research and networking functions. We also support Section 104(g) to facilitate regional cooperation among the Water Resources Research Institutes to improve their collective ability to address major problems through multi-university and multidisciplinary approaches. The Section 105 research will complement both the Section 104b and 104g provisions of the legislation. With the strong support of Congress for these three areas, the Nation's universities will provide a rigorous and dynamic program capable of yielding new and creative knowledge that can make major strides toward protecting and restoring our vital water resources.