

PURPOSE, ACCOMPLISHMENTS, CHALLENGES,
THOUGHTS AND IDEAS ON THE
WATER RESOURCES RESEARCH ACT

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The general idea underlying the long title of these remarks was the notion that possibly I could be helpful to you in preparing NAWID for the forthcoming reauthorization of the Water Resources Research Act of 1984. Some twenty-five years ago I was involved in drafting what became the Water Resources Research Act of 1964. I have followed generally its administration, reauthorizations, and appropriation history ever since. Also, I have participated in an evaluation in 1980-81 of Federal water research by a Water Resources Research Review Committee of the National Academy of Science/National Research Council; spoken at a symposium in 1984 on a National Center for Water Resources Research sponsored by the National Water Alliance and considered the reauthorization issue with an Ad Hoc Institute Program Planning Group sponsored by the U.S. Geological Survey in 1986 and 1987 (1, 2 and 3).

The four principal topics I will cover in these remarks are:

- 1) The importance of achieving consensus within the whole water research community upon a reauthorization proposal;
- 2) A brief historical analysis of the principal legislative issues involved in the original and subsequent water resources research legislation and of some institutional problems;
- 3) The principal issues today--as I perceive them--in reauthorization of the Water Resources Research Act of 1984; and
- 4) Political decision-making processes involved in all legislation, including water research reauthorization.

IMPORTANCE OF CONSENSUS

My main purpose in agreeing to prepare these remarks is to convince you of the importance of achieving a consensus within the water research community

on the major provisions of a new act. I am not trying to specify for you what that consensus should be. But I will endeavor to specify issues that should be considered by you in trying to develop a consensus.

Congressional committees do not have the time or patience to try to understand issues within the water research community and to resolve them for that community. To Congressmen these issues can often appear to be esoteric or picky. Committee members have enough to do in trying to reconcile your views with their own, those of the Executive Branch and others. Thus the water research community should be united as a whole in dealing with other interests, both within and outside government, which will have proposals of their own to try to advance.

Consensus does not mean that all within the water research community must positively agree unanimously on the major terms of a new act. But it does mean that all can live with the community's proposal. There must be no objection that is sufficiently strong to cause a public disagreement by members of the water research community before Congressional committees. To achieve consensus, all participants must rise above their own more narrow interests and recognize as legitimate the valid interests and concerns of others. They must bargain with each other to achieve compromises that will encompass the interests of the whole water research community. They must back solidly and strongly all parts of the final proposal and subsequent community positions on any changes proposed by others.

HISTORICAL ANALYSIS

Legislative History: 1964-1978

The Water Resources Research Act of 1964 was first drafted in 1962. It stemmed from the Report of the Select Committee on National Water Resources,

U.S. Senate, published in January 1961(4). The select committee was composed of the chairmen and the leading minority members of most of the Senate Committees dealing with water resources and was chaired by the late Senator Robert Kerr of Oklahoma. Theodore M. (Ted) Schad, whom many of you know and then a senior specialist in the Legislative Reference Service of the Library of Congress, was appointed staff director. Many hearings were held across the Nation and several special studies were prepared by water specialists at Resources for the Future, Inc. and other nongovernmental authorities.

The third of the Committee's five recommendations called for an "expanded and coordinated federal research program in relation to water and water resources." Three of the other recommendations were embodied in the Water Resources Planning Act of 1965, and the fifth endorsed the concept of flood plain management and other specific water policy proposals. The full statement of the Committee's research recommendation is as follows:

The Federal Government should undertake a coordinated scientific research program on water. This should include both research into ways to increase available supplies, and ways to increase efficiency in the use of water required to produce manufactured goods and crops. The committee recommends that existing programs be strengthened by taking the following action:

(a) Expanding the program of basic research dealing with atmospheric physics, solar activity, hydrology of groundwater movement and recharge, the physical chemistry and molecular structure of water, photosynthesis, climatic cycles, and other natural phenomena associated with water in all its forms. Such research is essential to a major breakthrough in such fields as short- and long-range weather forecasting, weather modification, efficient management of underground reservoirs, evaporation reduction, desalinization, and pollution abatement, as well as to major improvements in works for the storage and control of water.

(b) Providing for a more balanced and better constructed program of applied research for increasing water supplies through desalinization, weather modification, and evaporation and evapotranspiration reduction.

(c) Providing for an expanded program of applied research for water conservation. Special emphasis should be given to research on improved waste treatment methods, on ways of increasing efficiency in the

agricultural use of water, on fish and wildlife needs, and on methods of system planning for the optimum development of water resources of river basins.

(d) Evaluating completed projects with a view to determining modifications to enable them more effectively to meet changing needs, to provide better guidelines for future projects, and to better determine their effect on the local, regional, and national economy.

The executive branch should be requested to review present research programs in the field of water and to develop a coordinated program of research designed to meet the foregoing objectives. This should be submitted to Congress in January 1962, so that it can be considered along with the budget estimates for the 1963 fiscal year.

The select committee's report was timely and generally viewed as very important in view of its prestigious bipartisan political authorship. President Kennedy, in his Special Message on Natural Resources of February 23, 1961 soon after his inauguration, generally accepted on behalf of the Executive Branch all Select Committee recommendations. With respect to research, he stated that he had asked the National Academy of Sciences to undertake a broad, basic study of federal research relating to all natural resources, including water.

The date, January 1962, set by the select committee for the Executive Branch to report back a coordinated water research program to Congress was not met. However, the legislative branch learned that the President's Council for Science and Technology had established a Committee on Water Resources Research (COWRR) composed of representatives of all agencies having a research mission in the water field and chaired by a distinguished academic scientist. Ray Linsley, William Ackerman and other distinguished members of the water research community undertook the chairmanship over many years (1962-1977) on short-term assignments.

In May, 1962 Senator Clinton Anderson, Chairman of the Senate Committee on Interior and Insular Affairs, "set in motion a survey of water research in the federal agencies, in land grant colleges and universities and in a sampling

of non-land grant colleges, universities, foundations, private firms and by individual(5).” The responses to the survey reflected the broad, multi-disciplinary nature of water research involving many professions and disciplines. The responses also “reflected the fact that water problems vary in relation to the environment in which water occurs;” and therefore, “widely dispersed research centers” were needed to “permit assistance to even local agencies and officials concerned with water planning and management.” Thus it was foreseen even then that water matters would increasingly be matters of state and local concern.

At the policy level those concerned in Washington with water research can be said to have perceived: a very wide array of basic and applied research topics needing support; the necessity of a multidisciplinary approach to many of these topics; a need for a federal coordinated research program (as is still true today) involving the many separate federal mission-oriented research programs; and the need for “widely dispersed research centers” to assist state and local water action agencies and officials.

It was out of this last perception, the need for “widely dispersed research centers,” that the concept of the state water research institutes was born. This need was seen as not being met by existing water research programs and institutions within federal agencies.

The late Benton J. (Ben) Stong, professional staff assistant to Senator Anderson, was the principal person to identify and emphasize this new need. Given his origins in South Dakota and his great familiarity with agricultural legislation, it is not surprising that he saw federally-assisted state agricultural experiment stations as a highly successful analogy to what was needed in each state for water research.

The original draft of the Water Resources Research Act of 1964 was closely modeled on the Hatch Act of 1887 which created the state agricultural experiment stations. It was drafted primarily by Stong and Eugene Eaton, who later became the first Deputy Director of the Office of Water Resources Research within the Office of the Secretary of the Interior. The draft bill provided for authorization of "\$75,000 increasing to \$100,000 a year for establishment of a water resources research institute at a land grant college or state university in each state, or higher educational institution designated by the state legislature for support of a multidisciplinary water research center, and \$1 million growing to \$5 million the fifth year and thereafter, as dollar-for-dollar matching funds for specific water research projects undertaken by those centers" (underlining added).

During the draft bill's consideration within the Department of the Interior the issue arose as to what agency within the Department would administer the proposed program, the U.S. Geological Survey (USGS) or a newly created agency. Secretary Udall decided the latter. USGS, on the one hand, sought the administrative responsibility if such a program were to be established; but, on the other hand, it saw such a program as in competition with its own in-house research program for a share of what it saw as a relatively fixed water research budget. Non-USGS staff were concerned that USGS would favor its own established program in such competition and that USGS was inappropriate as the agency to administer a multidisciplinary program.

During Senate consideration of the bill a basic problem became evident. A proposal was made to split the basic grant for a research center between two or more schools(5). This idea was rejected because \$100,000 was seen as "little enough for one adequate center." But it was viewed as urgent that

“schools within a state pool their resources” and work together in undertaking water research projects. Nevertheless, Dr. Jerome Weisner of MIT was perturbed about “the possible exclusion from support of some of the centers of greatest excellence in hydroscience in the Nation.”

In the Water Resources Research Act of 1964 (P.L. 88-379), the provisions of the original draft bill were substantially retained as Title I, and a Title II was added. This title responded to a perceived wider constituency including those promoting, like Dr. Weisner, the concept of centers of excellence. For 1965 \$1 million was authorized and \$1 million in each succeeding nine years for “grants, contracts, matching or other arrangements with educational institutions (excluding Title I institutes), private foundations, private firms and individuals and with local, state and federal agencies related to the mission of the Department of the Interior and not otherwise being funded.” The exclusion of Title I institutes from Title II funds was removed in 1966 (P.L. 89-404).

In response to Congressional interest in coordination of the whole federal water research program, but recognizing that the President through his Council on Science and Technology had already established a coordination mechanism via the Committee on Water Resources Research, the bill placed legislated responsibility for such coordination on the President without further specification.

P.L. 88-379, as it finally emerged in 1964, was supported by NASULGC with Dr. William E. Morgan, then president of Colorado State University, playing a leading role in testimony and other supportive activities. It was also supported by “non-land grant institutions--Harvard, Johns Hopkins, the University of Georgia and others--by private firms and individuals and by state officials

through the Interstate Conference on Water Problems and the Council of State Governments" (5). Obviously, over a three-year period, a consensus had been achieved.

The original intent of the Water Resources Research Act of 1964, as already noted, was to authorize both basic and applied research. However, as perceptions developed within the legislative branch over subsequent years with respect to accomplishments it had sought under the Act, legislative direction clearly took the form of encouraging the products of research to be solutions to practical water problems which constituents of Congressmen and Senators had brought to their attention. Emphasis was put upon methodologies of technology transfer to make such solutions become realities in practice. Congressional authorizing and appropriations subcommittees, particularly the appropriations subcommittee in the House of Representatives, became skeptical of the quality, quantity and utility of the products of water research. To deal with these concerns, the authorizing subcommittee in the Senate requested and obtained in 1976 an assessment of implementation of the Water Resources Research Act of 1964 from the Congressional Research Service, which was expertly prepared by Warren Viessman and a research assistant (6).

Accordingly, changes in the authorizing legislation through 1978 included the following:

- 1) Technology development was, in effect, added to water research as a purpose in 1971 (P.L. 92-175). Correspondingly, within the Department of the Interior the original Office of Water Resources Research was merged in 1974 with the Office of Saline Water (which administered the Saline Water Conversion Act of 1971; P.L. 88-379, as amended) to form the Office of Water Research and Technology (OWRT).

- 2) Authorization was given in 1978 for development of technology transfer methodologies and of efforts "to make information gained from water research generally available" (P.L. 95-467).
- 3) Encouragement of regional consortia was given together with directions to increase the effectiveness of a nationwide network of institutes.
- 4) Direction was given to "cooperate closely with other colleges and universities in the state...in developing a statewide program directed to resolving state and regional water and related land problems" (underlining added).
- 5) An annual institute program was required for submission to the Secretary of the Interior with evidence that the program was developed in "close consultation and collaboration with leading water officials within the state and region..."
- 6) Very strong directions were given to the President and the Secretary to achieve effective coordination of the entire federal water research program.
(Subsequent efforts to achieve this coordination between 1978-1981 failed (1).)

Institutional Problems

During the first five years (1964-1968) of their coexistence, relations between the Office of Water Research (OWRR) and the water research community were relatively close. No major policy differences arose. Differences over the level of requested appropriations arose, of course; but such problems, along with administrative differences between the institute directors and OWRR, did not cause a major split.

The Universities Council on Water Resources (UCOWR) represented a largely united front of the water research community in testimony before Congressional

committees on changes in authorizing legislation and levels of appropriations. As I generally recall, the water research community, as represented by UCOWR, generally accepted the changes in legislation through 1978 emphasizing and reinforcing efforts to solve practical water problems.

Somewhere around 1969, however, relations between OWRR and the state water institute directors changed and became schismatic. Differences arose that caused the directors to form the National Association of Water Institute Directors (NAWID) in order to coordinate the views of the Directors on administrative policy issues arising with OWRR. OWRR tried to tighten controls on institute research programs and became somewhat skeptical of the products of research for which the Secretary of the Interior was accountable to the Congress. Some institute directors began to question the competence of the OWRR staff to judge the quality of the products of water research. Nevertheless, both the directors and the staff worked to convince the Congress of the worthwhile nature of the program.

Also, in the early 1970s Secretary of the Interior Morton, abetted as I recall by the Office of Management and Budget, raised again the issue of, say, five centers of excellence vs. the then fifty-four institutes (fifty states plus four--the District of Columbia, Commonwealth of Puerto Rico, etc.). However, no change occurred. Nevertheless, the dichotomy between the two institutional conceptions continued in the minds of those concerned.

Centers of excellence, if politically practicable of creation, could possibly be more effective and efficient in the conduct of academic water research per se than fifty-four centers. But they would hardly be as effective and efficient in the transfer of the products of technological research that often involves legislative and administrative action in each state or other

area. It is hard to get state legislators to pay heed to the products of university research. This is true even when those products come from their own universities. As many legislators see it, professors from out-of-state universities cannot possibly understand their states' water problems. At the state and local administrative level the difficulties are hardly less. Great trust and confidence must be developed, and the utility of research products clearly demonstrated, before such transfers can occur. The problem is comparable to that faced over many decades by Extension agents of land-grant universities in their relations with farmers and ranchers.

In the late 1970s another schism developed. This schism was between NAWID and UCOWR. Despite the fact that Institute directors have constituted a substantial percentage of attendees at the UCOWR meetings and generally have been represented on the UCOWR Board of Directors, some of them have looked upon UCOWR as not representing adequately their interests. UCOWR was seen sometimes as too responsive to the interests of non-institute universities. Strong rivalries between universities in some states may have reinforced this perception. In some instances delegates for non-institute universities may have seen their own universities as actual or potential centers of excellence. Also, they may have felt that fifty-four institutes are ineffective, inefficient and a waste of money that might better be utilized on research by them. Within this context of diverse interests a few unfortunate incidents relating to the preparation of testimony before the Congress exacerbated the situation.

With the advent of the Reagan Administration the issue was not fifty-four institutes vs. centers of excellence; it was continuance of all the programs authorized by the Water Research and Development Act of 1978 (P.L. 95-467). The story is reliably told that Secretary of the Interior Watt met with

Director Stockman of the Office of Management and Budget. Watt wanted abolition of the Water Resources Council and the River Basin Commissions, but supported (with the advice of Assistant Secretary Carruthers) the continuance of the water research program. Stockman wanted the opposite. He supported continuance of the Water Resources Council etc., but sought to abolish the OWRT program. This position with respect to the water research program was consistent with Stockman's more general policy position of abolishing federal programs in the Departments of Agriculture and Interior that he saw as subsidizing the solution of state-level problems.

The upshot of their meeting, as is well known, was that both agreed to the abolition of both the Water Resources Council, etc. and the OWRT water research program. As a consequence, the Administration proposed zero funding for the OWRT program and did not propose reauthorizing legislation.

Legislative History: 1981-1984

The Congress appropriated funds to keep the water research program going and former Senator Abdnor's subcommittee proposed reauthorizing legislation. Many of you are much more familiar than I am with the process by which Senator Abdnor's initiative, with former Congressman McNulty's strong leadership in the House of Representatives, became the Water Resources Research Act of 1984 (P.L. 98-242) over the veto of President Reagan.

Here, all I am concerned with is the resulting Act. It's more significant provisions, as I perceive them, are:

- 1) Continuation of the Institute Grant Program but with an increasing non-federal match (Section 104);
- 2) Continuation of the original Title II National Research Grant Program but with a matching requirement (Section 105);

- 3) Provision for a systematic program of evaluation of each institute--with statutory specification of the types of persons to be included on evaluation teams and of the criteria that teams shall utilize in their evaluations (Section 104(a)(1)); and
- 4) Continuation of grants or contracts for technology development (Section 106; not subsequently funded).

Two omissions from the Act are notable for their absence. First, this Act makes no provisions for coordination by the President and the Secretary of the Interior of the entire federal water research program. This omission, under the circumstances of Executive Branch-Legislative Branch relations in the 1980s, is quite understandable.

The second omission is perplexing and most unfortunate from my point of view. This omission was provision for continuation of institute competitive Matching Grant Program (Section 101(a) of the 1964 Act, P.L. 88-379, that was continued through the 1978 Act). It is true, of course, that the institutes can compete with all others under the National Research Grant Program (Section 105). But lack of an institute competitive grant program, as I see it, seriously undercuts the ability of institutes to formulate and pursue statewide programs of well-managed research projects on state and regional water problems. Given the previous long history of legislative directions trying to push the program toward solution of practical water problems at state and regional levels, it is surprising to me that this institute competitive grant program was not then continued.

PRINCIPAL ISSUES TODAY

The principal issues in a future reauthorization of the twenty-three year program of water research could be many. Hopefully, they will be few. One

primary issue is whether the Reagan Administration will propose a draft bill to the Congress. Since the Congress overrode the President's veto of the 1984 Act, the Administration would appear to have accepted the 1984 Act; but the level of funding each year has been problematic.

In its consideration of reauthorization, officials in the Administration quite appropriately will consider the National interest in continuing the state institute program. Its legislative history, as indicated above, strongly emphasizes research aimed at solution of practical problems at the level of local, state and regional concern. With more and more federal emphasis, quite properly in my view, upon state and local responsibility for solving water problems, there is a national interest--as I see it--in helping state and local governments to solve successfully these problems. The state institute water research program is a traditional conservative means of help, which is much less costly than direct federal assumption of these same problems for federal solution. Hopefully, the report of the Ad Hoc Institute Program Planning Group sponsored by the U.S. Geological Survey will be helpful to the Administration in formulating a positive proposal.

Within the water research community as a whole the principal issue, as I see it, relates to Sections 104 and 105. I have concentrated my thoughts on this issue and have chosen to ignore possible lesser issues.

In all of the disciplines that are involved in water research, I will assert, academic researchers are divided between those whose primary intellectual perspective at bottom is advancing their discipline and publishing in peer-reviewed journals, as contrasted with those whose primary interest at bottom is in applying their discipline to the solution of practical problems. Taken too literally, this dichotomy is false. But I believe you will agree

that there is more than a grain of truth in it. I could discuss many examples of this strong tendency of academic dichotomy; but I will not burden you with them.

When Dr. Jerome Weisner of MIT in 1963 was perturbed about "the possible exclusion from support (by the original draft bill) of some centers of greatest excellence of hydroscience in the Nation," his conception of the most useful research, ultimately, would be that which advanced the basic sciences that are involved in water research. When the late Ben Stong proposed the basic ideas to be incorporated into the original draft bill his model--as I have said--was the state agricultural experiment stations. He sought, not solely but primarily, applied research aimed at the solution of practical water problems, Title I and Title II of the 1964 Act constituted a consensus engineered by Stong, that recognized the validity of both types of intellectual perspective. Reauthorization of the water research program should aim, in my view, at reconstituting this consensus.

Reconstitution is not likely, in my view, by proposing authorization of a strong fifty-four state institute program and authorizing explicitly one or more national or regional centers of excellence. If this attempt at consensus were proposed, the issue would be which universities or regions would get the centers. The problem would be not unlike the National Science Foundation issue on where to locate five major new computer centers, except that the issue would be before the Congress and would become very divisive and attract a negative media response.

On the other hand if the new, or should I say "renewed," consensus were to involve reconstituting, in principle, the old consensus of 1964, then the political problem of reauthorization would become much less difficult. Moreover,

the fact of "centers of excellence," if not the labeling by Congressional action, would be manifest. I say this on the basis of the experience of the water research program in the last twenty-three years. That experience could be documented, I am sure, that certain universities emerged over the years as centers of excellence--say some six or eight. Both state institute universities and those without state institutes would be among these centers of excellence. If relative amounts of grant or contract funds received on the basis of national competition were taken to be a surrogate for excellence, then the experience of the last twenty-three years would be documented and my views confirmed or denied.

The fifty-four state institutes, in my view, should welcome this finding and support a reauthorization, in effect, of Section 105. True many universities, including state institute universities, will be found toward the bottom in this finding. If this bothers them, they can always try to compete for national research recognition under Section 105 and displace one of the top centers.

Likewise, the universities that now consider themselves centers of excellence, or aspire to be so, should support, in effect, reauthorization of Section 104. In addition, however, I believe they should support reauthorization of the old institute Matching Grant competitive program. In the report of the USGS Ad Hoc Institute Program Planning Group, renewal of this old program is its "Section 104(b) program." This renewal is essential, as I see it, to strong or stronger state institutes managing statewide problem-solving research programs. Also essential, I would agree, is continuation of the institute evaluation program in Section 101(e)(1) with the power of suspension of those state institutes that do not meet evaluation standards.

Strong institutes covering all the principal political subdivisions of the United States should not be viewed as a threat, but an advantage, to centers of excellence. There are obvious political advantages in having an institute in each state, as is attested by the legislative history of this program over the years. Strong state institutes, on the other hand, should not even suggest that they are a threat to the more academic centers of excellence. State institute directors should remember that a fundamental consensus within the water research community has long underlain this program, despite some institutional problems, and they should want to keep it that way. A fight before Congress between these two elements of the community would more than likely lead to disaster for both.

POLITICAL DECISION-MAKING

Three types of political decision-making in the legislative policy-making process have been identified by political scientists: ideological adherence, bargaining, and distributive politics (i.e., pork-barrel politics). Professor Lowi of Cornell University who first identified and defined these processes classified a long list of enacted federal legislation into one or the other of these categories (7). On the basis of my intensive experience in legislative processes in the 1960s, I have concluded that all of these types of decision-making are involved in all legislation in the field of natural resources and the environment.

With respect to water research legislation, you might ask, what is ideological about that? Ever since the Enlightenment a few centuries ago in the history of Western Civilization, science increasingly has become a high public value. Scientific thinking dominates much modern intellectual thought. And, as you well know, the fruits of science via technological advance are

widespread and greatly appreciated by the public. This honorific role of science gives water research a strong presumption of public worth. In the early 1960s those involved in water research legislation could take for granted its compatibility with prevailing political ideology. Generally, this is still true today. Moreover, political decision-makers, of course, must be convinced that the fruits of the research are manifest. But the ideological basis for legislation needs to be thought through from time to time and reformulated to make sure it makes contemporary sense.

The political process of bargaining to develop widespread practical consensus on legislation is well illustrated by the legislative history of the 1964 Act. The addition of Title II to the original proposal to authorize state water institutes, along with lesser compromises, was essential to necessary widespread consensus. A comparable widespread consensus will be required, as I see it, in the forthcoming reauthorization.

Lastly, distributive or pork-barrel politics is involved in political decision-making. Narrow self-interests are at bottom involved in distributive politics. Collectively the process means: "I will support what you want if you will support what I want" (e.g., a water resources development project). The fact that all of the state directors in NAWID supported each other, when political support has been needed over the years, has been a basic condition of success. To be effective, however, that mutual support had to be translated, of course, into support by Congressmen and Senators; and that was done.

In some legislative processes with respect to new programs in which I was involved in the 1960s, the political community itself took the initiative on subjects which it thought were "good public policy." Not much organized support by interest groups was required. This was the case, as I recall, of

the Water Research Act of 1964. However, as the original, self-convinced legislative leaders die off or otherwise leave the scene, organized interest-group action becomes essential in finding new supportive legislative leaders and in responding forthrightly to their concerns. UCOWR, NAWID and NASULGC have certainly learned this lesson well over the years. Achievement of the override of the President's veto in 1984 indicates that you have passed this test.

SUMMARY

In summary of these remarks, I just want to say this. It is essential, as I see it, that the whole water research community find a consensus for the water research program it wants to see reauthorized. In finding this consensus different interests within the community will need to bargain with each other to arrive at a consensus that all feel makes good sense and is capable of being sold to the political community. Also, the water research community will need to bargain on issues that arise that are important within the political community to gain its support. Finally, the water research community needs to stand solidly together in the forthcoming political process, or in division you may be conquered. The existence of fifty-four state institutes provides a widespread base for distributive politics that not all very worthwhile federal programs are fortunate enough to possess.

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