WATER RESOURCES RESEARCH IN THE UNITED STATES

Roland R. Renne[1/]

INTRODUCTION

I am pleased to have this opportunity to participate with you today in your Tenth Annual Water Conference. I am pleased for many reasons.

First of all, because Dr. Ralph Stucky, Director of the New Mexico Water Research Institute located here at this university, was an associate at Montana State for many years. Ralph, as you know, is a Montana native, and we are proud of the work which he has done over the years, and particularly in the years since he has been with you in New Mexico. I understand that he was instrumental in getting the first water conference going, and this Tenth Annual Conference is excellent evidence of the contribution which these annual sessions have made to a better understanding and utilization of the water resources of New Mexico by the leaders and people of the state.

I am very pleased to be here today because the President of New Mexico State University, Dr. Roger Corbett, has been a long-time friend and fellow worker in our National Association of State Universities and Land Grant Colleges, and I have developed a very high regard for him and the work which he has been doing here at your State University. It is indeed a pleasure to be on the campus today and to participate in this program with President Corbett.

Still another reason why I am happy to be here is that I have worked for some 35 years in the West and have had the opportunity to serve on several committees, both national and regional, which have dealt with western water problems, so that I feel that I have some understanding of the problems which are common to our western region and to New Mexico. I feel very much at home on your campus and among you, and am happy to be with you this morning.

I will confine my remarks primarily to the Federal water research program since Dr. Stucky tomorrow will cover the work contemplated by the New Mexico Water Resources Research Institute under the 1964 Act. The Act established a partnership arrangement between the Federal Government and the state land-grant universities and other universities in the states in a coordinated water resources research program. Under this cooperative or partnership research program, the role of the Federal Government is principally one of stimulating, encouraging, advising, and assisting the state water research centers to do an effective research and water scientist training job. These responsibilities include establishing guidelines or general policies for operation of the program, advising as to the most-needed types of research that might be undertaken, coordinating research operations to keep unnecessary and unproductive

1/ Director, Office of Water Resources Research, U. S. Department of Interior, Washington, D. C.

duplication of effort to a minimum, providing resource material such as catalogs of on-going research projects, assisting principal investigators and research workers to consult with other research workers on similar problems or related efforts, and noting what may be neglected or overlooked important areas needing research.

The Office of Water Resources Research in Washington will not perform any research, but will make funds available as appropriated by Congress under the 1964 Act to provide for a more adequate research program to solve our more major water problems. The state institutes or centers, such as the one which has been established here at New Mexico State University, will conduct research of both a basic and practical nature. There will be 51 such centers throughout the Nation (one in each State and one in the Commonwealth of Puerto Rico). These centers provide an institutional structure conducive to a multidisciplinary attack on water research problems which, up to now, has been generally lacking. By working closely with scientists interested and competent in the field of water resources at the University at Albuquerque and the New Mexico Institute of Mining and Technology at Socorro, the entire research competence and training of the State will be utilized most effectively.

GREAT INTEREST IN WATER PROBLEMS

New Mexico has been concerned with significant water problems for many years. Your senior Senator, Senator Clinton P. Anderson, has taken a leading role in the United States Senate to get legislation adopted which will help to bring sound and satisfying solutions to our major water problems. The Senate Select Committee on National Water Resources, in its report in January 1961, pointed out the extent and character of water resources activities required to meet the water related needs of the United States for various purposes to the years 1980 and 2000, and drew attention to the need for a coordinated Federal scientific research program on water. The hearings of this Committee and its reports (some 32 Committee Prints) were instrumental in providing the background which led to the passage of the Water Resources Research Act of 1964, signed by President Lyndon B. Johnson on July 17, 1964. Your own Senator Anderson sponsored this bill (S. 2) in the Senate, and was instrumental in securing its passage. This session of the Congress has now passed the Water Resources Planning Act, which provides for coordinated planning of water and related land resources through establishment of a water resources council and river basin commissions, and provides financial assistance to the states in order to increase state participation in such planning. Again, your Senator Anderson led the way with his Senate Bill 21 in getting this legislation through the Congress. There are still some minor matters to be settled by conference committees since the bills passed by the House and the Senate are not exactly alike, but it is not anticipated that these minor matters will prevent reaching agreement soon.

The Water Resources Research Act of 1964 and the Water Resources Planning Act of 1965 constitute the legislative basis for a speeded-up and more effectively coordinated nationwide water research and development program.

Our rapidly growing population and our tremendous industrial growth have put tremendous pressure on our water supplies. In the nearly 400 research projects which have been submitted to our office in Washington by the State water research institutes or centers, we note that research proposals dealing with the quantities of water available predominate in states west of the Mississippi, while those concerned with quality of water predominate in the states east of the Mississippi. In our southwest region we are all familiar with the very serious water problems which we face in securing an adequate amount of water to meet the needs of the rapidly expanding industries and population of the region.

SOUND AND SATISFYING SOLUTIONS

Research is vital if we are to discover sound and satisfying solutions to our major water problems. Everyone, of course, would like to think we could have dramatic breakthroughs almost overnight, such as discovery and development of a very low cost method of taking salt out of sea water which would solve some of our more urgent problems, but thus far this has not occurred. Some of the scientists working in the complex fields of water research indicate that they think a "work-through" is more likely than a breakthrough, meaning that there are many bugs to be removed through advancing technology and applications of scientific research before we will find sound and satisfying solutions to many of our water quality and quantity problems.

We all know that research takes time, especially when applied to some of our most difficult and complex problems. The agricultural experiment stations established by the Hatch Act of 1887 have a wonderful record of achievement. However, they have been in operation for nearly 80 years, and it is only in the last three decades that we have noted the most apparent evidences of their success. Today we harvest less land than we did 20 to 30 years ago, but we produce 60 percent more farm production. The Federal-State research program as exemplified by the agricultural experiment station system has indeed paid off with tremendous dividends, but we must not forget that it took many years of dedicated, tedious, sound research effort by many fine scientists before we reaped such dividends. The same may be true of our water research efforts. Fortunately, we are getting the program under way before it is too late, but certainly there is no time to lose.

THE UNITED STATES WATER RESEARCH PROGRAM

The Federal research program in water involves eight major departments: Agriculture; Commerce; Defense; Health, Education, and Welfare; Interior; Atomic Energy Commission; National Science Foundation; and the TVA. In 1964, nearly 65 million dollars was spent by these Federal agencies on water resources research and surveys. In 1965, the estimated expenditures are 75 million dollars -- or an increase of 10 million over the 1964 level. Budget requests for the 1966 fiscal year total approximately 102 million, or over 26 million more than the budget for the current fiscal year. Most of this increase is budgeted for the Department of the Interior, and is for efforts to advance desalting technology, and to provide support for the State water resources research institutes and related programs. Other increases in the budget for 1966 will provide additional funds for studies in water yield improvement; erosion, sediment, and pollution control; and more adequate research facilities.

Some 1,545 Federally supported water research projects are currently under way. The breakdown of these by agency is: Agriculture, 533; Interior, 532; Health, Education and Welfare, 223; Defense, 98; Atomic Energy Commission, 61; National Science Foundation, 46; Commerce, 26; and the Tennessee Valley Authority, 26.

More than half the total current Federal budget for water research is appropriated to the Department of Interior with nearly 40 million (53%), followed by the Department of Health, Education, and Welfare and the Department of Agriculture with approximately 13 million each, and the remaining less than 10 million spent by the other five Federal agencies mentioned above.

STATE WATER RESEARCH PROGRAMS

State water research programs are revealed through nearly 400 projects which have been submitted to the Office of Water Resources Research for funding under the allotment and matching grant programs. The fourteen institutes which have already been funded submitted 82 projects in connection with their allotment program, or an average of about six per institute. Of the 37 as yet unfunded State water research centers, 26 submitted 260 projects, or an average of ten projects each (eleven centers have not as yet submitted specific projects for funding).

It is interesting to note that more than three-fourths of the projects submitted by State research centers fall into four categories of the nine major categories of water research developed and used by the Committee on Water Resources Research of the Federal Council for Science and Technology, Office of Science and Technology. These four categories are: (1) Water Cycle --

including precipitation, evaporation and transpiration, ground water and hydrogeology, and forecasting; (2) Water and Land Management -- including water movement in soils, water, and plants, watershed protection, water yield improvement, erosion and sedimentation, irrigation, and drainage; (3) Development and Control -- including water supply, hydropower, navigation, urban and industrial water-use problems, recreation, fish and wildlife, and flood control; (4) Qualitative Aspects -- including characterization of wastes, effects of pollution on water uses, interactions of wastes, disposal of waste effluents, effects of development on quality, quality characteristics, and aqueous solutions. Nearly a fifth of all projects submitted fell into each of these four major categories.

RESEARCH MOST URGENTLY NEEDED IN THE SOUTHWEST

In addition to continued efforts to find an economical means of taking salt out of sea water or brackish water to make it useful for human use, and weather modification research to increase precipitation and water supplies, there are three other major areas of research of particular interest to New Mexico and the Southwest. The first of these is water use management applied in the most scientific ways possible to reduce water waste to a minimum, particularly in agricultural areas, so that the same amount of water will be able to go further and do more work. Second, re-use of water. Reclaiming water already used for one or more previous purposes holds much promise, provided research discovers methods of such treatment to make such re-use economical and safe. Third, more adequate classification of water, setting up needed standards to meet certain uses and then carrying out use programs which will utilize the quality suitable for the particular use. Today, much class A or uniformly excellent-quality water suitable for any purpose is utilized for uses which could be satisfied with lower-quality water. Much research, as well as effective classification and administration through effective control, is needed for more efficient utilization of water based upon quality classification.

CONCLUSION

Through annual water conferences such as this, and concerted effort on the part of our Federal, State, and local governments, public and private agencies, universities, experiment stations, research institutes, and individuals, we will be able to solve our more perplexing water problems in the years ahead. The steps taken by the Congress by passage of the Water Resources Research Act in 1964 and the Water Resources Planning Act of 1965 point the way by which our country may be assured of adequate water supplies for continued economic growth.