

# the divining rod

New Mexico Water Resources Research Institute

Vol. 2, No. 2

Special Edition--Fall 1978

## Saline and brackish water research will receive emphasis beginning in 1979

### Direct use of brackish and saline water: a neglected opportunity

Increased emphasis on searching for ways to effectively use brackish and saline water without desalting it will be a high priority subject for New Mexico water research programs during the coming year.

This topic received unanimous support at a special meeting of the WRRRI Program Development and Review Board held in Socorro on September 21, 1978. The Board stressed the need for an early start on this research while at the same time not preempting other important research areas. To accomplish this the WRRRI is seeking supplemental state funds which would be earmarked specifically for brackish and saline water research and development.

Some of this research will be conducted at the

Roswell Test Facility. This is now possible because of the signing of a cooperative agreement earlier this year between the WRRRI and the Department of the Interior. The remainder of the research will be conducted at field and laboratory locations at the several universities in the state.

The WRRRI through a preliminary inquiry this summer identified more than 20 scientists at universities in New Mexico who are interested and ready to begin the research. As the funding becomes available, WRRRI will solicit proposals. These proposals will be reviewed in the usual manner by the Program Development and Review Board. Faculty with interest in this program are strongly encouraged to contact WRRRI Director, Tom Bahr.

Using a portion of

CONTINUED ON PAGE 3

### Improvement in desalting methods: still a target

Improvement of current desalting methods continues as an important research priority of the Office of Water Research and Technology (USDI). Desalting technology may be the only economical alternative for some New Mexico communities to meet the new Federal drinking water standards. Reverse osmosis, and to some extent electrodi-alysis, are already commercially feasible for providing fresh water, to remote locations, where supplies must be transported great distances. In these cases, however, water costs are still very high and more research and development is needed to find less expensive ways to desalt water.

Private industry,

CONTINUED ON PAGE 4

*Special saline/brackish water edition*



Dr. George O'Connor checks a project in the NMSU greenhouses.



Dr. J.L. "Skipper" Botsford gets ready to grow new bugs.

## Two projects approved to begin campaign for direct uses of saline and brackish waters

How much salt can be in the water used to irrigate crops such as barley, alfalfa, and sorghum, and still produce acceptable yields? What will long-term use of saline water do to the soils? Is there a strain of bacteria that can survive in a saline-bathed soil and still provide nitrogen fixation capability to alfalfa?

Answers to these questions can give New Mexico a start toward using some of its vast brackish and saline water deposits without the expense and energy expenditures required for desalting.

George A. O'Connor, Associate Professor of Agronomy at New Mexico State University, is

starting a project which will determine the effects on crop growth of irrigating with waters of varying salinity in soils of differing textures.

Five levels of salinity are being used in the experiment, with total dissolved solids (TDS) ranging from 1250 to 15,000 parts per million. The higher level is roughly half as salty as sea water.

Crops common to most of New Mexico are being grown in soil columns in the NMSU greenhouses. Irrigation water of various salinities is supplied to the plants on a regular basis, with water loss from evapotranspiration and drainage being determined by

weight. Salinity of soils will be monitored throughout the experiment, with more complete analysis of both drainage water and soil salts content to be done at appropriate times.

*Rhizobium Meliloti* is the variety of nitrogen fixing bacterium that works in symbiosis with alfalfa to change soil nitrogen into forms useful to the plant. James L. Botsford, Jr., Associate Professor of Biology at NMSU, initiated a project to identify strains of this microbe that can survive and grow in brackish or saline water. If a field strain with this capability cannot be found,

CONTINUED ON NEXT PAGE

## Direct uses for salty water to be investigated

CONTINUED FROM PAGE 1  
the current research budget the WRRRI was able to begin two studies to investigate the possibility for direct use of brackish water for agricultural irrigation. Brief reports on these two projects can be found in this issue of the *Divining Rod*.

New Mexico has a vast untapped underground supply of more than 15 billion acre feet of brackish and saline water. Technology for desalting this water for high volume uses such as agricultural irrigation is simply too expensive at this time. While desalted water has its place in high quality uses such as drinking water, not enough attention has been placed on the possibility of using brackish water directly. The possibilities for New Mexico are vast but we haven't even scratched the surface yet. This is not easy research but likewise,

New Mexico's water problems are not simple. It will take years of intensive and often discouraging work to find the answers. It's not the kind of research where we will find solutions overnight. The payoffs, however, will be profoundly important to the future economy of New Mexico and will have broad national and international implications.

Some potentially promising avenues of research are listed below, but a major research and development commitment must be made to bring these ideas to practical use.

\* Agricultural uses of saline water is a high priority area in need of intensive research. There is ample evidence that through careful genetic selection and manipulation, plant breeders can develop new varieties of crops that are salt tolerant.

\* Greenhouse and hydroponic techniques for raising new horticulture varieties of vegetables hold promise as another means to economically use brackish and saline water.

\* The culture of shellfish, finfish and algae is well established in some coastal areas. Potential to expand mariculture techniques to inland areas having brackish and saline groundwaters is great. Successful development in this area could revolutionize regional fish product industries. New sources of protein from these techniques have obvious international implications.

\* A variety of other municipal and industrial applications, especially related to energy development, are possible and should be studied as part of this program.

## Two direct use projects

CONTINUED FROM PAGE 2

Botsford plans to attempt genetic modification of existing strains to develop one with high salt tolerance.

If successful, this project may well provide Southwestern farmers with a way to grow al-

falfa using the underground deposits of saline and brackish water available to them, instead of the dwindling supplies of the higher quality irrigation water now used.

Certainly supplies of fresh water would be preserved if brackish water

could be used in production of crops. Since the supply of fresh water is the single most important limiting factor in long-term growth of New Mexico, successful completion of these two projects could lead to important long-range consequences for the state.

# Our Holiday Wish!

PAGE 4

We at the New Mexico Water Resources Research Institute wish you serenity during this holiday season and a full measure of achievement during the coming months. Let us earnestly ask that you pause with us amongst the turmoil to find our places in seeking the true meanings of the holiday season.

---

## Improvement in desalting methods: still a target

CONTINUED FROM PAGE 1

assisted in some cases by federal and state monies, is carrying forward several programs in improvement of reverse osmosis technology. Hopefully, membrane efficiency and durability will be measurably improved as a result of these efforts, and desalting costs will come down as time passes.

Operational experience, developed in real-life situations, is an essential part of perfecting this technology. To meet this need, the WRRRI began a project in 1976. Under the direction of Dr. Bruce Wilson of NMSU's Chemical

Engineering Department a mobile desalting van was constructed with the objective of testing this technology on water supplies from several New Mexico communities. Funded by OWRT, WRRRI the N.M. Interstate Stream Commission, and private industry, the van is using both reverse osmosis and electrodialysis techniques. Performance and cost data are being collected and processed for final evaluation. An important part of the project is to identify potential problems related to power supplies, installation methods, equipment contamination,

equipment dependability, and manpower requirements. The information being compiled will be extremely valuable to planners and builders of fixed-plant desalination facilities.

Perhaps as valuable, though, is the experience and knowledge imparted to officials, employees, and citizens of each of the small towns which the van visits and serves during its six-week stay. They thus obtain additional information that will help them choose among the various options available to meet standards of the National Safe Drinking Water Act.

---

DR. THOMAS BAHR, Director, New Mexico Water Resources Research Institute; WINSTON L. COMER, Editor.

the *divining rod* is published quarterly by the New Mexico Water Resources Research Institute. WRRRI is supported by the Office of Water Research and Technology, U.S. Department of the Interior, and by the State of New Mexico.

---

### the *divining rod*

New Mexico Water Resources Research Institute  
Box 3167  
Las Cruces, NM 88003