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STAFF PAPER

GOVERNMENT'S EVOLVING ROLE IN GROUNDWATER ISSUES

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AUGUST 1987
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GOVERNMENT'S EVOLVING ROLE IN GROUNDWATER ISSUES

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UNSEEN THREATS INFEST OUR WATER

In a recent Kansas City Times newspaper article, Jake Thompson wrote "Two realities of modern American life collide at the water faucet: Science has given most Americans clear water when they turn the tap - water almost certainly cleansed of deadly diseases we feared 100 years ago, water many take for granted. Science also has created thousands of chemicals Americans use in their homes and factories, spray on their crops and bury underground. And now those chemicals come out of the faucet in millions of American homes. Some of the chemicals are known to be deadly, causing liver and kidney ailments, and cancer. Others are a mystery. The science of measuring the danger of chemicals has not caught up with the science of producing or detecting them." (1)

Presented at North Central Region Eight State Groundwater Workshop, Iowa State University, Ames, Iowa, May 12, 1987.

Hastings, Nebraska has forced three city wells to close because of chemical contamination. Discovery of chemicals in wells has left the people feeling powerless. The residents are concerned, but not concerned enough to disconnect the faucet. Marjorie Hays, resident, said, "I guess not until people start dropping dead in large numbers will we get really excited. What action do you take as a private citizen when you're afraid of your water?"(1)

In Boise, Idaho, a former missile silo complex turned toxic waste dump is suspected of leaking chemicals, which has some area residents and government officials very concerned that the groundwater may be polluted. Steve Provant, Solid and Hazardous Waste Section Chief for Idaho's Division of Environment, feels the aquifer underneath the toxic dump is low-yielding and slow-moving. He added that it is probably not a major aquifer and that possibily domestic water users off-site are using a different aquifer. At this point, there is no firm legal evidence that the groundwater has been contaminated or of who might be responsible. However, Provant is confident that, if the mess needs to be cleaned up, it will be done without delay.(2)

In Stillwater, Oklahoma, a court jury has awarded an 87-year old widow more than $4 million in her lawsuit against Tenneco Inc., alleging the oil company contaminated her drinking water with an abandoned salt water pond.(2)

In Yoder, Kansas, an Amish and Mennonite community, the Kansas Department of Health and Environment tested the water at Yoder Elementary School and found petroleum products in small quantities. Subsequent sampling of 31 wells, should that 12 homes and the school were using water containing up to four chemicals that are toxic or suspected of causing cancer. (3)

In recent years, 24 states, including Iowa, Kansas and Nebraska have discovered 17 pesticides in groundwater. Citizens are beginning to be increasingly aware that there is a problem that will not go away. The major issue is how to organize to either clean up a major polluted area or to prevent contamination of groundwater that will be used at some time in the future or both.

ROLE OF GOVERNMENT

Population and production expansion with subsequent increased groundwater use will provide more opportunities for various chemicals and other pollutants to dissolve as water moves from the surface to the aquifer. This will cause changes in the quality of water. Also, groundwater quality will vary from one location to another. The impurities that are contained in various water tables will vary depending on the time when the water was deposited or when the water moved from the surface through the various soil layers. It is very difficult at the present time to prove the source of contamination especially when legal requirements are necessary to determine a cause and effect relationship

for consumers who have been harmed by the pollutants. However, decisions on the source and subsequent regulations will be made by people representing either local, state, or federal government with information they have and understand.

Data collected nationally on groundwater quality indicate that contamination from human and industrial sources is present, increasing, and is currently affecting perhaps one to two percent of our total groundwater resources. Undetected additional contamination is nearly a certainty. Modern methods of detecting parts per billion are available and will be able to provide forewarning of potentially dangerous contaminates in a particular water supply. An example is in Des Moines, where farm pesticides - specifically those marketed under the names of Atrazine, Furadan, Dual, Bladex, and Lasso - have shown up in the drinking water supply. So far there has been only trace amounts, ranging from 0.34 to 0.59 parts per billion (ppb). According to officials, the pesticide contamination poses no immediate health threat under U.S. Environmental Protection Agency guidelines. Nevertheless, in a state that considers water pollution as one of the most important of political issues, even trace amounts are being taken seriously. (17)

To date, over 225 different chemical, radiological, and biological contaminates have been detected in U.S. groundwaters, including numerous cases of contamination that have caused severe shortages of safe water in local areas. Nationally, the most frequently detected contaminates in groundwater are chlorinated organic solvents, phthalates and phthalic

acid, benzene and ethylbenzene, carbon tetrachloride, chloroform, metals, chloride and nitrate, and radium. (6)

Society is beginning to evolve a system of control for application of various chemicals, fertilizers, pesticides, herbicides, petrochemicals, and any harmful chemical to prevent them from contaminating water. Many chemicals have already been banned as dangerous. Control can be an individual responding to an educational effort concerning the use of various chemicals. Local requirements for locating chemical storage units are beginning to get attention and people are beginning to request state or nationally mandated controls. There is still a great deal of confusion concerning how control is to be implemented and by whom.

Individual firms and state and federal agencies use various chemicals to solve a particular problem based mainly on cost and effectiveness considerations. Disposal of them is generally done within accepted or legally known requirements at the time. As more information becomes available, guidelines can change. What was once acceptable is no longer acceptable and could actually become a health hazard later. Individuals will not make the changes unless forced by some legal authority-city, county, state or federal government. Each of these governmental levels will develop regulations to reflect specific safety limits that people want for specific problems.

State and federal regulations will be broader and more concerned with the general welfare of the population. These regulations will be based on what is commonly called cause and effect within economic and political constraints. Specific information is needed by local and national policy making groups to spell out the specific pollutant results that can be expected if a particular chemical is used in a specific location. At the present time, adequate information concerning various chemicals in the groundwater is not sufficient for the policy makers to develop a complete set of regulations that will prevent any future pollution or cope with existing pollution problems. Scientists and subsequently state and federal agencies have not provided enough information and support for policy makers concerning the problem and subsequent alternative solutions.

SOURCES OF POLLUTION

The nation's water problems are reflected in Kansas, Missouri, Iowa and Nebraska, the states that make up the EPA's Region 7. Because of the states' agricultural, industrial, sociological and geologic similarities, officials in one state may look for problems that have surfaced in another.

The sources of pollution to public and private water systems are perplexing and varied. Among the dominant ones:

1) Farmers have increased production with the use of chemical layers of pesticides, herbicides, and nitrogen, which have run off the land or have seeped into the soil and well water at a later time.

2) Poisonous solvents, degreasers and other chemicals used in industry have been suspected of causing cancer and have been found in about 100 city wells in the four states.

3) Leaking gasoline tanks are found in service stations and farms.

4) Mining has contaminated drinking water in southwest Missouri and southeast Kansas with dangerous levels of cadmium and lead.

5) Several old landfills have leaked toxic chemicals into groundwater and new ones that have been built in the last 10 to 15 years could threaten surrounding groundwater.

6) Routine practices of grain elevators involve a cancer causing chemical, carbon tetrachloride, to kill insects in grain; it is showing up in drinking water.

7) Septic tanks and private wells are often poorly constructed or situated near one another and feedlots have fouled drinking water for millions of rural Americans who drink water from private wells.

8) Nature itself is the suspected cause of excessive amounts of lead, fluoride, selenium, and possibly nitrates in about four towns in Missouri and a dozen in Kansas, also natural radioactivity plagues dozens of Iowa and Missouri towns and five in Kansas. (3)

These current problems are increasing the pressure for state and local governments to become more involved in developing water legislation than just to ensure adequate supplies of safe clean water compared to 64 years ago. For example, in 1923 a law (K.S.A. 12-809) was passed granting municipalities the power and authority to dam any river not navigable and to condemn and appropriate such land as necessary for the construction and operation of waterworks. This dealt primarily with obtaining the appropriate quantity of water for municipalities. The concern has evolved from water quantity to water quality. This has become one of the major focal points for the development of the Kansas State Water Plan and subsequent water related legislation. The development of new regulations will be slow unless a major catastrophe occurs, then change could come quickly for a particular issue.

GROUNDWATER QUALITY

Cleaning a source of polluted groundwater is extremely difficult and costly. Most private firms or farms do not have the resources let alone the expertise to clean up a contaminated well and the surrounding area. The most economical action they can take is to abandon the well or area and obtain a source of water from some other area where it is not

polluted. If local residents deem it necessary to clean up the well and surrounding area, then that particular government that has jurisdiction will have to order the cleanup at the polluter's expense or pay for the cleanup from their funds. If more than one area is involved or several firms, then the state or federal government may have to get involved.

In an area just outside the city limits of Manhattan, Kansas, some neighborhood wells were tested by the Kansas Department of Health and Environment (KDHE) found to have carcinogens, and deemed not to be safe for drinking because of a landfill on an adjacent property. Continued testing by the county officials and private testing firms have been consistent. KDHE decided that after testing and identifying the problem, it was up the responsible parties to take over the testing. The city owns the property occupied by the landfill, but Riley County took over the operation in 1976. At this time, no one is assuming responsibility and it will probably take a court case to decide who is responsible and for what. During the interim, the City has agreed to sell water to the County who in turn will sell it to these households. The County has recently announced the closing of the landfill after a suitable alternative site has been selected. The present site was selected on the criteria set forth by State regulations.

Sometimes the Federal Government will get involved, if the contamination involves more than one state or if one or their agencies have been involved. For example, over the past two years the U.S. Department of Defense has launched a huge and expensive campaign to clean

up toxic wastes stored on military bases throughout the country. The Army has found 190 sites where its past activities may have polluted the land or water. Army officers have acknowledged at least part of the blame for contamination of public water supplies at five facilities: The Rocky Mountain Arsenal near Denver; the Phoenix missile site in Maryland; Letterkenney Army Depot at Chambersburg, Pa.; Riverbank Army Ammunitions Plant near Modesto, Calif.; and the Twin Cities Army Ammunitions Plant outside New Brighton, Minn. (7)

In Action, Mass. an $8 million aquifer purification program is cleaning the aquifer that provides approximately one-half of the water required by its 18,000 residents. Most of the money for the purification program, $6.7 million, has been paid by W. R. Grace & Co., the national chemical conglomerate. Grace's Polyfibron Division factory, a half-mile from the wells, has been identified as the primary polluter. Under a federal court order, Grace has been ordered to pay for cleaning the aquifer and to maintain it for 30 years. (13) Water quality is becoming the major issue to be considered.

EVOLUTION OF KANSAS WATER LAW

Water regulations have been developed based on the needs of the users at the time. Early concerns were the quantity of water, availability, and flood control. State regulations and laws were prepared to meet these needs.

The first water law in Kansas was the common law that embodied different rules for surface water and groundwater. The common law that applied to stream water was called the Riparian Doctrine. This Doctrine generally gives the right to water flowing in a stream to the individuals who own the land immediately adjacent to or crossed by the stream. Thus, surface water rights existed only for those who owned riparian land, which was defined as land bounded or crossed by the stream.

Under the common law, groundwater belonged to the landowner absolutely, in the same way as the land itself. Thus, the landowner could use as much or as little of the groundwater as he wished, without regard for his neighbor or risk of legal action. This policy was generally referred to as the doctrine of absolute ownership.

Texas is the sole western state to retain the doctrine of absolute ownership. Under Texas law and the judicial interpretations of the state courts, essentially all groundwater is considered to be the private property of the person with title to the land above it. The water can be withdrawn for use or sale without any effective control by the state. Furthermore, the land owner is not liable for damages such as land subsidence and falling water tables that his pumping might inflict on neighbors.(5) Nebraska limits land owners to reasonable use, and provides equal rights to a groundwater resource for all other owner's of land overlying a common supply. Oklahoma requires that land owners use must not only be reasonable, but must be correlated with the use of others, particularly during times of water shortage.(16)

HISTORY OF STATE WATER PLANNING

Kansas has been considered the "Great Desert" because of the lack of surface water except in a few areas. The need to control water and prevent pollution was officially started in 1917 with legislation to work out a systematic general plan for the complete development of each watershed in the state. The Kansas Water Commission was abolished in 1927, and its planning functions were assigned to the newly created Division of Water Resources, State Board of Agriculture.

In 1955, the Legislature removed the planning responsibility from the Division of Water Resources and gave it to the newly created Kansas Water Resources Board. The Board was directed to "...work out a state plan of water resources development for each watershed in the state..." Two events in 1958 were significant for the future direction of state water planning: a amendment to the Kansas constitution removing the prohibition against state financial involvement in water projects; and the passage of the 1958 Federal Water Supply Act authorizing a portion of the costs of a federal multipurpose reservoir project to be allocated to future municipal and industrial water supply.

In 1963, the Legislature enacted the State Water Plan Act, which directed the Board to formulate, adopt, and present to the Legislature a comprehensive state water plan. In 1965, the Board submitted a draft of proposed legislation, which was enacted as the State Water Plan. It

spelled out eight state water policies and 17 goals and objectives for the development of the state's water resources.

In 1966, the Board undertook an intensive statewide planning effort that culminated in reports on special water districts, groundwater, water quality control needs, irrigation, water law and water demands for industrial, municipal, and rural domestic uses. In 1968, the Board, in cooperation with the Bureau of Reclamation, began studies to analyze the land and water resources of Kansas. Included in this study were projections of the economy, population, and water needs for the years 1985 and 2000.

During the period 1970 - 1974, the Board concentrated on studies of mineral intrusion areas and modification to the 1968 Groundwater Management District Act. Two significant pieces of legislation were enacted during this period. The 1972 Groundwater Management District Act and the 1974 State Water Plan Storage Act.

In 1979, the Board began to revise the State Water Plan, placing increased emphasis on conservation and management. On July 1, 1981, the Kansas Water Resources Board was abolished by the Legislature and was renamed the Kansas Water Office. A 16 member Kansas Water Authority was created and assumed many of the duties and responsibilities of the former Board.(18)

The Kansas Water Authority is comprised of 11 private citizens members and five ex officio members as follows: 1) appointment by the Governor (this member serves as chairperson of the Kansas Water Authority); 2) appointment by the President of the Senate; 3) appointment by the Speaker of the House of Representatives; 4) a representative of large municipal water users; 5) a representative of small municipal water users; 6) a board member of western Kansas groundwater management districts; 7) a board member of a central Kansas groundwater management district; 8) a member of the Kansas Association of Conservation Districts; 9) a representative of industrial water users; 10) a member of the State Association of Watershed Districts and 11) a representative of general public. The five ex officio members are as follows: 1) the State Geologist; 2) the Chief Engineer of the Division of Water Resources of the State Board of Agriculture; 3) the Director of the Division of Environment of the Department of Health and Environment; 4) the Director of the Kansas Water Office and 5) the Director of the Agricultural Experiment Station of Kansas State University.(19)

The Kansas Water Authority is the coordinating group for all water related policy activities and recommendations to the legislature. Several departments in the state have specific regulatory powers such as granting water rights, health related issues, and recreation.

"Kansas utilizes the appropriation doctrine for establishing priority water rights. According to the Water Appropriation Act of 1945 (Kansas Statutes Annotated 82a-711), the Chief Engineer of the Water Resources

Division of the Board of Agriculture shall grant an appropriation right if the use of the water does not impair a prior right, and does not prejudicially or unreasonably affect the public interest. The appropriation doctrine, thus articulated in Kansas law, has brought order to the use of water, and has served the State well."(15)

The prior appropriation doctrine is based on the maxim that the first in time is the first in right. Under the doctrine of prior appropriation, the one who first diverts and applies the water to a beneficial use has a prior right to the water to the extent of his appropriation. Its origin was the early customs with respect to the use of water on public lands.

Today, in Kansas, all water is dedicated to the use of the people, subject to state control and regulation (K.S.A. 82a-702). A question still exists as to the extent of the authority the federal government has over the nation's water. All of the states west of the 95th meridian, which lies approximately at the eastern border of Kansas, have declared the surface waters within their boundaries to be the property of the people of the State. Interestingly, Congress has consented to this arrangement by ratification of state constitutions. However, all the states are subject to an overriding interest of the federal government, because of the Commerce Clause in the Constitution, which governs navigation.

With the water in Kansas dedicated to the public use, the state government has placed itself in charge of granting water rights to those private or public individuals, groups or corporations that comply with the statutory requirements. Note that a water right in Kansas is merely a right to use the water, it is not a right to legally own the water. By statute, a water right in Kansas is a real property right attached to and severable from the land on which the water is used. Such a water right may pass with the land when the land is conveyed to another or water rights may change the place of use, the point of diversion, or the use made of the water only with the approval of the Chief Engineer, Division of Water Resources (K.S.A. 82a-708b). Thus, the sale of water rights is subject to approval by the Chief Engineer.(4)

Total appropriations, as of May 1983, exceeded the actual supply of water available by 13 percent. Many appropriation rights do not have enough water available to supply the right, or they are not used for economic reasons and have been abandoned when the well went dry.

STATE WATER QUALITY PROGRAMS

Kansas is considering a very complete and detailed program with respect to controlling the quality of groundwater. In 1985, the Kansas Legislature established the State Water Plan, which had been approved and recommended by the Kansas Water Authority. This legislation, which amended the Kansas State Water Resource Planning Act also requires the

Kansas Water Office, with the approval of the Kansas Water Authority, to annually submit an updated State Water Plan to the Kansas Legislature and to the Governor. This legislation directs the State Water Plan to deal with: 1) management; 2) conservation; 3) quality; 4) fish, wildlife and recreation, and 5) development. (4)

One of the major benefits already in evidence in Kansas with the adoption of the State Water Plan has been the recognition by politicians and various state agencies that no single organization can carry out programs to manage, conserve or develop the waters of the state. As a result, local, state, and federal levels all act in a coordinated fashion to achieve desirable objectives in water resource management.

The Kansas Groundwater Quality Protection Strategy has been in preparation since mid 1985 and was formulated with the assistance of a 44-member task force representing government, industry, agriculture, professional organizations, and the public. The strategy is intended to serve two main purposes:

1) to outline a coordinated statewide groundwater resources plan for the foreseeable future, and

2) to serve as the state response to the National Groundwater Quality Protection Strategy developed by the U.S. Environmental Protection Agency. (6)

The Kansas Department of Health and Environment (KDHE) has approached strategy development from the standpoint of evaluating the adequacy of existing programs for groundwater pollution prevention and remediation. They will be taking into account new scientific information, which indicates that more stringent controls on sources and development of a broader information base may be needed. KDHE has concluded from the evaluation of the existing statutory and management structure that a new comprehensive groundwater protection act or major organizational changes are not necessary to provide effective prevention and cleanup of groundwater pollution. However, several additions or modifications are recommended to strengthen existing programs.

The strategy makes recommendations in the following areas: planning and coordination, data collection and resource, monitoring, remedial response, education, statutory and regulatory changes, and control of potential contamination sources. Some of the major recommendations contained in the strategies are:

1) development of statewide groundwater quality standards based on a nongraduation policy, including cleanup standards for recovery of polluted areas;

2) development of an Aquifer Remedial Response Plan containing investigation and cleanup procedures, based on the recommended policy that the state assume responsibility for remedial action when the polluting party cannot be identified;

3) a series of recommended statutory changes including clarification of pollution liability and property access for investigation or cleanup of pollution;

4) increased involvement for units of local government responsible for public water or wastewater systems, including:

   a) preparation of aquifer/wellfield protection plans for all public water supplies,

   b) local approval, under state standards, of water and wastewater systems for developing subdivisions, and

   c) preparation of county wide water and wastewater management plans;

5) a major review of all existing design standards and monitoring requirements for potential groundwater pollution sources and for public water supplies using groundwater;

6) new funding for field response and investigation of contamination incidents and immediate remedial work if imminent danger exists to public health or the environment, and site-by-site funding for long-term cleanups where the state assumes responsibility; and

7) several major education and information efforts targeting the public, governmental agencies, professional organizations, trade associations, industrial or commercial operations, state elementary/secondary/college education systems, units of local government, and water users in the Groundwater Management Districts.

Two new sub-sections are recommended for inclusion in the Quality Section of the State Water Plan. These are Water Pollution - Mitigation and Non-Point Source Pollution. The Water Pollution - Mitigation should be prepared to contain the following elements:

1) require the state to initiate cleanup procedures when a responsible party is unknown or cannot or will not undertake necessary clean-up;

2) require the preparation of standard procedures for evaluating and ranking problems;

3) require standard procedures for cleanup plan development and budget development and budget preparations;

4) allow the use of cleanup funds for investigations and preparation of plans and require annual submission of investigation and cleanup plans and budget proposals for priority problems to the Kansas Legislature;

5) clearly establish the authority of the state to gain access to private property for site investigations;

6) require the development of standard procedures for public notice regarding health risks; and

7) require that a status report for each river basin be published annually, identifying and describing priority problems, risks, and mitigation efforts. (9)

There are several statutes that deal with mitigation to varying degrees but none spells out a truly comprehensive program. These concerns should be addressed in recommended legislation to outline a coordinated and comprehensive approach to water quality mitigation. Too great a change would not be very popular especially to the politicians who would have to enact the change. New mitigation programs may be costly in the short run but will have to be dealt with at some time, probably at greater cost later. Some phases of a positive direction toward overall quality control is in progress.

Implementation of the Kansas Groundwater Quality Protection Strategy is anticipated to be a phased process, extending over a period of several years. A series of actions by several entities, including the state legislature, governmental agencies, the regulated community, and the public, will be necessary to implement the strategy. An annual status

report on implementation of the strategy will be prepared by the Kansas Water Office (6)

There are many changes that are being made by other states to protect groundwater quality. Nebraska, for example, has recently passed a number of different bills related to groundwater protection. These include such measures as:

1) authorization and inspection for underground storage tanks that contain petroleum products and certain other substances;

2) control by 24 Nebraska Natural Resources Districts, and the Department of Environmental Control to document, monitor, regulate, and enforce chemigation, the application of chemicals through irrigations systems;

3) allowing for interbasin transfer only if benefits to the state in the receiving basin are greater than, or equal to, adverse impacts to the state and the basin of origin;

4) requiring testing and licensing of well drillers and pump installers and the development of well construction standards, pump installation, and well abandonment;

5) granting determination, designation, and regulation of groundwater quality protection areas to the Department, but gradually allowing the Nebraska Natural Resources Districts to regulate amounts of fertilizer used;

6) regulating mining activities such as uranium; and

7) requiring the Natural Resources Commission and the Natural Resources Districts to conduct a statewide erosion and sediment control program. (8)

BASIC REGULATORY DEVICES - POLLUTION PREVENTION

States, together with local governments, have the principal role in groundwater protection and management according to the United States Environmental Protection Agency. The EPA bases this statement on the fact that states have historically undertaken groundwater management and have the basic implementation and enforcement authority, and local government has authority to control land use. (10)

There are a variety of regulatory techniques available to implement groundwater quality. These protection techniques include groundwater quality standards, source-oriented controls, land use controls, state and local regulatory powers and cleanup requirements. Groundwater quality standards describe desired levels of groundwater quality. Source-oriented controls focus on controlling the potential sources of

contamination through permit and license programs, facility design requirements and best management practices for potential pollution sources. Land use controls attempt to limit contamination by regulating the use of the land overlying the groundwater. Cleanup requirements address procedures for remedying contamination after it has occurred. These protection techniques are not mutually exclusive, i.e., they can be used in combination and elements of one technique can be incorporated into another.

In Wisconsin, legislation was passed in 1983 establishing important new state responsibilities for groundwater management and the potential for an important local governmental role as well. The law established groundwater quality standards for existing state regulatory programs and newly created state regulatory responsibilities. The numerical standards for substances that could contaminate groundwater were established as part of a two-tiered approach. "Preventive action limits" (PAL) represent a certain percentage of the enforcement standards. When a PAL is exceeded, state regulatory agencies are required to take action to maintain or lower the contaminate concentration. Also, PAL must be used in design standards for facilities (e.g., landfills) and management practices specific contaminates that cannot legally be exceeded. When an enforcement standard is exceeded, a state agency must prohibit continuation of the activity or enforce other actions that will achieve compliance with the standard. Several new state regulatory programs have been created to fill gaps that existed. State agencies will administer the new regulatory programs to control the storage of bulk quantities of

fertilizer and pesticides, the bulk storage of salt and other chlorides, and the storage of flammable and combustible liquids in underground tanks. There are also general requirements that any regulatory programs within state agency authority must comply with the groundwater protection standards.

The new legislation also establishes a groundwater monitoring program, a program to assist with the repair or replacement of contaminated wells, a fund to cover costs of repairing groundwater contamination, guidelines for laboratory certification, a council to coordinate state groundwater activities, and several other programs. (11)

STATES ADOPT FUNDING PROJECTS

A total of 18 states have established financial assistance programs or are offering other innovative approaches to help construct water and other local public works facilities. These programs are replacing the funds that have come from the federal budget in the form of grants and loans. Examples of state programs follow:

California has set up a Clean Water Bond Fund that provides loans and grants for wastewater treatment, water reclamation, and conservation.

Colorado has an Impact Assistance Program that provides grants and loans for wastewater and water supply projects.

Florida has a Bond Loan Program to finance the construction of water supply and solid waste disposal facilities and to control pollution.

Georgia has established a Development Authority to provide loans for construction and expansion of water and sewer facilities.

Kentucky has a Pollution Abatement Authority that finances the construction of water and sewer facilities. The state legislature recently passed a bill to promote "privatization" or the private ownership and operation of water and wastewater facilities. The bill authorizes cities and other political subdivisions to contract out these public services and allows revenue bonds to be issued to finance the costs of such projects.

Massachusetts is considering setting up a "Massbank" to provide financing for water and wastewater projects. The state would purchase local community debt obligations with proceeds from revenue bonds.

New Jersey has an Environmental Infrastructure Trust, which is authorized to make loans for wastewater, resource recovery, and landfills.

Ohio has a Water Development Authority to finance water, wastewater, and solid waste facilities for local government agencies.

Oklahoma set up a Water Resources Fund of $25 million to finance wastewater, water conservation, and development projects through loans and emergency grants.

Tennessee has a Local Development Authority, which provides financial assistance to construct wastewater treatment plants, water projects and solid waste recovery facilities.

Texas provides loans for wastewater, water supply, and reservoir projects.

Utah has a Loan and Credit Enhancement Program, which finances wastewater, drinking water, and water projects.

Washington has one of the first infrastructure banks, the Public Works Trust Fund, which provides loans for storm and sanitary sewage systems.

West Virginia has a Water Development Authority to finance wastewater and drinking water facilities with low interest loans.

Wyoming has a Farm Loan Program to finance municipal development.

New York has set up an Environmental Facilities Corporation to work in partnership with the New York State Pure Water Authority in financing, designing and construction wastewater, water management facilities, storm water collection system, and solid waste disposal facilities. (14)

CONCLUSIONS

Americans, for the past 200 years, have considered the concept of property rights, brought by the colonists from England, to be among their most prized acquisitions. The expanse of free land and readily available resources in the West minimized the need for comprehensive land or resource use planning and enhanced the concept that ownership of land included the air above and the water and mineral resources below. However, the federal government and state governments hold powers that constrain private ownership of resources.

The powers of the states include police power relating to health, peace, morals, education, good order, and the general welfare. Conservation of resources falls under the general welfare and health and safety doctrines, subject to due process and equal protection. These powers are being tested by politicians dealing with the issues of water pollution and its impact on the health of the public. This impact, both from a health and an economic development aspect, will stimulate local and state governments to manage, develop, and use water in the best interest of the people and economy of their state and community. Water will be one of the limiting factors that will determine the economic growth of an area in the future. More effort will need to be made through governmental regulations to eliminate possible contamination of aquifers that will be needed for the future survival of many communities. Water has been considered as an abundant replenishable resource without

limit. In recent years, the reality of water as a scarce resource has caused various groups of concerned citizens working with and through state and federal governments to begin the long arduous process of developing strict regulations to prevent contamination and to ensure a continuous supply of clean safe water.

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