

WATER RESOURCES RESEARCH INSTITUTE

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WATER RESOURCES RESEARCH ACT AMENDMENTS

The House of Representatives has passed legislation to amend the Water Resources Research Act increasing Institute annual allotments from \$100,000 to \$250,000 and authorize programs for the transfer of new technology into practice. Hearings were held in the Senate on October 13 with favorable reports from the Department of the Interior and Office of Management and Budget. Director Howells testified in support of the legislation. He reports a very favorable atmosphere and expects final enactment this fall.

NEW INSTITUTE REPORTS

*Report No. 55: Losses of Fertilizer Nitrogen and Phosphorus from Soils to Drainage Water

by

Dr. J. W. Gilliam and Dr. J. Fulton Lutz
Department of Soil Science
North Carolina State University at Raleigh

and

Dr. V. J. Kilmer
Tennessee Valley Authority

The loss of nitrogen and phosphorus to surface and subsurface drainage waters from two very similar watersheds with blue grass sod in Western North Carolina was measured for three years. One watershed was not fertilized during the first two years while the other watershed was fertilized with 112 kgN/ha and 96 kgP/ha during the first year with the same rate of N used the second year and one-half as much P. The third year both watersheds were fertilized with one watershed receiving one-half as much fertilizer as the other watershed.

There was approximately 10 kg/ha per year more N lost from the fertilized watershed than from the unfertilized watershed during the first two years. This is approximately 10 percent of that applied. The yearly loss of nitrogen from the unfertilized watershed was approximately 2.5 kg/ha. Most of the nitrogen lost from both watersheds was in the form of $\text{NO}_3\text{-N}$ and came during the winter months when the average N concentration in water leaving the unfertilized watershed was 2-3 ppm and 6-10 ppm from the fertilized watershed. During the third year when both watersheds were fertilized, very little nitrogen was lost from either watershed. There was actually less nitrogen lost from watershed I during this year when it received N fertilizer than in the previous two years when no fertilizer was added.

The conclusion reached in this study is that N fertilization in recommended rates of blue grass sod in Western North Carolina will result in 10 percent or less of the applied N getting into drainage waters.

Very little of the applied P was lost from the watersheds. The only exception to this was after the first fertilizer application when a very intense rain immediately followed the surface application to the field which had poor vegetative cover. Even this resulted in only 0.4 kgP/ha lost in the water. The normal loss of P from a fertilized watershed appeared to be 0.1 to 0.2 kgP/ha.

Shallow (10 foot) ground water wells were placed in the North Carolina Coastal Plain in sites selected to give a range in soil types, drainage conditions and type of crop grown. The $\text{NO}_3\text{-N}$ and $\text{NH}_4\text{-N}$ levels in these wells were monitored by sampling every two weeks for 15 months. The data were somewhat variable both between wells on similar sites and particular wells within short time intervals. However, some definite trends were evident.

The $\text{NO}_3\text{-N}$ levels were always low (1 ppm or less) in ground water under wooded areas. The concentrations were somewhat higher under cultivated fields with the levels usually being 1-5 ppm although several values in the range of 10-20 ppm were obtained. The concentrations were always higher during the winter months in all wells. There seemed to be no relationship between cultivated crop grown and $\text{NO}_3\text{-N}$ concentration in ground water below. The $\text{NO}_3\text{-N}$ concentration was almost always higher in the middle of the field than on the edge of the field even though the direction of water flow was toward the edge of the field. It is not known whether this is a result of dilution or loss of nitrogen through denitrification.

There was little difference in $\text{NH}_4\text{-N}$ concentration in water under cultivated fields and under unfertilized woods or pasture. The $\text{NH}_4\text{-N}$ concentrations were normally in the range of 0.1 to 1 ppm with the high levels being found under poorly drained soils.

One can conclude from the results obtained in the Coastal Plain that normal farming operations definitely tend to increase N concentrations in very shallow ground water. The $\text{NO}_3\text{-N}$ levels found are not likely to pose any problems with regard to toxic levels in drinking water. The amount of this nitrogen getting to surface water or deeper aquifers is undetermined at the present.

*Cooperative study with Tennessee Valley Authority

Report No. 56: Phytoplankton Species and Populations in the Pamlico River Estuary of North Carolina

by

Dr. John E. Hobbie, Department of Zoology
North Carolina State University at Raleigh

The Pamlico River Estuary of North Carolina is shallow, highly productive, and has a salinity range of 0.5 to 19 ppt (parts per thousand salt). The estuary extends from Washington, North Carolina, on the west some 35 miles to Pamlico Sound on the east. As a part of a long term study of the ecology of the estuary, a detailed study was made of the phytoplanktonic algae during 1966, 1967, and 1968.

The techniques used for the algal study involve preserving with an iodine-iodide-acetate solution and counting, after settling, with an inverted microscope. This method gives a complete picture of the algal population, unlike other methods previously used in most estuarine studies where the algae were preserved with formalin and concentrated with a net. As a result, the numbers and biomass found were much higher than that found in other estuaries of the southeastern U. S., but only because of the special methods used. It appears that a combination of an intensive study of the chlorophyll at many stations with a few counts of the preserved samples will give the best information about algal cycles.

There were two periods of high algal biomass in the river: during January, February, and March; and during late August and early September. Dinoflagellate algae, particularly the armored form Peridinium triquetrum, produced a red tide in mid-winter, but did not kill any fish, shellfish, or other marine life. The summer peak was also dinoflagellates but was quite brief and did not reach red tide proportions.

The cause of the red tide was likely the high nitrate concentrations that reached the middle reaches of the estuary, beginning in December. Although the rivers and streams entering the Pamlico River (mainly the Tar River) have high concentrations of nitrate at other times of the year, the nitrate is usually used up before the water goes very far into the estuary. The low temperatures of mid-winter, however, keeps biological activity low and allows the nitrate to stay in the water. Phosphorus concentrations are always more than adequate throughout the estuary, so the bloom (or red tide) results when the proper mix of salinity, nitrate, and phosphorus is reached. No effect of the release of phosphorus into the river from the phosphate mining activities could be found.

If the algal bloom were to extend into the summer months, then it is likely that the high biomass of algae would deplete the oxygen supply by night-time respiration. This depletion would cause a kill of young fish, shrimp, clams and oysters, and other marine organisms. Therefore, it is important not to allow increased amounts of nitrate to reach the estuary, especially during the summer months. The estuary appears to be able to handle the amounts now entering but is certainly close to its upper assimilatory limit for nutrients.

DO PEOPLE DRINK MORE WATER THAN THEY DID IN 1779?

The U.S.S. Constitution--Old Ironsides--as a combat vessel carried 48,600 gallons of fresh water for a crew of 475 men. This was sufficient to last through six months of sustained operation. Total evaporators installed--none. On August 23, 1779, the Constitution set sail from Boston. She carried 475 officers and men--48,600 gallons of fresh water, 7,400 cannon shots, 11,600 pounds of black powder, and 7,000 gallons of rum. Permission to harass and destroy English shipping was given. Making Jamaica on October 6th, she took on 620 pounds of flour and 68,300 gallons of rum. Then she headed for the Azores, arriving there on November 12th. She provisioned with 550 pounds of beef and 4,300 gallons of Portuguese wine. On November 18th, she set sail for England. In the ensuing days she defeated five British Men-of-War and captured and scuttled twelve English merchant ships--salvaging only the rum. By

January 27th, her powder and shot were exhausted. Unarmed, she made a night raid at the Firth of Clyde. The landing party captured a whiskey distillery and transferred 40,000 gallons abroad by dawn. Then she headed for home. The U.S.S. Constitution arrived in Boston in February 1780 with no cannon shots, no food, no powder, no rum, no whiskey, no wine, and 48,000 gallons of stagnant water.

— A.A.P.S.E. Newsletter

WATER RESOURCES LEGISLATION OF THE 1971 GENERAL ASSEMBLY OF NORTH CAROLINA

by
Warren J. Wicker
Assistant Director
Institute of Government

(continued)

F. State Policy and Organization

Concern for the environment was widespread in the 1971 General Assembly.

While all the legislation discussed in the article could be said to show that concern, three significant acts were adopted that have the quality of the total environment as a central concern.

Constitution. Early in the session, Senator Bowles (and others) introduced a constitutional amendment that was generally termed an "Environmental Bill of Rights." The bill (S96 - Ch. 630) declares that the protection and conservation of natural resources is a proper public purpose and the policy of the state. It would thus provide express constitutional sanction for actions by the state and local governments. The amendment, to be a new Sec. 5 of Art. XIV of the North Carolina Constitution, is to be voted on at the next general election and, if approved, will become effective on July 1, 1973. The proposed amendment reads as follows:

Conservation of natural resources. It shall be the policy of this state to conserve and protect its lands and waters for the benefit of all its citizenry, and to this end it shall be a proper function of the State of North Carolina and its political subdivisions to acquire and preserve park, recreational, and scenic areas, to control and limit the pollution of our air and water, to control excessive noise, and in every other appropriate way to preserve as a part of the common heritage of this state its forests, wetlands, estuaries, beaches, historical sites, openlands, and places of beauty.

To accomplish the aforementioned public purposes, the state and its counties, cities and towns, and other units of local government may acquire by purchase or gift properties or interest in properties which shall, upon their special dedication to and acceptance by resolution adopted by a vote of three-fifths of the members of each House of the General Assembly for those public purposes, constitute

✓ part of the 'State Nature and Historic Preserve,' and which shall not be used for other purposes except as authorized by law enacted by a vote of three-fifths of the members of each House of the General Assembly. The General Assembly shall prescribe by general law the conditions and procedures under which such properties or interests therein shall be dedicated for the aforementioned public purposes.

The North Carolina Environmental Policy Act of 1971. This Act (H646 - Ch. 1203) contains a declaration of state environmental policy. Sec. 3 of the Act declares:

✓ The General Assembly of North Carolina, recognizing the profound influence of man's activity on the natural environment, and desiring, in its role as trustee for future generations, to assure that an environment of high quality will be maintained for the health and well-being of all, declares that it shall be the continuing policy of the State of North Carolina to conserve and protect its natural resources and to create and maintain conditions under which man and nature can exist in productive harmony. Further, it shall be the policy of this state to seek, for all of its citizens, safe, healthful, productive and aesthetically pleasing surroundings; to attain the widest range of beneficial uses of the environment without degradation, risk to health or safety; and to preserve the important historic and cultural elements of our common inheritance.

The Act prescribes specific actions to be taken in furtherance of this policy. It stipulates that all policies, regulations, and public laws of this state shall be interpreted and administered in accordance with the policy. And it requires for the first time that every state agency include in its recommendations or reports for legislation or actions involving the expenditure of public monies for projects and programs that significantly affect the quality of the environment a fairly detailed environmental impact statement. The statement must show the environmental impact of the proposed action; adverse environmental effects that cannot be avoided, measures proposed to minimize these adverse effects, alternative actions that are possible, short term and long-term aspects of the proposal and any irreversable or irretrievable environmental changes that would be involved if the proposal is implemented. The Act requires review and advisory procedures designed to assure that the environmental impact statement is as accurate as possible and that all interested agencies and units of government have an opportunity for review or examination. When a state agency finds that a major adverse change in the environment will occur as a result of its proposals, it is directed to submit the proposal and statement to the Governor for special review and final decision by him or by his designated agency. All state agencies are directed to examine their present statutory authority, administrative regulations and current policies to determine if there are any deficiencies or inconsistencies with state policy as expressed in the Act.

The Act also authorizes the governing bodies of all counties, cities, and towns to require any special purpose unit of government or private developers of major

projects to submit detailed statements on the environmental impact of their proposals for review and consideration. This constitutes a major new power for local government. Under this authority, developers of shopping centers, subdivisions and other housing developments, and industrial and commercial projects involving tracts of more than two acres could all be required by local governments to prepare environmental statements.

The General Assembly appeared to be quite aware that the impact statements may be required under this Act and the review procedures imposed or authorized by it should be reviewed. The Act becomes effective on October 1, 1971, and expires (except for actions taken under it that may be in process) on September 1, 1973. The Governor is directed to report to the Legislative Research Commission not later than August 1, 1972, on the experience in the administration of the Act until that time, together with any recommendations that he might have for amendment or extension of the Act. This time table will permit the Legislative Research Commission to prepare bills either extending or amending the Act for consideration by the 1973 General Assembly.

New Industry Environmental Impact. House Bill 119 was introduced by Representative Bryan on February 1. In its initial form it would have required an environmental impact statement to be developed by the Board of Water and Air Resources on any prospective industry as soon as the Division of Commerce and Industry of the Department of Conservation and Development had learned of its intent or desire to locate in the state. In its final form, the Act (Ch. 824) requires the Department of Conservation and Development "in the process of exercising its powers to promote the development of commerce and industry, to conduct an evaluation in conjunction with other state agencies having environmental responsibilities of the effects of the state's natural and economic environment of any new or expanding industry or manufacturing plant locating in North Carolina." While the Act makes this a duty of the Department of Conservation and Development, and authorizes the employment of people to conduct the investigations and evaluations on the environmental impact, the statute does not indicate how detailed the investigation must be nor does it establish procedures for review of the information developed or its use.

If local governments and state agencies act under these new statutes, and given the previously existing federal requirements, it appears that a very large proportion of all major projects proposed by either public agencies or by private developers in the future will be examined for their environmental impact prior to being undertaken.

State Reorganization. Acting pursuant to a constitutional amendment approved by the voters in November 1970, the General Assembly adopted the Executive Organization Act of 1971. (H863 - Ch. 864) Under this Act all the administrative structure of the state government will be reorganized into nineteen offices and departments. Actual

implementation of the reorganization will take place by executive order of the Governor and, in the case of the water resources agencies listed below, not later than July 1, 1972. The two departments in which most of the water resources agencies will be located are the Department of Natural and Economic Resources and the Department of Human Resources. Each is to be headed by a Secretary. To be transferred to the Department of Natural and Economic Resources are the following agencies with major interests in water resources:

1. Geodetic Survey Division
2. North Carolina Forestry Advisory Committee
3. Commercial and Sport Fisheries Advisory Board
4. Atlantic States Marine Fisheries Compact

All of the above are so-called Type I transfers, meaning that the agencies will become, essentially, integral parts of the Department and their activities and functions are to be carried out in full under the direction and supervision of the Secretary.

Agencies subject to a Type II transfer to Natural and Economic Resources, in which general program direction continues to be vested in existing officers and boards, are the following:

1. Wildlife Resources Commission
2. Department of Water and Air Resources
3. Board of Water and Air Resources
4. Water Control Advisory Council
5. John H. Kerr Reservoir Development Commission
6. Lockhard Gaddy Wild Goose Refuge Commission
7. State Soil and Water Conservation Committee

In the Department of Human Resources the single major water resource agency is the State Board of Health, transferred to the Department under a Type II transfer.

Composition of BWAR. The composition of the Board of Water and Air Resources will be changed by enactment of a bill introduced by Senator Alley and others (S460 - Ch. 1090) who expressed concern with the possible conflict of interest arising from its current composition.

At the present time the Board has thirteen members who are generally interested in water and pollution control matters and may be said to represent the following areas:

- 2 - agriculture
- 2 - industry
- 2 - municipal government
- 1 - county government
- 1 - fish and wildlife
- 1 - public health
- 1 - physician
- 3 - public (one with ground water knowledge)

Transition to the new requirements are to take place as terms expire. The new line-up is as follows:

- 1 - physician
- 1 - public health
- 1 - agriculture
- 1 - licensed engineer specializing in water and air resources
- 1 - fish and wildlife
- 1 - ground water industry
- 1 - industry
- 1 - municipal or county government
- 5 - public

The change, as may be seen, reduces the representation of agriculture, industry and local government and increases the general public representation. The Act also requires that the public members be persons with no conflict of interest - not employees, officers or representatives of public or private agencies subject to the jurisdiction of the Board (or affected by its decisions).

✓ Soil and Water Committee. The State's Soil and Water Conservation Committee's composition was also changed. (H708 - Ch. 396) At the present time three of its members are the president, first vice-president and the immediate past president of the North Carolina Association of Soil and Water Conservation Districts. These three continue to serve. The Committee itself selects one person now and will continue to do so. New on the Committee will be three supervisor members elected by the North Carolina Association of Soil and Water Conservation Districts from its own membership, representing the three major geographic regions of the state. Going off the Committee are three ex-officio members: the director of the State Agricultural Extension Service, the director of the State Agricultural Experiment Station, and the State Forester. The Act stipulates, however, that the Committee shall invite these three and the State Conservationist of the Soil Conservation Service to serve as advisory, non-voting members of the Committee. The effective change is thus to increase direct representation of supervisors.

Withdrawal Rights. Under a bill introduced by Senator Allen and others (S113 - Ch. 111), withdrawal rights to excess volumes of water created by those who impound water are established through an amendment to Article 21 of G.S. 143. The Act provides that one "...who lawfully impounds water for the purpose of withdrawal shall have a right of withdrawal of excess volume of water attributable to the impoundment." The Act stipulates that the amount which may be withdrawn from either the impoundment or from a watercourse below the impoundment is the amount that will not foreseeably reduce "the rate of flow of a watercourse below that which would obtain in that watercourse if the impoundment did not exist." The Act also establishes the right of persons to assign or transfer withdrawal rights and invests in the Board of Water and Air Resources

the determination of minimum flows when these are necessary to establish the amount of water that may be withdrawn by impounders.

Natural and Scenic Rivers. The state's capacity to improve management and conservation of water resources was significantly enlarged by a bill introduced by Senator Allen and others (S432 - Ch. 1167). Part of the Act is a new Article 29 of G.S. 113, the Natural and Scenic Rivers Act of 1971. The Act establishes procedures for instituting a North Carolina Natural and Scenic Rivers System and prescribes methods for including rivers or portions of rivers in the System from time to time. Types of scenic rivers are defined and provisions for the acquisition of property and easements are made. Responsibility for administering the System is vested in the Department of Conservation and Development. The director of the department is charged with responsibility for submitting to the Governor and the General Assembly proposals for additions to the System. No actual system was established by the Act (that is, no rivers were named) but the procedure for establishing the System is now available.

✓ Floodways. The same Act (Ch. 1167) adds a new part to Article 21 of G.S. 143 providing for floodway regulation. The purpose of the Act is "to specify a means for regulation of artificial obstructions in floodways by responsible local governments with guidance, coordination and assistance from State Government, consonant with the state policy of vesting primary responsibility for flood plain management with local levels of government. It is hereby declared that the channel and a portion of the flood plain of all of the state's streams will be designated as a floodway, in which artificial obstructions may not be placed except with the permission of the responsible local government." The Act directs the Board of Water and Air Resources to provide advice and assistance to local governments exercising floodway responsibilities. Cities and counties are authorized to make the designation of floodways within their respective zoning jurisdictions.

Once floodways have been designated, the placement of any artificial obstruction within the floodway is prohibited except after a permit has been issued from the responsible local government. In deciding when permits may be issued, local governments are directed to consider to what extent water might be backed up or diverted by the proposed obstruction, the danger that the obstruction will be swept downstream to the injury of others, and the possible injury or damage at the site of the obstruction itself. The purpose of the Act is not to prohibit all obstructions but only those that can reasonably be expected to cause damage to the public health, safety, and welfare and increase flood hazards. The Act further specifies a large number of uses that may be undertaken without a permit. These include farming, forestry, lawns, gardens, play areas, loading ramps, golf courses, picnic grounds, horseback riding trails, streets, bridges, utility lines, water intakes, waste treatment plant outlets, docks, ramps and temporary facilities.

While the Act anticipates that all of the state's streams will be designated as a floodway (as noted above) no deadline for action by city and county governments is given nor does the Act make action by local governments mandatory.

✓ Reporting Discharges. The Water and Air Quality Reporting Act of 1971 constitutes still another part of Ch. 1167. An amendment to Article 21 of G.S. 143, this Act requires those who are discharging into streams of the state under permits issued by the Board of Water and Air Resources to establish approved systems for monitoring the quantity and quality of their discharges and to file monthly reports with the Board setting forth the volume and characteristics of the wastes discharged. The Board of Water and Air Resources is responsible for establishing standards for monitoring systems and for adopting other rules, regulations, and procedures as appropriate. Failure to provide a monitoring system or violation of the rules and regulations of the Board subjects the violator to a penalty of \$100 to \$1,000 with each day after notification by the Board constituting a separate violation.

G.S. 143-215.1(a) was further amended by Ch. 1167 to require those holding discharge permits from the Board to secure special permission before permitting wastes to be discharged into a stream in violation of its water quality standards.

Solid Wastes in Streams. The criminal statute relating to the deposit of solid wastes in rivers and streams was modified. (H1143 - Ch. 769). Under G.S. 14-134, depositing any solid waste in the streams of the state has been unlawful for many years. Ch. 769 rewrites this section slightly to continue to make such actions unlawful "unless specifically authorized by law or local authority."

Oil Pollution. Ch. 813 (S420, introduced by Senator Allen and others) makes effective immediately the Oil and Gas Conservation Act of 1945 (Part 2 of Article 27 of G.S. 113). Ch. 813 also increases bonding requirements of those prospecting for oil or natural gas and restates the purpose of the Act as being "for the protection of public interests...by prohibiting waste and compelling rateable production and authorizing regulations for the protection of the environment." The "protection of the environment" is added to the previous statement of purpose. In line with this changed emphasis, the rule-making power of the Petroleum Division of the Department of Conservation and Development is expanded to enable the division to adopt rules to prevent the pollution of fresh water supplies by oil, gas, or salt water, and to protect the quality of the water, air, soil, and any other environmental resources against injury, damage or impairment. Before this amendment, the division was empowered to adopt rules for the protection only of fresh water supplies. Finally, the Act amended G.S. 113-391 to permit the division "if necessary in its judgment for the protection of unique environmental values, to prohibit the location of [oil and gas] wells in the interest of protecting the quality of the water, air, soil or any other environmental

resource against injury, or damage or impairment." Under specified conditions, the state will be in a position to prohibit drilling for oil or gas altogether.

Note: This is the third of four installments of a summary of water resources legislation of the 1971 General Assembly prepared by Professor Wicker.

ENVIRONMENTAL IMPACT STATEMENTS

The Council on Environmental Quality Monitor for September 1971 lists the following new environmental impact statements for North Carolina projects:

Department of the Army

Drum Inlet navigation project - dredging an ocean bar channel 150 feet wide and 9 feet deep and restoring an existing connecting channel in Core Sound.

Department of Transportation

Douglas Municipal Airport, Charlotte
US-23 and 441: Jackson and Macon Counties
US-52 business: Surry County
US-64: Edgecombe County
NC-53-210: Cumberland County
Connector from I-40 N. to US-321 and South to NC-127: Catawba County
SR-1707 (Charles Street): Pitt County
NC-68: Guilford County
SR-2147 (Friendly Road): Guilford County

"TURN-KEY" APPROACH PROPOSED FOR CONSTRUCTION OF WASTE TREATMENT PLANTS

William D. Ruckelshaus, Administrator of the Environmental Protection Agency, has proposed that municipalities planning construction of waste treatment facilities with federal matching funds be permitted to award "Turn-Key" contracts under which a single contractor is responsible for all aspects of a construction project including the meeting of prescribed performance specifications and water quality standards.

The EPA Administrator said the purpose of the "Turn-Key" approach is to (1) help assure that treatment works will be designed and built to meet water quality standards, (2) reduce the time interval from initial application for a federal grant to start-up of the completed plant, and (3) encourage use of new technology in the waste treatment field, since the "Turn-Key" contractor must guarantee performance.

The proposal to permit federal approval of such projects was published in the Federal Register on September 15, 1971, as an amendment to present regulations governing Grants for Construction of Treatment Works.

Under the "Turn-Key" approach, a single contractor is responsible for both design and construction of a waste treatment works based on performance requirements

specified by the municipality. The same contractor also must operate the completed plant for a specified period to assure that the entire project meets the performance standards.

Under present conditions, communities negotiate with consulting engineering firms for planning and supervision of construction on the basis of performance and reputation. Actual construction of facilities is carried out by contractors through competitive bidding. This practice is based on the assumption that professional services cannot be subject to bidding if quality is to be preserved and interests of communities protected. Under the proposal, planning and construction would be combined raising questions of potential conflict of interests.

Currently, federal grants for construction of municipal waste treatment works are being approved at an annual rate of \$2 billion as authorized by Congress under an interim appropriation, pending approval of a final appropriations act for the 1972 fiscal year. The present rate is double the \$1 billion grants figure authorized for the prior fiscal year.

Persons interested in commenting on the proposed "Turn-Key" amendment must submit their views in writing not later than 75 days after publication in the Federal Register. Such comments and relevant material should be sent to the Director, Grants Administration Division, Office of Administration, Environmental Protection Agency, Washington, D. C. 20460.

HEARINGS ON PROPOSED NATIONAL LAND USE POLICY LEGISLATION

A second round of hearings on proposed national land use policy legislation has been announced by Representative Wayne N. Aspinall (D-Colo.), Chairman of the House Committee on Interior and Insular Affairs.

The hearings will be held November 8 and 9 by the Subcommittee on the Environment on H.R. 2973 (and related bills which are cited as the "Land and Water Resources Planning Act") and H.R. 4332 (and related bills which have been identified as the "National Land Use Policy Act of 1971").*

*The bills referred to the Committee to date are, with respect to a Land and Water Resources Planning Act, H.R. 2173 (Meeds), H.R. 7804 (Udall), and H.R. 8503 (Reid, N.Y.); with respect to national land use policy, H.R. 4332 (Aspinall, by request), H.R. 4337 (Bennett), H.R. 4569 (Kemp), H.R. 4703 (Broomfield), H.R. 5503 (Hosmer and others), H.R. 6579 (Chamberlain), and H.R. 8119 (Winn).

The first two days of hearings on these bills were concluded on September 14 by the Subcommittee during which time testimony was received from Secretary of the Interior Rogers C. B. Morton, Under Secretary of Housing and Urban Development Richard C. Van Dusen, Russel E. Train, Chairman of the Council on Environmental Quality, and others. The additional hearings have been scheduled to receive testimony and statements from other representatives of state and local governments and members of the public.

Persons desiring to submit statements or appear before the Subcommittee are requested to advise Chairman Aspinall immediately in writing. Committee rules require each witness to submit his prepared statement to the Committee at least 24 hours in advance of his appearance and limit oral presentation to a brief summary of his position. Eighty copies of the prepared statement should be furnished. All communications should be directed to:

Honorable Wayne N. Aspinall
Chairman, Committee on Interior
and Insular Affairs
House of Representatives
Washington, D. C. 20515

WATER QUALITY GUIDELINES FOR NATION BEING UPDATED BY NAS FOR EPA

A basic reference on water quality criteria used in setting federal-state water quality standards is being revised and updated by the National Academy of Sciences under a \$458,000 contract awarded by the Environmental Protection Agency earlier this year.

The reference is the 1968 National Technical Advisory Committee Report, Water Quality Criteria, which is used by federal, state and local agencies for guidance in formulating standards as required under the Federal Water Pollution Control Act, amended by the Water Quality Act of 1965. A draft of the updated version is due to be submitted to the Environmental Protection Agency by December 1, 1971.

The new edition will have broader scope, with more emphasis on public health than the original version, and will include additional information updated over a four-year period as well as more extensive review of existing literature on water quality.

A seven-member Committee on Water Quality Criteria, established under the Academy's Environmental Studies Board, will analyze scientific data, recommend quality criteria for various uses of water, and prepare the updated report from EPA.

The Committee is subdivided into six panels for determining water criteria with regard to public water supplies, agriculture, industry, marine life, freshwater

life, and recreation and aesthetics. Such determination involves complex factors such as temperature, industrial chemicals, minerals, organic wastes, and radioactive substances.

NEW REPORTS OF NATIONAL WATER COMMISSION

The National Water Commission has announced availability of three additional background study reports being prepared for the Commission. The reports deal with ground water management, wastewater reuse, and precipitation modification and were prepared to provide technical background for the Commission's deliberations on national water policy. They are published and distributed for the Commission by the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22151. The National Water Commission has not approved the reports but is making them immediately available to the public to stimulate general discussion of national water policy issues. The Commission invites the comments and suggestions of interested parties.

The report entitled Ground Water Management in Development of National Water Policy was prepared under a contract with Dr. Leslie E. Mack, Water Management Consultant of Little Rock, Arkansas. Dr. Mack reviews the role of ground water, fundamentals of ground water hydrology, ground water management, and constraints upon optimum use of ground water. The report points out the engineering, socio-economic, administrative, and legal disciplines that are involved in ground water management. Recommendations are made for policy changes by the federal government, directed towards more effective use of ground water resources. This report may be ordered from NTIS, under accession number PB 201 536, for \$3.

The report on Wastewater Reuse was prepared by Dr. Jerome Gavis, Associate Professor of Geography and Environmental Engineering at Johns Hopkins University, Baltimore, Maryland, under direction of the Commission's staff. The report evaluates the potential that reuse of wastewater has for increasing the effective water supply of the nation. It includes a review of the state-of-the-art of advanced waste treatment and gives generalized estimates of costs of such treatment. It demonstrates that technology for reuse is available at present and that application of the technology is limited primarily by public attitudes and by economic considerations. Wastewater Reuse may be ordered for \$3 under accession number PB 201 535, from NTIS.

The report on Precipitation Modification was written by Jack L. Lackner, Staff Engineer at the National Water Commission. This report reviews the state-of-the-art of precipitation modification. It evaluates the potential increase in the Nation's water supply which might result from seeding orographic, convective, and cyclonic storms. The report relies considerably on the opinions of experts in the field and

makes recommendations about the future of precipitation modification. Precipitation Modification can be ordered from NTIS under accession number PB 201 534 for \$3.

INTERIOR DISTRIBUTES \$255 MILLION TO STATES FROM LAND AND WATER CONSERVATION FUND

Secretary of the Interior Rogers C. B. Morton has announced distribution of \$255 million appropriation by Congress for fiscal year 1972 grants to states and their cities and counties under the Land and Water Conservation Fund program. North Carolina's share is \$4,790,175--up \$2,710,207 from 1971.

INDUSTRY-GOVERNMENT OIL SPILL CONFERENCE SLATED FOR 1973

Washington--The 1973 Joint Conference on Prevention and Control of Oil Spills will be held March 13-15 in the Sheraton-Park Hotel, Washington, D. C. Sponsors of the conference will be the American Petroleum Institute, the Environmental Protection Agency, and the U.S. Coast Guard. This will be the third such conference held under industry-government co-sponsorship. The first took place in New York in 1969, and the second last June in Washington. Each was attended by more than 1000 persons from five continents.

The conference will be devoted to scientific and technical discussions of nearly every facet of oil spill prevention and control.

LIAISON WITH CORPS OF ENGINEERS

The Institute for Water Resources (IWR) of the U. S. Army Corps of Engineers is engaged in a continuing program of research, study and evaluation aimed at achieving effective public involvement in Corps of Engineers' water resources programs. The Institute is interested in establishing informal liaison with any college, university, agency, consulting firm or individual in the U.S. or Canada engaged in research or practice in this relatively new area of water resources concern to exchange information and insights regarding these activities which might be of mutual benefit. Anyone interested should contact Mr. Burnham H. Dodge, Director, Center for Advanced Planning, IWR, at 2461 Eisenhower Avenue, Alexandria, Virginia 22314, or at Area Code 202 - 325-0370.

STATUS OF WATER IN NORTH CAROLINA

While monthly streamflow averages throughout the state were above normal in September, flows in the Blue Ridge, eastern Piedmont and Coastal Plain declined to

below average by the end of the month. Hurricane Ginger caused rises in streams in the Coastal Plain. Total rainfall was 13 inches at Wanchese and over 10 inches at Belhaven and Bayboro. The most notable floods occurred near Washington.

Ground water levels fell in the Blue Ridge and Piedmont and rose in the Coastal Plain. Levels were above average throughout most of North Carolina.

EPA NAMES NEW HEAD OF SOLID WASTE PROGRAMS OFFICE

Samuel Hale, Jr., has been appointed Deputy Assistant Administrator for Solid Waste Management Programs of the Environmental Protection Agency, it was announced by Administrator William D. Ruckelshaus.

Hale, 29, was formerly director of Special Projects for EPA. His appointment becomes effective October 4. He replaces Richard D. Vaughn, who resigned last month to accept a position in private industry.

In making the announcement, the Administrator said, "Hale has been in charge of a number of important projects, cutting across all the programs of EPA. He has carried them out effectively and has greatly assisted in efforts to develop EPA into a cohesive agency."

BIBLIOGRAPHIES ON AQUACULTURE AND AQUATIC PRODUCTS

The Coastal Plains Center for Marine Development Services has published two annotated bibliographies concerning aquaculture and products from aquatic organisms. These can be obtained free of charge from the Center, P. O. Box 3643, Azalea Station, Wilmington, N. C. 28401.

WATER RESOURCES LEGISLATION IN THE CONGRESS

Bills Passed:

- Senate Agreed to resolutions of ratification of International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, and certain amendments to the International Convention for Prevention of Pollution of the Sea by Oil.
- S. 2613 To extend for one month until October 31, 1971, the Federal Water Pollution Control Act.
- House
- HR 9727 To regulate the dumping of material in the oceans, coastal, and other waters, with amendments.
- HR 10203 To increase the authorizations for water resources research institutes.

Bills Introduced:

Senate

- S 2502 To establish federal fisheries environmental disaster assistance.
- S 2554 To establish a systematic and comprehensive national land use policy.
- S 2612 To establish policy and principles for planning the use of the water and related land resources of the U.S.
- S 2613 To extend the Federal Water Pollution Control Act, as amended, for one month.

House

- H. Con. Res.
400 To request that the President call a conference on anadromous fish in preparation for U.S. participation in the 1973 United Nations Law of the Sea Conference.

NEW PUBLICATIONS RECEIVED BY THE INSTITUTE

(These may be borrowed from the Institute for a two-week period. Where individual copies are desired, readers are encouraged to request copies from the organizations issuing the publication. The addresses are provided by the News for this purpose.)

Water Resources Planning

- "A Citizen Panel for Atlanta Area Studies: Field Experimentation and Methodological Substudies," by C. M. York, et al, Env. Res. Cntr., Inst. of Tech., Atlanta, Ga. 30332, June 1971.
- "Environmental Quality and Water Resources Planning," by W. Whipple, Jr., WRRRI, Rutgers Univ., New Brunswick, N. J. 08903, June 1971.
- "Evaluation of Natural Rivers (Final Report of Phase II)," by M. Morisawa, State Univ. of N. Y., Binghamton, N. Y., Sept. 1971.
- "Institutional Aspects of Water Resources Development--A Bibliography," by USDI, OWRR, WRSIC, Wash., D. C. 20240, Sept. 1971
- "Project Measure Work Plan (Revised) for Lake Brooks Watershed, Project Measure Proposal No. 8," by North Central Piedmont Resource Conservation and Development Project, Guilford Co., N. C. March 1971.
- "North Carolina Water Plan Progress Report, Chapter 1: Water Policy and Law," by N. C. Dept. of Water & Air Res., Raleigh, N. C., Sept. 1971.
- "The Feasibility of Centralized Management of Water Recreation Facilities in Mississippi," by D. C. Williams, Jr., et al, WRRRI, Miss. St. Univ., State College, Miss. 39762, Aug. 1971.
- "Methodology to Evaluate Socio-Economic Benefits of Urban Water Resources," and Appendices by L. Berger, Inc., OWRR, Wash., D. C. 20240, June 1971.
- "The W.A.T.E.R. System: Computer Programs for Stream Network Analysis," by D. M. Coffman, et al, (Tech. Report #16), Purdue Univ., WRRRC, LaFayette, Ind. 47907, June 1971.
- "Water for Texas," (Proceedings of the 15th Annual Conference), WRRRI, Texas A & M Univ., College Station, Tex., Nov. 1970.

"Water Use in South Carolina 1970," by S. C. Water Res. Comm., 2414 Bull St., Columbia, S. C. 29201, March 1971.

Water Quality Management

- "Pharmacological Testing of Blue-Green Algae for Constituents Having Therapeutic Value," by World Life Res. Inst., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 30¢, June 1970.
- "Arsenic and Lead in Water--A Bibliography," by USDI, OWRR, WRSIC, Wash., D. C. 20240, Sept. 1971.
- "Bibliography of Aquaculture," by G. Washington Univ., Coastal Plains Center for Marine Development Services, P. O. Box 3643, Wilmington, N. C. 28401, Sept. 1971.
- "Bibliography of Products Derived from Aquatic Organisms," by The G. Washington Univ., Coastal Plains Center for Marine Develop. Serv., P. O. Box 3643, Wilmington, N. C. 28401, Aug. 1971.
- "Development of Immobilized Enzyme Systems for Enhancement of Biological Waste Treatment Processes," by Grumman Aerospace Corp., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 70¢, July 1970.
- "The Effects of Various Gas Atmospheres on the Oxidation of Coal Mine Pyrites," by C. W. Rice Div., NUS Corp., EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$1.25, Aug. 1971.
- "A Survey of Alternate Methods for Cooling Condenser Discharge Water, Large-Scale Heat Rejection Equipment," by Dynatech R/D Co., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$1.25, July 1969.
- "A Survey of Alternate Methods for Cooling Condenser Discharge Water, Operating Characteristics and Design Criteria," by Dynatech R/D Co., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$1, Aug. 1970.
- "A Method for Predicting the Performance of Natural Draft Cooling Towers," by WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 75¢, Dec. 1970.
- "A Curriculum Activities Guide to Water Pollution and Environmental Studies (Vol. One)," Training Grants Branch, WQO-EPA, Wash., D. C. 20242, 1971.
- "Decision Processes in Water Quality Management," by R. M. Males, et al, Engineering-Science, Inc., R&D Lab., Sys./Behavioral Studies Div., Oakland, Cal., Apr. 1971.
- "Development of a Chemical Denitrification Process," by Rocketdyne Res.-Rockwell Corp., EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 65¢, Oct. 1970.
- "Infiltration Rates and Groundwater Quality Beneath Cattle Feedlots, Texas High Plains," by Texas Tech. Univ., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 65¢, Jan. 1971.
- "Reduction of Salt Content of Food Processing Liquid Waste Effluent," by National Canners Assoc., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 55¢, Jan. 1971.
- "Advanced Nonthermally Polluting Gas Turbines in Utility Applications," by United Aircraft Res. Labs of the United Aircraft Corp., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$2, March 1971.
- "Environmental Impact of Highway Deicing," by Edison Water Quality Lab., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$1.25, June 1971.
- "Models for Investigation of Industrial Response to Residuals Management Actions," by C. S. Russell (Reprint No. 95), Resources for the Future, Inc., 1755 Mass. Ave., NW, Wash., D. C. 20036, June 1971.

- "Potential Environmental Effects of an Offshore Submerged Nuclear Power Plant - Vol. I and II," by General Dynamics, EPA, WQO, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$2.50 (Vol. I) and \$2.25 (Vol. II), June 1971.
- "Oil Pollution Incident Platform Charlie, Main Pass Block 41 Field Louisiana," by Alpine Geophysical Assocs., Inc., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$1.25, May 1971.
- "Oxygen Regeneration of Polluted Rivers: The Passaic River," by WRRI, Rutgers Univ., New Brunswick, N. J., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 65¢, March 1971.
- "Process Control Model for Oxygen Regeneration of Polluted Rivers, Phase II," by Dr. B. Davidson, WRRI, Rutgers Univ., New Brunswick, N. J. 08903, Apr. 1971.
- "The Oxygen Uptake Demand of Resuspended Bottom Sediments," by Seattle Univ., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 50¢, Sept. 1970.
- "Factors Affecting Pollution Referenda," by Abt Assoc., Inc., EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$2.50, June 1971.
- "Stochastic Modeling for Water Quality Management," by Stochastics, Inc., EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$3, Feb. 1971.
- "Inorganic Sulfur Oxidation by Iron-Oxidizing Bacteria," by Syracuse Univ., EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 70¢, Sept. 1971.
- "Study of Sulfur Recovery from Coal Refuse," by Black, Sivalls & Bryson, Inc., EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 70¢, Sept. 1971.
- "Bio-Regenerated Activated Carbon Treatment of Textile Dye Wastewater," by Fram Corp., East Providence, R. I. 02916, WQO, EPA, Jan. 1971.
- "Activated Sludge Modifications for Enhancement of Trickling Filter Plant Performance," by D. E. Francisco, et al, UNC Wastewater Res. Center Report #15, Chapel Hill, N. C. 27514, Apr. 1971.
- "Turbidity Instrumentation: A Fiber-Optic System for Measuring Sediment Concentration by Optical Fourier Transformation," by A. McSweeney, Env. Res. Cntr., Ga. Inst. of Tech., Atlanta, Ga. 30332, July 1971.
- "Feasibility of Computer Control of Wastewater Treatment," by Amer. Public Works Assoc. WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$1, Dec. 1970.
- "Water Quality Control Through Flow Augmentation," by Heidelberg College, WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$1.50, Jan. 1971.
- "A Practical Guide to Water Quality Studies on Streams," by F. W. Kitrell, USDI, FWPCA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: 70¢, 1969.
- "Water Pollution Control, River Basin Authorities, and Economic Incentives: Some Current Policy Issues," by A. M. Freeman, III, et al, (Reprint #92), Resources for the Future, Inc., 1755 Mass. Ave., NW, Wash., D. C. 20036, May 1971.

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- "Studies of the Atmospheric Water Balance," by J. L. Rasmussen, Env. Res. Cntr., Colorado St. Univ., Ft. Collins, Colo., Aug. 1971.
- "Applications of Climatology and Meteorology to Hydrologic Simulation," by R. A. Clark, et al, (Report #38) WRRI, Texas A & M Univ., College Station, Tex., June 1971.
- "A Systematic Treatment of the Problem of Infiltration," by H. J. Morel-Seytoux, Env. Res. Cntr. Colorado State Univ., Ft. Collins, Colo., June 1971.

- "Shielding Precipitation Gages from Adverse Wind Effects with Snow Fences," by L. Larson, WRRRI, Univ. of Wyo., Laramie, Wyo. 82070, Aug. 1971.
- "Prediction of Seasonal-Low Streamflow Quantities," by J. C. Campbell, WRRRI, Oregon State Univ., Corvallis, Ore., WRRRI-10, Sept. 1971.
- "Selected Urban Storm Water Runoff Abstracts, July 1970-June 1971," by Franklin Inst. Res. Labs., WQO-EPA, Supt. of Doc., USGPO, Wash., D. C. 20402, Price: \$1.50, July 1971.
- "Summary of Ground Water Data for Tennessee, Through May, 1971," compiled by J. M. Wilson, et al, (Misc. Pub. #6) Tenn. Dept. of Cons., Div. of Water Res., 2611 W. End Ave., Nashville, Tenn., 1971.
- "Annual Cycle of Leaf Water Potential in Picea Engelmannii and Abies Lasiocarpa at Timberline in Wyoming," by J. H. Lindsay, WRRRI, Univ. of Wyo., Laramie, Wyo. 82070, 1971.

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- "Sixth Biennial Report, July 1, 1968-June 30, 1970," N. C. Dept. of Water & Air Res., Raleigh, N. C., Dec. 1970.
- "Technology and Management of the Environment," (Seminar report), WRRRI-Oregon State Univ., Corvallis, Ore., July 1971.
- "Evaluation of an Aspect of Environmental Quality: Hells Canyon Revisited," (Reprint #93), by J. Krutilla, Resources for the Future, Inc., 1755 Mass. Ave., NW, Wash., D. C. 20036, June 1971.
- "Directory of Personnel, Development Activities in the Marine Environment of the Coastal Plains Region," (Publication 70-1), Coastal Plains Center for Marine Development Services, Wash., D. C., March 1971.
- "Marine Research in the Coastal Plains Region," (Publication 71-2), by Smithsonian SIE, Coastal Plains Center for Marine Development Services, P. O. Box 3643, Wilmington, N. C. 28401, Aug. 1971.
- "A Compilation of the Named Lakes in Oregon with Bibliography," by D. W. Larson, et al, WRRRI-Oregon State Univ., Corvallis, Ore., Price: \$2, Aug. 1971.
- "Research Grant Reports," by P. J. Chenery, (A status report on research grants funded by N. C. Bd. of Sci. and Tech.), July 1971.
- "Solid Waste Management: A List of Available Literature," (Report SW-58.11), EPA, Solid Waste Pub. Dist., 5555 Ridge Ave., Cincinnati, Ohio 45213, July 1971.
- "Directory of Facilities, Development Activities in the Marine Environment of the Coastal Plains Region," (Publication 71-1), Coastal Plains Center for Marine Development Services, Wash., D.C., March 1971.

Water Resources Research Institute
of the University of North Carolina
124 Riddick Building
North Carolina State University
Raleigh, North Carolina 27607

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