

Determination of water quality requirements for fish and aquatic life is now underway for both freshwaters and coastal waters. At the National Water Quality Laboratory in Duluth, Minn., and the National Marine Water Quality Laboratory in Narragansett, R.I., the Federal Water Pollution Control Administration has initiated programs on the water requirements of diverse species and studies of their sensitivity to pollutants and toxicants. This necessitates rearing and maintenance of plankton organisms, invertebrates, aquatic insects, including their instars, and fishes. Bioassays are not being overlooked.

The Bureau of Sport Fisheries and Wildlife has an extensive Reservoir Fishery Research project concerned with the effect of water quality on fish production.

Among the Geological Survey's concerns are thermal stratification processes and biological influences as related to water quality.

The Office of Water Resources Research supports research in the field of water quality requirements at some 86 universities throughout the country.

Investigations underway and anticipated will produce essential information which can be applied in solving problems of control of pollution.

WATER QUALITY CONTROL: POLLUTION FROM MUNICIPAL SOURCES

Polluting discharges from municipalities are of two principal types: (1) municipal sewage and (2) urban storm runoff (discharges from storm and combined sewer systems).

Historically, little concern has been paid to urban runoff and pollution from municipal sewage has been partly controlled through application of waste treatment processes largely developed about the turn of the century. These waste treatment processes, however, were not designed to cope with the water pollution problems now emerging. The character of municipal sewage is being altered by our increasing use of synthetic products and also by the increasing introduction of industrial wastes directly into municipal sewerage systems.

Pollution from urban runoff is a matter of growing concern. The problem of discharges from storm and combined sewers has received recent attention and a sizable attack on this problem is already underway. The heart of the problem is, of course, that during storms the large volume of urban runoff water, which can itself be highly polluted, must be bypassed around conventional treatment facilities because these facilities were not designed to handle such large peak loads. This results in the discharge of sizable quantities of polluting materials directly to receiving waters without benefit of any treatment. This bypass water contains not only the runoff pollution but also contains in the case of combined sewer systems, much of the sanitary sewage which would normally have received treatment by the municipal facility. A variety of possible solutions to this problem are now being explored. For example, studies are underway of most of the more conventional storage techniques, including the use of tanks with pump-back to the interceptor, surface storage ponds, and treatment lagoons. More unique applications of storage principals such as localized "upstream" storage to prevent overloading of "downstream" sewers need further development. The use of chlorine to disinfect storm and combined sewer discharges is included in several projects; new disinfection techniques suitable for application to high volume—short duration flows need exploration as do entirely new concepts in peak-load treatment devices and in-sewer flow controls.

WATER QUALITY CONTROL: POLLUTION FROM INDUSTRIAL SOURCES

The quantity of industrial wastes discharged annually into the Nation's rivers is, in the most conservative estimates, equal in its pollutorial effect to municipal wastes. In all probability, it is significantly greater. The determination and development of economical methods of treatment of industrial wastes to prevent these damages to rivers is a challenge of major significance. These damaging effects run the entire gamut from unsightliness to toxicity; for example, oil slicks, tastes and odors, fish kills, floating solids, and even dissolved compounds poisonous to man.

The economic aspect of industrial waste control requires that both conventional and completely new approaches must be made to this problem. Present waste treatment methods, although satisfactory in many cases, do not provide solutions to the problem today and offer little hope that they will provide the type and degree of treatment which will be needed in the future.