

Missouri Drainage Basin Program for Control Of Water Pollution

By CARL E. SCHWOB, M.S.,
and GLEN J. HOPKINS, M.P.H.

THE TEN State health departments in the Missouri River Drainage Basin have agreed on a regionwide water pollution control program—the first major river basin program to be adopted by the Public Health Service as meeting the requirements of the Federal Water Pollution Control Act of 1948.

Damage to water resources has been one of the costs of the country's tremendous progress. This fact was recognized by the Congress in the enactment of the Federal Water Pollution Control Act of 1948. The Public Health Service, as part of its responsibilities under this act, must prepare or adopt, in cooperation with State and interstate water pollution control agencies, other Federal agencies, municipalities, and industries, comprehensive programs for the abatement of water pollution.

In the Missouri River Drainage Basin, a series of sub-basin reports was prepared cooperatively by the States and the Public Health Service, presenting information concerning water uses, types, amounts, and resulting damages of waste discharge, benefits that would accrue from pollution control, pollution prevention measures in effect, and pollution control measures required. The comprehensive pollution control program for the Missouri River

Mr. Schwob is chief of the Water Supply and Water Pollution Control Program, Division of Sanitary Engineering Services, Bureau of State Services, and Mr. Hopkins is the officer in charge, Missouri Drainage Basin Office, Public Health Service.

Drainage Basin developed by the 10 State water pollution control agencies was subsequently adopted by the Surgeon General of the Public Health Service.

Five other programs covering smaller areas have been adopted, and many more are in the process of development. Each comprehensive program is intended to provide to the citizens of the area, to city officials, industrial leaders, farmers, fishermen, and others, an objective plan based upon good engineering practice and reflecting sound economics. They are plans which the public should support if progress is to be made in the abatement of pollution.

The Missouri basinwide water quality objectives take into consideration all water uses, including the use of streams for disposal of wastes after minimum treatment needed to protect other water uses. The published report of the program recognizes that citizens and industries of the basin must assume their rightful obligations and provide the needed pollution control facilities, and that effective legislation must be enacted in several of the States authorizing effectual control activities and the funds necessary to operate such a program. The importance of public understanding of the need for pollution abatement, enforcement of laws, and financing of abatement works is stressed.

Facilities and Needs

There are 1,073 municipal sewerage systems in the basin serving 3,955,710 persons. In addition, these systems carry industrial wastes equivalent to the wastes of 2,784,250 persons, or a total of 6,739,960 population equivalents of organic waste. Treatment of sewage is provided in 759 communities containing 70.7 percent of the population served by sewers. Treatment reduces the total biochemical oxygen demand of the wastes by 27.4 percent so that a population equivalent of 4,891,650 is actually discharged to the streams.

Of the existing treatment plants, 299 have inadequate capacities and 38 percent are not operated satisfactorily.

Industry not served by sewer systems contributes to watercourses 10,008,880 population equivalents of organic wastes from 332 separate sources. In addition, considerable chemical and inorganic wastes are discharged. Some degree of treatment is provided at 143 industrial establishments, but 54 percent of these treatment facilities are inadequate.

Silt pollution is recognized as an important segment of the overall problem. Its control involves agricultural, mining, and other interests.

Treatment needs as established by the respective State water pollution control agencies for municipalities are 319 new plants, 146 replacements, 82 additions, and 96 enlargements. For industry, the treatment needs are 172 new plants, 38 replacements, 26 additions, and 14 enlargements. The total of 893 projects, 643 municipal and 250 industrial, for the Missouri River Drainage Basin are conservatively estimated to cost \$186,000,000, excluding interceptors, maintenance, and operation.

Criteria for Needs

The treatment needs are based upon criteria adopted by the engineering section of the Missouri Basin Health Council, consisting of the State sanitary engineers of the 10 States, to guide pollution control programs in the basin. The criteria provide the following:

1. Toxic substances should be virtually eliminated from sewage effluents.
2. Removal of settleable and floating solids should be required as minimum acceptable treatment.
3. Industrial wastes similar in nature to sewage should be provided the same treatment

as municipal wastes. Industrial wastes not comparable to municipal wastes should be treated as necessary to prevent deterioration of stream water quality for beneficial uses.

4. Additional treatment over that specified in item 2 should be provided to protect downstream uses. Quality objectives for selected water uses include:

a. For water serving as a source of domestic supply, raw water bacteriological quality should conform to the specifications in the Manual of Recommended Water Sanitation Practices, 1946, Public Health Bulletin No. 296, pages 11-13.

b. For bathing waters, the monthly average MPN coliform organisms should not exceed 1,000 per 100 ml. nor exceed this number in more than 20 percent of the monthly samples, nor exceed 2,400 per 100 ml. on any day. For nonbathing recreational waters, the monthly average MPN coliform organisms should not exceed 5,000 per 100 ml. nor should exceed this number in more than 20 percent of the monthly samples.

c. For fish and aquatic life, minimum dissolved oxygen should not be less than 5.0 p.p.m., and for trout streams, not less than 6.0 p.p.m.

d. For irrigation waters used for forage crops, sewage treatment should reduce coliform bacteria by not less than 90 percent. For waters used to irrigate human food crops, treatment should insure reduction of suspended solids, biochemical oxygen demand, and coliform organisms of not less than 75 percent, 75 percent, and 98 percent, respectively, unless minimum dilution is at least 10 times the maximum sewage discharge, in which case bacterial reduction of 90 percent may be acceptable.

