

easy, therefore, to recognize that the present-day technology of waste treatment will not be adequate to meet the challenge of the future.

With respect to BOD alone, the generally-attainable 85 to 90 per cent removal efficiency will not prevent some streams from being overwhelmed by oxygen-demanding pollution within the foreseeable future. Even now, a relatively small but increasing number of our streams (FIGURE 1)¹ have already reached the stage where complete primary-secondary treatment is being applied to every municipal discharge. (Industrial discharges are not considered here because comprehensive data are not available.) In a much larger number of cases (FIGURE 2)¹ 90 per cent of the volume of municipal discharges to streams now receives primary-secondary treatment. On the one hand, this is a highly desirable and even comforting picture because it indicates the widespread utilization of available technology; on the other hand, in places where serious water pollution now exists or is imminent, what can we do to remedy the situation if the best available conventional treatment is already in use?

When considering other gauges of pollution, the picture becomes darker. As an aid to understanding the trend, FIGURES 3, 4, and 5 show the estimated total municipal discharges of phosphates, total nitrogen, and refractory organics released into the nation's waterways during the twentieth century. Refractory organics include organic matter that resists biological degradation either from natural or sewage treatment processes.

Phosphates, nitrogen compounds, and refractory organics are of importance because they can cause a variety of pollutional effects, some of which are known and others only suspected. Phosphorus and nitrogen, for example, can act as fertilizers promoting the growth of troublesome algae or other aquatic plants. The pollutional effects of these substances can accelerate the natural aging of lakes, thus causing major ecological changes. Serious taste and odor

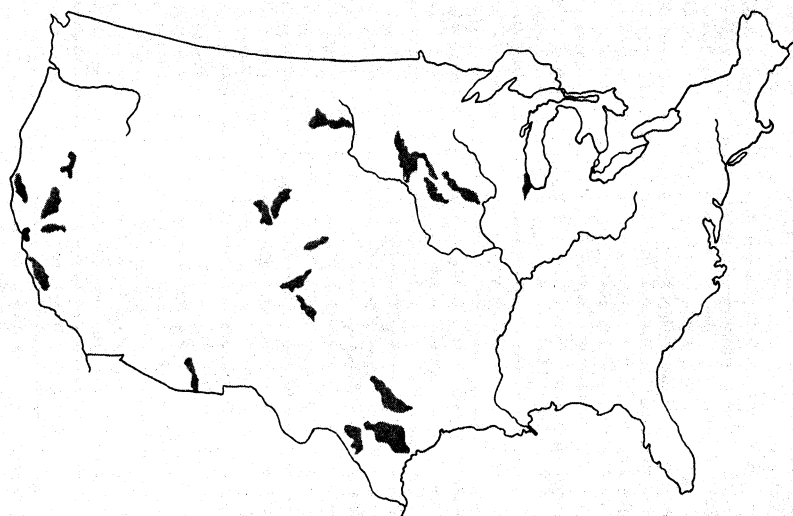


FIGURE 1. River basins in U.S. for which all municipal discharges have complete primary-secondary treatment.