# POLLUTION—ITS EFFECTS ON WILDLIFE AND WHAT IS BEING DONE ABOUT IT

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Stream pollution is one of the most important subjects before the public in this country today. The matter is so complicated, touches on so many different interests in so many ways that it is difficult to deal with it briefly and at the same time adequately. I would like to quote from the U. S. Public Health Service bulletin of 1957-1958:

"In the past, most people took water as much for granted as the air they breathed. Now on every hand—from municipal officials, manufacturers, conservationists, farmers, housewives, and others—come expressions of concern over water shortages. The Nation is not running out of water; there is just as much of it as there ever was. We are just using so much more of it. Water is precipitated from the atmosphere in one form or another—rain, snow, sleet, hail, frost, or dew. It runs across the land, serving a myriad of needs, and then is drawn back into the skies, soon to fall again and repeat its life-giving cycle of precipitation and evaporation.

"Each year just so much water falls on the United States and no more. For as long as records have been kept, this amount has been about 30 inches. Since precipitation remains relatively constant, it follows that the Nation's fresh water supply also is relatively fixed.

"This fixed amount of precipitation averages about 4,300 billion gallons per day. Not all of this seemingly vast quantity of water is available for use, however. Seventy percent of it, or 3,100 billion gallons, is returned each day to the sky by evaporation and by the breathing and perspiring of plants, animals and man. Neither is all of the remaining 30 percent, or 1,200 billion gallons, available for our use. A large proportion of this occurs as flood water which quickly runs off to the ocean—gone before we have a chance to use it. An increasing share of that which is left is spoiled by pollution.

"It has been calculated by water supply experts that not more than 600 billion gallons per day of the water that falls on this country can be kept available for use in the Nation's lakes and streams. It is on this fixed fresh water supply that the continued growth and prosperity of the United States depends.

"In 1900 we were largely a rural nation and used only 40 billion gallons of fresh water per day. Today we are predominately urban and our domestic, municipal, industrial and agricultural fresh water use has risen to 270 billion gallons per day. And by 1980, only 21 years away, it is predicted that our fresh water needs will be 600 billion gallons per day! Thus, in little more than two decades, the daily demand for fresh water will be equal to the daily supply.

"When the demand exceeds the supply, as it already has in many parts of the country, the only way needs can be met is by reusing the same water over and over. However, to be suitable for reuse the water must be of the right quality as well as in the right quantity. This requires that adequate pollution control measures be provided and maintained. More 'new' water can be provided by controlling pollution than by any other means. But, the production of refuse of various sorts is rapidly increasing as population grows and our inland waters are fast becoming merely avenues by which trade and sewage waste is gotten out of the way of those immediately concerned, the difficult problem being thereby transferred to others. I cannot hope to even break ground in dealing with so complex a subject, but we have neglected it too long, it seemed to me when asked to speak on pollution, and I am here chiefly to call attention to the duty we owe ourselves and those who will come after us of protecting our fishes and other aquatic life from complete extermination. With sportsmen and nature lovers it is a problem of conservation; with cities, which cause much of the pollution of which complaints are made, it has from the first been a problem of health. Health boards and other city officials were forced to consider years

ago contamination of city water supplies as a means of preventing certain epidemics, diseases, and the attention centered upon this feature of pollution has led to the most satisfactory advances thus far made in correcting the evils coming from polluted waters.

"But, while the importance of these advancements is very great, the contamination with which they deal may have little effect on the condition of streams at and below cities, and it is this feature of pollution with which those interested in the great out-of-doors are immediately concerned. The disposal of sewage and trade waste still remains a problem that, in some respects, baffles the best efforts of our people. Sewage disposal plants have been constructed and operated at great expense, but the waters of streams at and for some distance below cities are often what have been called aquatic deserts so far as water animals and plants are concerned. This is not due entirely to the ordinary sewage containing disease germs from dwellings. Waste from factories, tanneries, paper mills, and drainage from mines, may be even more destructive to aquatic life. The septic tank of sewage disposal plants may then not in the first place free streams from many poisonous ingredients, and when such plants are overtaxed or have become inadequate from a rapid growth in population and an increase in the activities associated with it, sewage may escape into streams so as to exhaust the dissolved oxygen for a time and thus exterminate the fishes. Chicago with its drainage or sanitary canal and the polluting materials it adds to the water of the Illinois River is a lesson as to what may be expected wherever population increases greatly and sewage disposal is not provided for.

"The combined results of these great out pourings of sewage are bound eventually to have an injurious effect on health in the open country and upon our people as a whole. Everybody in the city as well as in the country is therefore concerned with the question of how to dispose of this waste before it has destroyed the beauty and usefulness of our fresh waters.

"One of the most elusive and dangerous conditions of pollution so far as its effect on fishes is concerned is not due to poisonous trade waste, nor oil or tar, and is not directly the results of poisons developed from decaying or fermenting sewage, but comes from an exhaustion of the supply of oxygen in the water. When a freshet brings large quantities of sewage and other refuse from any source and sweeps it into sluggish streams, ponds, or lakes, so transient is the depleted condition of the water at times that chemists engaged in studying pollution problems hold that tests made shortly after a freshet or those made on samples carried some distance away and tested in the laboratory do not reveal the trouble because of rapid recovery of oxygen in the water. It must be tested at once in the field. We have cases of this sort in Kentucky. We have a chemist assigned to our Department that does this work and has a laboratory on wheels in the form of a station wagon.

"Attention has been called to only a few examples of the more important and dangerous sources of pollution tending to render waters unsuitable to our food fishes. There are other poisonous substances such as the waste of lead and tin, that are particularly deadly, while still others merely render the water turbid and unattractive at times, but do no permanent harm. I have not mentioned one of the worst forms of pollution that we have in Kentucky, or that is, we used to have, and that is the distillery pollution. In the early stages of the manufacture of whiskey this was not much of a problem, because the distilleries were small and only operated in the cooler months when all of the slop was fed to cattle. But, with the merger of the companies and operations became larger and cooling systems installed so they could operate in the warmer months, then the trouble started. Thousands and thousands of fresh water fishes were destroyed, and some of our best streams were practically ruined; distilleries operate only on our better water sheds as they need the best of limestone water for the distillation of their product. During the war when all of our distilleries were forced by the Government to make industrial alcohol the conditions were deplorable. The courts were very lax and lenient because it was for the war effort. Knowing this we went after it in another way. We called all of the large distilleries together, and explained to them that the pollution they were causing was bad public relations and was turning public sentiment against them. This made sense because they knew they had enough enemies through the WCTU and the

anti-saloon league. Then with information that we had from Washington we convinced the distilleries that we could get a priority for the installation of a redryer and an evaporator due to the widespread destruction of their operations. They were all very anxious to cooperate. First, their additional revenue from operations the year round was going back to the government in the form of taxes and they saw an opportunity to expand without much cost. Second, it was good public relations and in some instances, the distilleries gave Fish and Game Clubs large donations to help restock streams after their redryers were installed. Today, every distillery in Kentucky has this modern equipment and as a result, one-sixth of all dairy food feed used in the United States is the recovered solids from distillery slop, which in many instances pays for the entire operation of the distillery.

"Sewage and industrial waste are well known to destroy and drive away the fishes in the vicinity of cities. The Ohio River is no exception in this respect. It should be recalled that the Ohio River, for some 700 of its 981 miles, is the property of the Commonwealth of Kentucky which maintains jurisdiction over all fishing activities. Knowing this, states to the east of us and to the north do not hesitate to dump all of their industrial waste as well as city sewage into the Ohio River because they knew they were free from prosecution. This condition became very serious. Dr. H. Garman, Head of Department of Etomology and Botany at the University of Kentucky in a paper before the League of Kentucky Sportsmen Convention a few years ago, stated that one quart out of every gallon of water in the upper Ohio River came out of a sewer, and that the river was in absolute pollution stage as far down as Maysville, Kentucky and that this condition was moving down the river at the rate of 8 miles per year, and there was nothing we could do about it. This condition began to tell on fishing in our smaller streams, because the larger river was a feeder stream and with all of the game fish gone in it, our smaller streams began to suffer and still are in the eastern part of the state.

"We made several trips to Washington to see the U. S. Attorney General in regard to this, but to no avail. Other states' Conservation Departments knew our predicament and eventually came to our rescue. Then on June 30, 1948 the states of Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia and West Virginia signed a compact. It was an agreement written by them, supported by our respective legislatures and approved by the Congress of the United States. Under the terms of the compact the eight states pledged a pooling of their resources and then police powers for the control of interstate water pollution.

"To carry out this purpose the states created the Ohio River Valley Water Sanitation Commission. The membership included three representatives from each state appointed by the Governor of the state, and three from the Federal Government appointed by the President of the United States. The role of the Commissioners is to execute the compact provisions and to assert such powers as may be necessary for the enforcement of obligations. For administration of Commission functions the states maintain a staff and headquarters at Cincinnati, the cost of which is assessed on a proportionate basis among them.

"Signing of the compact gave substance to a dream. That dream envisioned the potentialities of joint action among the states in the Ohio Valley in tackling a job that neither one could do alone. Guided by the broad principle that no sewage or industrial waste discharge originating within a signatory state shall injuriously affect the use of interstate waters, the Commission is empowered to make determinations regarding control measures. Securing compliance with these measures then become an obligation of each state. To supplement state efforts the Commission is clothed with residual enforcement powers.

"The Commission has done a world of good since its formation in 1948. 800 communities, with three-quarters of the sewered population of the Ohio River Valley, are today operating or constructing sewage treatment works. This represents part of the gratifying response that has been generated by eight states in their conduct of a regional Crusade for Clean Streams. Meantime, two hundred additional communities, with a population of almost 1,200,000, have completed final plans that have been approved for construction. But, we still have a long way to go. In terms of scope and complexity the biggest challenge of

the eight-state program is the control of industrial waste pollution. Probably nowhere are there greater variety or more intensive concentrations of industrial operations than in the Ohio River Valley. Many of these operations are the largest of their type to be found anywhere in the world. Some laid their foundations in the Valley almost a century ago. More have had their origin only within the last decade, during which there has been a spectacular investment in new industrial facilities estimated at ten billion dollars. This is the broad perspective within which the Commission must view its task of safeguarding the quality of water resources. There are 1,438 industrial plants discharging effluents directly into the streams of the Ohio Valley. Of this number 654 or 46% have control facilities rated as adequate; 449 or 33% provide some form of control, but more will be required; 68 or 5% are installing or improving control facilities. This shows that 965 plants of the 1,438 total are complying with the Commission's minimum requirements for industrial waste discharge which was adopted one (1) year ago. At that time the 8 states reached an agreement on policy and procedure for the determination of specific industrial waste control measures as contemplated by the compact. I might add that one of the reasons why industrial waste hasn't been tackled with a little more vigor is the fact that most of the Commission is made up of men representing industry. They are, however, able men and I feel that industry will clean up in due time.

The purpose of promulgating minimum requirements was to expedite action on the part of all industries in taking the obvious and necessary steps toward pollution control. As a minimum the Commission called for the treatment or modification of every industrial discharge so as to maintain at least the following condition in the receiving waters; freedom from anything that will settle to a form of objectionable sludge deposit which will interfere with reasonable water use, and freedom from floating debris, scum or other floating materials in the amount sufficient to be unsightly, and also, freedom from materials producing color or odor in such a degree as to create a nuisance.

"Perhaps the most frustrating of the industry waste control problems in the Ohio Valley is that associated with the discharge of acid from active and abandoned coal mines. It is an old problem, and the scientific developments would have not been of a nature to permit the Commission and member states to adequately cope with the problem and the interest and leadership that the coal industry has applied to the problem have not measured up to the need. Coal washing is still very prevalent in Kentucky, and also in Virginia and West Virginia whose drainage comes into Kentucky and have practically ruined the Tug Fork of the Big Sandy River for any type of recreation or other industry use.

"Motivated by these considerations the Ohio Valley Commission on July 12, 1956 adopted a resolution petitioning the Surgeon General of the U. S. Public Health Service to consider the inauguration of a comprehensive program of research and development relating to the prevention, reduction or control of acid mine drainage. The resolution further called upon its coal industry committee to make available its resources and council in advancing the Commission's duties to promote an aggressive program or action in curbing the discharge of acid mine drainage.

"In mentioning mine acid control as an old industrial problem that compels attention, the Ohio Valley Commission is not unmindful of the implications of new industrial development. We have now in the Ohio Valley, and this is especially true in Charleston, West Virginia and the Ashland, Kentucky area, many chemical developments that are concerned with Atomic Energy facilities. These industries produce radioactive wastes, the measurement and evaluation of which fits no previous pattern of experience among state pollution control agencies.

"At the present time, the Atomic Energy Commission maintains exclusive responsibility for waste disposal relations and controls so that health and safety are not endangered. In 1955, knowing the importance of this type of waste the Atomic Energy Commission appointed a member of the Ohio River Valley Water Sanitation Commission, Mr. B. A. Poole, to the Atomic Energy Commission.

"I hope you all will pardon me for using the Ohio River Basin as a basis for most of my remarks, but it is one I have been closely connected with all

my life and one that has been a primary concern of my Department for a good many years. I suppose that many of you would like to know why our neighboring states were so anxious to help us in trying to eliminate the pollution of the Ohio River. I am sure the paramount thought behind the decision of our neighboring states to help in this great cause was the fact that the Ohio River is very valuable to each of our states for commercial navigation. Tonnage moving on the river during 1955, as reported by the U. S. Corps of Engineers as being 71,500,000 tons (as a matter of orientation the total tonnage moving through the Panama Canal is about 45,000,000 tons annually and through the Suez Canal about 118,000,000 tons annually) so you can readily see the vast importance of this great waterway. In the past 10 years the U. S. Corps of Engineers records show 111% increase in the amount of tonnage hauled on the Ohio River. I believe that another important thought in the minds of our neighbors when they came to our rescue was the importance of the river from a recreational standpoint as measured by the small boat use which is of considerable portion. In the Cincinnati area alone newspaper surveys show an estimated 14,000 pleasure boats of all kinds. Most of these are 14 feet or under in length, fitted with outboard motors and a great many of them are kept at the owner's home and moved to and from the river. Data are yet too sketchy to make an estimate of the total of the number of small boats using the Ohio River. However, in 1956 tabulations of the U. S. Corps of Engineers shows that there are at least 102 small boat harbors and 25 improved public landings and each year there is an appreciable increase for permits to install launching ramps. Another important aspect of having clean water in the Ohio River, and this is true of any other stream, is the growing demand of agriculture for water for irrigation purposes. The growth pattern of irrigation is very rapid. Professor John R. Davis of Purdue University in his report in the 1956 Journal of the American Waterworks Association on page 982 reports that 1,124 farms in the Ohio River Compact states were irrigating 20,330 acres. In 1954 the number of farms had increased to 3,727 and the acreage irrigated reached a total of 66,980. In summing up, the records show that we have made a good start in my state and in the Ohio Valley in the control of all types of waste going into our public streams. But, in the end terms of necessary accomplishments is still a long way off. This does not mean that you and I working in our respective states should show any disposition to be less aggressive in pursuit of our ends, and in making this statement, I am assuming that most of you are charged with the enforcement of your pollution laws. It is simple knowledge that the scope and magnitude of this task will require relentless efforts. Many of the industries in the Ohio Valley, a few from the sense of public responsibility, some from a proper self-interest in waste conservation and water quality protection, and others as a result of prodding from control agencies have taken steps to reduce pollution. Much more needs to be done, but some and something must be done by all."

## THE VALUE OF THE LABORATORY TO THE ENFORCEMENT OFFICER

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### INTRODUCTION

Evidence in criminal cases may be regarded in the same light as money. The mere collection of money does not make a person wealthy. He must have the power to spend or use the money before he realizes its value. So it is with evidence. The enforcement officer must collect the evidence in such a fashion that it can be used to its fullest advantage. When this is done and when the officer goes to court, he is indeed "wealthy" in so far as a particular case is concerned.

It has been said that there is no substitute for victory. We in the FBI believe there is no substitute for expert laboratory examination of evidence found at