

11.

Problems and Policies of Wildlife Management

IRA N. GABRIELSON

President, Wildlife Management Institute

IN DISCUSSING THIS SUBJECT IT SEEMS DESIRABLE to review the basic developments which have caused many students of wildlife problems to conclude that some forms of wildlife are facing their greatest crisis since the white man arrived in North America. This crisis is due entirely to human activity. Many students now believe that man's industrial and agricultural developments have become of almost geological magnitude affecting wildlife and wildlife habitat in vast areas as much as, if not more than, natural factors.

The white man found a virgin continent. Indians were few and lived directly by hunting and fishing. They had little effect upon the abundance or scarcity of other life. In fact, except for areas about more or less permanent villages, they were probably relatively insig-

nificant predators. The Indians lived largely by hand-to-mouth methods and such agriculture as they practiced was limited to small areas which had little effect upon other creatures.

Unquestionably, there were at this period, areas which were abundantly stocked with wild forms, and others in which they were scarce. These varying abundances were related to such factors as fertility, rainfall, climate, and other various influences that determine the quantities of life that may exist. Aside from these limiting factors, varying annual vegetative growth certainly provided at times extraordinarily abundant food supplies, while at other times in the same communities food was scarce. The Indians prospered or failed to prosper as other forms, and all were part of a community in which biological and physical factors directly affected both man and beast.

In a few hundred years the white man has changed this picture—first by his extraordinary increase in numbers from a few straggling colonies to a nation of 150 million people. It is a well-known biological axiom that there are maximum limits to the quantity of life that can be supported by any territory. Therefore, the mere fact that additional millions of individuals occupy the land means that other living things must be relatively less abundant. There is less living room for them and, consequently, less chance for them to reproduce and survive in the numbers which once existed.

Other than by mere numbers, man has influenced the abundance of other creatures by intensive use of land for agriculture, dwelling sites, roads, cities, towns, manufacturing plants, and other many and diverse exclusive uses which are made of space formerly available to other creatures. As this exclusive use grows, there must be a corresponding decrease in other forms.

Various activities of man directly affect the fortunes of other living creatures. These include killing for food or other purposes, clearing of forests and plowing grasslands for agricultural use, drainage of land for agricultural or industrial purposes, great impoundments for flood control, irrigation, or hydroelectric power, pollution of rivers and lakes by domestic sewage and industrial wastes, destruction of soil by improper land use, and the growing reliance placed upon control of plant diseases, insect pests, and weeds by chemical methods. This list could be considerably extended, but certainly no one can quarrel with the statement that these activities directly influence the fortunes of other living creatures.

The first human activity which interfered with native creatures in the New World was killing for food and clothing. The early

colonists lived off the land. They killed birds, mammals, and fish for food; used skins for clothing; and made various other uses of these animals. This killing was for a time confined to the vicinity of settlement and had little other than local effect. It did decrease the numbers of the more desirable forms in the vicinity of each community, and as the earlier settlements grew and new ones pushed westward, it gradually reduced populations not only about the towns but to a less extent for an increasing distance about each. As long as this killing was not too severe, it acted more or less as a cropping system in somewhat the same fashion as had Indian activities. However, as the white man grew more numerous and guns and equipment became more effective, killing began to affect total stocks of wildlife.

The early colonists were concerned not only with food but with finding desired native products which might be exchanged for goods from the Old World. Furs and hides were available, and the early settlements paid for tools and manufactured articles by the sale of furs. The trappers constantly pushed ahead looking for new trapping grounds, and were unquestionably responsible for the exploration of much of the continent. As the settlements grew, they still depended upon wild things for food, but it became increasingly difficult to secure enough game and fish near the villages, and hunters were paid to bring in game for their fellow citizens. Commercial fishermen developed as it became increasingly less easy for each individual to supply his own table. The majority remained at home occupied with other tasks, while a relatively few men procured the furs and hides that provided clothing and the meat and fish for the larders of the pioneers. This continued for many years.

Paid hunters supplied meat to the construction crews that built the transcontinental railroads. They were largely responsible for the destruction of the buffalo herds which, however, would have gone with the development of dry farming and stock raising. There could be little place in an agricultural community for migrating herds of huge beasts in the numbers that roamed the Great Plains. Unquestionably, market hunting seriously reduced but did not completely destroy such species as the passenger pigeon. Perhaps it became extinct because of destruction of habitat by agricultural development plus market hunting.

The Eskimo curlew probably disappeared largely because of market hunting in the Mississippi Valley, since its Arctic breeding grounds were still intact. Deer, antelope, elk, and mountain sheep were hunted assiduously both for food and hides. By 1910, they were

practically gone in the United States, and mammalogists were freely predicting that the age of big mammals was rapidly drawing to a close.

Beginning about 1875, the volume of market hunting declined largely because of scarcity of game. At the same time the numbers of those who hunted for recreation began to increase. While such shooting provides food, it is primarily a recreational activity. The increasing interest in this gradually eliminated legal market hunting. Similarly legal commercial fishing was stopped in many of the inland waters. Commercial hunting and fishing to feed expanding populations, followed by a growing number of recreational hunters and fishermen, undoubtedly continues to have great effect upon many living things. Yet this is only one factor.

Other human activities were, even at the beginning of market hunting, beginning to cut seriously into wildlife populations. The earliest of these, which started with the beginning of settlement, was the clearing of land for agricultural use. Naturally the first agricultural lands on the Atlantic Seaboard came from clearing forests. Forests were regarded not as a natural resource but as an enemy which must be fought ceaselessly. If cultivation stopped, the forests struck back and invaded again the cleared plots on which settlers depended for their rather meager agricultural supplies. These clearings, like the first efforts at hunting, had little other than local effect until human demands caused the clearing of vast areas. The progressive destruction of forests necessarily meant a decrease in the forest life dependent upon and associated with such life.

When settlers reached the grasslands and land could be converted to agricultural use by the breaking plow, the change in environment proceeded even more rapidly. Even if there had been no slaughter of the grassland herds of buffalo, deer, elk or antelope, they were doomed by the destruction of their habitat. There was no place for them and eventually they would have vanished, though perhaps more slowly than before the guns of the insatiable market hunters.

Placing under cultivation hundreds of millions of acres of land in 200 years has profoundly affected the abundance and distribution of many forms of life which were not considered at all in the plans of those who broke and cleared the land. Drainage did not seriously affect wildlife until the supply of good free land decreased. Then drainage schemes were developed. Some were good and produced good agricultural lands. Many were based on the false premise that any land from which water is removed makes good farm land.

These drainage schemes lined the pockets of the promoters and those who financed them, but left behind ruined hopes and heart-broken people who had spent their savings trying to farm land totally unfit for such use.

Drainage directly affects fish and aquatic mammals and birds which depend upon marsh and water habitat. Drainage has had a profound influence upon the numbers, the movements, and the distribution of waterfowl. It has affected fishery resources and has been a major factor in the decreased abundance of valuable furbearers, particularly the muskrat. Drainage, by lowering water tables and reducing storage facilities of natural marshes, has an indirect effect upon wildlife as well as upon agricultural and industrial affairs.

Land drainage is not only of historic importance. Many such projects are still being promoted—some of them by the Agriculture Department. A bill introduced in the 80th and 81st Congress authorized the study of 57 million acres in the Southeast to determine how much of it could be drained for agricultural use. One and a half million of these acres include coastal marshes which are the last remaining east coast wintering ground for waterfowl.

The Soil Conservation Service and perhaps other agricultural agencies are actively promoting land drainage in the northern Great Plains. It appears that departmental memory is short indeed. As recently as 1936 the Department of Agriculture and other federal agencies poured millions into these same areas to provide water for stock and for production of any kind of feed—even Russian-thistle. Droughts will come again, and it is disheartening to know that official memories are as short as that of the average uninformed individual.

Great publicity was given in 1945 and 1946 to drainage promoted by the Soil Conservation Service in eastern Maryland; for example, the Whaley marsh on the Chester River near Quaker Neck. The publicity stated the work was being done for conservation purposes, primarily to improve the habitat for muskrats, and to favor wildlife generally. Any party interested in knowing how the improvement has worked might inspect this and similar units. Many such projects produced little or no additional agricultural land or any other values. The acres of land obtained during wet years must be balanced against the average of lost production in dry years to determine whether or not a net gain is achieved.

In recent years, the building of great dams has reached such a

peak that they have an important influence upon the relative abundance and distribution of living creatures. Giant hydroelectric dams are being built for power, irrigation, flood control, or navigation, and sometimes an alleged combination of all. However good or bad these works may be, they do profoundly affect wildlife populations, not only in the immediate reservoir areas, but sometimes for some distance around. They always disturb local biological patterns. For example, by flooding winter range of big game mammals, they sometimes render much summer range unusable for that same species, even though they do not adversely affect the summer range itself.

It is obvious that each big impoundment floods land that produced certain forms of life. It is not true that wildlife can be produced abundantly in waste lands as many unthinkingly believe. Wildlife is a product of soil and water. It can be produced only in meager amounts on unfertile lands or in sterile water. It can be produced in abundance only in productive environment. Therefore, the projects may destroy key areas without which wildlife cannot survive in numbers on adjoining less fertile land.

The impoundment of water affects fish populations usually for the worse in that impoundments normally develop more coarse fish and less of the better quality fish than virgin waters of the same territory produced.

Soil waste by improper land use has been another great factor affecting wildlife. Americans have reduced the productivity of soils at a greater rate than many other nations. These abused lands that can no longer produce agricultural crops produce poor crops of wildlife and weeds or such other plants as can still survive. America has vast areas which are, by natural processes, slowly growing back into productive condition. Such lands may again become productive, but today they are almost sterile as far as producing healthy, vigorous, and abundant life is concerned.

It may appear that this question of sound soil management is an agriculture rather than a wildlife problem. Yet, it is the growing conviction of wildlife students that it is almost impossible to over-emphasize the importance of good soil and water management from a wildlife standpoint. If this nation has been careless in managing its soils, it has been even more so in the management of water. During the last few decades, the country has become increasingly conscious of the land problems and is slowly developing a better land-use philosophy. Similar progress has not been made in developing a program of water management.

Most water-utilization projects are still developed as isolated units with little consideration for anything except the particular objective of the promoter, be it hydroelectric power, irrigation, flood control or navigation. Big impoundments have been and are now being developed without much effort even to keeping them useful as long as possible. No effort comparable to the original effort and expenditure for impoundment has ever gone into preventing excessive erosion from silting up the reservoirs. Any engineer will readily admit that only a limited number of sites are available. Yet, national engineering organizations are engaged in a mad race to see how many units each can build with little or no thought, effort, or funds devoted to the preservation of these reservoirs for future use.

Not only has this nation been prodigal of impoundment possibilities, but it still goes on the theory that streams should be open sewers into which any community or industry has an inherent right to dump waste material. Waters are only partially productive because of this practice. While a number of states have pollution laws, many of them are inadequate and others cannot be enforced because of the political strength of the polluters. The recently enacted federal pollution law has neither teeth nor the promise of development of teeth in its present form, and its best feature is the fact that it indicates a growing public concern regarding this problem.

Much emphasis has been placed on the necessity for increased food production in recent years. Yet, the production of fish and other valuable natural products of many streams has been destroyed or greatly reduced by silt from excessive erosion, domestic sewage and industrial waste. Any one of these factors can destroy a stream; all three are almost certain to do so.

The propensity of man to look for easy and painless ways out of immediate predicaments also has profound effects upon other creatures. In agricultural lands, this search for a cure-all has taken the form of one fetish after another. Once a fetish was made of clean farming. It was made to appear almost immoral for a landowner to allow shrubs, bushes, trees, or hedges to remain on the land. Successively, reliance has been placed upon miracle crops, miracle fertilizers, and miracle chemicals, or belief of some that a chemical cure can be developed that will in some magic way prevent all insect or disease damage.

Many new toxic materials, such as DDT, have direct and indirect effects upon wildlife. It is known that DDT used in heavy concentrations will kill birds; used in weaker concentrations, it does not appear to be directly fatal to them. However, it could easily have

serious effects by destroying food supplies at critical periods such as the nesting season. There is some evidence that this does occur, but the frequency of such occurrences is still a question. Similarly, 2,4-D and other plant-killing chemicals can affect wildlife by destroying the plants which produce their food or which provide essential cover.

Questions have been raised as to the necessity of the extensive use of insecticides and plant sprays if proper attention is paid to the maintenance of soil fertility. It seems obvious that fertile productive land will grow more vigorous crops, better able to withstand diseases and attacks of insects, than those growing on land of low fertility.

The preceding discussion of certain human activities which affect wildlife is not a catalog of all the possible effects. It contains only the more important. It is obvious that any human activity which changes the type of vegetation on land will affect wildlife. Any human activity which puts land to intensive and exclusive use also will affect wildlife. In the latter case, the effect is always adverse; in the former, it may be adverse to some species and favorable to others, depending upon the new type of vegetation and the type of land management installed.

All these adverse effects could easily be added up to make a very black picture. It would be black indeed if there were no other factors to be considered. Fortunately, there are others.

The first and probably the most important is the growing public appreciation of the necessity of intelligent management of natural renewable resources. More individuals have informed opinions and are more concerned than ever before. Not only is the number of citizens interested in various individual natural resources increasing, but there is a growing appreciation among leaders and the rank and file of conservation groups that the conservation and wise management of soils and waters, and their plant and animal products are a part of one picture. It is not possible to promote one unit without some effect upon others.

Another favorable factor is the development of professional groups interested in these resources. Professional foresters and numerous groups of professional agricultural workers developed many years ago. In recent years, professional ecologists working in both soil and water conservation fields and a rapidly growing wildlife management profession have been added. The existence and activities of such groups give some assurance that management will be based somewhat more on facts and less on dogmatic opinion. These factors are signs of progress. The effect of these developments will be much greater

in the coming years than in the past. Wildlife, which is one product of land and water, will continue to be affected by all activities—good or bad—in the human management of these basic resources.

Wildlife of forested lands has relatively brighter prospects than those forms found in purely agricultural lands. Wildlife management can be easily fitted into forest management, partly at least because man has not altered forest types so radically as to destroy essential habitat for most forest creatures. In recent years, the growing understanding of the mutual interdependence of resources has improved the prospects. Foresters are increasingly conscious of the value of forest life and, as a result, are more inclined to modify management plans and programs for its benefit.

In recent years, much publicity has been given to irruptions of deer and other browsing and grazing animals. These irruptions have been caused by a complex of factors, a major one of which has undoubtedly been the "cut-out and get-out" policy of logging so long followed in this country. Under such a system, vast areas were cut rapidly. Such areas may have started to become reforested immediately or may have been held in a nonproductive state for many years by recurring fires. A forest recovery from fire or logging grows up to a mixed stand of shrubs and trees. During that period it produces a maximum amount of food and cover that favors the rapid increase of browsing species. As the forest grows and the overhead canopy closes, food and cover suitable for such animals decreases. Add to that natural cycle the concentrated effect of overbrowsing or overgrazing by too many animals for the conditions then existing and a "deer irruption" followed by starvation often appears.

Sustained-yield harvesting of forests placed into actual operation will eventually help stabilize populations of such animals. Combined with an intelligent game management program, it is possible to foresee a long-range picture in which numbers will not grow to such peaks nor decline so violently. Not only browsing animals but many other forest-inhabiting species will be benefited by sustained-yield harvesting. This segment of wildlife has prospects of better rather than poorer living environment.

The outlook for grassland wildlife is not so rosy. The antelope has made a come-back in many western states. To a less extent, it has recovered in the prairie states where once it was abundant, but its numbers are not and probably never will be large. The reason is obvious. Regardless of the fact that there is comparatively little direct competition between antelope and cattle for feed, intensive cattle

grazing normally results in a decrease in the amount of other available food. Sheep grazing conflicts more directly with antelope grazing.

The complete grazing utilization of grasslands, plus dry farming of many grassland areas, adversely affects many other forms of wildlife. The prairie chicken and the sharp-tailed grouse, two important species, may be cited as examples. They have been extirpated from large areas by the destruction of necessary habitat as a result of changed land use. Such forms can only recover when the original vegetation is restored or some acceptable substitute provided. The fact that prairie chickens and sharp-tailed grouse have recovered on numerous wildlife refuges where native vegetation has been partially restored emphasizes this point. Such species do not have the necessary adaptability to persist in the face of radical habitat changes, and their places have to some extent been taken by such exotic species as ring-necked pheasants and Hungarian partridges, both better able to live under present land-use practices.

The fact that other grassland species have increased on refuges when vegetative types have been restored indicates that the decrease in necessary environment has been a main cause of their declining numbers. Such forms can be restored only as advantageous changes are made in prevailing land-use practices. The prospect, therefore, for greatly increasing the grassland species is not as favorable as it is on forest lands. They can and have been aided by some new practices and perhaps can be aided more by methods to be developed in the future.

Lands now devoted to intensive agriculture have experienced the most revolutionary changes except those used exclusively for such things as buildings, highways and other permanent structures. Many types of wildlife have been affected by these changes. Wherever forests have been cleared to make agricultural land, forest wildlife has been replaced by forms that can live under the new conditions; where grasslands have been plowed, the same reactions have occurred; where land has been drained for agricultural use, aquatic wildlife using the marshes or lakes either moves elsewhere or disappears.

Since agriculture has affected so many millions of acres of land, agricultural development is a direct cause of many major problems in maintaining wildlife populations. Many resident species can persist only to the extent that they can adapt themselves to present and future agricultural land uses. Change in major farm crops favors one form over another. In western irrigation districts a change from corn and alfalfa to sugar beets has been followed by a decrease in pheasant and quail populations. Similar changes often follow other

shifts in agricultural crops. Yet many resident creatures can persist under agricultural conditions, particularly when some attention is given to their needs.

Migratory forms of wildlife have perhaps been most adversely affected of all. Something like 100 million acres of land, much of it either breeding, feeding or wintering habitat for migratory waterfowl, has been drained in the past 75 to 100 years, and drainage for agricultural purposes is still being promoted extensively. The future looks darkest of all for migratory wildlife, particularly the major waterfowl species. Until the values of marshes and lakes as water reservoirs and regulators of water tables and the values of the products that can be taken from such habitat are more clearly recognized and land management practices developed to utilize such values, there is little hope for rebuilding migratory aquatic wildlife. Despite all other efforts, they are apt to continue on the decline as long as drainage of additional marshes and lakes continues.

If all recommendations made by agriculturalists in the past were made completely effective on an individual farm, it is highly improbable that wildlife could or would persist on it. A combination of clean farming, intensive insect and weed control, coupled with an effort to mine the last possible nickel out of every square foot of available soil, would unquestionably destroy all food and cover for wildlife, with the exception of such forms as the English sparrow, the starling, the house rat and the house mouse. Yet, many of the most valuable forms of wildlife are inhabitants of agricultural areas. As one measure of the importance of farm wildlife, a large part of the annual game harvest is taken in agricultural areas.

The saving factor is the fact that securing the last ultimate nickel in profit is not the only interest and incentive that motivates human activity. It is possible to practice profitable agriculture with sound soil management and to maintain soil productivity on land while still leaving adequate food and cover for much valuable wildlife. It has been demonstrated on many farms that wildlife needs can be fitted into individual farm management programs in a way that is not harmful and often beneficial to the land-management program.

The use of permanent vegetation to prevent excessive erosion offers infinite possibilities for supplying adequate conditions under which wildlife may live without interference with sound land management. New techniques and new methods are continually being developed which will make such programs even more feasible in the future than at present.

Two examples of such new developments are the growing use of lespedezas and of multiflora rose. Lespedezas, grown primarily for land-management purposes, also provide food and cover for wildlife. Multiflora rose used as a living fence and as a soil cover in eroding areas also provides essential cover for many wild creatures. Unquestionably, more study will discover other plants and develop additional techniques which will meet various needs better than present methods.

The Department of Agriculture is the federal agency primarily interested in agricultural land. Land is the basis for all of the crops and livestock in which the various units of the Department are interested. Despite this basic importance of land, no land-management policy, accepted as a part of the working philosophy of all departmental units, has been developed.

As examples, there are groups advocating the destruction of shrubs and trees in fence rows and hedges, while others are promoting the planting of perennial trees, shrubs, and other plants for varying purposes. Some groups promote more and more toxic insecticides to destroy all insects, while others, appreciating the importance of insect pollinators and the services of predatory insects, publicize their values. Some units are building farm ponds and stressing the value of such ponds in maintaining water tables, controlling run-off, and preventing excessive erosion, while other groups are actively engaged in promoting the drainage of existing ponds, lakes, and marshes that fulfill the same functions. The latest and most striking example is the Department's industrious promotion of high farm price supports which encourage mining of present land fertility while piling up huge unused and unusable surpluses of perishable agricultural products. At the same time it supports gigantic drainage surveys to develop more farm land to grow more unwanted surpluses.

Such galloping wildly in all directions simultaneously seems utterly inconsistent to outside observers. The assumption on which some of these recommendations are based seems to be that this nation has grown so desperately poor that it must mine to the maximum extent every square inch of soil available; others seem to rely on the contrary philosophy that the nation can afford to be more wildly prodigal of its resources than ever before.

In thickly populated sections of Europe, there is still room for shrubbery, trees, hedges, and for wild creatures. In relatively thinly populated America, we must apparently urge the landowner to attempt to destroy everything that interferes with the maximum dollars-and-cents production of each unit of land.

There is too little appreciation of the fact that land can be profitably used for other purposes than the production of agricultural crops. Little attention has been given to the use of water farming, although it is an important part of management in other nations. There is little appreciation of the values of marshland, and yet there are such lands whose net profit from management of aquatic resources is greater than that secured on adjoining intensively cultivated agricultural land.

The Department of Agriculture is the most potent single governmental agency influencing owners of agricultural lands and in changing present management practices. It seems obvious that this Department could make a major contribution of national welfare by developing a sound land-management program *and using it* as a basis for its action and educational programs. If such a concept could be developed, many of the present inconsistencies in the agricultural program would vanish. The use of perennial vegetation for soil erosion control, the control of weeds, insects and plant diseases, and the best utilization of land for particular purposes would fall more naturally into their proper perspective and perhaps be emphasized more nearly in line with their relative importance.

It may seem strange that a wildlife man should be so interested in land management. Yet the fate of wildlife in agricultural areas is inextricably bound up with land use. To the extent that intelligent, long-range land management based primarily upon maintaining productivity can be translated from the field of theory into actual practices upon the land, wildlife will benefit. Intensive agriculture, properly planned, can mean change rather than extirpation for wild creatures. Change in crops or in land use may affect some forms of life advantageously and others adversely. Nevertheless, agriculture does not necessarily mean twilight for wildlife. The reverse may easily happen to the extent that intelligent management can be substituted for the exploitive type of land use still far too prevalent.

SELECTED REFERENCES

- GABRIELSON, IRA N. *Wildlife Conservation*. The Macmillan Co. New York, 1947.
———. "A National Program of Wild Life Restoration." *American Forests*. 42:104.
Planning for Wild Life in the United States Report of the Land Planning Committee. Part IX. National Resources Board. Govt. Print. Off., Washington, 1935.
Requirements for Wildlife Areas National Resources Board. 9:1-14 Govt. Print. Off., Washington, 1935.

