

NEEDED WILDLIFE RESEARCH

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PUBLIC SUPPORT FOR WILDLIFE RESEARCH

Research in most areas of resource conservation has long enjoyed public acceptance. Wildlife resources are a notable exception. In the Ohio Department of Natural Resources, for example, the Divisions of Geological Survey, Lands and Soils, and Water are largely concerned with investigations. There are large federal research programs in these areas costing many millions of dollars. To some degree, other state agencies conduct research in similar or related fields (The Agricultural and Engineering Experiment Stations, for example). Additionally, some research in these areas is conducted by private industry and through privately financed research (Battelle Memorial Institute, Mellon Institute, Resources for the Future). Basic research in the field of forestry in Ohio is largely carried out through the Ohio Agricultural Experiment Station and the U. S. Forest Service and that in the field of soil conservation through the Agricultural Experiment Station and the Agricultural Research Service.

Basic research concerning wildlife resources has never enjoyed whole-hearted public support. The reasons for this are many. Not the least of these is the tradition of wildlife ownership. This is a free resource held in trust by the states. The several species sought for recreational fishing and hunting do gain some attention, however, through pressure of a license-buying constituency and business enterprise built upon their expenditures for this purpose. Unfortunately this is a constituency often ill informed and confused by conflicting interests. Hook and line fishermen in Lake Erie, for example, have in recent years had their concern for the decline of the yellow walleye diverted from supporting scientific inquiry into the cause of the decline to blaming commercial fishermen who are equally concerned with the same problem.

THE NATURE OF WILDLIFE RESOURCES

Another important factor is the nature of the resource. With few exceptions, the almost five hundred kinds of vertebrate wild animals in Ohio had their origin in an environment vastly different than now exists. They are highly complex animals. They have different values to different people. The returning red-wing blackbird that brightens the day of the ornithologist in mid-March may bring scowls of scorn from the sweet corn grower in mid-August. The deer that provides a trophy for the hunter in December may leave offspring that brings grief to the claims adjustor for the auto insurance company before the winter is over.

With few exceptions, wildlife is considered a marginal resource—a kind of fringe benefit or curse as the case may be. It leads a largely marginal existence between life and death and in the habitat it occupies. It lives largely between the forest and the cropfield, the stream or pond and its edge, or the little pocket of clean water in a polluted stream. Wildlife has long been of marginal or incidental interest to a number of disciplines, but not strongly claimed by any. Is it, for example, the province of zoology, of ecology, of animal science, of animal husbandry, or a discipline of its own?

DEVELOPMENT OF INTEREST IN WILDLIFE RESEARCH

Organized and publicly-supported wildlife research had its significant beginning in the depression years of the 1930's. It was an under-nourished infant born

into an antagonistic environment. The infant has grown slowly and with a degree of proliferation which has impeded progress and mass accomplishment. Wildlife research in Ohio, as elsewhere, has suffered from the public image of a wildlife biologist as an impractical bird watcher. The official and public view for years held that wildlife research is play and therefore unnecessary and perhaps even undesirable. In this atmosphere, such research as was undertaken was given but token support in our colleges. In public agencies it was sometimes carried out under the guise of various management programs or, if openly, to put out brush fires of public discontent arising from natural calamities and ill-conceived projects.

If there is to be hope that we may long enjoy wildlife according to American traditions, we must devote our energies to developing ways to meet its needs in the future as contrasted with merely seeking explanation for what happened in the past. We must conduct research which has optimum production as an important goal as is true in other areas of resource use. The alternative is the hope that perhaps the next generation will enjoy at least in some measure our bequest of colored slides, paintings, stuffed skins, and descriptive words of a heritage we acted too late to conserve.

RECOGNIZING WHAT IS WILDLIFE RESEARCH

Part of the problem is inherent in the concept that many public administrators and biologists have of what comprises important wildlife research. Dr. Tony Peterle, leader of the Ohio Cooperative Wildlife Research Unit, in a paper presented before the Outdoor Writers of Ohio in March 1961 said, "Much of the money spent by state agencies is labeled research but is devoted to annual game production surveys. These are regular chores associated with the accumulation of facts for the administrator, so the seasons and bag limits can be set with some measure of intelligence. Yet year after year the surveys are charged to the research program. Not only are meager research funds spread over a great variety of projects, but the total research budget then becomes misleading to administrators and the public alike." Richard Stroud and E. A. Seaman, writing in *Fish Conservation Highlights for 1956*, voiced similar views when they wrote that: "Most activities labeled as research by most states are really only more or less routine kinds of management studies."

Dr. Peterle clearly identified the problem when he said, ". . . little of this effort can be considered basic research in a sense that it will provide new knowledge. . . ." It is doubtful that a substantial part of expenditures labeled research now actually are directed towards gaining new knowledge which may enable development of programs to enhance use of our wildlife resources. The annual summary of funds expended under the Federal Aid in Wildlife Restoration Program reflect this situation. A recent report summarized the situation by noting that, "General inventories for determination of the rate of harvest, angling pressure, and population characteristics continue to be emphasized."

CURRENT WILDLIFE RESEARCH EMPHASIS

Recently, I checked 399 abstracts listed in *Wildlife Review*, Number 99, for September, 1960. Of this number, only 9 involved experimental procedures. Three hundred and seven were descriptive and covered such diverse topics as taxonomy (38), ecology (29), natural history and life history (64), population (44), behavior (39), disease (38), morphology (6), physiology (9), bibliography (2) accidents (1) and techniques (37). Fifty-two of the abstracts were concerned with some aspect of management. Only 23 per cent of the total were concerned with the more important game, fur, and fish species. The remaining abstracted articles were concerned with such related topics as climate, conservation, education, and soils.

Research reports in the Journal of Wildlife Management also reflect this emphasis. The Journal in 1960, for example, had 24 articles on study methods, 13 on life history and behavior of which nine were on food habits. Twelve articles concerned evaluation of management practices, 10 diseases and parasites, 5 population, 4 physiology, 3 observations of the effect of fungicides, herbicides, and insecticides, and 1 each concerned classification and morphology. There was but one article involving experimentation. A great range of species were treated in these reports. Nineteen of the articles concerned big game. Fourteen articles were concerned with migratory birds. Only eleven articles were concerned with small game. There were three papers on fur-bearers including one each on beaver, muskrat, and seals. Other wildlife treated included foxes, bobcat, pocket gopher, shrews, songbirds, and long-horned cattle.

WHO CONDUCTS WILDLIFE RESEARCH

Research emphasis is a product of interest and support. Some measure of emphasis is evident from the above review. A measure of support is evident from a tally of the employment connections of those who produced the research reports. In the four issues of the Journal of Wildlife Management referred to, university professors and their graduate students led the way with 42 authors. Employees of fish and game agencies were next with 29, followed closely by employees of the U. S. Fish and Wildlife Service (exclusive of Cooperative Wildlife Research Units) with 28, graduate students and other personnel of the Cooperative Research Units totaled 9. Others were as follows: U. S. Forest Service, Illinois Natural History Survey, and foreign authors 5 each; State Health agencies 4; U. S. Soil Conservation Service 3; and the U. S. Public Health Service, Wildlife Management Institute and Museums 1 each.

DETERMINING WILDLIFE RESEARCH GOALS

The foregoing indicates, I believe, that wildlife research is still a feeble and widely diffused effort. There is need both for clear identification of problems and allocation of effort so that the limited resources available can be more effectively employed. There is obvious need too for more significant support about which more will be said later.

What should be the goals of wildlife research? Broadly, they should:

- 1) Seek the continued existence of as much of our natural wildlife heritage as we can consistent with the abundant life our material resources, institutions, and technology make possible.
- 2) Exercise that degree of control over inimical forms of wildlife which is necessary to avoid extirpation consistent with protection of human life, property, economic security, and aesthetic values.
- 3) Exercising that degree of management which makes possible such wildlife abundance that it can be used for recreational purposes without depletion of the basic stock. Such purposes include hunting, fishing, birdwatching, nature study, photography, and other uses.

The latter objective is the most difficult to achieve and the most dependent upon new knowledge.

SOME CHALLENGES FOR WILDLIFE RESEARCH

For many years, the natural production of wildlife incidental to agricultural and other uses of land and water has been sufficient to satisfy the demands of the times. It is increasingly evident that such production is not enough to meet present or foreseeable demands. The choices are to find ways to produce more per unit of land or water, to pro-rate diminishing supplies among increasing users or to devise ways to limit the number of users.

Finding economical ways to increase wildlife production in upland areas poses

a formidable but not hopeless challenge. This must be done in competition with more intensive uses of land and a rapidly expanding technology in impinging areas. It is not enough to find out what effect D.D.T., Dieldrin, Endrin, and other chemicals have on wildlife after they become accepted land management tools. By the time, these effects are measured, new materials will be available and used.

We need to find ways by which wildlife can be increased and managed using the products of modern technology. This requires basic research into the genetics, physiology, and behavior of the animals we are concerned with. Development of new ideas for management methods, and extensive experimentation to develop and refine those practices which have promise is also needed. The basic research and experimentation now underway to control the sea lamprey in the waters of Lake Superior with chlorinated and fluorinated nitro-phenolic compounds is an excellent example of the kind of research needed.

It is unrealistic to expect that public agencies will ever have the financial resources necessary to establish effective wildlife habitat on private lands to a significant degree. Nor is it realistic to expect that public lands will be adequate to meet demands for wildlife use. The logical alternative is to do what the agricultural experiment stations have done for farmers. When, through basic research and experimentation, wildlife management practices with predictable results which a land operator can apply are developed, it may be expected that they will be adopted to the degree desired. For some, this will be little, for others, particularly those interested for economic or other personal reasons, it will be to a high degree. On public lands and on commercial areas, a high level of application may be expected.

CONCENTRATING RESEARCH EFFORT

State agencies should concentrate their effort on those species of wildlife which are amenable to intensive management supporting insofar as they can research on other species. Conversely federal agencies should, it seems to me, concentrate on migratory species and those factors such as disease which are common to wildlife—irrespective of political sub-divisions.

We have expended a lot of time, energy, and money trying to find out where and when pheasants, quail, rabbits, squirrels, and other species reproduce. Very little has been done experimentally to find how more can be produced per unit of area or cost consistent with aesthetic concepts. Such research must be based on thorough knowledge of the behavior, physiology, and genetics of the animals we are working with. It involves also experimental procedures such as controlled mating of selected racial stocks, controlled behavior such as imprinting, controlled nutrition, controlled food and cover patterns to determine optimum conditions.

The needed kind of research requires a high level of competence, suitable areas, and continuity of effort. It cannot be accomplished by a few graduate students carrying on short term research projects incident to winning a degree. Neither can it be achieved by game technicians constantly harrassed to explain why one season's accidental production of game is better or worse than that of other years. Full time, experienced, research workers dedicated to creative wildlife research are needed.

Some biologists will argue that we should simultaneously study all species, that we must study the whole biota in order to understand its parts. The problems are too great and the resources too few to attempt a research program on a broad front. For practical purposes, research on species on which there is little pressure can be deferred. Until their importance justifies research effort they can largely be maintained in natural abundance by providing suitable habitat.

CHOOSING THE SPECIES TO STUDY

It is the species on which excessive pressure is exerted or which man desires

in greater or lesser abundance which are most in need of attention. Further, the basic concepts developed from intensive studies of a few species may be applicable to others when time and resources are available to test them. As to the species to be studied, and experimented with it would be prudent to consider largely those about which we have already learned much from observation. These include wildlife which may be intensively managed on private land (land devoted to that purpose and land used incidentally for that purpose.) These include the cottontail rabbit, the ringed-necked pheasant, the bobwhite quail, such fur bearers as the muskrat and raccoon, and such species as the red winged blackbird which cause significant crop losses, the mallard and black duck. Wildlife which may be intensively managed on public lands should also be included. Such land of necessity is largely unsuited to intensive agriculture. The species involved include those previously enumerated, white tailed deer, squirrels, grouse, and other forest species. Such research should be designed to develop management techniques applicable to the environmental conditions which the future promises, not the pristine conditions under which our present stocks evolved.

DEVELOPING FISHERIES RESEARCH FOR ARTIFICIAL IMPOUNDMENTS

Finding ways to increase production of fishes and quality of fishing in our largely artificial waters is promising. To some degree it has already been attained in experiments of the Alabama Agricultural Experiment Station, in the pond fish cultures of France, Poland, Thailand, and other far Eastern countries, in the trout streams of the Castalia Trout Club in Ohio, and trout lakes of the Mountain States where rotational fish removal and restocking is common practice.

To achieve quality results in our artificial but none the less fertile ponds and lakes requires knowledge comparable to that upon which modern agricultural production is based. Such production is based on development of the highest quality genetic stock possible, use of the best cultural practices known, and maintaining a healthy environment by eliminating or reducing competition with weeds or disease, parasites, or predators.

The genetic stocks of fishes now available are the compound product of thousands of years of natural selection in environments greatly different from modern impoundments. It should be possible to develop from existing wild populations of fishes, genetic stocks which have characteristics of growth better suited to waters in which we wish them to develop and habits better suited for recreational fishing. Remarkable improvements in several species of trout have, for example, already been achieved. It should be recognized, however, that pan fishes such as crappies, bluegills, yellow perch, and bullheads support most of the fishing in this state. More attention should be paid to managing these fishes. There is, unfortunately, little or no research of this kind underway.

We have little precise knowledge concerning the best cultural practices to apply to our artificial impoundments. Present efforts are limited to a few rule of thumb guides based on observation and general experience. These include such practices as stocking ratios, use of predatory species, use of fish toxicants, construction of brush shelters, and changes in water levels. These are all used largely on a trial and error basis because they have not been thoroughly tested under controlled conditions.

Our knowledge concerning the desirable environmental conditions in impounded water is also sorely deficient. There is little research data, for example, upon which to base control of undesirable vegetation in ponds, or the effects of such controls on fish production or fishing. Little is known of the role played by the smaller water organisms in fish production or how they may be modified by cultural practices to enhance their value or if harmful to control them.

FINANCING WILDLIFE RESEARCH

The kind of research effort here presented would require additional sources

of funds, reorientation of thinking, and institutional arrangements for its accomplishment. This raises the question of how much money should be invested in wildlife research.

The President's Science Advisory Committee in a report published November 15, 1960, stated that "both the security and general welfare of the American people urgently requires continued rapid and sustained growth in the strength of American science. American science in the next generation must quite literally double and redouble in size and strength. This means more scientists better trained with finer facilities. It is the simple truth that if this country is to safeguard its freedom and harvest the great opportunities of the next generation of science, the level of its scientific investment must be multiplied and multiplied again. Simply in terms of economic self interest, our proper course is to increase our investment in science just as fast as we can to a limit not yet in sight."

Research effort toward the development of wildlife resources has not been in keeping with this philosophy, on a state or national basis. A tremendous investment is being made in Federal expenditures however for research and development in many other areas. For the fiscal year 1960, an estimated 8 billion dollars were spent for these purposes, or 1.6 per cent of the gross national product. Most of this (91 per cent) was for defense, atomic energy, aeronautics, and space. Approximately 523 million dollars were expended by Federal agencies for research and development in the life sciences. Of this amount, health and education accounted for 56 per cent, agriculture for 17 per cent, defense 9 per cent, Atomic Energy Commission 8 per cent, National Science Foundation 4 per cent, and all others combined, including wildlife, 6 per cent.

Expenditures for research and development in industry for 1957 aggregated 7.2 billion dollars. More than half of this was financed by Federal funds and more than half of the total was for aircraft and electrical equipment. Of the total amount 240 million dollars were applied to basic research and physical and mathematical sciences benefitted from over 50 per cent of this amount, the field of engineering over a third and the life sciences including agriculture, biology, and medicine about 10 per cent. Three-fourths of the basic research expenditures in the life sciences were by the chemical and allied products industries.

FINANCIAL RESOURCES FOR WILDLIFE RESEARCH IN OHIO

The combined total of fees for hunting and fishing collected by all states would barely match the 144 million dollar expenditure for research and development in agriculture at the federal level. In Ohio alone, receipts from such fees total less than the monies expended for agricultural research. Combined federal and state allocations for this purpose totaled over 3.5 million dollars, or approximately 1 per cent of the personal income from farms as reported by the Ohio Department of Industrial and Economic Development in 1960. Federal expenditures for research in 1960 were about 10 per cent of the total budget or 2 per cent of total personal income. Company financed research and development averaged 1.6 per cent of net sales or, including Federal support, about 3.3 per cent of net sales.

Hunting and fishing in the nation annually involves business activity aggregating over three billion dollars. In Ohio it has been estimated that wildlife related business activity totals 100 million dollars a year. Outlays for wildlife research in Ohio and other states are far below the average national allocations of funds for research in other areas. An allocation for wildlife research of monies equal to one per cent of the total business enterprise attributable to use of wildlife in Ohio alone would total a million dollars per year. In the light of current allocations for this purpose, and of funds available for such use this figure appears unrealistic. This is especially so in view of the established state practice of limiting expenditures for wildlife purposes to moneys received from fishing and hunting license sales or Federal grants from excise taxes on hunting and fishing equipment.

CURRENT WILDLIFE EXPENDITURES

Applied wildlife research, development, and management are so intermingled as to defy separation for computation. A reasonable guess is that possibly 200 thousand dollars per annum may be expended in Ohio for these purposes out of a 4 million dollar budget available for all state wildlife management activities (including enforcement and management, land acquisition, property development, and education). Allocating funds to meet so many demands is a difficult assignment for the officials charged with the responsibility for wildlife resources. There are so many pressing short-term needs calling for attention that investment of funds for basic research is often difficult to provide for. It is evident, none the less that basic research in this area must be carried out or we will fall so far behind in knowledge of how to manage wildlife that this resource of significant aesthetic, cultural, and economic value will no longer be available for general public enjoyment.

We can, I believe, get along as a nation without wildlife as we now know and enjoy it. We would not in so doing be "harvesting the great opportunities of the next generation of science." Rather, we would be harvesting the sins of our failure to act adequately now. We should not expect the hunting and fishing-license buyer to carry the burden alone, however high his stake in this adventure. The public as a whole benefits aesthetically, culturally, and economically from our wildlife resources and should contribute its share for the research needed.

A SUGGESTED INSTITUTIONAL APPROACH

Illinois solved the problem of conducting wildlife research at a significant level a hundred years ago with the creation of the world famous Illinois Natural History Survey. This research center on the campus of the University of Illinois receives support primarily from general revenues of the State, special project funds in wildlife research from hunting and fishing license fees provided through the Department of Conservation, and grants from Federal and private sources. The section of wildlife research of this organization has a technical staff of 21 persons including 8 with doctoral degrees, 1 doctor of veterinary medicine, 6 with M.S. degrees, 3 with Bachelor of Science degrees, and 3 sub-professionals.

A Biological Survey was organized in Ohio in 1912 to do what the Illinois Natural History Survey has done for many years. It did not then achieve these goals and research in this field has since proliferated into scarcely identifiable segments. We would do well to consider a means by which these goals can be accomplished and in so doing we should not overlook the role that an effective Biological Survey or similar research institution could play in meeting wildlife research needs.

The Ohio agency charged with management of wildlife resources has exercised remarkable leadership in research despite contrary pressures not evident to the uninformed observer. This agency should be encouraged to continue and strengthen the kinds of applied investigations it can best carry on. An equally strong basic research program is an essential foundation to such investigations. This can best be carried out in an institutional atmosphere free from the pressures of day to day problems of public administration and where mature trained minds can devote their entire energies to researching the future. Such research should attract support from the many sources, both public and private which benefit from the continued availability, for use of our wildlife resources.