An Outline of Content for Wildlife Education and a Study of Wildlife Knowledge of High School Seniors of Louisiana.

Stanley Shaw
Louisiana State University and Agricultural & Mechanical College

Follow this and additional works at: https://digitalcommons.lsu.edu/gradschool_disstheses

Recommended Citation
https://digitalcommons.lsu.edu/gradschool_disstheses/681
This dissertation has been microfilmed exactly as received

SHAW, Stanley, 1924—
AN OUTLINE OF CONTENT FOR WILDLIFE EDUCATION AND A STUDY OF WILDLIFE KNOWLEDGE OF HIGH SCHOOL SENIORS OF LOUISIANA.

Louisiana State University, Ph.D., 1961
Education, general

University Microfilms, Inc., Ann Arbor, Michigan
AN OUTLINE OF CONTENT FOR WILDLIFE EDUCATION
AND A STUDY OF WILDLIFE KNOWLEDGE OF HIGH SCHOOL
SENIORS OF LOUISIANA

A Dissertation
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in
The Department of Education

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

by
Stanley Shaw
B. S., M. A., Louisiana State University
June, 1961
ACKNOWLEDGMENTS

The writer wishes to express his sincere appreciation to those who have aided in this study:

To Dr. W. A. Lawrence, Committee Chairman, for his valuable assistance and continual encouragement in this undertaking.

To the members of his committee, Dr. L. M. Harrison, Dr. L. L. Fulmer, Dr. G. H. Deer, and Dr. L. L. Glasgow, for their friendly criticisms, suggestions, and understandings.

To Mr. Howard P. McCollum and other personnel in the State Department of Education for their support and assistance.

To his wife, the author is especially grateful for her unfailing confidence, her cooperation, and untiring efforts in typing this manuscript.
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. THE PROBLEM AND ITS ORGANIZATION</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the problem</td>
<td>4</td>
</tr>
<tr>
<td>Definitions of terms</td>
<td>4</td>
</tr>
<tr>
<td>State approved school</td>
<td>4</td>
</tr>
<tr>
<td>Public high school</td>
<td>4</td>
</tr>
<tr>
<td>Conservation</td>
<td>4</td>
</tr>
<tr>
<td>Conservation education</td>
<td>4</td>
</tr>
<tr>
<td>Wildlife conservation</td>
<td>5</td>
</tr>
<tr>
<td>Wildlife</td>
<td>5</td>
</tr>
<tr>
<td>Importance of the study</td>
<td>5</td>
</tr>
<tr>
<td>Basic assumptions about wildlife education</td>
<td>6</td>
</tr>
<tr>
<td>Delimitations of the problem</td>
<td>6</td>
</tr>
<tr>
<td>Procedure</td>
<td>7</td>
</tr>
<tr>
<td>Organization of the study</td>
<td>8</td>
</tr>
<tr>
<td>II. REVIEW OF RELATED INVESTIGATIONS</td>
<td>9</td>
</tr>
<tr>
<td>Need for conservation and conservation education as indicated by current literature on the problem</td>
<td>14</td>
</tr>
<tr>
<td>The future of conservation education</td>
<td>17</td>
</tr>
<tr>
<td>III. FORMULATION OF THE PRELIMINARY OUTLINE OF CONTENT</td>
<td>21</td>
</tr>
<tr>
<td>Tentative list of topics</td>
<td>23</td>
</tr>
<tr>
<td>IV. THE APPRAISAL</td>
<td>33</td>
</tr>
<tr>
<td>Selection of the evaluating panel</td>
<td>33</td>
</tr>
<tr>
<td>Panel of jurors</td>
<td>34</td>
</tr>
<tr>
<td>CHAPTER</td>
<td>PAGE</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Technique employed in the appraisal of the compiled list of topics</td>
<td>39</td>
</tr>
<tr>
<td>Importance of the topics in the combined list as determined by ratings of panel</td>
<td>40</td>
</tr>
<tr>
<td>Results of the appraisal</td>
<td>41</td>
</tr>
<tr>
<td>The formulation of the outline of content for a wildlife conservation course</td>
<td>45</td>
</tr>
<tr>
<td>Recommended outline of content</td>
<td>46</td>
</tr>
<tr>
<td>Subjective reactions of the appraisal group</td>
<td>53</td>
</tr>
<tr>
<td>V. STATUS OF WILDLIFE CONSERVATION IN LOUISIANA</td>
<td>58</td>
</tr>
<tr>
<td>Preparation of the test</td>
<td>58</td>
</tr>
<tr>
<td>Administration of preliminary test</td>
<td>60</td>
</tr>
<tr>
<td>Administration of the final test</td>
<td>60</td>
</tr>
<tr>
<td>Analysis of wildlife conservation test</td>
<td>63</td>
</tr>
<tr>
<td>Achievement of high school seniors on the test</td>
<td>63</td>
</tr>
<tr>
<td>Activities that contributed to wildlife knowledge of the seniors</td>
<td>63</td>
</tr>
<tr>
<td>Comparison of boys and girls in overall achievement</td>
<td>66</td>
</tr>
<tr>
<td>Comparison of boys and girls on State-wide basis as to activities considered helpful in taking test</td>
<td>68</td>
</tr>
<tr>
<td>Comparison of Region 1 (South Louisiana) to Region 2 (North Louisiana)</td>
<td>68</td>
</tr>
<tr>
<td>Relationship of achievement according to residence</td>
<td>71</td>
</tr>
<tr>
<td>CHAPTER</td>
<td>PAGE</td>
</tr>
<tr>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>Relationship of residence to activities</td>
<td>73</td>
</tr>
<tr>
<td>Analysis of individual parishes</td>
<td>73</td>
</tr>
<tr>
<td>VI. SUMMARY AND RECOMMENDATIONS</td>
<td>78</td>
</tr>
<tr>
<td>Recommendations</td>
<td>80</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>81</td>
</tr>
<tr>
<td>APPENDIX A</td>
<td>84</td>
</tr>
<tr>
<td>APPENDIX B</td>
<td>86</td>
</tr>
<tr>
<td>APPENDIX C</td>
<td>88</td>
</tr>
<tr>
<td>APPENDIX D</td>
<td>105</td>
</tr>
<tr>
<td>APPENDIX E</td>
<td>107</td>
</tr>
<tr>
<td>APPENDIX F</td>
<td>109</td>
</tr>
<tr>
<td>VITA</td>
<td>126</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Rating of Topics by Panel of Experts</td>
<td>43</td>
</tr>
<tr>
<td>II. Scores of Seniors Participating in Wildlife Conservation Knowledge Test</td>
<td>64</td>
</tr>
<tr>
<td>III. Comparison of Achievement by Sexes</td>
<td>67</td>
</tr>
<tr>
<td>IV. Achievement of Boys and Girls in Region 1 (South Louisiana) and Region 2 (North Louisiana)</td>
<td>70</td>
</tr>
<tr>
<td>V. Relationship of Achievement According to Residence</td>
<td>72</td>
</tr>
<tr>
<td>VI. Summary by Parishes in Region 1 (South Louisiana)</td>
<td>76</td>
</tr>
<tr>
<td>VII. Summary by Parishes in Region 2 (North Louisiana)</td>
<td>77</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

FIGURE | PAGE
-------|--------
1 Parishes Participating in Wildlife Conservation Knowledge Test | 62
2 Percentages of Students Who Considered Given Activities Helpful in Taking the Wildlife Conservation Knowledge Test | 65
3 Comparison Between Boys and Girls as to Activities Considered Helpful in Taking Wildlife Conservation Knowledge Test | 69
4 Relationship of Residence to Activities | 74
ABSTRACT

The purposes of this study were to prepare an outline of content in wildlife conservation that could be used as a guide for developing a course of study for elementary and secondary schools, and to determine the status of wildlife conservation knowledge possessed by seniors in the white public high schools of Louisiana.

In the initial phase of this study, the director of the proper division of the state department of education and/or conservation in each of the fifty states was sent a letter relative to wildlife education courses offered within that state. Thirty-eight states reported that some type of conservation materials were given to schools for use; copies of these materials were secured for examination. These materials were analyzed according to topics used in wildlife education, and a tentative list of topics was compiled. The compiled list of topics dealt with the five classes of vertebrates: mammals, birds, amphibians, fishes, and reptiles. Each class of vertebrate was treated according to seven major topics which included: classification, characteristics, distribution, life history, management, value, and miscellaneous items.

The next step was concerned with the selection of the appraisal group, who would evaluate each topic in the combined list as to its importance in a program of instruction. Ninety-four leaders in the field of wildlife and wildlife education were carefully selected. Each member of the appraisal group was sent a copy of the tentative list of topics.

After the tentative outline had been evaluated by panel members, the mean rating for each item was computed. A topic was included in the
recommended course of study if its mean rating was as high as 2.0, the
data value assigned a topic "of some importance." It was on this basis
that a proposed outline of content for wildlife education for elementary
and secondary schools was developed from the appraisal made by the
evaluating panel.

Significant comments from the appraisal group expressed the feeling
that details in wildlife education should not be emphasized and that
greater stress should be placed upon broad concepts of wildlife conservation.

The second phase of the study was to determine the wildlife conserva-
tion knowledge possessed by seniors in the public high schools of Louisiana.
A test, consisting of 100 items based on the outline of content, was prepared.
This test was administered to 3,266 seniors in seventy high schools in
sixteen selected parishes of the State.

An analysis of the test results showed that the typical high school
senior boy in Louisiana made a median score of 57.69; whereas, the typical
high school senior girl made a median score of 49.46. From this information,
the conclusion was drawn that boys have a greater knowledge of wildlife
conservation than girls; but it was also felt that even this amount of
wildlife knowledge was insufficient if based upon a normal inventory of
100 test items.

The activities that were considered most helpful in taking the
Wildlife Conservation Knowledge Test were biology, general science, and
fishing. The activity considered the least helpful was going to summer
camp. Results of the test further indicated that there was not any significant
difference in wildlife knowledge possessed according to residence.
From these findings obtained in this study, the following recommendations were reached:

1. That a further study to determine grade placement of the outline of content be made.

2. That the amount of time allotted to the wildlife conservation program in each of the grades be determined.

3. That the Louisiana State Department of Education give serious consideration to the development of a well-defined program of wildlife education in the public schools.
CHAPTER I

THE PROBLEM AND ITS ORGANIZATION

One of the great incentives that led to the building of America was the exploitation of its bountiful natural resources. Very high in importance was the great variety of wildlife. On the eastern seaboard there was an abundance of white-tailed deer, elk and wild turkey. Smaller game animals such as ruffed grouse, heath hen, bobwhite quail, rabbit, and the gray squirrel provided food in quantities for all hunters who knew the art of capturing them. A similar abundance of fish in the streams and lakes also was available for those who sought to take them by net, spear, and the hook. Many kinds of wild ducks, as well as geese and shore birds, frequented the water areas during the spring and fall migrations. Inhabiting the rivers and streams were beaver, otter, muskrat and mink, whose pelts were considered very valuable abroad. Also present were bears, mountain lions, wolves, wildcats, and lesser predatory animals which raided livestock and invaded the gardens and fields of the pioneers.

Under these conditions, there developed a public attitude that wildlife resources were limitless, that they could be utilized fully without restraint or concern for the future, and that wildlife detrimental to the interest of man was to be eliminated by the most effective means at hand.  


Even in Audubon's time, in 1850, few if any birds or mammals were in danger of extinction. Then came the "terrible sixty years" of slaughter and decimation and disaster. According to Dambach, the heavy heel of civilization crushed deeply into the vast stores of wildlife resources. Many species declined greatly in population, some approaching extinction; others vanished completely.

No single cause can explain the decline of all American wildlife, says Dambach. He remarked that market hunting was probably the chief cause for the decline of gregarious birds like the passenger pigeon, and many species of ducks. Plume hunters and egg collectors nearly caused the extinction of the snowy egret and reduced many other species before their activities were outlawed. Aquatic resources declined because of pollution of streams by industrial waste and sewage from cities, along with silt from eroding fields. Other factors such as the draining of swamplands, clearing of forests, and the development of grasslands for agricultural purposes so altered the environment that animals unable to adjust to the changes could not survive.

At the present time, the cause of conservation in our state is faced with one of the most serious problems of its history, and that is the acquisition of more lands for public hunting and fishing and other outdoor recreation to meet the demands of our growing population.

---

3 Shomon, op. cit., p. 114.
4 Dambach, op. cit., p. 345.
5 Loc. cit.
Fifty-two years ago, President Theodore Roosevelt, in his glowing description of the natural wonders of Louisiana, made a prophecy which has indeed come true:

Beyond the end of cultivation towers the great forest. Wherever the water stands in pools, and by the edges of the lakes and bayous, the giant cypress loom aloft, rivaled in size by some of the red gums and white oaks. In stature, in towering majesty, they are unsurpassed by any trees of our eastern forests. Lordlier kings of the green-leaved world are not to be found until we reach the sequoias and red-wood forests of the Sierras... there is no richer soil on earth... I believe the whole land will be cultivated and densely populated...7

Today the primeval forests are no more; however, Easterly states:

... the prophecized dense human population is with us and our wildlife is being beaten back from its natural habitat by its encroachment. Now is the time for action. Ours is the moment when it is of paramount importance for all of us to put forth our every effort towards preserving our God-given wildlife heritage.8

Probably the most pressing wildlife need of our generation is preservation and proper management of habitat in which our wildlife exists. Encroachment of our expanding industrial economy is rapidly changing the ecology of our streams and forests. Only through a program of cooperation based upon complete understanding can we hope to preserve habitat to support wildlife in the face of the needs of our society. Education of the public is a prerequisite to insure this goal.

[Notes]

8 Easterly, op. cit., p. 1.
I. STATEMENT OF THE PROBLEM

Briefly stated, the purposes of this investigation are: (1) to determine an outline of content in wildlife conservation for elementary and secondary schools, and (2) to determine the present status of wildlife conservation knowledge possessed by high school seniors in selected parishes of Louisiana, based upon the outline of content.

II. DEFINITIONS OF TERMS

State approved school. This term is used in this study to designate any high school that is approved by the State Department of Education of Louisiana.

Public high school. In this investigation this term refers to any high school conducted within the state of Louisiana under the authority and supervision of a parish or city school board and supported and controlled by the state.

Conservation. In the society in which we live, this term refers to balancing the use of natural resources along with the demands of the population in such a way that resource supplies on hand will not become exhausted until there is a substitute made available for use.9

Conservation education. This term is defined as training and instruction that contributes to the public's knowledge of natural resources

and to the wise use and management of these resources.  

Wildlife conservation. In this study, this term will be defined as the wise use and management of non-domesticated animals for the benefit of the people.

Wildlife. In this investigation, this term refers to vertebrate animals native to Louisiana and includes fishes, mammals, birds, reptiles, and amphibians.

III. IMPORTANCE OF THE STUDY

Because of the general topography and location, Louisiana is rich in wildlife resources. There is an abundance of lakes and streams which provide excellent fishing. The sixteen million acres of forest land provide good habitat for deer, turkey, and squirrel. The large hardwood swamps winter at least fifty per cent of the continental woodcock population. There are four million acres of marsh in which millions of waterfowl and other migratory birds winter. The harvest of fur animals from these marshes, at one time, exceeded the combined production of oysters, shrimp, crabs, and marine fish as a major industry.

Present wildlife populations have been reduced in numbers because of the destruction of habitat for agricultural, industrial, and commercial development. At the same time, the rapidly rising human population has

---


11 Dambach, op. cit., p. 341.
resulted in an increased demand for all game species. Both trends are expected to continue in the future; therefore, it is necessary to protect and manage our wildlife resources in the most efficient manner.

IV. BASIC ASSUMPTIONS ABOUT WILDLIFE EDUCATION

The writer was guided by the following assumptions:

A good wildlife education program has certain characteristics which can be identified and evaluated.

There are certain functions that teachers can perform which can be evaluated.

Wildlife education is a recognized and important aspect of education in Louisiana.

Wildlife education is a necessary aspect of a well-organized modern and successful education program.

V. DELIMITATIONS OF THE PROBLEM

The survey for determining the pattern of the wildlife education program and the outline of content was limited to the various state departments of education and state departments of conservation throughout the United States. In determining the status of wildlife knowledge of high school seniors, a measuring device was used in selected parishes of Louisiana. To insure sampling of both rural and urban areas, selection of the parishes was based on their location within the state.
VI. PROCEDURE

The director of the proper division of the state department of education and/or conservation in each of the fifty states was sent a letter relative to wildlife education courses offered and materials used in these courses. From these data it was possible to determine the kind of program offered in the various states—that is, whether or not the program consisted of a planned sequence in wildlife education.

The second phase of the study dealt with the analysis of wildlife education materials currently used in the various states. Of the fifty letters sent to the various state departments, thirty-eight reported on some type of conservation materials being given to schools for use. The materials were analyzed according to topics used in wildlife education, and a compiled list of topics was made.

The next step was concerned with the selection of the appraisal group to evaluate each topic on the compiled list as to its importance. The writer consulted the Federal Government and States, Education Directory, 1958-1959, and the membership list of the Wildlife Society. Final consultation with the Executive Secretary of the Louisiana Wildlife Federation resulted in a list of ninety-four leaders in the field of wildlife and wildlife education.

---

12 Appendix A.

In closing this phase of the study, a proposed outline of content for wildlife education for elementary and secondary schools was developed from the appraisal made by the evaluating panel.

Finally, a test\textsuperscript{14} was constructed based on this outline of content\textsuperscript{15} and administered to high school seniors in sixteen parishes throughout the state, as mentioned in the delimitations, in cooperation with the State Department of Education and sponsors of the senior classes in the various high schools.

VII. ORGANIZATION OF THE STUDY

The first chapter presents a brief summary of wildlife conditions as they existed in this country. Since there is much literature on this subject, it is considered from a broad point of view. The statement of the problem and its delimitations were taken into consideration along with the definitions of terms used and the importance of the study. A short review of related investigations is presented in Chapter II. The formulation of a tentative outline of content for wildlife conservation is presented in Chapter III. The technique used and the appraisal group, along with the final outline of content, are presented in Chapter IV. Chapter V is concerned with the present status of wildlife conservation knowledge possessed by high school seniors of Louisiana. Chapter VI contains a summary and recommendations of the study.

\textsuperscript{14} Appendix F.

\textsuperscript{15} Appendix C.
CHAPTER II

REVIEW OF RELATED INVESTIGATIONS

The literature revealed no study which recommended an outline of content in wildlife education for elementary and secondary schools. A limited number of studies concerning the status of conservation knowledge and several studies dealing with identification and evaluation of soil and water conservation for inclusion in the secondary school curriculum were reported. These studies have been undertaken mostly in the field of general conservation, and wildlife conservation was considered as a part of each investigation.

One of the first controlled studies to be reported involving conservation knowledge was made by Capps in 1939. The purpose of his study was to survey the conservation knowledge possessed by pupils in Missouri high schools. An information test was constructed and administered to pupils in grades 9-12 in selected Missouri high schools. Areas of conservation covered in the test were forest, wildlife, fish and game, and soil. The study revealed that of the conservation information considered desirable by a group of experts for high school seniors in Missouri, there was approximately fifty-four per cent mastery. He concluded:

... it is clear that the present instruction in this subject matter area fails to produce results which measure up to the desirable standards of accomplishment.

---


2 Ibid., p. 82.
In 1942, Curtis reported on the conservation information possessed by pupils in Santa Clara high schools. This comprehensive study showed that conservation knowledge was definitely lacking and that more information should be given in the public schools of California. Curtis states:

If one may assume . . . that 57.05 per cent mastery for the entire group or 58.22 per cent mastery by the end of the senior year of the high school period represents inadequate understanding of the factors and principles of conservation, it is clear that the present instruction in this subject-matter area fails to produce results which measure up to desirable standards of accomplishment.

Selim conducted a similar study in the high schools of California in 1951. He concluded that "the present conservation program in the high schools of the State of California fails to produce results which measure up to desirable standards of achievement."

A similar study was made by Giles in Virginia schools in 1957. A multiple-choice test was constructed on the subjects of general, soil, water, forest, and wildlife conservation. He found that Virginia's public school pupils have inadequate knowledge of the principles of conservation to equip them for satisfactory citizenship. The state-wide average score

---


4 Ibid., p. 57.


6 Ibid., pp. 104-105.

was 54.8 out of a possible score of 100. Giles sums up his study by saying:

The test results are of value in pointing out a need for continued and increased conservation education within the state. The public schools offer a focal point for these educational activities. It is important that schools, assisted by resource agencies, assume this responsibility, integrating conservation training with their other responsibilities, and in so doing, become the center of a vital and dynamic state conservation education program.8

One of the most important studies pertaining to all phases of conservation was released in 1951 by the American Association of School Administrators9 in its 29th Yearbook. It was devoted to conservation education in American schools. Many phases such as trends, concepts, responsibility, training, and job function toward conservation were cited.

Under the direction and supervision of Weaver,10 a handbook for teaching conservation and resource-use was published for Biology teachers. The book or study was designed to help teachers get started on the job of teaching conservation in both elementary and secondary schools.

Michaud and Hitt11 investigated the extent of conservation education in the secondary schools of Indiana. They found that courses listed more

8 Ibid., pp. 23-24.


frequently as contributing to conservation education were: Biology, Agriculture, Social Science, General Science, and Geography.

In 1942, California set up a sub-committee on Conservation Education to investigate teaching of conservation in California schools. After five years of study, the sub-committee found that conservation education should be integrated with appropriate curriculum experience. In this respect the report reads:

In the elementary schools, the high schools and colleges, the teaching of conservation should be carried on actively at all levels, and in various subject-matter fields of the curriculum. It should not be taught as a separate subject except on the college level. It should not even be taught in the form of separate conservation units, except occasionally when some specific and limited aim may best be furthered by such treatment. The thought behind this conviction is that there is need for repeated and frequent emphasis on conservation so that a continuous state of conservation consciousness may be developed in the mind of every child. The desired attitude and spirit of conservation can be developed best through frequent and pervading emphasis in many fields rather than by intensive campaigns, however valuable the latter may be now and then.\(^\text{12}\)

A nation-wide study was conducted by Charles W. Quaintance\(^\text{13}\) to evaluate conservation education in schools and colleges. He concluded that cooperation of several agencies within a given area such as the state brings better results in teaching of conservation than the efforts of a single agency.

Treating the methods used in teaching conservation, Quaintance continues:

\(^{12}\) Guidebook for Conservation Education (Sacramento: California State Department of Natural Resources, 1950), pp. 10-11.

Conservation may be integrated with almost any subject in the curriculum, but it appears to fit in well with social science and natural science. It has been a kind of no-man's land between these two, one neglected by both.  

Davies reviewed more than a thousand elementary and secondary school textbooks in a study of the amount of wildlife conservation information presented in public school textbooks and magazines. The average number of pages devoted to causes of wildlife depletion ranged from zero in agriculture books to 5.63 in biology books. The amount of such information in the social and general science textbooks fell between these extremes. The average space for all books was slightly more than one-fourth of a page.

Davies also examined twenty-seven periodicals and magazines usually found in public school libraries. He studied their coverage over a five year period for causes of wildlife depletion, and for restoration and conservation of wildlife. He found an average of less than one-third of a page per year for such periodicals, or about one page in 1500, on causes of wildlife depletion and less than one page per year, or about one page in 700, on restoration and conservation of wildlife. He concluded that:

It is clearly evident from the data presented that very little information on causes of depletion, restoration, and conservation of wildlife is entering the public schools in textbooks and periodicals.

---

14 Ibid., p. 464.


16 Ibid., p. 24.
NEED FOR CONSERVATION AND CONSERVATION EDUCATION AS INDICATED BY CURRENT LITERATURE ON THE PROBLEM

If one accepts the modern school as an effective institution for the attainment of improved living, then a consideration of the conservation of natural resources as one phase of the school program is no longer debatable. The importance of the problems connected with the wise use of natural resources and their broad implications for the welfare of our people leave the school no alternative.

According to Allen, many of our mistakes in managing natural resources can be blamed on ignorance both of the facts and of their significance. There is no substitute for public school education even if it goes no deeper into wild animal conservation than elementary courses in nature study or courses in high school biology. Allen stated:

Where the public school systems recognized the value of translating such courses into the language and principles of wild animal conservation, there is a tremendous start on educating the public. Such effort is increasingly wide-spread as public school teachers in science, vocational training, and the social studies become equipped and interested themselves. Of all natural resources, too, animals have perhaps the strongest appeal to children.

The development of a sound national program of wildlife education is dependent on three basic steps, according to Dambach:

18 Ibid., p. 240.
1. An adequate research program to establish the status of important wildlife species, their needs, and measures necessary for their continued welfare under predicted use.

2. An educational program to acquaint the citizenry with the basic needs of wildlife and with the biological, social and economic problems involved in its use and to train adequate personnel to administer and manage this resource.

3. An action program to provide the food, water, cover, and protection from decimation needed by wildlife.19

In the field of wildlife management, considerable progress has already been made, he insists. Further progress is dependent upon continual research and sound educational programs unhampered by political interferences and the clamor of uninform ed or selfish groups.20

As a guide for educational leaders, the American Association of School Administrators sets forth the following objectives and characteristics of an effective resource-use program:

1. Education for the wise use of natural resources should be included in both rural and urban programs.

2. Conservation education should be included in both elementary and secondary schools.

3. Conservation education programs should start with a consideration of community environment and needs, then evolve into a consideration of state, regional, national aspects.

4. Appropriate conservation knowledge and experience should be correlated with or integrated into the prevailing curriculum.

5. The best existing textbooks, pamphlets, films, recordings, and other instructional aids should be utilized, but an attempt should be made to develop materials that are adapted to the community's own environment and resources.


20 Loc. cit.
6. Conservation education lends itself well to direct outdoor experience; and wherever practicable, such experience should accompany the vicarious classroom experience.

7. Schools should cooperate with community, state, regional agencies, governmental and non-governmental, which are concerned with resource use.

8. Conservation education should be of special concern to teachers colleges and universities involved in teacher education.

9. Effective administrative leadership is needed in all communities, states, and regions, including the in-service education of school personnel in the wise use of natural resources.

10. Conservation education should be the concern of all types of adult education agencies, such as State Departments of Education, Departments of Conservation, Adult Schools, colleges, universities, newspapers, magazines, radio and television.

11. Conservation education programs should be concerned with all natural resources and their relationships.

12. Conservation education should be based upon broad scientific and social concepts.21

Educators today realize the urgent need for conservation understandings and practices if America and other nations are to enjoy long-term security and prosperity. In 1949, the National Education Association indicated the need for conservation education when the Representative Assembly adopted the following resolution:

The National Education Association believes that the depletion of human and natural resources, is today a national problem of great gravity. Because it is a problem of the American people, it is also a problem of American education. The Association urges the development of research to determine control, classroom techniques, and teacher education essential to the construction of a program of conservation education in all levels of our schools.22


The American Association of School Administrators corroborates this view in a statement in its Yearbook:

To bring about the prudent use of natural resources in a democracy, large dependence must fall on education. This is not something to be accomplished by fiat or decree. Instead, children now in school and grownups in the world of business and industry must learn the true importance of natural resources and acquire both the incentive and the "know how" to use them wisely. Schools here and there, have given some attention to the problem, but much more needs to be done. Unless conservation education becomes much more general and effective than it has been in the past, needless shortages soon will undermine the prosperity and welfare of our people.23

THE FUTURE OF CONSERVATION EDUCATION

Funderburk24 and others have cited the need for conservation. The eagerness and conviction of these men have played a major part in the present day acceptance of the conservation program. Their beliefs were well founded, for the mis-use of natural resources is well documented. According to Darling,25 only by comparing the remaining resources of this continent now with the stock of nature's goods found here two hundred years ago can the extent of our wasteful squandering be realized. History reveals the resources and the stages through which they have come to their present status. It is the knowledge and significance of this status that points up the need for conservation education.26

23 Conservation Education in American Schools, op. cit., p. 7.


26 Giles, op. cit., p. 18.
Kaikow\textsuperscript{27} indicates clearly that the function of conservation is a means to an end; a better world in which to live. United States policies of isolationism no longer stand; to a large measure, world needs are being supplied by the resources of the United States.

It is not for personal benefit alone that our resources must be wisely used. Due to the interdependence of nations, conservation has become a necessity, for a healthy community of nations. Straus\textsuperscript{28} stressed the need for conservation when he stated:

\begin{quote}
... We still have the natural resources on which to survive with a rising standard of living--if we are willing to use them wisely. At long last we know enough if we are ready to recognize, regardless of nationalism, prejudice, or selfishness, that the destinies of the United States and all the world are forever bound together in one single great resource pot of land, mine, water, and forest on which we all, as multiplying humanity, absolutely depend.
\end{quote}

Pinchot states:

The word "conservation" in its present meaning was unknown until the early part of 1907. It occurred to me one day forestry, irrigation, soil protection, flood control, water power, and a lot of other matters which had up to that time been kept in separate water-tight compartments were all part of one problem. That problem was and is the use of the whole earth and all its resources for the enduring good of men.\textsuperscript{29}

Conservation of natural resources for preservation of human resources should be practiced. Realization of the importance of natural resources to our physical and spiritual well being is becoming more generally


accepted. The need for the preservation and perpetuation of these resources and their benefits is the need for conservation.  

It is evident that a national consciousness of the importance of conserving natural resources is being developed. Yet, taking stock in 1942, in a world of war, "America finds her conservation program inadequate in many respects. Individual knowledge about available resources and individual conservation habits are lacking."  

Conservation laws have been passed in an attempt to make people change their ways, but such legislation is never enough. We must turn to our schools--to education. The important part that education must play in our rapidly developing conservation program is evident by the number of writers who recognize this fact. Only when the people see and feel the need for wise resource-use will the practices of wise-use be adopted.  

There are two attacks to this problem of conservation: (1) legislation and government control imposed from above, and (2) education and voluntary cooperation developed from within. Both approaches have merit, but attacking the problem by law is usually unsuccessful, for "laws requiring certain actions do not guarantee the performance of the actions, or even if

30 Giles, op. cit., p. 20.


the enforcement is severe, they cannot assure the proper spirit in their obedience."34

Darling agrees with this point of view and states:

I am convinced that until a new generation is taught in the public schools man's utter dependence on natural resources. . .until in fact we have a majority of the American public schools in the fundamental principles of conservation, criminal wastes will continue to reduce our heritage of natural resources. . .Education has become the only pathway. . .35

---


35 Darling, op. cit., p. 29.
CHAPTER III

FORMULATION OF THE PRELIMINARY OUTLINE OF CONTENT

The major purpose of this study was to prepare an outline of content in wildlife conservation that could be used as a guide in developing a course of study for elementary and secondary schools.

In determining what materials should be included in a wildlife conservation course of study, it is first necessary to find out what is being done in the schools of the various states. Letters were sent to the fifty state departments of education requesting information pertaining to education in wildlife conservation. Thirty-eight states reported some type of such materials being used. The type of materials sent by the various states was a composite of booklets, syllabi, pamphlets, outlines, and regulations of wildlife pertaining to that particular state. Care was exercised to use only the materials with a recent copyright or revision. These materials included topics dealing with all phases of natural resource conservation; and, therefore, it was necessary to select only those areas dealing with wildlife education. After a careful analysis of all materials, a tentative outline of content was compiled for wildlife education at the elementary and secondary levels.

In the initial step of compiling the list, the topics were classified in accordance with conservation designations or subjects. Major topics relating to a particular body of subject matter were selected. To facilitate grouping, it was sometimes necessary to change the wording of the topics; and some of the topics were incorporated with other topics or
or further broken down into topics that would be similarly exclusive, and at the same time, definitive of material included.

Certain topics were repeated many times throughout these materials. Seven major topics were finally selected to be included in the tentative outline of content. The topics which appeared most frequently were: Classification; Distribution; Identification; Life History; Ecology; Management; and Miscellaneous items.

In the selection of a topic, a subjective element had to be used. Reliance had to be placed on judgment as to what particular terminology was most appropriate for a specific body of material. For example, the topic "Classification and Types" is inclusive of both the original titles "Taxonomy" and "System of Classification." An attempt was made to designate each topic as concisely as possible without sacrificing clarity. Care was taken to avoid overlapping, repetition, or omission of topics.

After all the materials were examined, seven major topics with forty-nine sub-topics were included in the tentative outline of content. The major groupings included: Mammals and Birds; Fish; Amphibians; and Reptiles. The tentative list represented seven wildlife conservation subjects dealing with any vertebrate plan of development. These seven major topics were: Classification; Characteristics; Life History; Distribution; Management; Value; and Miscellaneous. The tentative list of topics is presented on pages 23-32. This tentative outline was then presented to seventy-five experts in wildlife education for their evaluation.
TENTATIVE LIST OF TOPICS

Mammals and Birds

I. CLASSIFICATION AND TYPES

A. Order
B. Family
C. Genus
D. Species
E. Common name
F. Scientific name
G. Types
   (Forest; fur; wilderness; farm; song;
    upland; migratory; predatory)

Comments:

II. CHARACTERISTICS AND IDENTIFICATION

A. Characteristics common to mammals and birds
   (Feathers; fur; wings; beaks; warm blooded;
    vertebrate; diaphragm; other)
B. Identification of external features
   (Size; shape; sex coloration; track print;
    sex determination; other)
C. Identification of internal features
   (Respective body systems)

Comments:

III. RANGE AND DISTRIBUTION

A. Past distribution
   1. World-wide
   2. United States
   3. State-wide
   4. Local

B. Present distribution
   1. World-wide
   2. United States
   3. State-wide
   4. Local

Comments:
TENTATIVE LIST OF TOPICS (continued)

IV. LIFE HISTORY

A. Type of habitat preferred
   (Water; land; both; brush; wooded; other)
B. Breeding or mating habits
   (Time of year; calls; courtship patterns; number of litters or broods per year; defense of territory; frequency)
C. Nesting and/or den habits
   (Site of nest or den; type used; structure; male-female participation; re-nesting attempts)
D. Rearing of young
   (Incubation or gestation time; size; shape; number; color; weaning age; age of eye opening; name of young; protection of; precociousness of young; age of leaving)
E. Food requirements
   (List of basic foods for young and adults; amount of food needed; seasonal use; manner of collecting; storage; grit; water; vitamins; minerals)
F. Feeding habits
   (Manner by which birds and mammals feed)
G. Range requirement
   (Feeding; roosting; nesting; escape cover; size; special use; dusting; type seasonal range)
H. Movement and activity periods
   (Daily; nocturnal; seasonal; annual migration; hibernation; estivation; moulting; shedding; flyway used)
I. Mortality

1. Weather
   (Rain; snow; sleet; hail; storms; droughts; temperature)
2. Predators
   (Major; lesser; on young; nest; eggs; adults)
3. Man
   (Legal; illegal hunting; accidents)
4. Parasites, Disease
   (Method of transmission; effects)

Comments:
TENTATIVE LIST OF TOPICS (continued)

V. MANAGEMENT

A. Objectives
   (Number of animals per unit of area)

B. Establishing population trends
   (Purpose; census technique; causes of decline; extinction; beneficial-adverse factors)

C. Hunting regulations
   (Seasons; time of year; dates; length; split; zones; bag limit; season limit; restriction of male-female shooting; public shooting areas)

D. Food improvement
   (Agricultural practices; special food producing practices; plots; feeders; winter feeding)

E. Cover improvement
   (Planting escape cover; making artificial cover; nest boxes)

F. Special cultural practices
   (Use of fire; discing; timber harvest; mechanical brush cutters)

G. Restocking
   (Advantages-disadvantages; trapping methods; selection of area to be stocked; methods of establishing on new area)

H. Predator control
   (Need; use of state employees; bounty systems)

Comments:

VI. VALUE

A. Economic value
   (Recreational; monetary; sporting; aesthetic; food; damage)

B. Public attitude
   (Illegal hunting; special privileges; early hunting seasons)

Comments:

VII. MISCELLANEOUS

A. Incidents
   (Stories; legends; superstitions; mysteries; unusual happenings; other)

Comments:
TENTATIVE LIST OF TOPICS (continued)

Amphibians

I. CLASSIFICATION AND TYPE
   A. Order
   B. Family
   C. Genus
   D. Species
   E. Common name
   F. Scientific name
   G. Type
      (Tree frog; toad; pond frog; newt; salamander)

Comments:

II. CHARACTERISTICS AND IDENTIFICATION
   A. Characteristics common to amphibians
   B. Identification of external features
      (Size; shape; color; body)
   C. Identification of internal features
      (Respective body systems)

Comments:

III. RANGE AND DISTRIBUTION
   A. Past distribution
      1. World-wide
      2. United States
      3. State-wide
      4. Local
   B. Present distribution
      1. World-wide
      2. United States
      3. State-wide
      4. Local

Comments:
TENTATIVE LIST OF TOPICS (continued)

IV. LIFE HISTORY

A. Type habitat preferred
   (Water; land; both; other)
B. Breeding habits
   (Mating voice; time of year; temperature needed; parabon formation; amplexis)
C. Egg laying cycle
   (Metamorphosis; type eggs laid; incubation; care by adults; placement of eggs)
D. Food requirement
   (Basic foods for young and adults; duration between meals; manner of collecting; amount)
E. Movement and activity periods
   (Daily; nocturnal; seasonal; periods of migration; hibernation; estivation)
F. Mortality
   (Man; weather; natural causes; predators; other)

Comments:

V. MANAGEMENT

A. Hunting regulations
   (Seasons on frogs; limits; other)

Comments:

VI. VALUE

A. Economic value
   (Recreational; sporting; food; monetary; aesthetic)
B. Public attitude
   (Illegal hunting; other)

Comments:

VII. MISCELLANEOUS

A. Incidents
   (Stories; legends; superstitions; mysteries; unusual happenings)

Comments:
TENTATIVE LIST OF TOPICS (continued)

Fish

I. CLASSIFICATION AND TYPES
   A. Order
   B. Family
   C. Genus
   D. Species
   E. Common name
   F. Scientific name
   G. Type
      (Game; forage; rough; predatory)

Comments:

II. CHARACTERISTICS AND IDENTIFICATION
   A. Characteristics common to most fish
      (Cold blooded; scales; gills; other)
   B. Identification of external features
      (Size; shape of head and body; color; scales; eyes; teeth; fins)
   C. Identification of internal features
      (Respective body systems)

Comments:

III. RANGE AND DISTRIBUTION
   A. Past distribution
      1. World-wide
      2. United States
      3. State-wide
      4. Local
   B. Present distribution
      1. World-wide
      2. United States
      3. State-wide
      4. Local

Comments:
TENTATIVE LIST OF TOPICS (continued)

IV. LIFE HISTORY

A. Type habitat preferred
(Swift, slow moving water; warm, cold water;
marine, fresh water; clear, muddy, turbid water)

B. Reproduction
(Time of year; behavior of males and females;
water temperature; location of nest; how eggs
laid or placed; how fertilization takes place;
type bottom; catadromous, anadromous)

C. Spawn
(Name of young; care of young; losses of young)

D. Food requirements
(List of basic foods for young and adult)

E. Movement or activity
(Migration of spawn; daily; nocturnal; reasons
for migration; seasonal)

F. Life span and size reached

G. Mortality
(Man; weather; natural causes; predators; other)

Comments:

V. MANAGEMENT

A. Objectives
(Founds of fish per acre)

B. Establishing trends in populations
(Purpose; method of census technique)

C. Fishing regulation
(Daily limit; possession limit; method of taking;
public fishing areas; open and closed seasons)

D. Habitat improvement
(Impoundment of waters; fertilization of waters;
weed control practices; pollution control)

E. Restocking
(Advantages-disadvantages; selection of stocking
area; methods of establishing in new area)

F. Predator control
(Need; methods employed)

Comments:
TENTATIVE LIST OF TOPICS (continued)

VI. VALUE

A. Economic value
   (Recreational; commercial; sporting; aesthetic; food; other)

B. Public attitude
   (Illegal fishing; special privileges; early fishing seasons; limits)

Comments:

VII. MISCELLANEOUS

A. Incidents
   (Stories; legends; superstitions; mysteries; unusual happenings; other)

Comments:

REPTILES

I. CLASSIFICATION AND TYPES

A. Order
B. Family
C. Genus
D. Species
E. Common name
F. Scientific name
G. Type
   (Snake-poisonous, non-poisonous; Turtle-commercial, non-commercial; Lizard-poisonous, non-poisonous; Alligator)

Comments:
II. CHARACTERISTICS AND IDENTIFICATION

A. Characteristics common to reptiles
   (Scales and horny plates; cold blooded; other)
B. Characteristics distinguishing one from another
C. Identification of external features for poisonous and non-poisonous species
D. Identification of internal features
   (Respective body systems)

Comments:

III. RANGE AND DISTRIBUTION

A. Past distribution
   1. World-wide
   2. United States
   3. State-wide
   4. Local

B. Present distribution
   1. World-wide
   2. United States
   3. State-wide
   4. Local

Comments:

IV. LIFE HISTORY

A. Type habitat preferred
   (Land; water; both; trees; other)
B. Breeding habits
   (Time of year; temperature required; number of times per year; behavior patterns of adults)
C. Nesting or den habits
   (Location; type structure; defense of territory)
D. Egg laying cycle
   (Size of eggs; number of eggs; color of eggs; way young are born; average number in clutch)
E. Food requirement
   (List of basic foods for young and adult; length
or duration between meals; manner of collecting
food)
F. Feeding habits
   (Crushing; killing first; use of venom; swallowing
alive; other)
G. Movement or activity periods
   (Daily; nocturnal; seasonal habits; hibernation;
estivation; moulting; shedding)
H. Size reached and life span
I. Mortality
   (Man; weather; natural causes; predators; other)

Comments:

V. MANAGEMENT

A. Objectives
   (Maximum size; maximum number; minimum number;
reduction of population)
B. Hunting regulations
   (Seasons; limits; method of control)
C. Establishing population trends
   (Purpose; method of census technique; bounty systems)

Comments:

VI. VALUE

A. Economic value
   (Recreational; monetary; sporting; food;
aesthetic; other)
B. Public attitude

Comments:

VII. MISCELLANEOUS

A. Incidents
   (Stories; legends; superstitions; mysteries;
unusual happenings)

Comments:
CHAPTER IV

THE APPRAISAL

In the preceding chapter, a tentative list of the topics for a course of study in wildlife education for elementary and secondary schools was presented. The purpose of this chapter is to explain the method employed in the appraisal of the outline by the group of experts, and to present the final outline based upon the ratings by the appraisal group.

The personnel of the appraisal group is described in order to establish the competency of the judges to evaluate materials for inclusion in wildlife education for elementary and secondary schools. It was considered pertinent to this study to show how these leaders felt about the topical content of wildlife education in a manner which could not be revealed by a pure objective appraisal. Many valuable comments were received and presented to indicate the perspective from which the compiled list of topics was appraised.

I. SELECTION OF THE EVALUATING PANEL

During the fall semester of 1959, a list was obtained of prominent leaders in the field of wildlife conservation and wildlife education who were qualified to evaluate elementary and secondary conservation needs in wildlife education. The School of Forestry faculty at Louisiana State University was consulted and it was suggested that the best approach in selecting the list was to consult the Journal of Wildlife Management, and the Federal Government and States, Education Directory, 1958-1959, and to
identify the leaders involved. Persons who were considered consultants in conservation activities of the various state departments of education were also contacted. Those who agreed to serve on the evaluating panel and their areas of service are listed on the following pages.

Seventy-five members agreed to evaluate the questionnaire. Only sixty members returned usable questionnaires. Of this number, forty-two per cent are in the field of university teaching; eighteen per cent are consultants in conservation education; thirty per cent are research specialists in the field; and ten per cent are associated with state game and fish commissions.

<table>
<thead>
<tr>
<th>Member of Panel</th>
<th>Field of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. R. W. Larimore</td>
<td>State Natural History Survey, Urbana, Illinois</td>
</tr>
<tr>
<td>Dr. Ward M. Sharp</td>
<td>Head &amp; Professor of Game Management, Penn. State University, University Park</td>
</tr>
<tr>
<td>Dr. Frank W. Fitch, Jr.</td>
<td>4-H Club Leader, Eatonton, Georgia</td>
</tr>
<tr>
<td>Dr. Wendell G. Swank</td>
<td>Chief, Game Division, Arizona Game &amp; Fish Commission, Phoenix</td>
</tr>
<tr>
<td>Dr. Burd S. McGinnes</td>
<td>Head &amp; Professor of Game Management, Cooperative Wildlife Research Unit, Blacksburg, Virginia</td>
</tr>
<tr>
<td>Mr. Max Carpenter</td>
<td>Wildlife Education Specialist, Dayton, Virginia</td>
</tr>
<tr>
<td>Dr. Leslie L. Glasgow</td>
<td>Associate Professor of Game Management, Louisiana State University, Baton Rouge</td>
</tr>
</tbody>
</table>
PANEL OF JURORS (continued)

Mr. John H. Phares

Assistant Pittman-Robertson Coordinator, Miss. Fish & Game Commission, Jackson

Dr. Bryant Bateman

Professor of Game Management, Louisiana State University, Baton Rouge

Mr. Jack A. Ellis

Illinois Natural History Survey, Urbana

Dr. Frederick Greeley

Research, Illinois Natural History Survey, Urbana

Dr. Ronald Libisky

Research, Illinois Natural History Survey, Urbana

Dr. Rexford Lord

Research, Illinois Natural History Survey, Urbana

Dr. Carl O. Mohr

Research, Illinois Natural History Survey, Urbana

Mr. Glen C. Sanderson

Research, Illinois Natural History Survey, Urbana

Mr. Walter Rosene, Jr.


Dr. F. S. Barkalow, Jr.

Head, Zoology Department, North Carolina State College, Raleigh

Mr. Hurley Campbell


Mr. Seth Gordon

Consultant in Wildlife Management, Sacramento, California

Dr. Milton B. Trautman

Professor of Fisheries, Ohio State Museum, Columbus

Dr. Helmut K. Buechner

Professor, Department of Zoology, Washington State College, Pullman

Dr. Kenneth D. Carlander

Professor of Fisheries, Iowa State University, Ames
Mr. Harold E. Warvel
Pittman-Robertson Coordinator,
Game Division, Nashville,
Tennessee

Mr. Stuart T. Critcher
Pittman-Robertson Coordinator,
North Carolina Dept. of
Natural Resources, Raleigh

Mr. Malcolm W. Coulter
Assistant Leader, Cooperative
Wildlife Research Unit,
University of Maine, Orono

Dr. Stephen L. Beckwith
Professor of Game Management,
School of Forestry, University
of Florida, Gainesville

Dr. Charles S. Kendeigh
Professor of Ecology, University
of Illinois, Champaign

Dr. W. H. Burt
Professor of Zoology, University
of Michigan, Ann Arbor

Dr. H. H. Michaud
Professor of Conservation,
Purdue University, Lafayette,
Indiana

Dr. Joseph J. Shomon
Chief, Educational Division,
Richmond, Virginia

Mr. Leonard E. Foote
Field Representative, Wildlife
Management Institute,
Atlanta, Georgia

Dr. Henry S. Mosby
Professor of Wildlife Management,
Virginia Polytechnic Institute,
Blacksburg

Dr. Willard D. Klimstra
Leader, Wildlife Research Unit,
Southern Illinois University,
Carbondale

Mr. Dan M. Russell
Wildlife Biologist, Kentucky
Department of Natural Resources,
Bowling Green
Mr. Douglas E. Wade  
Wildlife Management, Soil Conservation Service, Des Moines, Iowa

Dr. R. E. Trippensee  
Professor of Game Management, University of Massachusetts, Amherst

Dr. Starker A. Leopold  
Professor of Game Management, University of California, Berkeley

Dr. F. Olin Capps  
Missouri Conservation Commission, Jefferson City

Dr. Irven O. Buss  
Washington State College, Pullman

Mr. Donald D. Strode  
Game Biologist, Southeast Forest Experiment Station, U. S. Forest Service, Asheville, North Carolina

Dr. Thomas G. Scott  
Head, Game Section, Illinois Natural History Survey, Urbana

Dr. George W. Bennett  
Fish Research, Illinois Natural History Survey, Urbana

Dr. Paul R. Needham  
Professor, Fish Research, University of California Berkeley

Dr. Robert A. McCabe  
Professor of Game Management, Department of Wildlife Management, Madison, Wisconsin

Mr. Harold E. Wallace  
Game Biologist, Florida Fish and Game Commission, Vero Beach

Dr. William G. Sheldon  
Leader, Cooperative Wildlife Research Unit, University of Massachusetts, Amherst

Dr. O. C. Wallmo  
Professor, Game Management, Texas A. & M. College, College Station
PANEL OF JURORS (continued)

Mr. Stephen A. Liscinsky

Mr. Jay S. Gashwiler

Dr. W. J. Jahoda

Dr. Lee E. Yeager

Dr. Werner O. Nagel

Mr. Harold S. Peters

Dr. Maurice F. Baker

Dr. Arthur A. Allen

Dr. George A. Petrides

Dr. George H. Kelker

Dr. Clarence Cottam

Mr. John F. Dequine

Dr. Frederick C. Dean

Game Biologist, Pennsylvania Game Commission, State College

Research Biologist, U. S. Fish and Wildlife Survey, Oregon State College, Corvallis

Willimantic State College, Willimantic, Connecticut

Leader, Cooperative Wildlife Research Unit, Colorado A. & M. College, Ft. Collins

Missouri Conservation Commission, Jefferson City

Field Consultant, Natural Audubon Society, Atlanta, Georgia

Leader, Cooperative Wildlife Research Unit, Auburn Polytechnic Institute, Auburn, Alabama

Orinthologist, Cornell University, Ithaca, New York

Professor of Game Management, Michigan State University, East Lansing

Professor of Game Management, Utah State University, Logan

Director, Walder Wildlife Foundation, Sinton, Texas

Fisheries Consultant, Leesburg, Florida

Professor of Game Management, University of Alaska, College, Alaska
II. TECHNIQUES EMPLOYED IN THE APPRAISAL OF THE COMPILLED LIST OF TOPICS

The compiled list of topics was organized in the form of a questionnaires to assure an objective evaluation. Each part of the outline dealt with one of the five phases of the vertebrate plan and included: Mammals and Birds; Fish; Amphibians; and Reptiles. Seven major topics had to be supplemented in certain cases by definite sub-topics. This organization required a re-examination of the materials in order for the sub-topics to clarify the scope of each topic. The five phases of the vertebrate plan\(^1\) are presented in their complete form for the benefit of those who might wish to examine them closely.

Before a proper appraisal could be made of the worth of the topical content of a wildlife conservation course, a stipulation had to be made as to the nature of the course of study and when this material should be taught. In view of that fact, the jurors were requested to make evaluations based on the following: (1) that the wildlife conservation outline of content might include those materials taught in school somewhere before the student has reached his twelfth year of schooling; (2) that the wildlife conservation outline of content would not indicate any grade placement; (3) that the wildlife conservation outline of content could be used by any teacher at any level in the selection of any vertebrate plan of study; and (4) that the wildlife conservation outline of content might prove useful in selecting teaching material.

\(^1\) Appendix C.
III. IMPORTANCE OF THE TOPICS IN THE COMBINED LIST AS DETERMINED BY RATINGS OF PANEL

Each member of the evaluating panel was sent a copy of the combined list of topics with instructions for evaluating the topics. In order to determine the relative importance of the topics, each juror was asked to rate them as to their importance according to the following rating scale:

4 - Topic is essential
3 - Topic is highly important
2 - Topic is of some importance
1 - Topic is of doubtful importance
0 - Topic should be omitted

The evaluation of each topic was to be made by placing an "X" in the block which, in the panelist's opinion, was adequately represented by the categorical value of the topic.

These questionnaires were sent to seventy-five members of the appraisal group. From this group, sixty members returned completed evaluations, which were compiled for analysis. The results of this analysis appear in the next section of this chapter.

Considerable interest was shown in the project by the appraisal group. Some of the jurors requested an additional copy to keep in their files; most of them indicated that they were eager to receive a report on the results; some of the group wrote personal letters of encouragement and constructive criticisms; and as a whole, the enthusiasm displayed was sufficient to indicate a conscientious and thorough evaluation of the material submitted to them.

2 Appendix B.
IV. RESULTS OF THE APPRAISAL

In analyzing results of the panelists' judgments, evaluation of each of the topics was considered separately and given a mean rating. This mean rating was computed by adding all the numerical values representing the different categories and dividing by the number of questionnaires in which this topic was evaluated. The mean rating was determined by the formula:

\[ M = \frac{\sum fx}{N} \]

- \( M \) is the mean rating
- \( f \) is the frequency of each rating
- \( x \) is the value of each rating
- \( \sum \) is the sum
- \( N \) is the total number of responses

This mean rating is interpreted to represent the average categorical value of each topic insofar as the opinions of the appraisal group can be accepted as a reliable method for determining the content for such a course. This information is shown in Table I. The topics are listed in the same order in which they appeared in the compiled list of topics and in the appraisal questionnaire. The rating scale used by members of the appraisal group was presented in the previous section of this chapter.

Table I presents the mean rating of each item in the tentative outline. The table is presented in this manner so that the reader might make comparisons of the sub-topics in each area rated. Table I indicates clearly that there were some topics which were rated very highly, and further, indicates that each vertebrate plan of development is consistent.

It is evident from an inspection of the rated outline of content, in Table I, that all of the seven major topics were selected and only a few
of the sub-topics were omitted, or rated below 2.00 (of some importance). It was felt that any topic with a rating below 2.00 (of some importance) should not be included in the final outline of content. Under the major topic Classification and Types, the sub-topics of Order, Family, Genus, Species, and Scientific name were rated below 2.00. Generally speaking, this would imply that these sub-topics would be too technical for elementary and secondary school instruction or would be of little value in conservation education.

In the next major topic, Characteristics and Identification, the panel of experts rated the sub-topic Identification of internal features low. One can readily see that at the elementary level, dissection of animals would not be permitted and at the high school level, it is time consuming and detailed.

The third major topic, Range and Distribution, indicates that Past distribution for most vertebrates was not considered by the panelists as important on a World-wide basis; but at the United States level, Past distribution of mammals and birds was considered highly important by the panelists. Perhaps here, the panel felt that due to man's careless management practices in the past, students should become more mindful that many mammals and birds did exist but are now extinct or rare.

Further examination of Table I shows that all sub-topics under Life History should be included in the final outline of content. The life history of an animal is usually considered by most students to be very important. The panel felt that many interesting features of an animal's life might bring added interest for the student and possibly to incite further study.
### TABLE I

**RATING OF TOPICS BY PANEL OF EXPERTS**

<table>
<thead>
<tr>
<th>Classification and types</th>
<th>Mean Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mammals/Birds</td>
</tr>
<tr>
<td>Order</td>
<td>1.80</td>
</tr>
<tr>
<td>Family</td>
<td>1.62</td>
</tr>
<tr>
<td>Genus</td>
<td>1.32</td>
</tr>
<tr>
<td>Species</td>
<td>1.40</td>
</tr>
<tr>
<td>Common name</td>
<td>3.40</td>
</tr>
<tr>
<td>Scientific name</td>
<td>1.60</td>
</tr>
<tr>
<td>Type</td>
<td>3.60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Characteristics and identification</th>
<th>Mean Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristics common to all/most</td>
<td>3.50</td>
</tr>
<tr>
<td>Identification of external features</td>
<td>3.13</td>
</tr>
<tr>
<td>Identification of internal features</td>
<td>0.16</td>
</tr>
<tr>
<td>Identification of external features for poisonous/non-poisonous species</td>
<td>NR</td>
</tr>
<tr>
<td>Characteristics distinguishing one from another</td>
<td>NR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range and distribution</th>
<th>Mean Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past distribution</td>
<td></td>
</tr>
<tr>
<td>World-wide</td>
<td>1.55</td>
</tr>
<tr>
<td>United States</td>
<td>2.00</td>
</tr>
<tr>
<td>State-wide</td>
<td>2.43</td>
</tr>
<tr>
<td>Local</td>
<td>2.78</td>
</tr>
<tr>
<td>Present distribution</td>
<td></td>
</tr>
<tr>
<td>World-wide</td>
<td>2.33</td>
</tr>
<tr>
<td>United States</td>
<td>2.66</td>
</tr>
<tr>
<td>State-wide</td>
<td>3.07</td>
</tr>
<tr>
<td>Local</td>
<td>3.48</td>
</tr>
</tbody>
</table>

NR = Not Rated by Panel
TABLE I (continued)

RATING OF TOPICS BY PANEL OF EXPERTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Mean Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mammals/Birds</td>
</tr>
<tr>
<td>Life history</td>
<td></td>
</tr>
<tr>
<td>Type habitat preferred</td>
<td>3.71</td>
</tr>
<tr>
<td>Breeding or mating habits</td>
<td>2.95</td>
</tr>
<tr>
<td>Nesting or den habits</td>
<td>2.95</td>
</tr>
<tr>
<td>Rearing of young, reproduction, egg laying cycle</td>
<td>3.02</td>
</tr>
<tr>
<td>Food requirement</td>
<td>3.15</td>
</tr>
<tr>
<td>Feeding habits</td>
<td>2.73</td>
</tr>
<tr>
<td>Range requirement</td>
<td>3.37</td>
</tr>
<tr>
<td>Movement and activity periods</td>
<td>2.83</td>
</tr>
<tr>
<td>Mortality</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>2.98</td>
</tr>
<tr>
<td>Weather</td>
<td>2.95</td>
</tr>
<tr>
<td>Predators</td>
<td>3.05</td>
</tr>
<tr>
<td>Parasites/disease</td>
<td>2.42</td>
</tr>
<tr>
<td>Spawn</td>
<td>NR</td>
</tr>
<tr>
<td>Life span/size reached</td>
<td>NR</td>
</tr>
<tr>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Objectives</td>
<td>3.00</td>
</tr>
<tr>
<td>Establishing population trends</td>
<td>2.75</td>
</tr>
<tr>
<td>Fishing and/or hunting regulations</td>
<td>2.57</td>
</tr>
<tr>
<td>Food improvement</td>
<td>3.08</td>
</tr>
<tr>
<td>Cover improvement or habitat improvement</td>
<td>3.15</td>
</tr>
<tr>
<td>Special cultural practices</td>
<td>2.47</td>
</tr>
<tr>
<td>Restocking</td>
<td>2.40</td>
</tr>
<tr>
<td>Predator control</td>
<td>2.23</td>
</tr>
<tr>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>Economic value</td>
<td>3.43</td>
</tr>
<tr>
<td>Public attitude</td>
<td>3.09</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td></td>
</tr>
<tr>
<td>Incidents</td>
<td>2.17</td>
</tr>
</tbody>
</table>

NR = Not Rated by Panel
Management is considered very essential in the area of wildlife conservation. Over the past century, many animals might have survived had there been proper wildlife management. The most significant aspect of this division of the outline indicates that Management, as such, should be taught to both elementary and secondary students as indicated by the opinion of the panel. The degree to which these sub-topics should be taught might, therefore, be recommended for further study.

The last two major topics, Value and Miscellaneous, were given mean ratings high enough to warrant their inclusion in the final outline of content, as indicated in Table I.

V. FORMULATION OF THE OUTLINE OF CONTENT FOR A WILDLIFE CONSERVATION COURSE

In determining the final outline of content to be recommended for elementary and secondary schools, a decision had to be made as to what items should be included in the outline. After careful reviewing of all the ratings made by the panel of jurors, it was decided arbitrarily that all items having a mean rating of 2.00 or higher would be included in the final outline of content. This rating of 2.00 means "of some importance." The final outline consists of a list of topics recommended for a wildlife conservation course of study for elementary and secondary schools, and is found on the following pages.
RECOMMENDED OUTLINE OF CONTENT

**Mammals and Birds**

I. CLASSIFICATION AND TYPES
   A. Common name
   B. Types
      (Forest; fur; wilderness; farm; song; upland; migratory; predatory)

II. CHARACTERISTICS AND IDENTIFICATION
   A. Characteristics common to mammals and birds
      (Feathers; fur; wings; beaks; warm blooded; vertebrate; diaphragm; other)
   B. Identification of external features
      (Size; shape; sex coloration; track print; sex determination; other)

III. RANGE AND DISTRIBUTION
   A. Past distribution
      1. United States
      2. State-wide
      3. Local
   B. Present distribution
      1. World-wide
      2. United States
      3. State-wide
      4. Local

IV. LIFE HISTORY
   A. Type habitat preferred
      (Water; land; both; brush; wooded; other)
   B. Breeding or mating habits
      (Time of year; calls; courtship patterns; number of litter or broods per year; defense of territory; frequency)
   C. Nesting and/or den habits
      (Site of nest or den; type used; structure; male-female participation; re-nesting attempts)
IV. LIFE HISTORY (continued)

D. Rearing of young
   (Incubation or gestation time; size; shape; number;
    color; weaning age; age of eye opening; name of
    young; protection of; precociousness of young;
    age of leaving)

E. Food requirements
   (List of basic foods for young and adults; amount
    of food needed; seasonal use; manner of collecting;
    storage; grit; water; vitamins; minerals)

F. Feeding habits
   (Manner by which birds and mammals feed)

G. Range requirement
   (Feeding; roosting; nesting; escape cover; size;
    special use; dusting; type seasonal range)

H. Movement and activity periods
   (Daily; nocturnal; seasonal; annual migration;
    hibernation; estivation; moulting; shedding;
    flyway used)

I. Mortality
   1. Weather
      (Rain; snow; sleet; hail; storms; droughts;
       temperature)
   2. Predators
      (Major; lesser; on young; nest; eggs; adults)
   3. Man
      (Legal; illegal hunting; accidents)
   4. Parasites, disease
      (Method of transmission; effects)

V. MANAGEMENT

A. Objectives
   (Number of animals per unit of area)

B. Establishing population trends
   (Purpose; census technique; causes of decline;
    extinction; beneficial-adverse factors)

C. Hunting regulations
   (Seasons; time of year; dates; length; split;
    zones; bag limit; season limit; restriction
    of male-female shooting; public shooting areas)

D. Food improvement
   (Agricultural practices; special food producing
    practices; plots; feeders; winter feeding)

E. Cover Improvement
   (Planting escape cover; making artificial cover;
    nest boxes)
RECOMMENDED OUTLINE OF CONTENT (continued)

V. MANAGEMENT (continued)

F. Special cultural practices
(Use of fire; discing; timber harvest; mechanical brush cutters)

G. Restocking
(Advantages-disadvantages; trapping methods; selection of area to be stocked; methods of establishing on new area)

H. Predator control
(Need; use of state employees; bounty systems)

VI. VALUE

A. Economic value
(Recreational; monetary; sporting; aesthetic; food; damage)

B. Public attitude
(Illegal hunting; special privileges; early hunting seasons)

VII. MISCELLANEOUS

A. Incidents
(Stories; legends; superstitions; mysteries; unusual happenings; other)

Amphibians

I. CLASSIFICATION AND TYPE

A. Common name
B. Types
(Tree frog; toad; pond frog; newt; salamander)

II. CHARACTERISTICS AND IDENTIFICATION

A. Characteristics common to amphibians
B. Identification of external features
(Size; shape; color; body)
III. RANGE AND DISTRIBUTION

A. Past distribution
   1. State-wide
   2. Local

B. Present distribution
   1. United States
   2. State-wide
   3. Local

IV. LIFE HISTORY

A. Type habitat preferred
   (Water; land; both; other)

B. Breeding habits
   (Mating voice; time of year; temperature needed; parabon formation; amplexis)

C. Food requirement
   (Basic foods for young and adults; duration between meals; manner of collecting; amount)

D. Movement and activity periods
   (Daily; nocturnal; seasonal; periods of migration; hibernation; estivation)

E. Mortality
   (Man; weather; natural causes; predators; other)

V. MANAGEMENT

A. Hunting regulations
   (Seasons on frogs; limits; other)

VI. VALUE

A. Economic value
   (Recreational; sporting; food; monetary; aesthetic)

B. Public attitude
   (Illegal hunting; other)

VII. MISCELLANEOUS

A. Incidents
   (Stories; legends; superstitions; mysteries; unusual happenings)
Fish

I. CLASSIFICATION AND TYPES

A. Common name
B. Types
   (Game; forage; rough; predatory)

II. CHARACTERISTICS AND IDENTIFICATION

A. Characteristics common to most fish
   (Cold blooded; scales; gills; other)
B. Identification of external features
   (Size; shape of head and body; color; scales; eyes; teeth; fins)

III. RANGE AND DISTRIBUTION

A. Past distribution
   1. State-wide
   2. Local
B. Present distribution
   1. United States
   2. State-wide
   3. Local

IV. LIFE HISTORY

A. Type habitat preferred
   (Swift, slow moving water; warm, cold water; marine, fresh water; clear, muddy, turbid water)
B. Reproduction
   (Time of year; behavior of males and females; water temperature; location of nest; how eggs laid or placed; how fertilization takes place; type bottom; catadromous, anadromous)
C. Spawn
   (Name of young; care of young; losses of young)
D. Food requirements
   (List of basic foods for young and adult)
E. Life span and size reached
F. Mortality
   (Man; weather; natural causes; predators; other)
RECOMMENDED OUTLINE OF CONTENT (continued)

V. MANAGEMENT

A. Objectives
   (Pounds of fish per acre)
B. Establishing trends in populations
   (Purpose; method of census technique)
C. Fishing regulations
   (Daily limit; possession limit; method of taking;
    public fishing areas; open and closed seasons)
D. Habitat improvement
   (Impoundment of waters; fertilization of waters;
    weed control practices; pollution control)
E. Restocking
   (Advantages-disadvantages; selection of stocking
    area; methods of establishing in new area)

VI. VALUE

A. Economic value
   (Recreational; commercial; sporting; aesthetic;
    food; other)
B. Public attitude
   (Illegal fishing; special privileges; early
    fishing seasons; limits)

VII. MISCELLANEOUS

A. Incidents
   (Stories; legends; superstitions; mysteries;
    unusual happenings; other)

Reptiles

I. CLASSIFICATION AND TYPES

A. Common name
B. Types
   (Snake--poisonous, non-poisonous;
    Turtle--commercial, non-commercial;
    Lizard--poisonous, non-poisonous;
    Alligator)
II. CHARACTERISTICS AND IDENTIFICATION

A. Characteristics common to reptiles
   (Scales and horny plates; cold blooded; other)
B. Characteristics distinguishing one from another
C. Identification of external features for poisonous and non-poisonous species

III. RANGE AND DISTRIBUTION

A. Past distribution
   1. Local
B. Present distribution
   1. United States
   2. State-wide
   3. Local

IV. LIFE HISTORY

A. Type habitat preferred
   (Land; water; both; trees; other)
B. Breeding habits
   (Time of year; temperature required; number of times per year; behavior patterns of adults)
C. Nesting or den habits
   (Location; type structure; defense of territory)
D. Egg laying cycle
   (Size of eggs; number of eggs; color of eggs; way young are born; average number in clutch)
E. Food requirement
   (List of basic foods for young and adult; length or duration between meals; manner of collecting food)
F. Movement or activity periods
   (Daily; nocturnal; seasonal habits; hibernation; estivation; moult; shedding)
G. Size reached and life span
H. Mortality
   (Man; weather; natural causes; predators; other)

V. MANAGEMENT

A. Objectives
   (Maximum size; maximum number; minimum number; reduction of population)
RECOMMENDED OUTLINE OF CONTENT (continued)

V. MANAGEMENT (continued)

B. Hunting regulations
   (Seasons; limits; method of control)
C. Establishing population trends
   (Purpose; method of census technique; bounty systems)

VI. VALUE

A. Economic value
   (Recreational; monetary; sporting; food; aesthetic; other)
B. Public attitude

VII. MISCELLANEOUS

A. Incidents
   (Stories; legends; superstitions; mysteries; unusual happenings)

VI. SUBJECTIVE REACTIONS OF THE APPRAISAL GROUP

Revealed in the following comments are certain basic attitudes toward the content of wildlife courses underlying the evaluations of the appraisal group. These vital comments reveal the perspective from which the appraisal was made and show the underlying philosophy upon which these evaluations were based. These appeared on the "Comments" sections of the original check list.

...The basic outline for topical presentations is good. I would suggest a comparative approach where the life history of key vertebrates are discussed and contrasted. The handling of each vertebrate group separately leads to unnecessary duplication and gives the student an impression of compartmentalization which does not exist in nature.
I urge the avoidance of memorizing classifications and distributions. Concepts and principles are the essentials.

...Treat organisms not as entities within themselves, but as units in the ecological community. ...De-emphasize classification. ...make sure course of study does not become one of taxonomy but of ecology and management.

Life History details are valuable, but less time should be devoted to this area of study and more time to principles of populations under management and ecology. ...

In general, I believe the objective at the elementary level should be to interest, and inform only generally. At the secondary level, I believe the details of classification, life history, etc., could be gone into with considerable more detail. Perhaps this could be taken care of, in part, by the way the course is taught.

...The principal purpose of the elementary schools is to impart a general education. This can well include an appreciation for wildlife, especially if integrated with an appreciation for all natural resource use. But it should not stress wildlife management and probably not stress taxonomy.

...Broad topics for elementary students; more details for the older ones. ...Incidents should be taught to create interest.

...Internal systems might well be taught at the college level. The more obvious external features should be emphasized in the elementary and secondary schools. ...To avoid confusion, past distribution should be broadly treated with fossil materials and not too much detail while present distribution can be illustrated with migratory birds; passing through students' local areas. Mammals, of course, should include mostly local forms at this level.

...The emphasis of teaching life history should be to get the child to be able to relate the animal to its proper type of environment.

...Teachers should introduce course with basic principles and a very brief short course in ecology.
Identification of internal features is of no importance to elementary levels and of very doubtful importance at the secondary level of a wildlife education course. I do feel that the Life History in general, is the most important area to be stressed in a wildlife education program at these levels. I think most of the topics in this section on Management a little beyond the reach of elementary and even secondary students. Values of wildlife should be stressed and incidents are always good teaching devices and can be effective in debunking many modern day myths.

On the topic of Value in Fishing, I would like to see grade school teachers hammer on the mis-use of the out-of-doors, that is litter-bugging, the leaving of bait cans on lakes and streams, picnic discards, etc. . .

A curriculum can be easily loaded with too much material which is for the advanced student. Some of your topics, which if evaluated down, are material for the college level. Life history, management, and value are rated high because I feel that these are the things needed for little and big people. Characteristics and identification is also rated favorably. In most cases the common name is the most important in classification, while other phases of classification at the college level.

I am opposed to too much emphasis on internal features. This work should not be introduced until at the college level. Let's not kill the appreciation for wildlife values; but, instead, let us instill enthusiasm in them. Enthusiasm, at the elementary and secondary level, is stimulated by a study of animals themselves and their ecological requirements.

Classification and types should be put on local species. Scientific terminology is very important but I doubt if school children would grasp it too readily.

Characteristics and identification may be too advanced for the elementary school and therefore should be handled and presented carefully.

I believe that Life History will be one of the most essential parts of a curriculum for elementary and secondary schools. This will be foundation material for management.

In teaching a unit on Birds, would recommend that you use records of bird calls.
Emphasis should be placed on management in rural schools.

Incidents that give true insight into the lives of animals or that would correct superstitions could be used to advantage.

...With the outlines you have prepared, a very comprehensive educational program could be set up even on the college level. Therefore, it would seem to be a matter of amount of time spent on the given items as much as rating the specific item.

...It seems to me that what we want in wildlife education for all students by the time they have finished high school is a better understanding of the relationships and inter-relationships of all forms of life to their environment and to each other and the part man plays in keeping that environment such that each form can assume its proper place in the maintenance of a good natural balance.

Management, especially "management of man himself," is probably one of the most important aspects of all. Without serious interference by man, a natural balance between all forms of life is generally maintained.

...The basic biological knowledge seems to be well covered. From the standpoint of conservation, the following items are suggested for inclusion in an outline of wildlife education:

1. Emphasize wildlife requirements--that is, general and specific habitat requirements--as cover types, edge effect, carrying capacity.

2. Farmer-sportsman relations.

3. Landowners place in habitat improvement, or what the farmer can do to improve wildlife habitat.

4. Work of agencies and organizations devoted to wildlife conservation.

Probably the most distinguishing feature of these comments was the fact that the philosophical views, as expressed by the leaders in the field of wildlife, emphasized the role of wildlife education in one's general education. Implied, or directly expressed, were the views that,
in general, ecology should be at the maximum, with emphasis being placed on general concepts and meanings, and that the nature, language, and significance of wildlife conservation in other fields of knowledge were of vital importance and should permeate the rest of the material.
CHAPTER V

STATUS OF WILDLIFE CONSERVATION IN LOUISIANA

The second part of this study was to determine the status of wildlife conservation knowledge as possessed by the seniors in the white public high schools of Louisiana. As a basis for this phase of the study, the outline of content, as recommended by the panel of jurors, was used for preparing the wildlife conservation knowledge test.

I. PREPARATION OF THE TEST

The multiple-choice type of question is regarded as "the most valuable and most generally applicable of all test forms." Some advantages in using this type of testing device are: (1) it is widely used in the high schools and the students are familiar with it; (2) it is adaptable to measuring factual knowledge and memory details; (3) it can be answered quickly and thus allows for a wider knowledge area coverage by more questions; and (4) it can be graded quickly and consistently.

The test used in this study was designed to measure what the student had learned, and not his ability to learn. Similar tests have been used to measure conservation knowledge or attitudes by Capps, Curtis, and others.


The importance of each sub-topic in the final list of topics served as a guide in constructing the test. Any sub-topic that had a high rating was considered as a basis for a potential test item, and those sub-topics in the proposed list that had a rating of 3.00 (highly important) were given first preference in the test item construction.

Approximately 35 multiple-choice items based on wildlife that were used in the Giles study were used in this investigation. It was found that these 35 items paralleled the outline of content very closely. The remainder of the 65 items were based upon the subject matter in the outline of content compiled from the ratings of the expert panel of jurors.

To further check the validity of the test, it was submitted to members of the faculty and to graduate students in wildlife management at Louisiana State University. Upon their final approval, a trial test was given to seniors at the University High School to determine factors such as:

---


difficulty of the test, length of time involved in taking the test, and
problems involved in administering the test. Students were then inter-
viewed and their comments and suggestions were given consideration in making
further revisions of the test. The test in its final form will be referred
to as the Wildlife Conservation Knowledge Test in the remainder of this
study, and is found in Appendix F.

II. ADMINISTRATION OF PRELIMINARY TEST

The preliminary test was administered as nearly like the anticipated
final testing program as possible. The procedure consisted of contacting
the principal, obtaining approval, and delivering the testing materials.
The tests were given by the school. Testing materials included test book-
lets, instructions for teachers, and answer sheets.

Preliminary test questions were answered on standard answer sheets
and graded. From the answer sheets, the writer was able to determine:
discrimination, ease of scoring, and arrangement in order of difficulty.
Administration of the test followed closely the recommendations of Remmers
and Gage.9

III. ADMINISTRATION OF THE FINAL TEST

When the test was in its final form, a letter along with a postal
card,10 was sent to thirty-two selected parishes within the state asking

---

9 H. H. Remmers and N. L. Gage, Educational Measurement and Evaluation

10 Appendix D.
their cooperation in the testing program. This letter was sent under the auspices of the State Department of Education. Sixteen parish superintendents indicated their willingness to cooperate in the study, and these parishes are represented by the shaded areas in Figure 1. It can be seen from this map that the sixteen parishes represent the various geographical areas of the state, and include parishes that are largely rural and parishes with large urban centers. North Louisiana is represented by the area covered with parallel lines, and South Louisiana by the area covered with diagonal lines.

After receiving the postal card from the parish superintendent indicating willingness to participate, another letter was sent to the various principals within that parish requesting their cooperation and information concerning the number of seniors in their schools. This involved seventy schools with 3,266 high school seniors.

The testing materials were sent under the direction of the State Department of Education to the various schools, and final testing of the seniors was completed by May 1, 1960.

After grading of the test was completed, the scores, along with the general information, were coded and processed through the Research Section at Louisiana State University by IBM machines.

The data concerning the status of the white graduating seniors in Louisiana are presented in tables and graphs in terms of the various factors

11 Appendix E.
12 Appendix F.
LOUISIANA

FIGURE 1  PARISHES PARTICIPATING IN WILDLIFE CONSERVATION KNOWLEDGE TEST

Region 1, South Louisiana
Region 2, North Louisiana

SCALE - MILES 0 10 20 30 40 50
being considered in this particular study. The median has been calculated as the measure of central tendency in order to present the status of the seniors in terms of the factors being studied.

IV. ANALYSIS OF WILDLIFE CONSERVATION TEST

Achievement of high school seniors on the test. Table II, page 64, presents the distribution of the overall scores found within the cross-sectional view of the state of Louisiana. An analysis of the table is as follows: the median score of all seniors was 52.93. As shown by Q1, one-fourth of the seniors had scores of 44.58 or less. One-fourth of the seniors had scores of 60.85 or higher. Table II further illustrates that of a total of 3,266 seniors taking the Wildlife Test, only 12 students scored within the 80-84 interval. Assuming that the Wildlife Conservation Knowledge Test is a valid test of wildlife conservation knowledge, then the conclusion drawn is that the knowledge of wildlife conservation of the seniors in the high schools of Louisiana is inadequate.

Activities that contributed to wildlife knowledge of the seniors. Some idea as to the relative importance of various activities in assisting the seniors in taking the Wildlife Conservation Knowledge Test is illustrated by a state-wide percentage breakdown given in Figure 2, page 65.

It can be seen that Biology ranked highest with 64 per cent of the seniors indicating that this subject helped them most in taking the test. General Science followed with 54 per cent; and Fishing ranked third with 46 per cent of the students indicating assistance. Television, Radio, and Movies followed fourth with 41 per cent. The activity considered lowest was
TABLE II

SCORES OF SENIORS PARTICIPATING IN WILDLIFE CONSERVATION KNOWLEDGE TEST

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Frequencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-84</td>
<td>12</td>
</tr>
<tr>
<td>75-79</td>
<td>57</td>
</tr>
<tr>
<td>70-74</td>
<td>153</td>
</tr>
<tr>
<td>65-69</td>
<td>294</td>
</tr>
<tr>
<td>60-64</td>
<td>438</td>
</tr>
<tr>
<td>55-59</td>
<td>503</td>
</tr>
<tr>
<td>50-54</td>
<td>558</td>
</tr>
<tr>
<td>45-49</td>
<td>441</td>
</tr>
<tr>
<td>40-44</td>
<td>331</td>
</tr>
<tr>
<td>35-39</td>
<td>254</td>
</tr>
<tr>
<td>30-34</td>
<td>128</td>
</tr>
<tr>
<td>25-29</td>
<td>70</td>
</tr>
<tr>
<td>20-24</td>
<td>18</td>
</tr>
<tr>
<td>15-19</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>3266</td>
</tr>
</tbody>
</table>

Median: 52.93
Q1: 44.58
Q3: 60.85
FIGURE 2  PERCENTAGES OF STUDENTS WHO CONSIDERED GIVEN ACTIVITIES HELPFUL IN TAKING THE WILDLIFE CONSERVATION KNOWLEDGE TEST
Summer Camp. Only 13 per cent of the 3,266 seniors participating indicated this activity to be helpful; however, this may simply indicate that few students had attended summer camps.

Comparison of boys and girls in overall achievement. Table III, page 67, presents a comparison of achievement of boys and of girls on the test. The median score for the 1,712 girls was 49.46. The median score for the 1,554 boys was 57.69, giving the boys a median score of 8.23 points above the girls' median score, and implies that the knowledge possessed by boys was greater than that of the girls. $Q_1$ signifies, as shown in Table III, that one-fourth of the girls' scores are 41.64 or less. On the other hand, $Q_1$ for the boys signifies that one-fourth of the boys' scores are 49.38 or less. $Q_3$ further denotes that one-fourth of the girls had scores of 56.30 or higher, whereas $Q_3$ denotes that one-fourth of the boys had scores of 64.88 or higher. This table indicates clearly that the senior boys in the white public high schools of Louisiana have more knowledge about Louisiana wildlife than do the senior girls.

The hypothesis that no difference exists between boys and girls will be rejected at the one per cent level. From Table III, it may be seen that the critical ratio of the difference between medians is greater than 2.58. Therefore, the null hypothesis may be rejected and it may be assumed that there are real differences between the knowledge possessed by boys and that possessed by girls.
TABLE III

COMPARISON OF ACHIEVEMENT BY SEXES

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-84</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>75-79</td>
<td>51</td>
<td>6</td>
</tr>
<tr>
<td>70-74</td>
<td>126</td>
<td>27</td>
</tr>
<tr>
<td>65-69</td>
<td>217</td>
<td>77</td>
</tr>
<tr>
<td>60-64</td>
<td>279</td>
<td>159</td>
</tr>
<tr>
<td>55-59</td>
<td>257</td>
<td>246</td>
</tr>
<tr>
<td>50-54</td>
<td>221</td>
<td>337</td>
</tr>
<tr>
<td>45-49</td>
<td>148</td>
<td>293</td>
</tr>
<tr>
<td>40-44</td>
<td>91</td>
<td>240</td>
</tr>
<tr>
<td>35-39</td>
<td>72</td>
<td>182</td>
</tr>
<tr>
<td>30-34</td>
<td>41</td>
<td>87</td>
</tr>
<tr>
<td>25-29</td>
<td>24</td>
<td>46</td>
</tr>
<tr>
<td>20-24</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>15-19</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1554</td>
<td>1712</td>
</tr>
</tbody>
</table>

Median
- Boys: 57.69
- Girls: 49.46

Q1
- Boys: 49.38
- Girls: 41.64

Q3
- Boys: 64.88
- Girls: 56.30

Difference between Medians: 8.23

Critical Ratio: 16.80
Comparison of boys and girls as to activities considered helpful in taking test. A general idea of the relative importance of the activities considered most helpful by both boys and girls is given in Figure 3, page 69. Biology ranked first for both boys and girls, with 65 per cent of the boys and 63 per cent of the girls giving it first place. General Science ranked second for the girls with a total of 55 per cent; while for the boys, Hunting ranked second. In third place for the girls was Television, Radio and Movies, with 42 per cent; taking third place for the boys was Fishing, indicated by 63 per cent. The activity considered least helpful by the girls was reading Sports Magazines, with 10 per cent so indicating. The boys considered the least helpful activity as going to Summer Camp, with 14 per cent responding. It is also interesting to note from Figure 3 that the senior girls indicated that they received more help than the boys in two areas; namely, General Science and Television, Radio and Movies.

Comparison of Region 1 (South Louisiana) to Region 2 (North Louisiana). An analysis of Table IV, page 70, shows that the boys of Region 2 (North Louisiana) made a median score of 57.75; the boys of Region 1 (South Louisiana) made a median score of 57.63, only .12 points lower than the score for Region 2. However, the girls of Region 1 (South Louisiana) had a median score of 49.97; the girls of Region 2 (North Louisiana), 48.78. In Region 2, \( Q_1 \) signifies that one-fourth of the male students had scores of 49.88 or lower; in Region 1, 48.71 or lower. In Region 1, \( Q_1 \) signifies that one-fourth of the girls had scores of 41.79 or lower; in Region 2, 41.48 or lower. As represented
FIGURE 3 COMPARISON BETWEEN BOYS AND GIRLS AS TO
ACTIVITIES CONSIDERED HELPFUL IN TAKING
WILDLIFE CONSERVATION KNOWLEDGE TEST
TABLE IV

ACHIEVEMENT OF BOYS AND GIRLS IN REGION 1 (SOUTH LOUISIANA) AND REGION 2 (NORTH LOUISIANA)

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Region 1 (South Louisiana)</th>
<th></th>
<th>Region 2 (North Louisiana)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td>80-84</td>
<td>4</td>
<td>1</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>75-79</td>
<td>30</td>
<td>3</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>70-75</td>
<td>56</td>
<td>18</td>
<td>70</td>
<td>9</td>
</tr>
<tr>
<td>65-69</td>
<td>115</td>
<td>46</td>
<td>102</td>
<td>31</td>
</tr>
<tr>
<td>60-64</td>
<td>145</td>
<td>96</td>
<td>134</td>
<td>63</td>
</tr>
<tr>
<td>55-59</td>
<td>134</td>
<td>137</td>
<td>123</td>
<td>109</td>
</tr>
<tr>
<td>50-54</td>
<td>104</td>
<td>189</td>
<td>117</td>
<td>148</td>
</tr>
<tr>
<td>45-49</td>
<td>79</td>
<td>153</td>
<td>69</td>
<td>140</td>
</tr>
<tr>
<td>40-44</td>
<td>47</td>
<td>121</td>
<td>44</td>
<td>119</td>
</tr>
<tr>
<td>35-39</td>
<td>44</td>
<td>100</td>
<td>28</td>
<td>82</td>
</tr>
<tr>
<td>30-34</td>
<td>23</td>
<td>52</td>
<td>18</td>
<td>35</td>
</tr>
<tr>
<td>25-29</td>
<td>10</td>
<td>21</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>20-24</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>15-19</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>802</td>
<td>946</td>
<td>752</td>
<td>766</td>
</tr>
<tr>
<td>Median</td>
<td>57.63</td>
<td>49.97</td>
<td>57.75</td>
<td>48.78</td>
</tr>
<tr>
<td>Q₁</td>
<td>48.71</td>
<td>41.79</td>
<td>49.88</td>
<td>41.48</td>
</tr>
<tr>
<td>Q₃</td>
<td>64.73</td>
<td>56.89</td>
<td>64.94</td>
<td>55.57</td>
</tr>
</tbody>
</table>
by Q₃, one-fourth of the boys in Region 2 made scores of 64.94 or higher; in Region 1, 64.73 or higher. One-fourth of the girls in Region 1 scored 56.89 or higher; Q₃ in Region 2, 55.57 or higher.

As can be seen from Table IV, there is no significant difference in the regional scores of North Louisiana versus South Louisiana.

Relationship of achievement according to residence. Table V, page 72, presents the distribution of the scores of seniors in relationship to their place of residence—rural, urban, and large city. This table takes into consideration the distribution of both boys and girls. An analysis of the table is as follows: the median score for students living in the rural area is 53.78; the median score for students living in the urban area is 53.16; and the median score for students living in the large city area is 52.09. From this table, it is seen that the students in rural areas have a slightly higher median score than the students in the urban or large city areas. As shown by Q₁, one-fourth of the senior students living in the rural area have scores of 44.99 or less; one-fourth of those students living in the urban area have scores of 44.94 or less; and one-fourth of those students in large city areas have scores of 42.20 or less. Q₃ signifies that one-fourth of the students living in rural areas have scores of 61.35 or higher; in the urban areas, 61.40 or higher; and in the large city areas, 59.99 or higher.

This table indicates that the seniors living in the rural areas have slightly more achievement in wildlife knowledge than those students living in the urban and large city areas.
### TABLE V

**RELATIONSHIP OF ACHIEVEMENT ACCORDING TO RESIDENCE**

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Rural</th>
<th>Urban</th>
<th>Large City</th>
</tr>
</thead>
<tbody>
<tr>
<td>80-84</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>75-79</td>
<td>18</td>
<td>31</td>
<td>8</td>
</tr>
<tr>
<td>70-74</td>
<td>55</td>
<td>75</td>
<td>23</td>
</tr>
<tr>
<td>65-69</td>
<td>114</td>
<td>135</td>
<td>45</td>
</tr>
<tr>
<td>60-64</td>
<td>148</td>
<td>194</td>
<td>96</td>
</tr>
<tr>
<td>55-59</td>
<td>188</td>
<td>211</td>
<td>104</td>
</tr>
<tr>
<td>50-54</td>
<td>185</td>
<td>263</td>
<td>110</td>
</tr>
<tr>
<td>45-49</td>
<td>153</td>
<td>204</td>
<td>84</td>
</tr>
<tr>
<td>40-44</td>
<td>128</td>
<td>148</td>
<td>55</td>
</tr>
<tr>
<td>35-39</td>
<td>80</td>
<td>105</td>
<td>69</td>
</tr>
<tr>
<td>30-34</td>
<td>40</td>
<td>51</td>
<td>37</td>
</tr>
<tr>
<td>25-29</td>
<td>18</td>
<td>33</td>
<td>19</td>
</tr>
<tr>
<td>20-24</td>
<td>1</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>15-19</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**Total:**

<table>
<thead>
<tr>
<th></th>
<th>1132</th>
<th>1468</th>
<th>666</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>53.78</td>
<td>53.16</td>
<td>52.09</td>
</tr>
<tr>
<td>Q₁</td>
<td>44.99</td>
<td>44.94</td>
<td>42.20</td>
</tr>
<tr>
<td>Q₃</td>
<td>61.35</td>
<td>61.40</td>
<td>59.99</td>
</tr>
</tbody>
</table>


Relationship of residence to activities. Some idea of the relative importance of the overall activities according to residence which were considered most helpful to seniors is given in Figure 4, page 74.

An analysis of Figure 4 indicates that Biology ranked, in all areas of residence, as the activity most helpful to seniors taking the wildlife test. General Science followed next, with Fishing ranking third in importance. Seniors in all parishes ranked Scouting and going to Summer Camp as the least helpful activities. It is interesting to observe, however, that in all areas of residence, there is either an increase in the activity or a decrease in the activity according to the place of residence. For example, Nature Magazines are read more in the rural areas, a little less in the urban areas, and even less in the large city areas. On the other hand, the influence of Television, Radio and Movies was indicated as being greatest in the large city areas, less in urban areas, and even less in the rural areas. Throughout Figure 4, there is a tendency for these activities to follow this particular pattern.

Analysis of individual parishes. Tables VI and VII, pages 76 and 77, may be analyzed in the following manner, using Parish 1 as an example. The data for the other fifteen parishes participating in this study can be analyzed in a similar way.

An analysis of Table VI, page 76, indicates that in Parish 1 of Region 1 (South Louisiana), 125 boys and 154 girls, total of 279, participated in this testing program. All of the high school seniors in this group lived in urban areas. The three activities considered by
<table>
<thead>
<tr>
<th>Activity</th>
<th>Rural</th>
<th>Urban</th>
<th>Large City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>62%</td>
<td></td>
<td>62%</td>
</tr>
<tr>
<td>General Science</td>
<td>54%</td>
<td></td>
<td>46%</td>
</tr>
<tr>
<td>Scouts</td>
<td>20%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Nature Magazines</td>
<td>15%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Sports Magazines</td>
<td>21%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>TV, Radio, Movies</td>
<td>45%</td>
<td>43%</td>
<td></td>
</tr>
<tr>
<td>Summer Camp</td>
<td>15%</td>
<td>19%</td>
<td></td>
</tr>
<tr>
<td>Hunting</td>
<td>34%</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>Fishing</td>
<td>47%</td>
<td>36%</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4** Relationship of Residence to Activities
these students as being most helpful in answering the Wildlife Conservation Knowledge Test were: Biology, Television, and General Science. The reading of Nature Magazines was considered the least helpful activity. The median score for Parish 1 was 50.45; while one-fourth of the students achieved scores of 42.53 or less as indicated by Q₁; and one-fourth of the students achieved scores of 56.76 or higher as indicated by Q₃.

An overall picture of Tables VI and VII indicates that the median scores for the sixteen parishes ranged from 49.50 to 56.83. The differences in achievement from parish to parish are not great enough to warrant the conclusion that wildlife knowledge of the seniors of any one parish is superior to that of any other parish. In thirteen of the parishes, Biology was considered the most helpful activity in taking the Wildlife Conservation Knowledge Test, whereas going to Summer Camp was considered the least helpful activity.
<table>
<thead>
<tr>
<th>Parish</th>
<th>Sex Type</th>
<th>Total</th>
<th>Residence</th>
<th>3 Top Activities in Order of Impt.</th>
<th>Least Impt. Activity</th>
<th>Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boy</td>
<td>Girl</td>
<td></td>
<td></td>
<td></td>
<td>Median</td>
</tr>
<tr>
<td>1</td>
<td>125</td>
<td>154</td>
<td>279</td>
<td>Biology, TV, &amp; Gen. Science</td>
<td>Nature Magazines</td>
<td>50.45</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
<td>157</td>
<td>247</td>
<td>Biology, Gen. Science, Fishing</td>
<td>Summer Camp</td>
<td>52.46</td>
</tr>
<tr>
<td>3</td>
<td>47</td>
<td>57</td>
<td>104</td>
<td>Biology, Gen. Science, TV</td>
<td>Summer Camp</td>
<td>52.33</td>
</tr>
<tr>
<td>4</td>
<td>58</td>
<td>74</td>
<td>132</td>
<td>Biology, Fishing, Gen. Science</td>
<td>Summer Camp</td>
<td>49.50</td>
</tr>
<tr>
<td>5</td>
<td>192</td>
<td>235</td>
<td>427</td>
<td>Biology, Gen. Science, Fishing</td>
<td>Summer Camp</td>
<td>52.55</td>
</tr>
<tr>
<td>6</td>
<td>31</td>
<td>15</td>
<td>46</td>
<td>Biology, Fishing, Hunting</td>
<td>Summer Camp</td>
<td>56.64</td>
</tr>
<tr>
<td>7</td>
<td>212</td>
<td>191</td>
<td>403</td>
<td>Gen. Science, Biology, Fishing</td>
<td>Summer Camp</td>
<td>56.83</td>
</tr>
<tr>
<td>8</td>
<td>57</td>
<td>63</td>
<td>120</td>
<td>Biology, Gen. Science, Fishing</td>
<td>Scouts</td>
<td>50.08</td>
</tr>
</tbody>
</table>

SUMMARY BY PARISHES IN REGION 1 (SOUTH LOUISIANA)
<table>
<thead>
<tr>
<th>Parish</th>
<th>Sex</th>
<th>Residence</th>
<th>3 Top Activities in Order of Impt.</th>
<th>Least Impt. Activity</th>
<th>Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rural</td>
<td>Urban</td>
<td>Large City</td>
<td>Median</td>
</tr>
<tr>
<td>9</td>
<td>89</td>
<td>91</td>
<td>109</td>
<td>70</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>278</td>
<td>245</td>
<td>179</td>
<td>316</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>79</td>
<td>102</td>
<td>120</td>
<td>61</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>32</td>
<td>27</td>
<td>33</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>31</td>
<td>32</td>
<td>44</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>76</td>
<td>75</td>
<td>107</td>
<td>44</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>42</td>
<td>55</td>
<td>58</td>
<td>39</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>125</td>
<td>139</td>
<td>29</td>
<td>209</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER V

SUMMARY AND RECOMMENDATIONS

A brief historical development of wildlife and its early destruction was presented in order to identify the nature, scope, and importance of this study. It became apparent in the United States during the first decade of the 20th century, largely through the efforts of prominent individuals and major committees, that wildlife resources were a part of conservation and should be taught in the schools.

An attempt was made to describe the place of wildlife conservation in our schools by reviewing the topics expressed in the literature related to this field.

The major feature of this study was the formulation of an outline of content in wildlife conservation to be used in elementary and secondary schools of Louisiana. The final outline of content consisted of seven major topics and numerous sub-topics, all dealing with the five classes of vertebrates: Mammals, Birds, Fish, Amphibians, and Reptiles.

The formulation of the preliminary outline of content was described in detail and is reproduced in its entirety in the Appendix of this study to enable the reader to interpret the results presented in tabular form.

Many valuable comments were received and presented in order to indicate the perspective from which the seven major topics and sub-topics were appraised. It was considered pertinent to discover how the leaders in wildlife felt about the topical content of a wildlife conservation course in a manner which could not be revealed by a purely objective
appraisal. The most significant comments expressed the feeling that
details in wildlife education should not be emphasized. Greater stress
should be placed on broad concepts of wildlife conservation.

The final outline of content as recommended by the panel of jurors
could be used as a basis for developing a course of study or as a guide
for classroom instruction in teaching wildlife conservation at any grade
level.

From the final outline of content, a test consisting of 100 points
was prepared and administered to 3,266 seniors in sixteen selected
parishes to determine the wildlife conservation knowledge of the graduat-
ing seniors of Louisiana. A brief resume describing the typical
graduating senior indicated the following.

The typical high school senior boy in Louisiana made a median
score of 57.69 on the Wildlife Conservation Knowledge Test consisting
of 100 items; whereas, the typical high school senior girl made a median
score of 49.46. Boys, as indicated by the test results, have a greater
knowledge of wildlife principles than girls.

Some idea as to the relative importance of various activities in
assisting the seniors in taking the Wildlife Conservation Knowledge Test
is as follows. Biology ranked highest, with 64 per cent of the students
indicating that this subject helped most in taking the test. General
Science followed, with 54 per cent indicating that this helped; and
Fishing ranked third, with 46 per cent of the seniors responding to this
activity. The activity considered least helpful was going to Summer Camp,
with only 13 per cent of the seniors checking this activity.
Senior boys and girls living in the rural areas had only slightly more knowledge than those living in urban or large city areas. Differences in scores did not vary significantly by regions.

The overall state-wide median score was 52.93. There was no attempt to break down the sections in the test on General Management, Mammals, Birds, Fish, Amphibians, or Reptiles to show areas of greatest or least knowledge.

RECOMMENDATIONS

Inasmuch as these findings can be accepted as significant within the limitations and predicated on the basic assumptions as set forth in Chapter I, the following recommendations seem justifiable: (1) that a further study to determine the grade placement of the outline of content be recommended; (2) that the amount of time to be allotted to the wildlife conservation program in each of the grades be determined; and (3) that the State Department of Education in Louisiana give serious consideration to the development of a well defined program of wildlife education in the public schools.
BIBLIOGRAPHY

A. BOOKS


B. PERIODICAL ARTICLES


C. UNPUBLISHED MATERIALS


D. PUBLICATIONS OF LEARNED ORGANIZATIONS


E. BULLETINS


APPENDIX A
July 7, 1959

Wildlife Management Institute  
Wire Building  
Washington, D. C.

Gentlemen:

I am undertaking a doctoral study concerning the status of wildlife education in Louisiana. The problem has the approval and support of the National Wildlife Federation, the Louisiana Wildlife and Fisheries Commission, the Department of Education of Louisiana, and of the graduate faculty in education at Louisiana State University.

Since you represent significantly these interests, I am directing this inquiry to you. Would you please assist me in the problem to the extent of furnishing materials which might be available from your Institute.

Reliable conservation education data, with emphasis on wildlife, must be secured from each of the states in order to orient the direction of this research. These materials would include bulletins on conservation, syllabi, courses of study, published policies of the state relating to such activities, and informative pamphlets from other pertinent areas.

Your contribution toward this study will be extremely valuable and will be deeply appreciated.

Sincerely yours,

STANLEY SHAW
APPENDIX B
Dr. Burd S. McGinnis  
Head and Professor of Game Management  
Cooperative Wildlife Research Unit  
Blacksburg, Virginia  

Dear Dr. McGinnis:

I am conducting a study to determine an outline of content for a course of study in wildlife education for elementary and secondary schools. This study is based on data secured from state departments of education, fish and wildlife commissions, state departments of conservation, and wildlife literature.

No attempt is being made to determine grade placement or organization of the material into a course of study. The main objective is to determine merely the content that should be covered by the time the students complete their high school training.

To determine the validity of the material in this outline, I will need the opinions of men who are outstanding in the fields of wildlife and wildlife education. Your name was submitted by Dr. Leslie Glasgow, of the School of Game Management of Louisiana State University, as being an outstanding leader in these fields.

Your cooperation in appraising the validity of this outline of content will be greatly appreciated. If you are willing to evaluate this proposed outline, would you please sign the enclosed card to indicate your acceptance and return it to me.

Sincerely yours,

Stanley Shaw, Supervisor of  
Student Teaching in Biological Science  
LSU Laboratory School  

Enclosure
QUESTIONNAIRE

DIRECTIONS:

In accordance with your agreement, would you please review the following topics and evaluate them as to their "value" for an Outline of Content for a course of study in wildlife education in elementary and secondary schools.

It is proposed that these outlines be used for the development of a course of study in wildlife education for elementary and secondary schools. These outlines will also be used as teaching guides in preparing lesson materials on the life history of any animal.

Most topics are supplemented by definite sub-topics to clarify their scope. To the right of each topic are spaces or blocks which have been assigned a numerical value to represent the following scale:

4 - Topic is essential
3 - Topic is highly important
2 - Topic is of some importance
1 - Topic is of doubtful importance
0 - Topic should be omitted

Please make your evaluation of each topic by placing a check mark or cross in the square which, in your opinion, most adequately represents the numerical value of the topic.

Space has been assigned at the end of each section for whatever additions or suggestions you might wish to make.

Your contribution to this study will be greatly appreciated.

Stanley Shaw
Supervisor of Biological Sciences
Laboratory School, College of Education
Louisiana State University
Baton Rouge, Louisiana
AN OUTLINE OF CONTENT FOR WILDLIFE EDUCATION IN ELEMENTARY AND SECONDARY SCHOOLS

4 - Topic is essential
3 - Topic is highly important
2 - Topic is of some importance
1 - Topic is of doubtful importance
0 - Topic should be omitted

SUBJECT: MAMMALS AND BIRDS

I. CLASSIFICATION AND TYPES

<table>
<thead>
<tr>
<th>Topic</th>
<th>Rating</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Order</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Genus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Species</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Common name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. Scientific name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. Types</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Forest; fur; wilderness; farm; song; upland; migratory; predatory)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:

II. CHARACTERISTICS AND IDENTIFICATION

<table>
<thead>
<tr>
<th>Topic</th>
<th>Rating</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Characteristics common to mammals and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>birds (Feathers; fur; wings; beaks;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>warm blooded; vertebrate; diaphragm;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Identification of external features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Size; shape; sex coloration; track</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>print; sex determination; other)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Identification of internal features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Respective body systems)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:
III. RANGE AND DISTRIBUTION

A. Past distribution
   1. World-wide
   2. United States
   3. State-wide
   4. Local

B. Present distribution
   1. World-wide
   2. United States
   3. State-wide
   4. Local

Comments:

IV. LIFE HISTORY

A. Type habitat preferred
   (Water; land; both; brush; wooded; other)

B. Breeding or mating habits
   (Time of year; calls; courtship patterns; number of litter or broods per year; defense of territory; frequency)

C. Nesting and/or den habits
   (Site of nest or den; type used; structure; male-female participation; re-nesting attempts)

D. Rearing of young
   (Incubation or gestation time; size; shape; number; color; weaning age; age of eye opening; name of young; protection of; precociousness of young; age of leaving)

E. Food requirements
   (List of basic foods for young and adults; amount of food needed; seasonal use; manner of collecting; storage; grit; water; vitamins; minerals)

F. Feeding habits
   (Manner by which birds and mammals feed)
### SUBJECT: MAMMALS AND BIRDS

#### TOPIC

<table>
<thead>
<tr>
<th>IV. LIFE HISTORY (continued)</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 3 2 1 0</td>
</tr>
</tbody>
</table>

**G. Range requirement**
- Feeding; roosting; nesting; escape cover; size; special use; dusting; type seasonal range

**H. Movement and activity periods**
- Daily; nocturnal; seasonal; annual migration; hibernation; estivation; moulting; shedding; flyway used

**I. Mortality**
1. Weather (Rain; snow; sleet; hail; storms; droughts; temperature)
2. Predators (Major; lesser; on young; nest; eggs; adults)
3. Man (Legal; illegal hunting; accidents)
4. Parasites, Disease (Method of transmission; effects)

### Comments:

#### V. MANAGEMENT

**A. Objectives**
(Number of animals per unit of area)

**B. Establishing population trends**
(Purpose; census technique; causes of decline; extinction; beneficial-adverse factors)

**C. Hunting regulations**
(Seasons; time of year; dates; length; split; zones; bag limit; season limit; restriction of male-female shooting; public shooting areas)

**D. Food improvement**
(Agricultural practices; special food producing practices; plots; feeders; winter feeding)

**E. Cover Improvement**
(Planting escape cover; making artificial cover; nest boxes)
### SUBJECT: MAMMALS AND BIRDS

#### TOPIC

<table>
<thead>
<tr>
<th>F. Special cultural practices</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Use of fire; discing; timber harvest; mechanical brush cutters)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. Restocking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Advantages-disadvantages; trapping methods; selection of area to be stocked; methods of establishing on new area)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. Predator control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Need; use of state employees; bounty systems)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:

#### VI. VALUE

<table>
<thead>
<tr>
<th>A. Economic value</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Recreational; monetary; sporting; aesthetic; food; damage)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Public attitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Illegal hunting; special privileges; early hunting seasons)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:

#### VII. MISCELLANEOUS

<table>
<thead>
<tr>
<th>A. Incidents</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Stories; legends; superstitions; mysteries; unusual happenings; other)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:
AN OUTLINE OF CONTENT FOR WILDLIFE EDUCATION IN ELEMENTARY AND SECONDARY SCHOOLS

4 - Topic is essential  
3 - Topic is highly important  
2 - Topic is of some importance  
1 - Topic is of doubtful importance  
0 - Topic should be omitted

SUBJECT: AMPHIBIANS

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

I. CLASSIFICATION AND TYPES

A. Order

B. Family

C. Genus

D. Species

E. Common name

F. Scientific name

G. Types  
(Tree frog; toad; pond frog; newt; salamander)

Comments:

II. CHARACTERISTICS AND IDENTIFICATION

A. Characteristics common to amphibians

B. Identification of external features  
(Size; shape; color; body)

C. Identification of internal features  
(Respective body systems)

Comments:

III. RANGE AND DISTRIBUTION

A. Past distribution  
1. World-wide

2. United States

3. State-wide

4. Local
### SUBJECT: AMPHIBIANS

#### TOPIC

<table>
<thead>
<tr>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

#### III. RANGE AND DISTRIBUTION (continued)

- **B. Present distribution**
  - 1. World-wide
  - 2. United States
  - 3. State-wide
  - 4. Local

  Comments:

#### IV. LIFE HISTORY

- **A. Type habitat preferred**
  - (Water; land; both; other)

- **B. Breeding habits**
  - (Mating voice; time of year; temperature needed; parabon formation; amplexis)

- **C. Egg laying cycle**
  - (Metamorphosis; type eggs laid; incubation; care by adults; placement of eggs)

- **D. Food requirement**
  - (Basic foods for young and adults; duration between meals; manner of collecting; amount)

- **E. Movement and activity periods**
  - (Daily; nocturnal; seasonal; periods of migration; hibernation; estivation)

- **F. Mortality**
  - (Man; weather; natural causes; predators; other)

  Comments:

#### V. MANAGEMENT

- **A. Hunting regulations**
  - (Seasons on frogs; limits; other)

  Comments:
### SUBJECT: AMPHIBIANS

#### VI. VALUE

<table>
<thead>
<tr>
<th>Topic</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Economic value</td>
<td></td>
</tr>
<tr>
<td>(Recreational; sporting; food; monetary; aesthetic)</td>
<td></td>
</tr>
<tr>
<td>B. Public Attitude</td>
<td></td>
</tr>
<tr>
<td>(Illegal hunting; other)</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

#### VII. MISCELLANEOUS

<table>
<thead>
<tr>
<th>Topic</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Incidents</td>
<td></td>
</tr>
<tr>
<td>(Stories; legends; superstitions; mysteries; unusual happenings)</td>
<td></td>
</tr>
</tbody>
</table>

Comments:
If it were necessary to limit this Outline of Content, which of the major topics would be most important. PLEASE RANK THEM IN THEIR ORDER OF IMPORTANCE, using Number 1 as the first in importance.

<table>
<thead>
<tr>
<th>MAJOR TOPICS FOR MAMMALS AND BIRDS</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification and Types</td>
<td></td>
</tr>
<tr>
<td>Characteristics and Identification</td>
<td></td>
</tr>
<tr>
<td>Range and Distribution</td>
<td></td>
</tr>
<tr>
<td>Life History</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

<table>
<thead>
<tr>
<th>MAJOR TOPICS FOR AMPHIBIANS</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification and Types</td>
<td></td>
</tr>
<tr>
<td>Characteristics and Identification</td>
<td></td>
</tr>
<tr>
<td>Range and Distribution</td>
<td></td>
</tr>
<tr>
<td>Life History</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td></td>
</tr>
</tbody>
</table>

Comments:
AN OUTLINE OF CONTENT FOR WILDLIFE EDUCATION IN ELEMENTARY AND SECONDARY SCHOOLS

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUBJECT: FISH</td>
<td>4 3 2 1 0</td>
</tr>
</tbody>
</table>

I. CLASSIFICATION AND TYPES

A. Order
B. Family
C. Genus
D. Species
E. Common name
F. Scientific name
G. Types
   (Game; forage; rough; predatory)

II. CHARACTERISTICS AND IDENTIFICATION

A. Characteristics common to most fish
   (Cold blooded; scales; gills; other)
B. Identification of external features
   (Size; shape of head and body; color; scales; eyes; teeth; fins)
C. Identification of internal features
   (Respective body systems)

III. RANGE AND DISTRIBUTION

A. Past distribution
   1. World-wide
   2. United States
   3. State-wide
   4. Local
### Subject: Fish

#### Topic: Range and Distribution (continued)

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Present distribution</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. World-wide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. United States</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. State-wide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Local</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:

#### IV. Life History

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Type habitat preferred</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Swift, slow moving water; warm, cold water; marine, fresh water; clear, muddy, turbid water)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Reproduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Time of year; behavior of males and females; water temperature; location of nest; how eggs laid or placed; how fertilization takes place; type bottom; catadromous, anadromous)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C. Spawn</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Name of young; care of young; losses of young)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>D. Food requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(List of basic foods for young and adult)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Movement or activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Migration to spawn; daily; nocturnal; reasons for migration; seasonal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F. Life span and size reached</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>G. Mortality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Man; weather; natural causes; predators; other)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments:

#### V. Management

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Objectives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Pounds of fish per acre)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Establishing trends in populations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Purpose; method of census technique)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**SUBJECT: FISH**

### V. MANAGEMENT (continued)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Rating</th>
</tr>
</thead>
</table>
| C. Fishing regulations  
(Daily limit; possession limit; method of taking; public fishing areas; open and closed seasons) | |
| D. Habitat improvement  
(Compounding of waters; fertilization of waters; weed control practices; pollution control) | |
| E. Restocking  
(Advantages-disadvantages; selection of stocking area; methods of establishing in new area) | |
| F. Predator control  
(Need; methods employed) | |

Comments:

### VI. VALUE

<table>
<thead>
<tr>
<th>Topic</th>
<th>Rating</th>
</tr>
</thead>
</table>
| A. Economic value  
(Recreational; commercial; sporting; aesthetic; food; other) | |
| B. Public attitude  
(Illegal fishing; special privileges; early fishing seasons; limits) | |

Comments:

### VII. MISCELLANEOUS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Rating</th>
</tr>
</thead>
</table>
| A. Incidents  
(Stories; legends; superstitions; mysteries; unusual happenings; other) | |

Comments:
AN OUTLINE OF CONTENT FOR WILDLIFE EDUCATION IN ELEMENTARY AND SECONDARY SCHOOLS

4 - Topic is essential
3 - Topic is highly important
2 - Topic is of some importance
1 - Topic is of doubtful importance
0 - Topic should be omitted

SUBJECT: REPTILES

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 3 2 1 0</td>
</tr>
</tbody>
</table>

I. CLASSIFICATION AND TYPES

A. Order
B. Family
C. Genus
D. Species
E. Common name
F. Scientific name
G. Types
   - (Snake - poisonous, non-poisonous;
      Turtle - commercial, non-commercial;
      Lizard - poisonous, non-poisonous;
      Alligator)

Comments:

II. CHARACTERISTICS AND IDENTIFICATION

A. Characteristics common to reptiles
   - (Scales and horny plates; cold blooded; other)
B. Characteristics distinguishing one from another
C. Identification of external features for poisonous and non-poisonous species
D. Identification of internal features
   - (Respective body systems)

Comments:
### III. RANGE AND DISTRIBUTION

<table>
<thead>
<tr>
<th>A. Fast distribution</th>
<th>B. Present distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. World-wide</td>
<td>1. World-wide</td>
</tr>
<tr>
<td>2. United States</td>
<td>2. United States</td>
</tr>
<tr>
<td>4. Local</td>
<td>4. Local</td>
</tr>
</tbody>
</table>

Comments:

### IV. LIFE HISTORY

<table>
<thead>
<tr>
<th>A. Type habitat preferred</th>
<th>B. Breeding habits</th>
<th>C. Nesting or den habits</th>
<th>D. Egg laying cycle</th>
<th>E. Food requirement</th>
<th>F. Feeding habits</th>
<th>G. Movement or activity periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>(land; water; both; trees; other)</td>
<td>(Time of year; temperature required; number of times per year; behavior patterns of adults)</td>
<td>(Location; type structure; defense of territory)</td>
<td>(Size of eggs; number of eggs; color of eggs; way young are born; average number in clutch)</td>
<td>(List of basic foods for young and adult; length or duration between meals; manner of collecting food)</td>
<td>(Crushing; killing first; use of venom; swallowing alive; other)</td>
<td>(Daily; nocturnal; seasonal habits; hibernation; estivation; moulting; shedding)</td>
</tr>
</tbody>
</table>
IV. LIFE HISTORY (continued)

H. Size reached and life span
I. Mortality
   (Man; weather; natural causes; predators; other)

Comments:

V. MANAGEMENT

A. Objectives
   (Maximum size; maximum number; minimum number; reduction of population)
B. Hunting regulations
   (Seasons; limits; method of control)
C. Establishing population trends
   (Purpose; method of census technique; bounty systems)

Comments:

VI. VALUE

A. Economic value
   (Recreational; monetary; sporting; food; aesthetic; other)
B. Public attitude

Comments:

VII. MISCELLANEOUS

A. Incidents
   (Stories; legends; superstitions; mysteries; unusual happenings)

Comments:
If it were necessary to limit this Outline of Content, which of the major topics would be most important. PLEASE RANK THEM IN THEIR ORDER OF IMPORTANCE, using Number 1 as the first in importance.

<table>
<thead>
<tr>
<th>MAJOR TOPICS FOR FISH</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification and Types</td>
<td></td>
</tr>
<tr>
<td>Characteristics and Identification</td>
<td></td>
</tr>
<tr>
<td>Range and Distribution</td>
<td></td>
</tr>
<tr>
<td>Life History</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

<table>
<thead>
<tr>
<th>MAJOR TOPICS FOR REPTILES</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification and Types</td>
<td></td>
</tr>
<tr>
<td>Characteristics and Identification</td>
<td></td>
</tr>
<tr>
<td>Range and Distribution</td>
<td></td>
</tr>
<tr>
<td>Life History</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>Value</td>
<td></td>
</tr>
</tbody>
</table>

Comments:
Mr. T. L. Rodes, Superintendent  
Bossier Parish School Board  
Benton, Louisiana

Dear Mr. Rodes:

Recently a statewide committee was appointed by State Superintendent of Education, Shelby M. Jackson, to study the natural resources and conservation programs of Louisiana in a search for new teaching materials.

Present wildlife populations have been reduced in numbers because of the destruction of habitat for agricultural, industrial, and commercial development. At the same time, the rapidly rising human population has resulted in increased demand for all game species. Both trends are expected to continue in the future; therefore, it is necessary to protect and manage our wildlife resources in the most efficient manner.

Stanley Shaw, an instructor at Louisiana State University and Supervisor of Student Teaching in science at the University Laboratory School, is conducting a study to determine the status of wildlife education in the public, white high schools of Louisiana. This study should provide the State Committee and the Department of Education with much valuable data.

In order to accomplish this status study, an objective testing device must be administered to senior students of high schools to determine their knowledge of wildlife conservation.

We, at the State Department level, are particularly interested in the seniors of your parish participating in the testing phase of this study. The test has been designed so that all students should complete it within forty or fifty minutes. Names of individual parishes or schools will not be used in the report, nor will schools be compared.

Would you please sign the enclosed card indicating whether or not you will assist us in this study. If you are willing to participate, I shall direct all future correspondence to the principals of high schools in your parish.

Sincerely yours,

Howard P. McCollum  
Supervisor of Science
APPENDIX E
March 17, 1960

Mr. P. C. Robert, Principal
Glen Oaks High School
5300 Monarch Street
Baton Rouge, Louisiana

Dear Mr. Robert:

Recently a statewide committee was appointed by State Superintendent of Education, Shelby M. Jackson, to study the natural resources and conservation programs of Louisiana in a search for new teaching materials.

Present wildlife populations have been reduced in numbers because of the destruction of habitat for agricultural, industrial, and commercial development. At the same time, the rapidly rising human population has resulted in increased demand for all game species. Both trends are expected to continue in the future; therefore, it is necessary to protect and manage our wildlife resources in the most efficient manner.

Stanley Shaw, an instructor at Louisiana State University and Supervisor of Student Teaching in science at the University Laboratory School, is conducting a study to determine the status of wildlife education in the public, white high schools of Louisiana. This study should provide the State Committee and the Department of Education with much valuable data.

Your parish superintendent has been contacted regarding the testing phase of this program, and has indicated that he is willing for the high schools in the parish to participate.

The test has been designed so that all students should complete it within forty or fifty minutes. We will need a teacher to administer the test to the seniors—the senior sponsor or the science teacher—and return the test booklets and answer sheets to the State Department of Education.

We, at the State Department level, are particularly interested in the results of the testing phase of this study. Names of students, schools, or parishes will not be used in this report, nor will schools be compared.

Would you please sign the enclosed card indicating whether or not you will assist us in this study. Also indicate the number of seniors in your school so that we will know how many testing booklets and answer sheets to send you.

Sincerely yours,

Howard P. McCollum
Supervisor of Science

Enclosure
Conservation Pledge

I give my pledge as an American to save and faithfully to defend from waste the natural resources of my country - its soil and minerals, its forests, waters, and wildlife.

WILDLIFE CONSERVATION KNOWLEDGE TEST

Howard P. McCollum  
Supervisor of Science  
State Department of Education

Stanley Shaw  
Supervisor of Science  
Louisiana State University

-1960-
INSTRUCTIONS

for taking the

WILDLIFE CONSERVATION KNOWLEDGE TEST

Today you are going to be given the opportunity to work on some questions that will help many people in Louisiana. In doing your best on this test, you will be giving valuable information to hundreds of people who are interested in the things in which many of you are interested—wildlife conservation.

This study is being conducted to find out how much you know about the conservation of mammals, birds, fish, amphibians and reptiles. This same test is being given to other seniors in the white, public high schools of Louisiana.

The scores made on these tests will be used to find out about the teaching of wildlife conservation in our state. Your score will not affect your school grade, so please do your best.

Read each question and its numbered answers. When you have decided which answer is correct, place an "X" in the numbered block on the answer sheet that corresponds to the test question.

WHEN YOU HAVE FINISHED READING THESE INSTRUCTIONS, BEGIN TAKING THE TEST. PLEASE DO NOT MARK ON THIS TEST BOOKLET. IT MUST BE USED BY OTHER PUPILS.
1. The season when wildlife foods are most scarce in Louisiana is:
   1. Summer
   2. Fall
   3. Late spring
   4. Winter

2. The major objective of wildlife managers is to:
   1. Keep lands posted
   2. Maintain wildlife populations at desirable levels
   3. Control predatory animals
   4. Make sure that all game laws are obeyed

3. The greatest wildlife production can be obtained on weedy:
   1. Poor soil
   2. Average soil
   3. Rich soil
   4. Unfertilized soil

4. Wildlife management is best promoted by:
   1. Restoration of food and cover on the land
   2. Killing predatory birds and mammals
   3. Restocking from game farms and hatcheries
   4. Restriction of the kill by man

5. The best way to get wise use of Louisiana wildlife is to:
   1. Make laws
   2. Educate the people
   3. Employ more wardens and rangers
   4. Rent land to hunters

6. The wildlife in Louisiana is the property of:
   1. Wildlife and Fisheries Commission
   2. The landowners
   3. The sportmen
   4. All the people of the state

7. Wildlife is likely to be most abundant in:
   1. Forests
   2. Highly developed farm land
   3. Prairies
   4. Regions in which these three are mixed

8. The study of plants is important to the wildlife manager because:
   1. He must know all the plants
   2. Plants harbor insects
   3. Many plants are poisonous to wildlife
   4. Plants provide food and shelter for wildlife
9. Artificial restocking of game is not a sound management practice except when:
   1. The public clamors for better hunting and fishing
   2. Hunters have difficulty in bagging game
   3. Conservation agencies have funds
   4. Game is not present in suitable areas

10. Recommendations for wildlife harvests should be made by:
   1. Sportsmen's clubs
   2. Police juries
   3. State senators and representatives
   4. Trained wildlife biologists

11. Poaching wildlife refers to:
   1. Feeding wildlife
   2. Cooking wild game
   3. Taking game illegally
   4. Taking game legally

12. The study of wildlife diseases is important because:
   1. Some of these diseases are caught by people
   2. All wildlife diseases are caught by farm animals
   3. The same diseases are caught by plants
   4. Wildlife diseases are easy to control

13. One of the best methods to prevent floods and droughts in streams is to:
   1. Construct large reservoirs downstream
   2. Construct drainage canals along the stream
   3. Fill the low areas along the stream
   4. Stabilize the drainage area of the stream with plants and trees

14. The relationship of a plant or animal to its environment is called:
   1. Flora
   2. Terrestrial
   3. Ecology
   4. Habitat

15. Watersheds are found in:
   1. River flood plains
   2. Swamps
   3. Hilly regions
   4. Prairies and plains

16. An animal which preys on another live animal for food is:
   1. A vegetarian
   2. A scavenger
   3. A browser
   4. A predator
17. Estivation means to:
   1. Travel to other places
   2. Fight for food
   3. Sleep through the summer
   4. Sleep through the winter

18. A nocturnal animal is one that is active:
   1. At night
   2. At dusk
   3. At dawn
   4. During the day

19. The free publication that stresses wildlife in Louisiana is:
   1. 4-H Journal
   2. Conservationist
   3. Outdoor Inn
   4. Conservatist

20. Deer can be aged most accurately by checking the:
   1. Number of antler points
   2. Teeth
   3. Size of antlers
   4. Weight of the animal

21. Animals which feed their young on milk are:
   1. Voracious
   2. Mammals
   3. Cold blooded
   4. Invertebrates

22. The mammary glands of nutria are located:
   1. On the sides of the back
   2. On the belly
   3. Do not exist
   4. In the neck region

23. From the standpoint of the number of pelts sent to market, the most important furbearer in Louisiana is the:
   1. Raccoon
   2. Opossum
   3. Muskrat
   4. Mink

24. An animal that is being accused of causing serious damage in the marshes is:
   1. Alligator
   2. Beaver
   3. Otter
   4. Nutria
25. Rabbit fever is contracted by humans by:
   1. Eating diseased rabbits
   2. Handling infected rabbits
   3. Being bitten by redbugs
   4. Being bitten by a rabid rabbit

26. The mammal most likely to cause the greatest disturbance in the balance of nature is:
   1. Fox
   2. Skunk
   3. Man
   4. Owl

27. The bulk of the food of the red fox consists of:
   1. Mice and rabbits
   2. Farmers' chickens
   3. Quail and woodcock
   4. Song birds

28. The most hunted game animal in the state is the:
   1. Fox
   2. Squirrel
   3. Deer
   4. Cottontail rabbit

29. The beaver:
   1. Is a romantic animal that should not be disturbed
   2. Floods cropland and timber; therefore, should be controlled
   3. Is a very valuable fur animal in Louisiana
   4. Is not present in Louisiana

30. Crayfish are an important food for:
   1. Muskrat
   2. Mink
   3. Beaver
   4. Nutria

31. During the cold months, rabbits:
   1. Hibernate
   2. Estivate
   3. Migrate south
   4. Remain active and feed

32. Rabies is a disease that:
   1. Is carried only by dogs
   2. Occurs in many kinds of animals
   3. Always kills humans
   4. Is harmless to humans
33. Deer antlers are:
   1. Shed every two years
   2. Shed annually
   3. Retained for life
   4. Shed every five years

34. The habitat preferred by the cottontail rabbit is:
   1. Forest land
   2. Intensively grazed pasture
   3. Cotton or cane fields
   4. Brushy areas mixed with cultivated, weedy fields

35. Nutria feed chiefly on:
   1. Birds and small mammals
   2. Fish, oysters, and clams
   3. The basal section and roots of plants
   4. Woody vegetation

36. Deer:
   1. Eat all kinds of tender woody vegetation
   2. Are selective in choosing the kinds of woody plants eaten
   3. Eat only grass
   4. Never eat weeds

37. Based on feeding habits, raccoons are:
   1. Omnivorous
   2. Herbivorous
   3. Grainivorous
   4. Carnivorous

38. Armadillos feed largely on:
   1. Bird eggs
   2. Small animals and birds
   3. Grain and weed seeds
   4. Insects and worms

39. Ordinarily, the maximum number of squirrels can be produced in:
   1. Pine forest
   2. Old oak-hardwood forests
   3. Young oak-hardwood forests
   4. Mixed hardwood-pine forests

40. The removal or killing of hardwood trees in a pine forest:
   1. Reduces the number of squirrels
   2. Makes no difference in the number of squirrels
   3. Increases the number of squirrels
   4. Causes squirrels to eat pine buds
41. Deer should be reduced on over-populated ranges by harvesting:
   1. Only adult bucks
   2. Only does
   3. Young and adult bucks
   4. Any deer

42. Woodlands are good places for deer and turkeys because they:
   1. Provide protection from diseases.
   2. Provide shelter from lightning.
   3. Provide food and shelter.
   4. Provide protection from snakes.

43. The bird in the following list which is not a game species is:
   1. Snipe
   2. Rail
   3. Woodcock
   4. Robin

44. The official state bird of Louisiana is the:
   1. Cardinal
   2. Mocking bird
   3. Brown pelican
   4. White pelican

45. The bat is a:
   1. Bird
   2. Reptile
   3. Amphibian
   4. Mammal

46. The number of quail in an area depends largely on:
   1. The climate
   2. The slope
   3. The number of other birds in the area
   4. The condition and type of vegetative cover

47. The flyway used by most waterfowl coming into Louisiana is the:
   1. Central flyway
   2. Eastern flyway
   3. Pacific flyway
   4. Mississippi flyway

48. Wood ducks commonly nest:
   1. In shrubs and vines
   2. On the ground
   3. In tree cavities
   4. In bank burrows
49. The bobwhite (quail) makes its nest:
   1. On the ground
   2. On tree branches
   3. On other bird's nest
   4. In hollow trees

50. The duck that nests in the marshes of Louisiana is the:
   1. Pintail
   2. Blue goose
   3. Mallard
   4. Mottled duck

51. Turkeys are scarce in Louisiana because:
   1. There is too much illegal hunting
   2. There is very little suitable habitat
   3. There are too many predators
   4. The hunting season is too long

52. The bulk of the woodcock diet consists mainly of:
   1. Earthworms
   2. Ants
   3. Leaves
   4. Seeds

53. The Wilson or jack snipe is normally hunted:
   1. On forest land
   2. At night with a sack and lantern
   3. In wet pastures, rice fields and marshes
   4. In dry hilly pastures

54. The mallard duck feeds largely on:
   1. Vegetative seeds
   2. Minnows
   3. Clams and snails
   4. Plant leaves

55. The normal dove nest contains:
   1. 2 eggs
   2. 4 eggs
   3. 6 eggs
   4. More than six eggs

56. Good dove foods are:
   1. Earthworms and bugs
   2. Grain and weed seeds
   3. Young clover and grass shoots
   4. Succulent plant leaves and stems
57. In a year, one pair of quail ordinarily raise:
   1. Two broods
   2. One brood
   3. Four broods
   4. Three broods

58. Most waterfowl in Louisiana are:
   1. Permanent residents throughout the year
   2. Summer residents only
   3. Transients only during the fall and spring migrations
   4. Winter residents only

59. The goose most abundant in Louisiana is the:
   1. Snow
   2. Canada
   3. Blue
   4. Speckled belly

60. Botulism, a disease that causes heavy losses to waterfowl, is caused by:
   1. Lead poisoning
   2. Crowded conditions
   3. Low water areas
   4. Poisons produced by bacteria

61. Burning the marsh in the fall is desirable because it:
   1. Eliminates the mosquitoes
   2. Provides succulent vegetation for goose food
   3. Drives away alligators
   4. Kills many muskrats

62. Birds are banded in order to:
   1. Show government ownership
   2. Prevent them from being shot by hunters
   3. Assist them in their flight south
   4. Get information about their habits

63. A major cause for the decline in the population of migratory ducks and geese is:
   1. Large bag limits for hunters
   2. Draining marshes and swamps
   3. Alkaline poisoning
   4. Lead poisoning

64. The most hunted game bird in the State of Louisiana is the:
   1. Turkey
   2. Dove
   3. Snipe
   4. Canada goose
65. A migratory bird stamp is needed to hunt:
   1. Coot
   2. Dove
   3. Snipe
   4. Waterfowl

66. Hawks and owls are usually beneficial because they:
   1. Kill rats and mice
   2. Eat weeds and unwanted plants
   3. Help spread plant and tree seeds
   4. Eat waste grain and seeds

67. A bird nearing extinction today is the:
   1. Whooping crane
   2. White heron
   3. Red headed woodpecker
   4. Canada goose

68. Spawning in fish refers to:
   1. Feeding
   2. Migrating
   3. Laying eggs
   4. Caring for young

69. Forage fish are important:
   1. As food for other fish
   2. As predators on other fish
   3. As commercial food fish
   4. As sport or game fish

70. The food chain of a lake or pond means:
   1. The factors which prevent feeding
   2. The limbs of green plants found on the lake bottom
   3. The food items eaten by various aquatic animals
   4. The ripple marks made by the wind and sun on the water

71. Heavy pollution in a stream destroys fish life by:
   1. Reducing the oxygen content
   2. Preventing their free movement
   3. Encouraging growth of other plants
   4. Reducing the carbon dioxide content

72. Microscopic algae are important in water because they:
   1. Reduce pollution
   2. Hide young fish
   3. Serve as a source of oxygen and food
   4. Color the water
73. The creel limit refers to:
   1. The size of fish you can keep
   2. The season you can fish
   3. The number you can catch in one day
   4. The number you can possess at one time

74. Fish are sometimes tagged to:
   1. Show ownership
   2. Prevent sale of game fish
   3. Prevent sale of commercial fish
   4. Determine the rate of harvest

75. Fertilizing a pond is beneficial to fish production because:
   1. It makes the weeds grow better, so that fish have more shade
   2. Fish eat the fertilizer
   3. It kills fish parasites
   4. It increases the number of minute plants and animals which fish eat

76. The best combination of fish for stocking ponds is:
   1. Catfish and bluegill
   2. Bass and bluegill
   3. Catfish and crappie (Sac-a-lait or white perch)
   4. Bass and crappie (Sac-a-lait or white perch)

77. The total fisheries production in a body of water is related to:
   1. The location of the water
   2. The color of the water
   3. The amount of nutrient materials in the water
   4. The sweetness of the water

78. Severe soil erosion affects fish:
   1. Not at all
   2. By clogging the pores of their skin
   3. By making fishing impossible
   4. By preventing the growth of food

79. The best way to provide for better fishing in the state is:
   1. To build more dams
   2. To build more hatcheries
   3. To shorten the fishing season
   4. To restore their natural habitat

80. Grass on land surrounding a pond or stream is of value to fish because it:
   1. Attracts songbirds
   2. Increases water temperature
   3. Attracts insects
   4. Prevents soil erosion
81. Commercial fishing in lakes and streams of Louisiana:
   1. Is detrimental to game fish
   2. Is beneficial to game fish
   3. Destroys waterfowl food
   4. Destroys crayfish population

82. An important commercial fish in Louisiana is the:
   1. Sac-a-lait (White perch or crappie)
   2. Buffalo
   3. Bluegill
   4. Bass

83. Some species of fishes serve man in ways other than food by:
   1. Controlling mosquitoes and other aquatic insects
   2. Feeding upon rubbish at public places
   3. Cleaning up the bottom of lakes
   4. Removing disease organisms from drinking water

84. A non-poisonous snake in the following list is:
   1. Mud snake
   2. Crown snake
   3. Cottonmouth
   4. Canebrake rattler

85. Turtles are:
   1. Crustaceans
   2. Amphibians
   3. Reptiles
   4. Protozoans

86. The number of rattlers on a rattlesnake indicates:
   1. Size of the snake
   2. Sex of the snake
   3. Age of the snake
   4. Number of times snake has shed its skin

87. Snakes which bear their young alive are classed as:
   1. Viviparous
   2. Ooviviparous
   3. Oviparous
   4. Parous

88. The poisonous snake whose venom affects the circulatory system is the:
   1. King snake
   2. Coral snake
   3. Rattlesnake
   4. Bull snake
89. One difference between a snake and a lizard is in:
   1. Leg structure
   2. Eyelid structure
   3. Scale structure
   4. Skin structure

90. Alligators first lay eggs when they are:
   1. 2-3 years old
   2. 5-6 years old
   3. 8-10 years old
   4. Over 10 years old

91. Alligators in Louisiana should be:
   1. Exterminated because they are dangerous
   2. Managed wisely because their hide is valuable
   3. Protected at all times because they eat snakes
   4. Destroyed because they eat too many ducks

92. Many snakes are helpful to game management because they:
   1. Eat crow and owl eggs
   2. Keep hunters out of the woods
   3. Consume many mice and rats
   4. Reduce high bird populations

93. A snake that should be protected at all times is the:
   1. Chicken snake
   2. Rat snake
   3. King snake
   4. Coral snake

94. The tongue of a snake functions:
   1. To frighten enemies
   2. As a sense organ
   3. In swallowing
   4. To inject poison

95. An amphibian used for food by man is the:
   1. Crab
   2. Frog
   3. Turtle
   4. Rabbit

96. Bullfrogs eat many:
   1. Ducklings
   2. Crayfish
   3. Turtles
   4. Snakes
97. In Louisiana, bullfrogs are protected during the months of:
   1. June and July
   2. April and May
   3. February and March
   4. September and October

98. In Louisiana, it is illegal to hunt bullfrogs with:
   1. A stick
   2. A grab
   3. A gig
   4. A net

99. The type habitat preferred by the bullfrog is:
   1. Large, marshy, swamp areas
   2. Small bodies of water
   3. Ordinary ponds and streams
   4. Swift bodies of water

100. A tailed amphibian is:
    1. An alligator
    2. A toad
    3. A lizard
    4. A salamander
### Student Answer Sheet

**Wildlife Conservation Knowledge Test**

<table>
<thead>
<tr>
<th>Check Only One:</th>
<th>Boy</th>
<th>I Live In:</th>
<th>City or Town</th>
<th>Large City</th>
<th>Rural Area</th>
<th>Edge of Town or City</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>2 3 4</td>
<td>61 1 2 3 4</td>
<td>91 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2 3 4</td>
<td>62 1 2 3 4</td>
<td>92 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>2 3 4</td>
<td>63 1 2 3 4</td>
<td>93 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>2 3 4</td>
<td>64 1 2 3 4</td>
<td>94 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>2 3 4</td>
<td>65 1 2 3 4</td>
<td>95 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>2 3 4</td>
<td>66 1 2 3 4</td>
<td>96 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>2 3 4</td>
<td>67 1 2 3 4</td>
<td>97 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>2 3 4</td>
<td>68 1 2 3 4</td>
<td>98 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>2 3 4</td>
<td>69 1 2 3 4</td>
<td>99 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>2 3 4</td>
<td>70 1 2 3 4</td>
<td>100 1 2 3 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>2 3 4</td>
<td>71 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>2 3 4</td>
<td>72 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>2 3 4</td>
<td>73 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1</td>
<td>2 3 4</td>
<td>74 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>2 3 4</td>
<td>75 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>2 3 4</td>
<td>76 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>2 3 4</td>
<td>77 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>2 3 4</td>
<td>78 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>2 3 4</td>
<td>79 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>2 3 4</td>
<td>80 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>1</td>
<td>2 3 4</td>
<td>81 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>1</td>
<td>2 3 4</td>
<td>82 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>2 3 4</td>
<td>83 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>2 3 4</td>
<td>84 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>2 3 4</td>
<td>85 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>1</td>
<td>2 3 4</td>
<td>86 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>1</td>
<td>2 3 4</td>
<td>87 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>1</td>
<td>2 3 4</td>
<td>88 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>1</td>
<td>2 3 4</td>
<td>89 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>2 3 4</td>
<td>90 1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### General Information

Check the items listed that have helped you in taking this test.

- **Biology**
- **General Science**
- **Girl or Boy Scouts**
- **Reading:**
  - Nature Magazines
  - Sportsmen Magazine
- **Radio, TV, Movies**
- **Summer Camp**
- **Going:**
  - Hunting
  - Fishing
VITA

Stanley Shaw was born in Washington, Pennsylvania, on May 3, 1924. He received his elementary and secondary education in the public schools of Washington County, and was graduated in 1942 from Trinity High School, Washington, Pennsylvania.

He served with the Army Air Corps in the Pacific Theater of Operations from 1944 to 1945. After being separated from service in 1946, he enrolled at Louisiana State University and received the Bachelor of Science degree in Education in 1950, and the Master of Arts degree in 1951.

From 1951 to 1954, he taught chemistry at the Istrouma High School in East Baton Rouge Parish. Since 1954, he has served as an Instructor in the Science Department at the University Laboratory School, Louisiana State University, and is presently a candidate for the degree of Doctor of Philosophy in the Department of Education.
EXAMINATION AND THESIS REPORT

Candidate: Stanley Shaw

Major Field: Education

Title of Thesis: An Outline of Content for Wildlife Education and a Study of Wildlife Knowledge of High School Seniors of Louisiana

Approved:

[Signatures]

Major Professor and Chairman

Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

April 25, 1961