

ENHANCING PUBLIC BENEFITS FROM WILDLIFE MANAGEMENT
THROUGH EDUCATION AND COMMUNICATION

by

Gerri A. Pomerantz

April 1987

HDRU LIBRARY

DO NOT REMOVE

COPY



Series No. 87-2



Human Dimensions Research Unit
Department of Natural Resources
New York State College of Agriculture and Life Sciences
A Statutory College of the State University
Cornell University, Ithaca, N. Y.



**ENHANCING PUBLIC BENEFITS FROM WILDLIFE MANAGEMENT
THROUGH EDUCATION AND COMMUNICATION**

by

Gerri A. Pomerantz

April 1987

motivate teachers to look for educational strategies that are engaging to their students and easy to understand. The inherent attractiveness of wildlife among young people makes wildlife ecology a primary candidate as a topic to carry the meaning of fundamental ecological principles to students.

The New York State Education Department (SED) has expressed interest in DEC's participation in enacting the new science syllabus by asking DEC's Division of Environmental Education to provide instructional materials that can be used by classroom teachers in implementing science programs with a focus on ecological concerns. Rather than simply providing a miscellaneous group of instructional materials, however, DEC decided to approach this as an opportunity to influence wildlife education and, more broadly, environmental education in a systematic and comprehensive way.

Enhancing Public Benefits From Wildlife Management Through Education and Communication

Study IX, "Enhancing Public Benefits From Wildlife Through Education and Communication," was designed to assist the BOW's combined efforts with the Division of Environmental Education to identify, select and evaluate educational objectives and strategies that will communicate wildlife management rationales to the public. The first job in this study is the "Formalization of DEC's Wildlife Education Objectives" (Job IX-1). The original plan was for DEC's BOW to develop its wildlife education objectives for fifth grade elementary students and then for a task force of education professionals and DEC representatives to evaluate the objectives and develop a strategy for infusion in the New York State public schools.

The first of these 2 procedures was carried out and is described herein. However, the BOW requested that an intermediary evaluation stage be conducted after DEC's development of the wildlife education objectives and before

submission to the task force. The BOW decided it would be beneficial to have a panel of experts in the field of education evaluate the wildlife education objectives for their comprehensiveness regarding the minimum level of knowledge necessary to develop an understanding of the principles upon which wildlife management are based. Consequently, an Expert Review Panel (ERP) of education professionals was formed to carry out this task.

Study Procedures and Results

The following describes the process used in the formulation of DEC's original wildlife education objectives and the subsequent evaluation of the objectives by the ERP. The major issues raised during this process are summarized. A detailed record of each step in the process and the intermediary products can be found in the appendix.

DEC's Development of Wildlife Education Objectives

On 27 May 1986 Project 146 staff conducted a brainstorming session with biologists from the BOW, sportsmen education coordinators, and a representative from the Division of Environmental Education. The purpose of the session was to develop a preliminary set of wildlife education goals, concepts, and objectives designed to achieve the following overriding goal:

To have elementary school-age children develop awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment.

The 13 workshop participants (Appendix A.3) were divided into 2 work groups and each group developed its own set of wildlife education objectives by the end of the day's session. The products of these 2 groups were summarized by the Project 146 staff and distributed to the workshop participants for their review (Group Reports, DEC Wildlife Education Objectives, Brainstorming Session, Appendix A.4).

3. Dr. Thomas Lickona, Professor, Department of Education, SUNY Cortland; Moral and cognitive developmental psychologist.
4. Dr. George Posner, Associate Professor, Department of Education, Cornell University; Curriculum specialist.
5. Dr. Verne Rockcastle, Professor Emeritus, Department of Education, Cornell University; Elementary science educator.
6. Dr. Charles Smith, Director, Education and Information Services, Laboratory of Ornithology, Cornell University; Wildlife biologist.

Each member received a letter requesting his participation (Appendix D.1), and an abstract of the study's objectives and the role of the ERP (Background Information, Appendix D.2). After all ERP members agreed to participate, each was sent a copy of the "Goals and Concepts for Curriculum Development in Wildlife Education," the corresponding "Instructional Objectives," and directions for the items to include in his individual evaluation (Appendix D.4).

After receipt of the reviews by the 6 individual ERP members, their comments were synthesized by Project 146 staff and organized in the following way:

- (1) A summary was compiled of the main issues raised by ERP members about the suitability of the wildlife curriculum for elementary schoolchildren (Memo - 5 January 1987, Appendix E.1);
- (2) Copies of each member's general comments were made (Appendix E.2); and
- (3) All comments and suggested revisions for particular goals, concepts, or objectives were synthesized in the document "Comments on Individual Goals, Concepts, and Objectives" (Appendix E.3).

These 3 documents were distributed to the ERP for their review prior to the first meeting of the group.

The 3 major issues that emerged as a result of the individual reviews concerned the: (1) appropriateness of teaching wildlife management concepts to fifth graders, (2) discussion of different types of human values of wildlife, and (3) ability to implement a wildlife education curriculum in the public

After comments were made by individual workshop participants, the objectives of the 2 groups were synthesized into the following 4 categories: (1) basic wildlife knowledge, (2) wildlife management concepts, (3) skills, and (4) attitudes (Wildlife Education Objectives, Appendix B.2). Within each category was: (1) a goal statement, (2) list of concepts, (3) specific behavioral objectives, and (4) list of basic and advanced terms that reflected important concepts.

Project 146 staff then correlated the DEC wildlife education objectives with the concepts outlined in the curriculum framework from Project WILD, a curriculum guide for wildlife education developed by the Western Regional Environmental Education Council. The final document developed, "Goals and Concepts for Curriculum Development in Wildlife Education" (Appendix C.1), represented an integration of the concepts from Project WILD and those established by DEC. A separate listing of "Instructional Objectives" (Appendix C.2) represented those classroom objectives developed by DEC that corresponded to the specific wildlife goals and concepts in the first document.

Evaluation of DEC's Wildlife Education Objectives: Expert Review Panel

These 2 documents were then submitted to the ERP for their review. After consultation between the Project 146 staff and the BOW it was determined that to accomplish its objectives effectively the ERP needed to have representatives who would reflect the most important education areas as well as representation from the wildlife management arena. The ERP members and their areas of expertise were:

1. Dr. Michael Duttweiler, Cooperative Extension administrator, Cornell University; Organizational programmer.
2. Jonathan Jansen, graduate student, Department of Education, Cornell University; Educational change strategist.

presented as one means of demonstrating stewardship of natural resources, as one way to influence the environment.

The topic of human values of wildlife was intensely debated and the following solution was suggested. A curriculum should be developed that conveys to children a sense of obligation to living things. The two value positions should be: think before you act and become informed. The curriculum should not indicate that wildlife management is the only way to achieve stewardship, but that it is one tool, the consequences of which can be discussed.

Discussion regarding the extent of curriculum coverage integrated considerations of specific content areas with considerations of teachers' ability to implement such a curriculum in the fifth grade. The cognitive and moral abilities of children (their ability to evaluate and apply ethical judgments) 10-11 years of age were addressed. It was indicated that children this age cannot handle more than 3-4 variables simultaneously which limits the amount of ecological information that can be absorbed. Ecological concepts and examples of wildlife management therefore should be simple. It was emphasized that the length of the curriculum must be dramatically cut if teachers are expected to use it.

The following curriculum format was agreed upon:

- (1) 2/3 ecological information that integrates presentation of ecological principles within considerations of the consequences of human actions, and
- (2) 1/3 management concepts that present actual examples of wildlife management and the results of management practices.

The total curriculum should be confined to 3 pages to have the greatest possibility of being implemented by teachers.

There was a strong feeling that the curriculum should utilize an experiential approach. It was indicated that the advantages of an experiential

schools. Almost all panel members questioned the curriculum approach as presented in the "Goals and Concepts for Curriculum Development in Wildlife Education," but differed in their solutions. Suggestions for curriculum emphasis ranged from a concentration on the intrinsic values of wildlife to an examination of the scope of human/wildlife associations. Likewise, opinions differed on the most appropriate way to organize the curriculum to maximize its utilization by classroom teachers. A complete discussion of the major points surrounding each issue can be found in the 5 January 1987 memo (Appendix E.1).

Each ERP member had an opportunity to review the above information prior to the panel's first meeting on 9 January 1987 (Minutes - Jan. 9, 1987, First Meeting of ERP, Appendix F.2). At that meeting the ERP agreed that the superordinate goal of the wildlife education curriculum should reflect goals in 3 areas: knowledge - for children to understand wildlife; affect - for children to value wildlife; and behavior - for children to demonstrate behavior that enhances wildlife. They felt also that there should be a broadening of the concern for "wildlife" to "living things" in general.

Discussion about the appropriateness of the wildlife education curriculum for fifth graders centered around ecological information, wildlife management concepts, and human values of wildlife. Regarding ecological information, the ERP felt that a focus on wildlife should be nested within a concern for all living things. It was agreed that the presentation of the existence of wildlife management as a means of resource management was appropriate information. However, value-laden discussions of whether wildlife management is necessary needed to be geared to a level that fifth graders could understand. Discussion of specific bureaucratic wildlife management policies was deemed inappropriate. It was suggested that wildlife management be

but would build upon existing information; and (3) the process that teachers and students would use to consider the values associated with decisions to manage wildlife.

The Draft - Wildlife Education Curriculum (Appendix F.4) consisted of 2 parts. Part I built upon the ecological principles espoused in the NYS New Elementary Science Syllabus. It emphasized the interdependence of humans with their environment and used that as the rationale for explaining the obligation that people therefore have to be responsible stewards for wildlife and the environment.

Part II of the Draft - Wildlife Education Curriculum focused on wildlife management as a form of demonstrating stewardship. It developed the concept of wildlife management and indicated the need for students to consider the consequences of decisions to manage or not to manage wildlife resources.

The Draft - Wildlife Education Curriculum was then distributed to the full ERP for their review. The subcommittee reconvened on 11 February 1987 to address the concerns of the full ERP and revise the Wildlife Education Curriculum accordingly. The comments and corresponding revisions were compiled by Project 146 staff in the document, "Comments and Revisions of Draft Wildlife Education Curriculum" (Appendix G.2). This document and the Revised - Wildlife Education Curriculum (Appendix G.3) were then distributed to the ERP for their review prior to the second and final meeting of the entire group.

On 4 March 1987 the full ERP held its last meeting to discuss the Revised Wildlife Education Curriculum and formulate its final recommendations about the curriculum to DEC (Agenda - 4 March 1987, Appendix H.1; Minutes - 4 March 1987, Appendix H.2). The meeting began with discussion about the specific goals and concepts of the revised Wildlife Education Curriculum (WEC). The panel expressed concern about presenting wildlife management as the only form of

approach are that it ignites children's interest and is the best way to affect their values and behavior. By its nature, however, it requires that more time be spent on fewer things, which limits the amount of information that can be covered in the curriculum.

It was suggested that the curriculum be packaged as self-contained components (modules) that would be organized in a hierarchical order of increasing complexity. Everyone agreed that the curriculum would have the greatest chance of success if it was integrated with existing school curricula wherever possible. The wildlife education curriculum could not only help supplement the elementary science syllabus, but the math, history, library, and social studies programs whenever appropriate.

ERP's Development of a Revised Wildlife Education Curriculum

The ERP appointed the subcommittee of Verne Rockcastle and Charles Smith (facilitated by Gerri Pomerantz of the Project 146 staff) to draft a new wildlife education curriculum that would incorporate the above suggestions. The following procedure was agreed upon by the ERP.

- (1) The subcommittee develop a new curriculum draft.
- (2) The new curriculum be distributed for review to the entire ERP.
- (3) Based on the ERP's review, the subcommittee revise the draft.
- (4) The revised draft be distributed to the full ERP.
- (5) The entire ERP meet to discuss the revised edition and formulate its final recommendations.

The ERP subcommittee met on 26 January 1987 to formulate the new wildlife education curriculum. Specific consideration was given to: (1) the need to integrate a sense of stewardship with the presentation of ecological information and management principles; (2) presenting concepts that did not duplicate those already presented in the NYS New Elementary Science Syllabus,

students and teachers. It was indicated that although general ecological and environmental issues are of considerable concern, wildlife management problems are minor by comparison. It was for these reasons that the broad concept of stewardship was chosen for emphasis in the curriculum and why the management concepts in Part II of the WEC were broadened to encompass environmental in addition to wildlife concerns.

Project 146 staff incorporated the changes made to the WEC at the 4 March 1987 meeting and distributed the Wildlife Education Curriculum - Second Revision (Appendix H.4) to the ERP for their final evaluation. Each ERP member reviewed the second revision and a number of minor changes were suggested. The "Wildlife Education Curriculum (Final Revised Edition)" represents the final product of the ERP.

stewardship. It was pointed out that in the curriculum, management is discussed as one form of stewardship and that it might be useful to articulate alternative forms of stewardship. Rather than listing these alternatives, it was suggested that the concept of management be broadened from the traditional wildlife management focus to one that views management as any intentional change, including a decision for nonintervention.

The ERP agreed that the broader concept of management would be beneficial, especially in light of the concern that the curriculum be sufficiently broad-based to be relevant to the concepts an elementary schoolteacher must communicate in the classroom. The broader definition of management would also open up the ways in which students could experientially learn about management and bring it onto a personal level.

With the adoption of this broader definition of management, the ERP felt that Part II of the WEC needed to be broadened to be consistent with the new focus of Part I. The concepts in Part II were therefore edited to indicate their applicability to environmental management as well as to wildlife management. The subordinate goals were also edited to reflect the personal responsibility that students have to be stewards of wildlife and the environment. The 9 March 1987 memo details the specific changes to the WEC that were made as a result of this meeting (Appendix H.3).

The ERP agreed that the (1) broadening of the concept of management, and (2) change in focus of the second half of the WEC from solely wildlife management to wildlife and environmental management would strengthen the curriculum and increase the likelihood of its utilization in the elementary classroom. The point was made that this curriculum will be competing for classroom time with topics like nuclear war, drugs, and teenage pregnancy. Consequently, the information presented must be as relevant as possible to both

- (9) Trying to understand and enhance the conditions of wildlife and wildlife habitat necessitates some form of responsible stewardship.
- (10) Stewardship involves the decision to intervene or not. Intervention may take several forms, one of which is management of living things; another is management of nonliving things; still another is education.
- (11) Management as a form of stewardship can be carried out by individuals, community groups, or government agencies.

Part II

Subordinate Goal (3):

To develop a student population that is knowledgeable about wildlife and environmental management principles and practices.

Subordinate Goal (4):

To develop a student population that can evaluate and apply information about wildlife and environmental management principles and practices.

Subordinate Goal (5):

To develop a student population that can exercise responsible stewardship toward wildlife and the environment.

Concepts:

- (1) Scarcity of any factor essential for survival limits population growth, in which case an abundance of all other factors makes little difference.
- (2) Wildlife and environmental management is the process of modifying those factors that can be controlled by people.
- (3) These factors include nonliving elements, e.g., soil-air-water-space, and living elements, both human and nonhuman.
- (4) Wildlife and environmental management include monitoring (e.g., counting ducks on New York lakes in winter; measuring acidity of mountain lakes), manipulation (e.g., cutting timber, mowing, burning; water diversions such as dams), and regulation (e.g., laws regulating taking game animals; air and water pollution standards).
- (5) Wildlife and environmental management may have positive effects on some wildlife or aspects of the environment and negative effects on others. (e.g., aspen regeneration programs that benefit grouse prevent forest succession to mature hardwoods that would benefit gray squirrel and turkey).

Wildlife Education Curriculum
(Final Revised Edition)

Superordinate Goal:

To have elementary school-age children develop knowledge, skills, and commitment to result in informed decisions and responsible actions toward wildlife and all other living things and their environment.

Part I

Subordinate Goal (1):

To develop a student population that is knowledgeable about wildlife (e.g., birds and mammals).

Subordinate Goal (2):

To develop a student population that has a sense of responsibility/stewardship for wildlife.

Concepts:

- (1) All living things, including people, have basic needs (i.e., Food - Air - Water - Space).
- (2) All living things, including people, operate according to natural laws (e.g., laws of gravitation and thermodynamics) which are fixed and ultimately binding.
- (3) Plants and animals depend on each other in many ways.
- (4) People not only share their environment with other living things, but are an interactive part of that environment.
- (5) Humans can adjust to and alter their environment far more than any other living thing. Therefore, humans have the greatest responsibility for that environment.
- (6) People can analyze factors affecting the environment, predict future trends, and make deliberate decisions based on this information (e.g., identifying sources of air pollution and taking steps to correct the problems).
- (7) Because of the interdependence of plants and animals, the conditions of wildlife and wildlife habitat reflect the quality of the environment for all living things, including people (e.g., the presence of chemical contaminants in fish indicates industrial pollution in the Great Lakes).
- (8) Wildlife is important in the cultural heritage and economic welfare of many regions and groups of people (e.g., for generations, certain Northwest Indian tribes have depended on salmon runs).

Recommendations For Implementation

In its formulation of the WEC, the ERP considered the ways that such a curriculum could best be implemented in the elementary schools (see Minutes - Jan. 9, 1987, Appendix F.2). To summarize their recommendations, they felt:

- (1) The WEC would have the greatest chance for classroom use if it were infused with existing school curricula. Specific correlations between the WEC and school science, social studies, math, and language arts syllabi should be outlined explicitly.
- (2) The lesson plans and activities that will illustrate the individual concepts of the WEC should be packaged as independent modules. This would enable teachers to use those activities they believed complemented the required syllabus the best.

Background information that applies to the individual concepts should be provided for teachers, as well as a list of resources and where they can be found.

- (3) An experiential approach should be used in implementing the curriculum. As many modules as possible should contain activities that require children to have first-hand experiences as active stewards of wildlife and the environment. Although modules should be self-contained, it would be beneficial for the experiential activities to be of a long enough duration to provide continuity through the curriculum and encourage children's involvement and commitment over time.
- (4) A statement of "Rationale" should be included when presenting the WEC to teachers that would explain why the curriculum was created and how it can be used to assist teachers in teaching their content areas.

Conclusions

The final WEC is a different product from the one originally given to the ERP for their evaluation. It represents the combined recommendations of a group of education and natural resource professionals. The curriculum builds upon the ecological principles presented in the New Elementary Science Syllabus, emphasizes the need for students to be responsible stewards of wildlife and the environment, and discusses the role of wildlife and environmental management as a means of demonstrating responsible stewardship.

- (6) Management activities can enhance some types of human behavior and restrict others (e.g., protecting wetlands enhances opportunities for waterfowl hunting but restricts agricultural and commercial development).
- (7) To be responsible stewards, people must be knowledgeable about wildlife and environmental management options and be prepared to consider the consequences of management activities.
- (8) Responsible stewardship also includes personal and community action that benefits wildlife and the environment.
- (9) Because wildlife and the environment mean different things to different people, decisions about their management are often complex and controversial.
- (10) Careful decision making is accomplished through identifying the problem, obtaining and evaluating information, considering alternative solutions and their consequences, and making a choice.

Literature Cited

Adams, C. E. and J. K. Thomas. 1986. Wildlife education: present status and future needs. *The Wildl. Soc. Bull.*, Vol. 14(4):479-486.

This curriculum embodies the components of the definition of wildlife education proposed by Adams and Thomas (1986:480) as, "those teaching and learning processes that introduce information about specific wildlife resources, habitats, ecological interrelationships, conservation, and management strategies into public school and community educational programs."

It was the opinion of the ERP that the WEC goals and concepts as revised represent a legitimate and valuable inclusion in the elementary program. The ERP felt that the WEC and the procedures for its implementation have a strong likelihood of being adopted by teachers and succeeding in the public schools.

It is now up to the BOW to review the WEC and form its own opinion about its content and suggested implementation. Project 146 staff is available to answer any questions and clarify the procedures used to develop this curriculum.

If the BOW is satisfied with the outcome of the ERP, the next step in this study is to form the interagency task force. Because of the change in the study time table due to the evaluation by the ERP, it is imperative that preparation for the next stage begin as soon as possible to avoid any further delays. With that in mind, the Project 146 staff is submitting this report and the WEC to the BOW for its consideration.

- F. ERP's first rewrite of the Goals and Concepts for Curriculum Development in Wildlife Education (Draft - Wildlife Education Curriculum).
 - 1. Agenda - ERP Meeting 9 January 1987.
 - 2. Minutes of 9 January 1987 meeting of ERP outlining the issues of major concern for the Wildlife Education Curriculum and the procedure agreed upon by the ERP to revise the wildlife education materials.
 - 3. Memo - 27 January 1987 describing rationale for Draft Wildlife Education Curriculum.
 - 4. Draft - Wildlife Education Curriculum developed by the ERP subcommittee of Verne Rockcastle and Charles Smith.
- G. ERP's Revised - Wildlife Education Curriculum.
 - 1. Memo - 19 February 1987 outlining ERP members' critique of Draft Wildlife Curriculum.
 - 2. "Comments and Revisions of Draft Wildlife Education Curriculum" detailing individual comments and subsequent revisions of Draft Wildlife Education Curriculum.
 - 3. Revised - Wildlife Education Curriculum.
- H. ERP's second Revision of the Wildlife Education Curriculum.
 - 1. Agenda - 4 March 1987.
 - 2. Minutes - 4 March 1987 meeting outlining points of discussion at the second ERP meeting.
 - 3. Memo - 9 March 1987 summarizing changes made to the Revised - Wildlife Education Curriculum at the ERP meeting on 4 March 1987.
 - 4. Wildlife Education Curriculum - Second Revision.

APPENDICES

- A. DEC biologists brainstorming session at Arnot 27 May 1986.
 - 1. Memo - 28 May 1986.
 - 2. Agenda - DEC Wildlife Education Objectives Brainstorming Session, 27 May 1986.
 - 3. List of Workshop Participants.
 - 4. Group Reports - DEC Wildlife Education Objectives Brainstorming Session.
- B. Establishment of DEC's wildlife education goals, concepts, and objectives.
 - 1. Memo - 12 June 1986.
 - 2. Wildlife Education Objectives
 - 3. Comparison of DEC's Wildlife Education Objectives With Those of Project WILD.
- C. Synthesis of DEC's wildlife education goals, concepts, and objectives with the curriculum framework from Project WILD.
 - 1. Goals and Concepts for Curriculum Development in Wildlife Education.
 - 2. Instructional Objectives.
- D. Request of Expert Review Panel's (ERP) evaluation of the Goals and Concepts for Curriculum Development in Wildlife Education.
 - 1. Participation request letter.
 - 2. Background information.
 - 3. Participation acknowledgement letter.
 - 4. Directions for review of documents, "Goals and Concepts for Curriculum Development in Wildlife Education" and "Instructional Objectives."
- E. ERP's individual evaluations of the Goals and Concepts for Curriculum Development in Wildlife Education and Instructional Objectives.
 - 1. Memo - 5 January 1987 synthesizing major issues raised by ERP members about the suitability of the wildlife education materials for elementary schoolchildren.
 - 2. Copies of general comments made by individual ERP members.
 - 3. Synthesis of comments on individual goals, concepts, and objectives.



New York State College of Agriculture and Life Sciences
a Statutory College of the State University
Cornell University

Department of Natural Resources
 Fernow Hall, Ithaca, N. Y. 14853-0188

Fishery Science
 Forest Science
 Wildlife Science
 Natural Resources
 Resource Policy
 and Planning
 Aquatic Science

Appendix A.1

DATE: 28 May 1986
 MEMO TO: Participants in Arnot Workshop
 FROM: Gerri Pomerantz and Dan Decker
 SUBJECT: Workshop Results

First, let us thank each of you again for making the workshop both productive and enjoyable. Enclosed is a list of workshop participants, the meeting agenda, and the results of each group's brainstorming session.

Please review both groups' results carefully. There is a good deal of overlap between the groups, particularly in the content area for wildlife knowledge. Prior to the regional managers' meeting on June 18th and 19th we would like to synthesize the results of the two groups so we can present an integrated report at the meeting.

It is imperative that we receive your written responses to these results by June 10, 1986 to prepare the synthesis for the managers' meeting on the 18th. Please feel free to suggest modifications, additions, and changes in specific items. Suggestions for synthesis of the two groups' results are welcomed, as well as any new ideas you have as a result of the workshop. Show this summary to your colleagues, get their opinions, and let us know what you think.

If you would like to discuss any aspect of the workshop results or the educational study in general, please call Gerri Pomerantz at (607) 255-2829. We look forward to your responses.

GAP/DJD:mp
 Enclosures

APPENDIX A

DEC Biologists Brainstorming Session at Arnot 27 May 1986

Appendix A.3

LIST OF WORKSHOP PARTICIPANTS

Daniel J. Decker
 Department of Natural Resources
 124 Fernow Hall
 Cornell University
 Ithaca, NY 14853
 (607) 255-2831

Gerri A. Pomerantz
 Department of Natural Resources
 126 Fernow Hall
 Cornell University
 Ithaca, NY 14853
 (607) 255-2829

George Mattfeld
 NYSDEC
 Bureau of Wildlife
 50 Wolf Road
 Albany, NY 12233
 (518) 457-4480

Don Slingerland
 NYSDEC
 Wildlife Resources Center
 Delmar, NY 12054
 (518) 439-8014

Al Breisch
 NYSDEC
 Wildlife Resources Center
 Delmar, NY 12054
 (518) 439-8014

John Major
 Division of Fish & Wildlife
 Bureau of Wildlife
 NYSDEC
 50 Wolf Road
 Albany, NY 12233
 (518) 457-4480

Judy Ford
 Region 3
 NYSDEC
 Division of Fish & Wildlife
 21 South Putt Corners Rd.
 New Paltz, NY 12561
 (914) 255-5453/254

Steve Clarke
 NYSDEC
 Wildlife Resources Center
 Delmar, NY 12054
 (518) 439-8014

Ann Harrison
 Bureau of Environmental Education
 NYSDEC
 50 Wolf Road
 Albany, NY 12233
 (518) 457-3720

Steve Litwhiler
 Region 6
 NYSDEC
 Division of Fish & Wildlife
 State Office Building
 317 Washington St.
 Watertown, NY 13601
 (315) 785-2497

Ron Schroder
 Region 8
 NYSDEC
 Division of Fish & Wildlife
 P.O. Box 57, Rte. 20
 Avon, NY 14414
 Avon - Ext. 293 /716-226-2466

Dick Henry
 Region 3
 NYSDEC
 Division of Fish & Wildlife
 21 South Putt Corners Rd.
 New Paltz, NY 12561
 (914) 255-5453/259

Appendix A.2

AGENDA

DEC WILDLIFE EDUCATIONAL OBJECTIVES BRAINSTORMING SESSION

Arnot Teaching and Research Forest
Cornell University
27 May 1986

- 10:30-11:00: Arrival and Refreshments
- 11:00-12:00: Setting the Stage
Introductions - Dan
Overview of Day's Activities - Dan
Orientation to Background and Purpose - Gerri
Educational Objectives Defined - Gerri
Procedural Specifics - Dan
Identify Work Groups - Dan
- 12:00-12:45: Lunch
- WORK GROUPS - Facilitators: Dan and Gerri
- 12:45-1:30: Brainstorming Wildlife Educational Objectives
- 1:30-2:15: Refining Objectives
- 2:15-2:30: Refreshment Break
- 2:30-3:00: Synthesis and Group Report Preparation
- 3:00-4:00: Group Reports and Further Refinement
- 4:00: End

Appendix A.4

GROUP REPORTS

DEC WILDLIFE EDUCATIONAL OBJECTIVES
BRAINSTORMING SESSION

Arnot Teaching and Research Forest
Cornell University
27 May 1986

Nathan Tripp
Region 4
NYSDEC
Division of Fish & Wildlife
2176 Guilderland Ave.
Schenectady, NY 12306
(518) 382-0680

Ken Kogut
Region 5
NYSDEC
Division of Fish & Wildlife
Route 86
Ray Brook, NY 12977
(518) 891-1370

Gordon Batcheller
Region 9
NYSDEC
Division of Wildlife
600 Delaware Avenue
Buffalo, NY 12402
(716) 847-4550

EDUCATIONAL OBJECTIVES

- To list and explain the various management options faced by man when dealing with the conservation of natural resources, including options such as direct actions, preservation (case study approach probably required).
- To demonstrate that life is a cyclic process from birth to death, and that each wildlife species plays an integral and specific part.
- To list specific natural resources used in everyday activities and to explain how this makes management necessary.
- To describe local land use history, and impacts of these practices on wildlife populations.
- To illustrate differences/distinction between managing individual versus the population.
- To describe life cycle or life history of a species of choice.
- To identify human values toward wildlife and describe how these values are formed.
- To list both positive and negative interactions between wildlife and people.
- To define characteristics of "wildlife" in an ecological context.
- To identify evidence that man is a part of "nature."
- To demonstrate the variety and relative abundance of wildlife species found in several New York habitats: farm, forest, city, water/wetland.
- To identify common wildlife in their natural habitat and describe their role in the ecosystem.
- To illustrate with specific examples (deer, turkeys, peregrines, etc.) how wildlife management has helped restore species adversely affected by man's activities in the past.

Products of Work Group A: Dan Decker, facilitator

The following list of terms represent concepts that a student will have to understand as a prerequisite to meeting the educational objectives that follow.

basic terms (10 year olds)

conservation
preservation
extinction
endangered and unendangered species
nature and natural
species
land use
renewable and nonrenewable resources
land and habitat
consumer
wild, domestic, and feral animals
wildlife

advanced terms (12 year olds)

population dynamics
diversity
ecosystem
management
community
decision making
trophic level
ecosystem cycling
carrying capacity
ecology
niche
succession

Items generated by Work Group A during brainstorming session:

- Appreciation for diversity (example)
- Ability to list components of nature
- Recognize types of plants and animals (example)
- Describe ecological roles of organisms in an ecosystem (process)
- Man as a part of the system (goal) (process)
- Understand and describe life cycle or life history of a species of choice (process)
- Values clarification vis-a-vis wildlife
- Develop species framework into populations and ecosystems - community ecology as students mature (process)
- Wildlife needs habitat
- Recognize and describe impacts of personal daily life on wildlife resources - your decisions and actions make a difference (example)
- Consumers of resource
- Impact of wildlife on people - positive and negative
- Understand management of populations; individuals (process)
- Understand and describe differences between resource and natural resources
- Explain difference between renewable and non-renewable resources
- Relationship between "resources" and the land that produces them (process)
- Illustrate reproductive potential with examples - 1 pair of ____ will give ____ after 1 year, if all lived. What happens to population—growth, stability, decline (example)
- Recognize "wild" origins of common "domestic" plants and animals—man's role and use of resource (example)
- What is management?
- Nature and natural processes exist everywhere—Manhattan and High Peaks are both "natural systems" (example)
- What is conservation?
- What is preservation?
- Recognize legitimacy of management and resource use (killing is OK, cutting trees is OK)

To demonstrate that life is cyclic process—birth, living, dying (process)

Extend listing concept to include abundance, population dynamics

Describe number of seedlings on an acre of land 1 year, 100 yrs. after fire (example)

Present concept of "natural" may be counterproductive

Wildlife exists everywhere

Describe how management has "unendangered" several species (example)

Describe land use history of the student's county or town (example)

Describe wildlife history of the student's county or town (example)

Describe management that would have had to occur to result in a different outcome

What is extinction?

Endangered vs. un-endangered.

Products of Work Group B: Gerri Pomerantz, facilitator

Goal 1 - Create a population that is knowledgeable of wildlife and wildlife management needs.

Objective: . Identify and describe local wildlife species, their habitats, and roles.

Goal 2 - Create the ability to evaluate the quality, significance, validity, and application of information.

Objectives: . Develop investigative skills utilizing such things as field observations, written materials, audio/visual sources, and human contacts.

. Communicate newly acquired knowledge of wildlife and wildlife management in both written and verbal reports.

Goal 3 - Encourage creative thinking and develop problem solving skills.

Goal 4 - Develop a sense of responsibility/stewardship for wildlife.

Objective: . Plan 3 programs at the local community level to benefit wildlife.

Goal 5 - Individual actions and decisions may have a significant impact on wildlife.

Objective: . Explain how your community project impacted wildlife.

Basic Concept 1 - All living resources are renewable.

Objectives: . List characteristics of a renewable resource and give examples for all trophic levels.

. List characteristics of a nonrenewable resource and give examples.

Basic Concept 2 - All living resources live at the expense of other organisms.

Objectives: . Describe 3 local food webs, including one with humans.

. Compare and discuss the causes of death for wildlife and humans.

Basic Concept 3 - All living organisms produce both positive and negative impacts.

Objectives: . List the causes and impacts of overpopulation.

. List ways that a mammal, amphibian, reptile, bird, insect, and fish positively and negatively impacts other species.

Basic Concept 4 - The term management does not always imply negative or short-term impact.

- Objectives:
- . List 3 examples of wildlife management at the local, state, and federal level and explain why management was needed and how it was used.
 - . List 3 agencies involved in the management of the wildlife resource and describe their responsibilities.

APPENDIX B

Establishment of DEC's Wildlife Education Goals, Concepts, and Objectives



New York State College of Agriculture and Life Sciences
 a Statutory College of the State University
Cornell University

Department of Natural Resources
 Fernow Hall, Ithaca, N. Y. 14853-0188

Fishery Science
 Forest Science
 Wildlife Science
 Natural Resources
 Resource Policy
 and Planning
 Aquatic Science

Appendix B.1

DATE: 12 June 1986

MEMO TO: Arnot workshop participants

FROM: Gerri Pomerantz and Dan Decker

SUBJECT: Synthesis of Wildlife Education Objectives

The enclosed listing of wildlife education objectives is based upon your reviews of the workshop results. The results of both groups were consolidated and suggested additions (starred items) were included.

Review of the original items suggested four categories of objectives: (A) Basic Wildlife Knowledge, (B) Wildlife Management Concepts, (C) Skills, and (D) Attitudes. Within each category is: (1) a goal statement, (2) listing of concepts, (3) specific behavioral objectives, and (4) list of basic and advanced terms that reflect important concepts. These objectives were compared to those outlined by Project WILD (PW). Most of DEC's objectives are covered by PW. However, there were some concerns stressed by DEC that were not given similar emphasis in the PW curriculum guide. The last page of the synthesis lists these concerns.

Please note that this synthesis was compiled on Thursday, June 12, 1986. Consequently, any comments received after that date were not included in this report but be assured they will be considered. This represents a first draft of objectives which still needs refinement. As we proceed, we hope we can call upon your expertise and that you will provide us with your critical review.

Please examine these objectives carefully and send your comments to Gerri Pomerantz. Thank you very much for your efforts.

GAP:mp
 Enclosure

Appendix B.2

WILDLIFE EDUCATION OBJECTIVES

A. BASIC WILDLIFE KNOWLEDGE

Goal A. To develop a student population that is knowledgeable about wildlife.

Concept A1. All living elements of an ecological system are interdependent.

Objectives:

- A1.1. To identify and describe local wildlife species, their habitats, and roles in the ecosystem.
- A1.2. To describe the types and relative abundance of wildlife species that reside in the various habitats of New York (e.g., farm, forest, city, water/wetland).
- A1.3. To describe 3 local food webs, including 1 with humans.
- A1.4. To compare and discuss the causes of death for wildlife and humans.

Basic Terms

nature and natural
species
habitat
land and soil
consumer
producer (*)
herbivore (*)
predator (*)
territory (*)
competition (*)
food pyramid (*)
resident vs. migratory (*)
ecosystem (*)

Advanced Terms

diversity
ecosystem
community
trophic level
ecosystem cycling
ecology
niche
succession
territory (*)
home range (*)
biosphere (*)
adaptation (*)
productivity (*)

Concept A2. Living organisms produce both positive and negative impacts.

Objectives:

- A2.1. To describe local land use history and the impacts of land use practices on wildlife populations.
- A2.2. To list both positive and negative interactions between wildlife and people.

*Additions or changes suggested after workshop.

- A2.3. To list ways that a mammal, amphibian, reptile, bird, insect, and fish positively and negatively impacts other species.
- A2.4. To list the causes and impacts of overpopulation.
- A2.5. To describe the role that native wild plants and animals play in creating soil. (*)

Basic Terms

extinction
 endangered and nonendangered species
 land use
 wild, domestic, and feral animals
 nuisance wildlife (*)
 pollution (*)
 human ecology (*)

Advanced Terms

exploitation

Concept A3. All living resources are renewable.

Objectives:

- A3.1. To list the characteristics of a renewable resource and give examples for all trophic levels.
- A3.2. To list the characteristics of a nonrenewable resource and give examples.

Basic Terms

renewable and nonrenewable resources
 wildlife
 energy (*)

Concept A4. Some wildlife populations exhibit cyclic patterns over time.

Objectives:

- A4.1. To describe the life cycle of a local wildlife species.
- A4.2. To illustrate the reproductive potential of a specific wildlife species.

Advanced Terms

population pyramid (*)
 population dynamics
 carrying capacity
 succession

B. WILDLIFE MANAGEMENT CONCEPTS

Goal B. To develop a student population that is knowledgeable about wildlife management principles and practices.

Concept B.1. The term management does not always imply negative or short-term impact.

Objectives:

- B1.1. To list 3 examples of wildlife management; 1 at the local, state, and federal level, and explain why management was needed and how it was used.
- B1.2. To list 3 agencies involved in the management of the wildlife resource and describe their responsibilities.
- B1.3. To differentiate between short-term and long-term management objectives and identify possible conflicts between the two. (*)
- B1.4. To explain how wildlife management can influence interactions between people and wildlife. (*)
- B1.5. To give specific examples of wildlife management programs that have helped restore wildlife species (e.g., deer, turkeys, peregrines, beaver) that were adversely affected by human activities in the past.
- B1.6. To explain the role that DEC has in the management of wildlife. (*)

Concept B2. Natural resource management is necessary to meet the needs of people in modern-day life.

Objectives:

- B2.1. To give examples of natural resources used in everyday life and explain why the management of these natural resources is necessary.
- B2.2. To list and explain the various management options available when dealing with the conservation of natural resources (e.g., direct actions, preservation).

Basic Terms

conservation
preservation
restoration (*)
harvest (*)

Advanced Terms

harvest (*)
decision making (*)

Concept B3. Individual human actions and decisions may have a significant impact on wildlife.

Objective:

- B3.1. To describe how a local community project could (or did) impact wildlife.
- B3.2. To give an example of one of your own actions that impacts wildlife and describe how it does. (*)

Concept B4. Federal, state, and local laws exist to promote the conservation of wildlife. (*)

Objectives:

- B4.1. To identify and discuss some basic wildlife laws.
- B4.2. To differentiate between prohibitive laws (e.g., The Endangered Species Act) and permissive laws (e.g., hunting seasons and bag limits). (*)

C. SKILLS

Goal C1. To develop a student population that has the ability to evaluate the quality, significance, validity, and application of information about wildlife and the environment.

Objectives:

- C1.1. To develop investigative skills utilizing such things as field observations, written materials, audio/visual sources, and human contacts.
 - C1.2. Communicate information about wildlife and wildlife management in both written and verbal reports.
- Goal C2. To develop a student population that thinks creatively and uses problem-solving skills systematically and with ease.

Objective:

- C2.1. To plan 3 programs at the local community level to benefit wildlife.

D. ATTITUDES

Goal D. To develop a student population that has a sense of responsibility/
stewardship for wildlife.

Objective:

D1.1. Implement a local program in your home or community to benefit
wildlife. (*)

Concept D1. People value wildlife in different ways.

Objective:

D1.1. To give examples of different human values toward wildlife.

Appendix B.3

Comparison of DEC's Wildlife Education Objectives
With Those of Project WILD

1. DEC has placed a strong emphasis on knowledge of local wildlife species and application of that knowledge in DEC's management strategies.
2. DEC objectives not specifically addressed by Project WILD include:
 - A1.4. To compare and discuss the causes of death for wildlife and humans.
 - B2.1. To give examples of natural resources used in everyday life and explain why the management of these natural resources is necessary. (Project WILD refers to management of wildlife rather than natural resources in general.)

APPENDIX C

Synthesis of DEC's Wildlife Education Goals, Concepts, and Objectives
With The Curriculum Framework From Project WILD

Appendix C.1

GOALS AND CONCEPTS FOR CURRICULUM DEVELOPMENT
IN WILDLIFE EDUCATION¹

¹Portions of this document contain copyrighted material. This is a working in-house document not to be used for distribution.

GOALS AND CONCEPTS FOR CURRICULUM DEVELOPMENT
IN WILDLIFE EDUCATION

Superordinate Goal:

To have elementary school-age children develop awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment.

Subordinate Goal (1): To develop a student population that is knowledgeable about wildlife.

CONCEPT I: AWARENESS AND APPRECIATION OF WILDLIFE

- A. Humans and wildlife have similar basic needs.
 1. All forms of life depend upon water, oxygen, nutrients, and/or sunlight in some combination.
 2. All living things are affected by and interact with their environment.
 3. Either directly or indirectly, plants support nearly all forms of animal life, including humans.
 4. Wildlife has habitat needs that are much like those of humans, although these needs are satisfied in different ways.

- B. Humans and wildlife share environments.
 1. Wildlife is present in or on nearly all areas of the earth's surface.
 2. Over a period of time, humans and wildlife must adjust or adapt to the environment, alter the environment, or perish.
 3. Wildlife is all around us even though we may not actually see, hear, or otherwise sense its presence.
 4. Wildlife varies from microscopic forms to those over 100 feet in length and occurs in a variety of forms, colors, and shapes.

- C. Humans and wildlife are subject to many of the same environmental conditions.
 1. Both humans and wildlife depend on their habitats.
 2. Habitat is composed of many integrated components including food, water, shelter or cover, space, and the arrangement of these in relation to each other.
 3. The health and well-being of both humans and wildlife are dependent upon the quality of the natural environment.
 4. Environmental change in its various forms affects all life.

- D. Humans have far greater ability to alter or adjust to environments than does wildlife; thus, humans have a responsibility to consider effects of their activities on other life forms.

CONCEPT II: HUMAN VALUES AND WILDLIFE

- A. Wildlife has aesthetic and spiritual values.
 - 1. The aesthetic and spiritual values humans place on wildlife vary from person to person and culture to culture.
 - 2. Human and wildlife relationships are expressed through myths, religious teachings and writings, symbols, ceremonies, and other activities.
 - 3. Humans may find peace and inspiration through study and observation of wildlife, or simply through knowledge of its existence.
 - 4. Human appreciation of wildlife is often expressed through art, music, drama, dance, literature, photography, and other means of creative expression.

- B. Wildlife has ecological and scientific values.
 - 1. Wildlife interacts with its environment and thereby affects the functioning of the ecological system.
 - 2. Wildlife may be used as a barometer of overall environmental quality.
 - 3. Study of the interaction of wildlife and its environment, past and present, helps humans to better understand ecological systems and the effect of human activities on those systems.
 - 4. Study of the physiology, behavior, and needs of wildlife can yield insight into some of the physiology, behavior, and needs of humans.

- C. Wildlife has social and political values.
 - 1. Historically, wildlife affected the development, movement, and size of human societies.
 - 2. Wildlife questions and issues have influenced alliances and conflicts between and within communities, societies, states, and nations.
 - 3. Wildlife issues can affect national, regional, and local political activities.

- D. Wildlife has commercial and economic values.
 - 1. The distribution and abundance of wildlife can affect the economy of an area.
 - 2. Throughout history, humans have utilized wildlife for food, shelter, clothing, and other products.
 - 3. Human use of wildlife directly and indirectly creates job opportunities for people.
 - 4. Some wildlife provides products of commercial value to humans.

- E. Wildlife has consumptive and non-consumptive recreational values.
 - 1. Wildlife-based recreation is of major importance to many millions of Americans.

2. Consumptive wildlife-based activities, such as hunting and fishing, provide U.S. and Canadian citizens with millions of days of outdoor recreation each year.
 3. Non-consumptive activities, such as wildlife photography, painting, feeding, and observation also provide millions of days of recreation annually.
- F. Wildlife has intrinsic value, although humans often only recognize values based upon human wants and needs.

CONCEPT III. WILDLIFE ECOLOGICAL SYSTEMS

- A. Each environment has characteristic life forms.
1. The environment, created and shaped by natural forces and modified by humans, determines what life forms can occupy it.
 2. Each species occupies a niche within the range of environments in which it is found.
 3. All life forms show adaptations to the environments in which they live.
- B. All living elements of an ecological system are interdependent.
1. Plants and animals in ecological systems live in a web of interdependence in which each species contributes to the functioning of the overall system.
 2. Food webs and energy chains illustrate the interrelationships of all living things.
 3. In a naturally functioning ecosystem, life forms and environmental factors interact to keep wildlife populations in a long-term dynamic equilibrium with each other and with their habitats.
 4. Diverse plant communities tend to support diverse wildlife communities.
 5. Some wildlife populations exhibit cyclic patterns over time.
 6. Natural laws are ultimately as binding on human populations as on wildlife.
- C. Variation and change occur in all ecological systems.
1. All forms of life, including wildlife, are affected by changes in their environments.
 2. Wildlife numbers and species compositions are not static but are constantly changing.
 3. There is a trend of continuous replacement of one natural community of life by another.
 4. Natural events and human activities affect the rate and direction of succession.
 5. Living organisms produce both positive and negative impacts.
- D. Adaptation is continuous within all ecological systems.
1. Each habitat is suitable only to those forms that have adapted, over a number of generations, to its ecological conditions.

2. Wildlife adapts to its environment in ways that enable it to survive and maintain its numbers.
 3. Wildlife species differ in their ability to adapt to changes in their habitat.
 4. Species with very specific habitat requirements tend to be less able to adjust to environmental change.
 5. Isolated ecosystems such as lakes and islands may develop specialized life forms, thus making these systems more vulnerable to environmental change.
- E. Living things tend to reproduce in numbers greater than their habitat can support.
1. A population tends to increase in size until limited by one or more factors.
 2. Various mortality factors, such as disease, predation, climatic conditions, pollution, accidents, and shortages of life's necessities, will cause a percentage of any population to die each year.
- F. Each area of land or water, and ultimately the planet, has a carrying capacity of plants and animals.
1. Carrying capacity is determined by climatic, geological, biological, and/or behavioral factors along with human activities.
 2. Carrying capacity may vary from season to season and year to year.
 3. Carrying capacity affects and is affected by wildlife behavior.
 4. The numbers, health, and distribution of wildlife are related to carrying capacity.
 5. Carrying capacity limitations can result in competition between and among domestic animals, wildlife, and humans.

Subordinate Goal (2): To develop a student population that is knowledgeable about wildlife management principles and practices.

CONCEPT IV: WILDLIFE CONSERVATION

- A. Management of resources and environments is the application of scientific knowledge and technical skills to protect, preserve, conserve, limit, enhance, or extend the value of a natural resource, as well as to improve environmental quality.
1. All resource and environmental management practices are limited in their scope and effectiveness.
 2. Wise resource and environmental management can improve the quality of life for wildlife and humans.
 3. Wildlife management practices are limited in their ability to benefit wildlife.
 4. Philosophies, objectives, and practices of various types of resource management are sometimes incompatible with each other, and therefore conflicts and trade-offs may occur.
 5. Natural resource management is necessary to meet the needs of people in modern-day life.

- B. Wildlife is one of our basic natural resources, along with water, air, minerals, soil, and plant life.
 - 1. Nonrenewable natural resources are those which are available on a finite basis, such as minerals and fossil fuels.
 - 2. Wildlife and other renewable natural resources can replenish themselves independently or with human assistance.

- C. Good habitat is the key to wildlife survival.
 - 1. Wildlife is affected by changes in the quality, quantity, and distribution of its habitat.
 - 2. For a wildlife population to sustain itself there must be suitable habitat to support a viable breeding population, not just a few individuals.
 - 3. Most species that are endangered or threatened became so from natural or human-caused changes in their habitat and their inability to adapt or adjust to such changes.
 - 4. Successful reintroduction of wildlife into formerly occupied range may be possible but only if suitable habitat is available.

- D. Wildlife resources can be managed and conserved.
 - 1. Wildlife can be managed to alter its value to humans.
 - 2. Humans have learned management principles by observing natural forces and events through experimentation and research.
 - 3. Conservation of wildlife involves wise and varied uses as well as protection.
 - 4. The diversity and numbers of wildlife present in an area often reflect the nature of human use of that habitat.
 - 5. Habitat management is often the best way to help threatened or endangered species.
 - 5. Management of one species will affect other species in a community.
 - 6. Management of one species will affect other species in a community.
 - 7. For management purposes, wildlife has often been divided into categories such as game, nongame, endangered, threatened, furbearers, and commercial.

- E. Wildlife conservation practices depend on a knowledge of natural laws and the application of knowledge from many disciplines.
 - 1. Wildlife management practices generally developed in a progressive sequence, beginning with regulations, followed by predator control, creation of refuges, stocking programs, and habitat management.
 - 2. Systematic inventory of wildlife populations did not become a common practice until the 1930s, although journals of early explorers reflect considerable variation in historic population levels.
 - 3. Nongame species have recently begun to receive greater and more specific management attention.

4. Scientific knowledge of all aspects of wildlife, including biological and social, is limited but growing.
 5. Wildlife managers use a variety of techniques in management programs, such as information, education, and regulations involving people; as well as inventory, damage control, habitat management, stocking, artificial propagation, transplanting, and direct manipulation of wildlife populations.
 6. Regulated harvest of some wildlife is a management technique.
 7. Regulations are necessary for wildlife conservation but cannot substitute for good habitat or maintain a species whose habitat has been depleted or destroyed.
 8. Some wildlife species are not native but have been introduced to the area they presently occupy. Such introductions create changes ranging from beneficial to harmful.
 9. Adding members to a community or subtracting members from it affects other members of the community.
 10. Acquisition, protection, improvement, and restoration of habitat are considered to be the most beneficial long-range management techniques for wildlife.
 11. Wildlife management programs are based on both biological and social-political considerations.
- F. In the United States, wildlife is considered to be a public resource. Ownership of land or water alone does not secure ownership of wildlife on that land or in that water as it does in some countries.
1. Primary responsibility for most wildlife conservation programs in the U.S. is delegated to government agencies.
 2. States are generally considered to have a greater responsibility for wildlife conservation programs than the federal government.
 3. State wildlife agencies are legally responsible for managing most wildlife on public and private lands within their geographic jurisdictions.
 4. Federal agencies, in cooperation with state agencies, are legally responsible for managing wildlife affecting national interest such as most threatened and endangered species and migratory wildlife.
 5. Private organizations, industrial interests, and individual citizens also conduct wildlife conservation activities.
 6. Privately owned lands continue to provide significant amounts of habitat for wildlife.
 7. Funds provided by consumptive users, not general tax dollars, are the primary source of income for most state wildlife management programs and some federal programs.
 8. Most wildlife exists on land or in waters that are not directly controlled by state or federal wildlife management agencies.
 9. Wildlife agencies manage not only wildlife but also the activities of people who use wildlife.

10. Wildlife agencies employ persons with a variety of scientific training and vocational skills. Competition for jobs in the wildlife field is very keen, and applicants must usually have a college degree.
11. Citizens can become involved in the management of wildlife, habitat, and the environment by direct participation in the political process or through local, state, national, or international organizations.

Subordinate Goal (3): To develop a student population that has a sense of responsibility/stewardship for wildlife.

CONCEPT V: CULTURAL AND SOCIAL INTERACTION WITH WILDLIFE

- A. Human cultures and societies, past and present, affect and are affected by wildlife and its habitat.
 1. All livestock and pet animals were domesticated and developed from wildlife species as humans sought to provide themselves with food, shelter, medicines, and companionship and to satisfy other needs and wants.
 2. Human societies and cultures developed in various ways partly because environmental factors produced different types of plants and animals in different places.
 3. Members of some cultures still depend on wildlife to supply a portion of their requirements for food, shelter, and clothing.
 4. Creative portrayal of wildlife through art, literature, dance, music, and drama is an historic as well as contemporary means of expressing human relationships with wildlife.
 5. Societies and subgroups within a society may have different attitudes toward wildlife and its uses, formed and transmitted by family, community, and other social groups in a variety of ways.
 6. Social attitudes toward wildlife and habitat are affected by the content of various communications media such as books, television, radio, movies, and magazines.
- B. Societies develop programs and policies relating to wildlife and its habitat through a variety of social mechanisms.
 1. Some of the values, ethics, and historical traditions of societies are reflected in their treatment of wildlife and other resources.
 2. Wildlife management programs and policies are developed largely through political, social, economic, and scientific processes.
 3. Other nations and governments have different policies and philosophies relating to wildlife ownership and protection and to habitat management.

CONCEPT VI: WILDLIFE ISSUES AND TRENDS: ALTERNATIVES AND CONSEQUENCES

- A. Human impacts on wildlife and its habitat are increasing worldwide.
1. Demand for wildlife tends to be greater than the supply available.
 2. Human intervention in the environment continues to change plant and animal distribution, diversity, and abundance.
 3. Increasing human populations and technologies often require space and activities that are detrimental to wildlife and its habitat.
 4. Loss and degradation of habitat is considered the greatest problem facing wildlife today.
 5. Human activities are accelerating the rate at which wildlife becomes threatened, endangered, and extinct.
- B. Issues involving wildlife and its habitat are a product of social and cultural trends.
1. Cultural differences and priorities continue to cause conflicts concerning wildlife.
 2. Modernization continues to separate people from direct contact with the natural world. This affects their actions and attitudes toward wildlife.
 3. Economic trends plus increased human population and mobility have important influences on wildlife and its habitat.
 4. Recreational trends affect wildlife and its habitat.
 5. More leisure time and growing pursuit of outdoor activities are increasing the pressures on wildlife and habitat.
 6. Political trends affect wildlife and other natural resources.
- C. Current wildlife issues and trends are complex and involve alternatives and consequences.
1. Public interest and involvement in wildlife continues to grow.
 2. Many wildlife issues involve conflicts between different interest groups.
 3. Historically when conflict between recreational and commercial harvest of a wildlife species became severe, the commercial use has been eliminated.
 4. Native American Indians and other groups at times disagree over certain uses of and rights to wildlife.
 5. Charging an access fee to hunt, fish, camp, recreate, or trap on private land is becoming a more common practice.
 6. Wildlife interest groups are making increasing use of the judicial, legislative, and regulatory systems in seeking their objectives.
 7. Whether uses of wildlife should be consumptive or non-consumptive is of concern to increasing numbers of people.
 8. Among consumptive groups, conflicts often involve how, when, and how much wildlife populations are used.

9. Funding for state wildlife agencies historically has been derived from consumptive user fees.
 10. The levels and methods by which wildlife interest groups should fund wildlife programs are continuing issues.
 11. Recent concerns are that policies are influenced by funding sources rather than from a wider constituency.
 12. Various groups interested in wildlife represent a wide range of philosophies and ethics concerning wildlife and how best to ensure its long range health and viability.
 13. Questions exist concerning efforts to save endangered species for their present and future scientific, biological, aesthetic, economic, social, and intrinsic values.
 14. Controversy exists between some state and federal agencies over the responsibility for management of various wildlife species.
 15. Philosophies and practices in wildlife management have been both supported and criticized by individuals as well as public and private organizations.
 16. The value placed on wildlife is commonly an issue in resource management decisions because value is often intangible and varies from person to person.
- D. Many problems, issues, and trends involving wildlife in other parts of the world are similar to those in this country.
1. Wildlife habitat loss as a result of natural trends or human activities is a condition common among nearly all nations.
 2. Consumptive uses of wildlife have been excessive in some settings and continue as a persistent problem in parts of the world.
 3. Commercial sale of wildlife and wildlife products is controversial and has worldwide implications.
 4. Many wildlife species regularly move across national boundaries, making adoption of international agreements necessary along with formation of international agencies and organizations to ensure protection and management of these species.

CONCEPT VII: WILDLIFE, ECOLOGICAL SYSTEMS, AND RESPONSIBLE HUMAN ACTIONS

- A. Each person as an individual and as a member of society affects the environment.
1. Individual and community lifestyle decisions, including recreational choices, transportation options, housing selections, vocation, food, clothing, and energy use, affect wildlife directly and indirectly.
 2. Personal and community conservation practices, plus social, cultural, and economic values, affect environmental programs and activities.
 3. Wildlife depredation and habitat destruction can be changed by the development and adoption of alternative human lifestyles and social expectations.

4. In determining responsible and ethical actions in relation to wildlife and the environment, individuals must separate desires from actual needs.
- B. Responsible environmental actions are the obligation of all levels of society, starting with the individual.
1. Human activities increasingly determine which species of plants and animals will flourish and which will decline and disappear.
 2. All users of wildlife must respect the rights and property of others, consider effects on the habitat, and observe rules and regulations relating to wildlife.
 3. It is the responsibility of citizens, government, and industry to avoid waste and destructive exploitation of natural resources, including wildlife.
 4. Prosecution for violations relating to wildlife and other natural resources often reflects the community's perception of the importance of those resources.
 5. Public decisions that affect wildlife and the environment are made through social and political processes designed to represent the wishes of the society.
 6. Individuals can influence public processes by voting, demonstrating, lobbying, seeking office, and supporting compatible interest groups.
 7. Private decisions that affect wildlife and the environment are made through personal judgments. Each person makes such decisions on a daily basis, including use of time and energy, consumer choices, vocational and leisure time activities.

Subordinate Goal (4): To develop a student population that has the ability to evaluate the quality, significance, validity, and application of information about wildlife and the environment.

CONCEPT VIII: PROBLEM-SOLVING SKILLS

- A. Knowledge and investigative and evaluative skills are necessary to analyze wildlife issues and evaluate alternative solutions for remediating issues.
1. An individual should be able to use both primary and secondary sources of information (e.g., field observation, written materials, media, and human contacts) and to synthesize data gathered.
 2. An individual should be able to communicate information about wildlife and wildlife management in both written and verbal reports.
 3. Creative thinking and problem-solving skills are necessary to objectively evaluate wildlife issues.

INSTRUCTIONAL OBJECTIVES

Concept I.D.

Humans have far greater ability to alter or adjust to environments than does wildlife; thus, humans have a responsibility to consider effects of their activities on other life forms.

Instructional Objectives:

1. To describe local land use history and the impacts of land use practices on wildlife populations.
2. To list both positive and negative interactions between wildlife and people.

Concept II

Human Values and Wildlife

Instructional Objective:

1. To give examples of different human values toward wildlife.

Concept III.A.2

Each species occupies a niche within the range of environments in which it is found.

Instructional Objective:

1. To describe the types and relative abundance of wildlife species that reside in the various habitats of New York (e.g., farm, forest, city, water/wetland).

Concept III.B.1

Plants and animals in ecological systems live in a web of interdependence in which each species contributes to the functioning of the overall system.

Instructional Objectives:

1. To list ways that a mammal, amphibian, reptile, bird, insect, and fish positively and negatively impacts other species.
2. To describe the role that native wild plants and animals play in creating soil.

Concept III.B.2

Food webs and energy chains illustrate the interrelationships of all living things.

Instructional Objective:

1. To describe 3 local food webs, including 1 with humans.

Concept III.B.3

In a naturally functioning ecosystem, life forms and environmental factors interact to keep wildlife populations in a long-term dynamic equilibrium with each other and with their habitats.

Instructional Objectives:

1. To identify and describe local wildlife species, their habitats, and roles in the ecosystem.
2. To describe the life cycle of a local wildlife species.

Concept III.B.6.

Natural laws are ultimately as binding on human populations as on wildlife.

Instructional Objective:

1. To compare and discuss the causes of death for wildlife and humans.

Concept III.E.

Living things tend to reproduce in numbers greater than their habitat can support.

Instructional Objective:

1. To list the causes and impacts of overpopulation.

Concept III.E.1.

A population tends to increase in size until limited by one or more factors.

Instructional Objective:

1. To illustrate the reproductive potential of a specific wildlife species.

Concept III.E.2.

Various mortality factors, such as disease, predation, climatic conditions, pollution, accidents, and shortages of life's necessities, will cause a percentage of any population to die each year.

Instructional Objective:

1. To compare and discuss the causes of death for wildlife and humans.

Concept IV.A.

Management of resources and environments is the application of scientific knowledge and technical skills to protect, preserve, conserve, limit, enhance, or extend the value of a natural resource, as well as to improve environmental quality.

Instructional Objective:

1. To list and explain the various management options available when dealing with the conservation of natural resources (e.g., direct actions, preservation, etc.).

Concept IV.A.5

Natural resource management is necessary to meet the needs of people in modern-day life.

Instructional Objective:

1. To give examples of natural resources used in everyday life and explain why the management of these natural resources is necessary.

Concept IV.B.1.

Nonrenewable natural resources are those which are available on a finite basis, such as minerals and fossil fuels.

Instructional Objective:

1. To list the characteristics of a nonrenewable resource and give examples for all trophic levels.

Concept IV.B.2.

Wildlife and other renewable natural resources can replenish themselves independently or with human assistance.

Instructional Objective:

1. To list the characteristics of a renewable resource and give examples.

Concept IV.D.1.

Wildlife can be managed to alter its value to humans.

Instructional Objective:

1. To list 3 examples of wildlife management; 1 at the local, state, and federal level, and explain why management was needed and how it was used.

Concept IV.E.1.

Wildlife management practices generally developed in a progressive sequence, beginning with regulations, followed by predator control, creation of refuges, stocking programs, and habitat management.

Instructional Objective:

1. To give specific examples of wildlife management programs that have helped restore wildlife species (e.g., deer, turkeys, peregrines, beaver) that were adversely affected by human activities in the past.

Concept IV.E.11.

Wildlife management programs are based on both biological and social-political considerations.

Instructional Objectives:

1. To differentiate between short-term and long-term management objectives and identify possible conflicts between the two.
2. To explain how wildlife management can influence interactions between people and wildlife.

Concept IV.F.

In the United States, wildlife is considered to be a public resource. Ownership of land or water alone does not secure ownership of wildlife on that land or in that water as it does in some other countries.

Instructional Objectives:

1. To identify and discuss some basic wildlife laws.
2. To differentiate between prohibitive laws (e.g., The Endangered Species Act) and permissive laws (e.g., hunting seasons and bag limits).

Concept IV.F.1.

Primary responsibility for most wildlife conservation programs in the U.S. is delegated to government agencies.

Instructional Objective:

1. To list 3 agencies involved in the management of wildlife resources and describe their responsibilities.

Concept IV.F.3.

State wildlife agencies are legally responsible for managing most wildlife on public and private lands within their geographic jurisdictions.

Instructional Objective:

1. To explain the role that DEC has in the management of wildlife.

Concept VII.A.1.

Individual and community lifestyle decisions, including recreational choices, transportation options, housing selections, vocation, food, clothing, and energy use, affect wildlife directly and indirectly.

Instructional Objectives:

1. To describe how a local community project could (or did) impact wildlife.
2. To give an example of one of your own actions that impacts wildlife and describe how it does.

Concept VII.A.2.

Personal and community conservation practices, plus social, cultural, and economic values, affect environmental programs and activities.

Instructional Objectives:

1. To give examples of different human values toward wildlife.
2. To develop a local program for your home or community to benefit wildlife.

APPENDIX D

Request of Expert Review Panel's (ERP) Evaluation of the
Goals and Concepts for Curriculum Development in Wildlife Education



New York State College of Agriculture and Life Sciences
 a Statutory College of the State University
Cornell University

Department of Natural Resources
 Fernow Hall, Ithaca, N. Y. 14853-0188

Fishery Science
 Forest Science
 Wildlife Science
 Natural Resources
 Resource Policy
 and Planning
 Aquatic Science

Appendix D.1

13 November 1986

Dr. George Posner
 Associate Professor
 Department of Education
 402 Roberts Hall
 Cornell University

Dear Dr. Posner:

In the past, the elementary science program in New York has given little emphasis to environmental education. However, with the current introduction of a new elementary science syllabus in New York State's public schools, the opportunity now exists to strengthen classroom instruction in this area. Through joint efforts of the New York State Department of Environmental Conservation (DEC), the New York State Education Department (SED), and Cornell University we hope to encourage teachers' presentation of information about wildlife and the environment. As an educator with concern for curriculum development, I am asking for your help in this project.

The enclosed background information describes the establishment of a panel of experts to evaluate the content validity of a new set of wildlife education goals and objectives that would be used to achieve the following goal: To have elementary school-age children develop awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment. With your expertise in curriculum development, the insights you could offer in the establishment of a science program with a strong ecological emphasis would be critical to the program's successful integration into the elementary classroom.

I would very much like for you to serve on the Expert Review Panel. I will be contacting you in a few days after you have had a chance to examine the enclosed information. If you would like to discuss the study or if you have immediate questions, please call me at (607) 255-2829.

Sincerely,


 Gerri A. Pomerantz, Ph.D.
 Research Associate
 Human Dimensions Research Unit

GP:mp
 Enclosure

Background Information

The Human Dimensions Research Unit in Cornell's Department of Natural Resources is assisting DEC in identifying and evaluating wildlife education objectives and instructional strategies that will communicate the ecological basis and purposes of wildlife management to students in elementary school. The DEC, as the state agency responsible for the management of wildlife, believes that without public understanding of wildlife management principles, practices, and purposes, support for agency programs will be minimal. The agency has therefore made a commitment to public education, recognizing that before people can understand the rationale for resource management programs, they must first have a good comprehension of basic ecological principles underlying management.

DEC's new thrust in wildlife education coincides with the introduction of a new elementary science syllabus in New York State public schools. The new science syllabus, with its strong ecological emphasis, provides an excellent opportunity for discussion of wildlife management concepts, and wildlife in turn can be a primary vehicle to explain fundamental ecological principles. The need to implement the new elementary science syllabus in the classroom will motivate teachers to look for educational strategies that are engaging to their students and easy to understand. The inherent attractiveness of wildlife among young people makes wildlife ecology a primary candidate as a topic to carry the meaning of fundamental ecological principles to students.

SED has expressed interest in DEC's participation in enacting the new science syllabus by asking DEC's Division of Environmental Education to provide instructional materials that can be used by classroom teachers in implementing science programs with a focus on ecological concerns. Rather than simply providing a miscellaneous group of instructional materials, however, DEC decided to approach this as an opportunity to influence wildlife education, and more broadly, environmental education, in a systematic and comprehensive way. The Bureau of Wildlife and Division of Environmental Education collaborated and developed a set of wildlife education goals, concepts, and instructional objectives designed to achieve the following goal:

To have elementary school-age children develop awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment.

A brainstorming session with DEC biologists, administrators, and educators was organized to identify wildlife education goals. The results were synthesized, sent out for review by workshop participants, and revised based on workshop participants' evaluations. The set of wildlife education goals, concepts, and objectives were then correlated with the conceptual framework from Project WILD, a curriculum guide for wildlife education developed by the Western Regional Environmental Education Council. The final document developed, "Goals and Concepts for Curriculum Development in Wildlife Education," represents an integration of the concepts from Project WILD and those established by DEC. A separate listing of "Instructional Objectives" represents those classroom objectives developed by DEC that correspond to specific wildlife goals and concepts.

DEC's primary objective is to see the public educated about wildlife principles and management practices. And it is with this mission in mind that they would first like to see the wildlife education goals, concepts, and objectives evaluated for their comprehensiveness and ability to achieve the above goal. Once a panel of experts agrees on the validity of these components from the perspective of wildlife education, the educational goals will be submitted to a larger Task Force which will have the job of evaluating them from a broader environmental education perspective. The responsibility of the Task Force will be to compare the wildlife education goals with broader environmental education goals and then to focus on those educational objectives that meet SED's science education goals.

The obstacles to teachers' adoption of new education materials are keen. Environmental education is not a separate subject taught on par with reading, math and the like. It is not our expectation that environmental or wildlife education will receive that level of attention. Our hope is that, with the new emphasis on science education at the elementary level, wildlife education can serve as a vehicle for the transmission of ecological concepts that can be integrated into the elementary science program.

The successful integration of wildlife education materials depends on many things. At the outset, teachers and administrators must be convinced of their soundness and educational value. A diverse group of experts is being asked to evaluate the validity of the wildlife education goals and objectives to ensure this sound educational foundation. Each member of the Expert Review Panel will be asked individually to evaluate the content validity of the wildlife education goals, concepts, and objectives. All the separate evaluations will

be compiled and distributed to the entire group for their review. A half-day meeting of the Expert Review Panel will then be convened to discuss individual perspectives and come to a consensus on the validity of the stated goals, concepts, and objectives. The input of the panel will be used to modify and revise the wildlife education goals and objectives, as necessary, before being submitted to the Task Force for their evaluation vis-a-vis environmental education goals and SED's science education goals.

Gerri A. Pomerantz, Ph.D.
Research Associate
Human Dimensions Research Unit
Department of Natural Resources
Cornell University
2 December 1986



62
New York State College of Agriculture and Life Sciences
a Statutory College of the State University
Cornell University

Department of Natural Resources
Fernow Hall, Ithaca, N. Y. 14853

Fishery Science
Forest Science
Wildlife Science
Natural Resources
Resource Policy
and Planning

Appendix D.3

4 December 1986

Dear ERP Member:

I am very pleased you have decided to participate as a member of the Expert Review Panel (ERP) for establishing wildlife education goals and objectives for elementary schoolchildren. I realize that each Panel member's schedule is packed, so to minimize meeting time I suggest the following procedure.

Each member of the ERP should independently evaluate the enclosed wildlife education goals, concepts, and instructional objectives. Directions for evaluation procedures are attached. Please provide a written statement of your evaluation. Feel free to write directly on the documents, and/or write your comments separately.

After receipt of all five evaluations, I will synthesize the separate reviews and send each ERP member a copy of the synthesis. Once everyone has had a chance to review the synthesis, a meeting of the entire ERP will be convened to discuss individual perspectives and come to a consensus on the validity of the stated goals and objectives.

If it is possible I would like to receive your independent review by the end of December. If this presents a problem, please let me know. Also, please feel free to call me to discuss any questions or comments you have about the enclosed materials.

Once again, thank you very much for your cooperation. I look forward to hearing from you.

Sincerely,


Gerri A. Pomerantz, Ph.D.
Research Associate
Human Dimensions Research Unit

Directions for Expert Review Panel:

The "Goals and Concepts for Curriculum Development in Wildlife Education" are organized in the following manner: The "superordinate goal" represents the goal for the entire program; "subordinate goals" represent the major subdivisions needed to achieve the superordinate goal; and "concepts" relate to the individual subordinate goals. A separate listing of "Instructional Objectives" outlines the classroom objectives developed by DEC that correspond to the respective subordinate goals and concepts.

Assume the superordinate goal is conceptually correct as stated, so that subordinate goals can be analyzed in the context of the superordinate goal.

Do not assume that the goals, concepts, or objectives are necessarily exhaustive or appropriate as classified in the document. It is entirely possible that a critical element may have been omitted.

Please respond specifically to the following items:

- (1) Content Validity - Superordinate Goal: To what extent do you perceive that the superordinate goal is valid for use in curriculum development in elementary science education?
- (2) Content Validity - Subordinate Goals: To what extent do you perceive that the subordinate goals in this model represent the substantive structure of the superordinate goal as stated?
- (3) Content Validity - Concepts: To what extent do you perceive that the concepts in this model represent the substantive structure of the subordinate goals as stated?
- (4) Content Validity - Instructional Objectives: To what extent do you perceive that the instructional objectives in this model represent the substantive structure of the concepts as stated?
- (5) Syntax: (A) To what extent is the sequencing from Subordinate Goal 1 through Subordinate Goal 4 logical and psychologically sound? (B) To what extent is there logical sequencing of concepts within each Subordinate Goal?
- (6) Subjective Analysis: To what extent do you think this model represents a suitable framework for curriculum development in wildlife education for 5th graders?
- (7) Recommended Goals and/or Concepts: Are there other goals and/or concepts perceived as critical?

APPENDIX E

ERP's Individual Evaluations of the "Goals and Concepts for Curriculum Development in Wildlife Education" and "Instructional Objectives"



New York State College of Agriculture and Life Sciences
 a Statutory College of the State University
Cornell University

Department of Natural Resources
 Fernow Hall, Ithaca, N. Y. 14853-0188

Fishery Science
 Forest Science
 Wildlife Science
 Natural Resources
 Resource Policy
 and Planning
 Aquatic Science

Appendix E.1

DATE: 5 January 1987

MEMO TO: Mike Duttweiler
 Jonathan Jansan
 Thomas Lickona
 George Posner
 Verne Rockcastle
 Charles Smith

FROM: Gerri Pomerantz

SUBJECT: Individual Reviews of Wildlife Education Goals, Concepts, and Objectives, and Jan. 9, 1987 Meeting

First, let me thank each of you for the time and effort you spent evaluating the wildlife education materials. The amount of thought and concern that went into your reviews is obvious by the nature and extent of your comments.

I have organized the individual evaluations in the following manner: (1) All comments made by individual Expert Review Panel (ERP) members about particular goals, concepts or objectives have been compiled in the document entitled "Comments on Individual Goals, Concepts, and Objectives." Each reference is listed in the order it appeared in the original curriculum guide with all the comments made about the reference. (2) Copies of everyone's general comments are provided. (3) The main issues raised by ERP members about the suitability of the materials for elementary schoolchildren are highlighted in this memo.

Three major points of concern emerged. First and foremost is the issue raised by George Posner, Associate Professor of Education, Cornell University, of the appropriateness of teaching elementary schoolchildren about wildlife management goals and concepts. Dr. Posner has indicated that the fifth grade classroom is not an appropriate forum for this information. The presentation of ecological information, he said, is sequenced in such a way to convince students that wildlife management practices are beneficial to humans and wildlife.

Dr. Thomas Lickona, Professor, Department of Education, SUNY, Cortland, also thought that the concepts overwhelmingly emphasized the "instrumental value" of wildlife (how wildlife satisfy some human need) versus an "intrinsic value" of wildlife. He indicated that the inherent worth of wildlife should be made a stronger part of the curriculum. The inherent worth concept, he said, should be used as the basis of moral sensibility and the curriculum should build upon children's regard for animals to establish a sense of stewardship for wildlife.

Dr. Charles Smith, Director of Education and Information Services, Laboratory of Ornithology, Cornell University, has indicated the need for children to understand that current human values relating to wildlife evolved from the historical/cultural association of humans with wildlife, and from those historical/cultural values has developed a sense of responsibility for stewardship of the wildlife resource. Dr. Smith emphasized that understanding the history and nature of associations among humans and wildlife (which includes the diversity of human values of wildlife) provides the "bridge" between a comprehension of basic ecological principles and the ability to evaluate management practices and options to make responsible, informed decisions about the management of wildlife resources.

Dr. Lickona, on the other hand, indicated problems with making value diversity a concept. When you raise the discussion of the different values people have regarding wildlife to the level of a "concept," he said, "you either have to seem to sanction all kinds of attitudes or explicitly reject a relativistic stance (which means an explicit judgment that some individual and cultural practices are less ethical than others)." Dr. Lickona pointed out that when you deal with dangers to wildlife and the history of human behavior, it will be obvious that people differ in their values of wildlife. Dr. Mike Duttweiler, Senior Extension Associate, Extension Administration, Cornell University, questioned whether the distinction among intrinsic, ecological, and spiritual values is appropriate in a fifth grade curriculum.

The views expressed regarding (1) the appropriateness of teaching wildlife management concepts and (2) the discussion of different types of human values of wildlife were diverse. Almost all panel members questioned the current curriculum approach, but differed in their solutions, ranging from a concentration on the intrinsic values of wildlife to an examination of the scope of human/wildlife associations.

The third major issue of concern to almost all panel members was the ability to implement such a wildlife education curriculum in the public schools. Dr. Verne Rockcastle, Professor Emeritus, Department of Education, Cornell University, strongly advocated that the curriculum goals and concepts be streamlined and that statements should be phrased in a simple, straightforward manner. Simplification of the curriculum, he said, would make it more easily translated into specific teaching strategies that would maximize the likelihood of use by classroom teachers.

Similar views were expressed by Dr. Lickona and Dr. Duttweiler. Both felt that there was too much material to cover during one academic year and that some of the material was too complex for fifth graders.

Almost everyone suggested either a different approach or a restructuring of the current curriculum. Dr. Lickona said the curriculum should start with Subordinate Goal (3) on Stewardship and that Concepts I-IV should be integrated within Concepts V-VIII. He felt the concepts under Subordinate Goal (3) are more meaningful to children and that youngsters would be more likely to learn the basic ecological information if it was combined with the material on the responsibility that humans have for wildlife.

Dr. Smith also advised restructuring the curriculum (see his memo for specific details). He, like Drs. Lickona, Rockcastle, and Duttweiler, felt that the curriculum should lead the student from the awareness stage through the action stage. His rationale for the reordering of concepts is based on his perception that the historical/cultural association of humans with wildlife led to current human values of wildlife. From these values developed a sense of responsibility for stewardship of wildlife which led to the perceived need for active wildlife management. With the need for active wildlife management is the need for people to be sufficiently well educated so they can evaluate management practices and options and make responsible, informed decisions about the management of wildlife. Dr. Smith felt that reordering and modification of the goals and concepts would help develop the ability to make educated and informed management decisions. Unlike others, however, who saw a need to reduce the amount of information presented, Dr. Smith felt that some key elements of basic ecology were neglected in the curriculum. He indicated a need to strengthen the basic ecology content to assure an understanding of the principles which underlie wildlife management practices.

Specific means of implementing this material in the classroom were suggested. Dr. Lickona said that an experiential approach is the best way to develop both in-depth knowledge and commitment in students. He thought the instructional objectives need to be restructured to reflect an action-oriented approach throughout the curriculum.

Dr. Duttweiler suggested a series of increasingly sophisticated modules that would build upon information presented previously. He felt it would be easier for teachers to infuse these modules into the existing science, mathematics, and social studies curricula.

Dr. Rockcastle shared Dr. Duttweiler's opinion that the curriculum as a whole was too large for effective implementation. He suggested selecting about six of the most important points and designing a workable set of activities and supporting reading, writing, mathematics, discussion, and art materials that would not take up too much space in the regular curriculum.

I have tried to represent your opinions accurately. I realize that there is a large amount of material to review in preparation for Friday's meeting, but this memo should provide a framework for discussion of the major issues. The copies of everyone's written statements will provide more detailed information.

I feel the concerns raised regarding the appropriateness of teaching wildlife management concepts and the discussion of human values of wildlife need to be addressed more fully before we can consider the points made about the ability to implement such a wildlife curriculum in the public schools. It is my hope that the ERP will formulate recommendations on these issues by the conclusion of the meeting.

Due to the limited time, I do not think it will be possible to discuss all the comments made about the specific goals and concepts. No doubt, the most significant ones will be addressed in the discussions of human values of wildlife and program implementation. Additional time will be needed to focus on the level of detail required to rewrite specific curriculum items. I would like for the ERP to consider devoting a second meeting for this effort. Since this additional work was not anticipated of the ERP, I fully understand that you may not be able to commit to increased participation. I hope, though, that each of you will carefully consider staying with the project so that your evaluations of the goals, concepts, and objectives can be used to their greatest advantage.

After the holidays I trust you are relaxed and ready to greet the new year in a spirit of lively cooperation. I look forward to meeting with you all on Friday, January 9, 1987 between 1:30 and 4:30 in Room 1107, Bradfield Tower.

GP:mp

Appendix E.2

COPIES OF GENERAL COMMENTS

DATE: 18 Dec. 86

MEMO TO: Gerri Pomerantz

FROM: *Mike Duttweiler*
Mike Duttweiler

ABOUT: Wildlife Education Curriculum

Let me start with the subjective analysis. I found it very difficult to assess the appropriateness of the outline without a clear sense of how it was anticipated to be implemented. I know that mixes goal and concept identification with implementation stages of program development but that seems the only way to assess the potential "deliverability" of the conceptual package. If this is viewed as a statewide product to be applied in the wide variety of educational settings, then there might be significant problems with the framework.

As outlined, it is a linear curriculum that would likely reach its goal only with relatively long-term, in-class development, that is, the goal would be reached only if the entire package could be developed.

The contrast would be a series of increasingly sophisticated modules (increasing enrichment of basic concepts) which would assure that program goals would be at least partially met even if only a portion of the overall curriculum were able to be used. This alternative structure would have the additional benefit of easier infusion into existing curricula (science, mathematics, social studies) rather than existing as an alternative curriculum.

Some sections seem to be quite sophisticated for elementary level--especially Concepts IVF.-VI and VIII. Modularization would allow these to be treated as independent research or for "advanced" learners.

On to specific comments....

Superordinate Goal 1 does not seem to encompass the concepts identified, lacking dimensions such as the relationship between wildlife and humans and values of wildlife. As stated, it can be interpreted as having only a biological survey orientation.

GOALS AND CONCEPTS

I.3.B. Change "actually" to "always".

I.3.D. Are humans more adaptable than all lifeforms?
Insects? Bacteria?

II.E. In some ways this is a subset of II.D. Should at least identify economic aspects of recreation under II.D?

II.F. How does intrinsic value differ from ecological value or spiritual value? (The argument can be made but does it have to in a 5th grade curriculum?)

III.D.1. Is overstated. What about highly successful exotics?

III.D.5. Implies all lakes and islands are isolated ecosystems.

IV.B.2. Implies that resources will renew themselves if left alone even in disturbed environments.

III.D.5-6. Duplicate entries and numbers.

V.A.3. Certain economic or geographic sectors of our culture depend on wildlife for sustenance.

INSTRUCTIONAL OBJECTIVES

As written, these truly are instructional objectives rather than learning objectives. Might be helpful guidance to teachers to also identify learning objectives, i.e., exactly what do you want the kids to learn and why?

II.1. What about "values of" in addition to "values toward"?

IV.B.2 Not always true.

December 19, 1986

Dr. Gerri Pomerantz
 Department of Natural Resources, Cornell University
 Ithaca, NY 14853

Dear Gerri:

I've just had a chance to go through the materials you sent me. Let me emphasize again that I come to this area as a novice. I'm very much impressed by the obvious content expertise that went into the formulation of the proposed goals, concepts, and objectives for your program. I can also imagine the amount of time that went into bringing it to this level of organization.

Because my own time right now is short (papers to grade and Christmas shopping yet to do!), my comments won't be as thorough or as organized as I'd like. But I hope they'll be helpful in some way.

First, some general comments.

1. I like the superordinate goal. But I think it would be helpful if you broke it down to indicate that it contains three kinds of goals for students:

* Awareness. Understandings of wildlife, the value of wildlife, human impact on wildlife, ways of contributing to wildlife preservation, and so on.

* Affect. An attitude of valuing wildlife, caring about the environments that wildlife require for survival, and being committed to responsible personal behavior and social action that enhances wildlife preservation.

* Action. Developing habits of personal behavior that are respectful toward wildlife; practicing skills involved in constructive social action.

This formulation no doubt reflects my own biases. But my point is that I think it should be clear to teachers and schools that you hope to have impact on all three of these areas. Given the fact that children have strong natural feelings about wildlife, and given the opportunities for positive action, it would be a great shame if schools implemented this as just a cognitive curriculum -- one more information survey.

(The way the superordinate goal is now stated, it's not clear whether you plan to develop awareness and appreciation now and hope for behavioral payoff later in students' lives -- or whether you want them to cross the bridge from attitude to action during the curriculum. Your very last instructional objective, "Develop a local program for your home or community to benefit wildlife," suggests you're thinking of behavior as part of the

curriculum.)

2. Unfortunately, I think several things about the present material could lead to this becoming a cover-the-waterfront survey rather than a program that affects attitudes and behavior as well as knowledge.

* There's a tremendous amount of material covered. The list of concepts seems to me (from my naive viewpoint) to be comprehensive enough for an advanced high school or even college-level course. If you want to maximize chances of teachers working this into an already crowded curriculum, and doing it in a way that touches students' hearts as well as minds, I'd suggest reducing the concepts to a third the present number. What's really important for 5th-graders to know?

* There's too much information before one gets to the action-oriented parts. The sequence now is logical enough: from lots of understanding, context, history, etc. to the notion that we have a stewardship regarding wildlife and how to carry that out. But there are two dangers in that sequence: teachers tend to spend more time on the front part of a curriculum and get rushed toward the end; and students may well get bored by information overload the way it's set up now.

I would start with subordinate goal number 3, dealing with the responsibility we have for wildlife. Concepts V through VIII, I think, provide a rich and manageable wildlife curriculum for 10-year-olds -- and one which touches them more directly and immediately. The really important ideas in the preceding sections could be woven through this material -- and would be more meaningful to kids integrated in this way. They'd have a reason to learn them ("If you want to be able to save wildlife, these are the things you need to know...").

* The focus seems to be on wildlife and living things in general rather than on particular species. I understand the importance of the general understandings. But kids respond better to the particular than the general; it's the particular that arouses empathy and inspires action.

Wouldn't it be possible to develop the important understandings through the in-depth study of, say, one or two species to be found in the students' own community or part of the state? Other species could be brought in more briefly for comparison. Instructional objectives 1 and 2 for Concept III.B.3 do take the local-species approach. But I'm suggesting that this be a much more central organizing

strategy for the curriculum -- which it would have to be to do it well.

If the curriculum were focused in this way on a local wildlife species, it would lead very naturally into instructional objectives like those on page 5 (e.g., "describe how a local community project could or did impact wildlife," "develop a local program," etc.)

3. I think the information on society's management of resources and environments is important; fifth-graders need to know there's a social system out there that affects wildlife and that they can make use of as concerned citizens. But there seems to be more information about this (and perhaps at a greater level of complexity) than 10-year-olds will want to know or remember.

If Piaget is right, understanding the complexity of systems and their interactions requires formal-operational thinking, which 10-year-olds are just beginning to develop. I think it's good to stretch them in this direction, but I wouldn't overtax them.

4. I would like to see a curriculum that is more experiential than this one now seems to be. The instructional objectives now speak largely of asking students to list, explain, describe, and so on. This morning, in connection with some writing I'm doing, I was rereading an account of the Fieldston Lower School, part of the Ethical Culture Schools in Riverdale, N. Y. I visited there last January. Its elementary education program is designed to help children (1) learn about the interdependence of all living things; (2) identify, affectively, with people and other living things; and (3) develop, as a consequence of this learning and identification, a sense of obligation to nurture, protect, and respect all life.

Here is the principal talking about the program: "We want our children to understand and respect the balances in nature, to respond to the needs of living things, to support and consequently to value life. Our 5-and 6-year-olds become caretakers of butterflies and birds. Third-graders become gardeners. Each fourth-grader adopts one tree on the campus and studies it throughout the school year. We do this so our children will come to see themselves as part of and responsible for the natural world around them."

How to frame instructional objectives along these lines? It's through caring that children learn to care, to develop the kind of commitment you speak of in your superordinate goal. And experiential involvement is also the best way to develop in-depth knowledge. I'd like to see the program involve fifth-graders in at least one project that would have real longevity, spanning, say, at least half a year. The study of a local

wildlife situation offers that possibility. But they'd have to get started on it early in the curriculum.

5. The concepts, as they stand, overwhelmingly emphasize the instrumental value of wildlife -- how they satisfy some human need. On page 3, there is one sentence that states, "Wildlife has some intrinsic value..." My experience with elementary school-age children is that they think wildlife, and animals in general, have considerable intrinsic value. There are moral education programs, like Matthew Lipman's "Philosophy for Children," which recognize that "the rights of animals" is a subject which engages children deeply.

Fifth-graders are likely to think eagles and bears and fish have a lot of inherent worth, even rights. How can the curriculum be modified to take into account this moral sensibility and build on a regard they have for animals which their elders typically have in lesser degree?

6. How much time do you expect each of the concept areas to take? The total program? Or is that to be worked out?

Goals and Concepts Document

Concept II A. 1: "The aesthetic and spiritual values humans place on wildlife vary from person to person and culture to culture." This is tricky. What ethical framework will precede this, so it doesn't come across as shallow moral relativism ("Some people like to smash frogs against rocks, some don't...")

Does this really need to be presented as a separate "concept"? When you deal with dangers to wildlife and the history of human behavior, it will be obvious that people differ in their values in this area. But if you lift this to the level of a "concept," you either have to seem to sanction all kinds of attitudes or explicitly reject a relativistic stance (which means an explicit judgment that some individual and cultural practices are less ethical than others).

Concept II C. "Wildlife has social and political values." This is the sort of material that I think could be sacrificed, at this age level, in the interests of streamlining the curriculum.

Concept III: I think all of these understandings of interdependence are extremely important -- but I wonder if they can't be integrated into a unit on stewardship.

Concept VIII: I think this could use some fleshing out. It's obviously less developed than the other concepts. What skills do 10-year-olds need to be able to analyze a wildlife issue, propose and evaluate alternative courses of action, and implement a plan?

The work that Fred Newmann has done on "action learning" at the secondary level might be adapted here.

Instructional Objectives

p. 1: "To list both positive and negative interactions between wildlife and people." Granted, there are some "negative interactions" between wildlife and people, but what's the rationale for making this a prominent instructional objective? Seems to give equal weight to negative and positive aspects of wildlife. Doesn't capture the substantive focus of "appreciation of wildlife."

p. 1: "To give examples of different human values toward wildlife." This seems amorphous and value-neutral to me. See above comments on problems related to making value diversity a concept. If this is retained, it will be very important to instruct teachers in how to handle it, so it doesn't come across as wishy-washy "Some people think this, some think that..."

p. 2: "To describe the life cycle of a local wildlife species." How about "to investigate the life cycle...."

p. 2: "To compare and discuss the causes of death for wildlife and humans." I wonder about the necessity of this as a concept for fifth-graders. A class which grimly reviewed all the factors -- disease, pollution, accidents, shortages -- which assure that "a percentage of any population will die each year" could be emotionally burdensome for at least some children this age. There is already public concern and controversy about school discussions that deal with death, the threat of nuclear war, and other topics that depress children or make them anxious about the future.

I wonder if the parallel between wildlife vulnerability and human vulnerability can be made in a way that is sensitive to children's need for security and optimism and to public ambivalence about discussing human death in the elementary grades.

p. 5: Again, I really like the instructional objectives on this page because they reflect the emphasis on stewardship.

I hope at least some of this is helpful, and that it reaches you in time. All best for the holidays, and I'll see you in January.

Sincerely,

Tom Lickona

Tom Lickona



Cornell University

77

New York State College of
Agriculture and Life Sciences

Department of Education
Roberts Hall
Ithaca, NY 14853-5901

December 12, 1986

Gerri A. Pomerantz
Research Associate
Human Dimensions Research Unit
Department of Natural Resources
Fernow Hall
Cornell University

Dear Gerri:

I have reviewed the Goals and Concepts for Curriculum Development in Wildlife Education, and I am ready to give you my comments on the document.

Generally speaking, I think the document is competently prepared and reflects a very knowledgeable approach to curriculum development. It is comprehensive and makes a great deal of sense. The subordinate goals seem logically related to the superordinate goals; the concepts, in turn, seem to be related to the subordinate goals. The examples of instructional objectives that are supplied seem to contribute relatively little to the development of the ideas in the document. They seem less like objectives and more like possible evaluation items. There is always the danger that when we start aiming at our indicators of success, we get neither good evidence nor good instruction.

My major criticism of the materials is its emphasis on, and even inclusion of the wildlife resource management goals and concepts. This emphasis appears to me to be, on the one hand, overly self-serving for the DEC and, on the other hand, inappropriate for elementary school children. Although much of the content, particularly the ecological content, in the document seems reasonable and accurate, its role in the curriculum seems to be in convincing students that practices of the DEC are beneficial to humans and wildlife. This hidden agenda is accomplished in various ways: by the sequence of concepts, by the sharp distinction between humans and wildlife, and by the emphasis on habitat management as the key to wildlife survival.

Concepts 4, 5 and 6, that is, those concepts under Subordinate Goals 3, are particularly noxious and self-serving. I cannot agree that a child in the fifth grade needs to learn that "funding for state wildlife agencies historically has been derived from consumptive user fees" (page 9), that "recent concerns are that policies are influenced by funding sources rather than from a wider constituency" (page 9), or that "systematic inventory of wildlife populations did not become a common practice until the 1930's..." (page 5).

Gerri A. Pomerantz
December 12, 1986
Page 2

Clearly this curriculum is more concerned with justifying state agencies than it is with educating children regarding the relationship between humans and their environment. Why should wildlife education be separated from other aspects of environmental education? Why is it that the curriculum, after mentioning that wildlife includes microscopic forms of life, never mentions any form of wildlife other than those regulated by the DEC and other similar state agencies? How much of the curriculum relates to one-celled animals and insects? Some of the instructional objectives are particularly problematic. For example, consider the one on the bottom of page 3, "to list three examples of wildlife management; one at the local, state, and federal level, and explain why management was needed and how it was used." This instructional objective does not leave open the possibility that management was not needed and was counterproductive.

Along with these general comments, more specific comments can be found in marginal notes on the documents that are enclosed.

I look forward to the comments of others on the panel.

Sincerely yours,



George Posner
Associate Professor of Education

/bmo
Enc.

405 Roberts Hall, Cornell
Ithaca, N.Y. 14853
December 11, 1986

Dr. Gerri Pomerantz
126 Fernow Hall
Campus

Dear Gerri,

I have looked over the materials you left with me regarding the goals, concepts, and instructional objectives for the Wildlife Education project, and in addition to whatever comments I have penned in the margin of the goals and concepts section, offer these general comments:

1. The whole outline appears to have had a lot of thoughtful input, is carefully done, and is very complete. In fact, my one over-all comment would be that it may be too broad for efficient use.
(Comment on that later)

2. In some places, the outline seems more focussed and substantive than in others. For example, in the early sections of the Goals and Concepts, I found the sub-sections meaty. But when I got to Concepts IV and V, my impression was that the sub-sections were not equivalent in substance to earlier ones. B(1) on page 5, as an example, is a definition, and as such seems not equivalent to other, more substantive statements or ideas.

3. (A minor point, but one that I, personally, look at when going over theses . . .) In the Instructional Objectives, Concept ID., and all those that follow, with the exception of Concept II, are statements. Concept II is not. If it were put in the form of the others, I think that the instructional objective supporting it would be better focussed.

With regard to the extent and complexity of the outline, I don't honestly see how what you would create to cover this could possibly be implemented in the elementary school. They already feel crowded. What would they feel to have thrust upon them a sort of total curriculum in addition to what is already a mandate from the State? At least that's the way they might look at it.

My own feeling would be to take selected portions of what you have outlined in the Goals and Concepts (perhaps a half-dozen of the more important points), design a tight, eminently workable set of activities and supporting reading, writing, math, discussion, and art materials that don't make too big a wedge in the regular curriculum, and limit the effort to that. What I'd hate to see happen is that a lot of time, effort, and expense go into development of a full-blown wildlife curriculum, only to have it be unused because of the sheer magnitude, or even perceived magnitude of it.

Perhaps it is your intent not to flesh out the whole package you have shared with me, but to focus on certain parts of it. In any case, you

know I am interested and ready to help in whatever way I can.

In summary, it is generally good, very complete, and shows a lot of thoughtful input. I am impressed. Just don't let the magnitude of it get in the way of implementation.

Sincerely,



Verne N. Rockcastle
Professor, Science & Environmental
Education (emeritus)

405 Roberts Hall, Cornell
Ithaca, N.Y. 14853
December 11, 1986

Dr. Gerri Pomerantz
126 Fernow Hall
Campus

Dear Gerri,

After taking my earlier notes to your office, I noticed that in a subsequent couple of pages you asked for responses by the Expert Review Panel to specific questions. I had neglected to respond to those specifics, so I returned for the Goals and Concepts, and present the following for your perusal:

(1) Content validity

My only reservation with the superordinate goal is that it contains some terms that I find difficult to deal with because of their vagueness. The term "awareness" is often used in environmental goal statements. Awareness is such an idiosyncratic thing, so difficult to define and measure, that among some curriculum developers it simply is not used. I, myself, prefer "understand" (because I can assess this), or "demonstrate" (because I can assess that, too). But I would have the same difficulty with "awareness" that I do with "appreciation" or "commitment."

For superordinate goal statements, they may be O.K. In fact, they are part and parcel of my own thinking and intent. But if I were to ask you, yourself, what was meant by "commitment," you might have a difficult time delineating particulars. If I were to ask a teacher to teach so that pupils would be committed, I'm not at all sure he or she would know what to do. I would find it difficult to break these down into manageable units that I could implement and assess. I find nothing wrong with the implied direction of the superordinate goal, merely in extracting from it steps of action and assessment.

(2) Content validity -- subordinate goals

It is with the substantive structure of superordinate goals #3 and #4 that I have a problem. Not in their intent, but in the way they are stated. For example, I do not know what "a sense of" really means. How would I know when one "has a sense of" responsibility or stewardship?

There are those (among them, many of my colleagues) who still poke fun at behavioral objectives. And yet, in the final analysis, one must assess in terms of behavior, even if it is only the behavior of putting a check in a certain box. Until someone acts, I don't know what has happened inside him; I can only infer or guess. And both of those, unfortunately, are tenuous at best. So in regard to Subordinate goal #3, I would much prefer something such as:

To develop a student population that understands the intricacies of human interaction with wildlife, and acts in a way to enhance that interaction.

This probably has limitations, too, but at least soft, unfocussed phrases such as "a sense of" are eliminated. Also, the idea of action, which can be observed and measured is included.

(3) Content validity -- concepts

Most of these are pretty good. I have commented on them in my earlier letter. I do wish, however, that fewer were stated so that the whole curriculum were "tighter," and thus less formidable in its entirety than I think it will prove to be.

(4) Content validity -- instructional objectives

In general, O.K.

(5) through (7) -- Syntax, Subjective analysis, and recommended goals and/or concepts

As I look all this over again, it seems to me that the whole package is unnecessarily loaded with pedageese. I guess I am one of those simple-minded (different from simpleton-minded) people who prefers few letters to many letters, few syllables and short sentences to verbosity, and short-cuts to lengthy, complex elaborations. It just seems to me that a compact, straightforward, more simple working set of goals would get the job done more cleanly and in a way that would invite teachers' participation.

My own working routine is to generate not more than, say, twenty simple-stated concepts, then rank those from simple to complex that would suggest curricular development, and finally put them into a teaching package. I am enclosing such a set of concepts that I developed for a K-6 curriculum on the particulate nature of matter. Compared to the broad, vague "conceptual scheme" that N.S.T.A. developed some years ago, these concepts look over-simplified. Yet so far as I know, nothing ever came of N.S.T.A.'s conceptual schemes; they were looked at, discussed, and remained as written. I think the reason was that they were just too "chiffon pie" for isolation and action.

On the other hand, the ones you see on the accompanying sheet, because they were easily translated into a teaching strategy, became an honest-to-gosh package used by hundreds of thousands of children -- who understand the particulate nature of matter!

Sorry if I, myself, have used many words to make a point, Gerri. I'll be much briefer in the future!

Sincerely,



Verne N. Rockcastle

A List of Concepts About Particles

For Grades K-6

1. A container "full" of a substance may still have room in it for other substances.
2. A tiny bit of something may appear different from a large mass of the same stuff; conversely, a large mass of something may appear quite different from a tiny bit of the same stuff.
3. Many things can be broken into bits too small to be recognized, yet retain the same properties of the bigger pieces.
4. Some substances can pass through objects or materials that don't appear to have holes.
5. Large masses of tiny particles sometimes can flow much as liquids do.
6. Liquids can move by themselves between two surfaces that are close together, or that even seem to be touching.
7. Some substances can be added to water without increasing the volume by as much as was added.
8. Particles too small to be seen without a microscope can sometimes be seen by reflected light.
9. Masses and motions too small to be observed individually sometimes can be observed if a lot of them are lumped together.
10. Small particles and soluble substances can spread through a liquid even though the liquid is neither heated nor stirred.
11. Regardless of size, particles in fluids tend to move away from where they are most concentrated . . . to places where they are the least concentrated.
12. Substances vary in the ease with which they pass through membranes.
13. A membrane that will not permit some substances to pass through it may still permit others to pass through it.
14. Some substances that cannot pass through a membrane before dissolving can do so after dissolving.
15. Two chemicals that react always do so in the same proportions; the reaction stops when the one present in the lesser amount (proportionally) gets used up.
16. Some things that cannot be seen can be sensed in other ways, with almost equal certainty.
17. An inference, when arrived at in several different ways, or which is the result of considerable evidence, may be as certain as an observation.

18. Most of what is "known" about molecules and atoms (as well as smaller particles) is the result of inference based on countless observations; the particles themselves have never been seen.
19. Even the most widely accepted "facts" about sub-visible particles may be changed as future evidence, and more careful inferences, develop.
20. There is a constant trend toward disorder among the particles on Earth, so that although Man strives to assemble materials and make "neat" objects, Nature is forever wearing them away, changing them, or disassembling them.

MEMORANDUM



SUBJECT: Review of "Goals and Concepts for Curriculum Development
in Wildlife Education"
DATE: 23 December 1986
FROM: Charlie Smith *Charlie*
TO: Gerri Pomerantz

As you requested, I've reviewed the enclosed materials. I have several comments to offer, ranging from very general to very specific. I'll cover my general observations in this memo. My more specific questions or comments are included in the margins of the proposal itself. Below, I'll respond in general to the items you specifically wanted addressed in the order in which you presented them in your letter of 8 December.

(1) Content Validity--Superordinate Goal: The statement of the Superordinate Goal could be improved with a more explicit statement of the usual cognitive steps that might lead to a heightened perception of wildlife and wildlife management. Something like the following illustrates what I mean: To communicate information and develop skills among elementary school-age children leading to development of levels of awareness, knowledge, understanding, insight, appreciation, and commitment that result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment in general.

(2) Content Validity--Subordinate Goals: I believe that an additional Subordinate goal needs to be added to serve as a "bridge" or transition between the basic ecology and the basic wildlife management information. I suggest something like the following for an additional Subordinate Goal 1A: To develop a student population with an understanding of the history and nature of associations among humans and other wildlife. Under Item 5, below, I offer further suggestions for a revised sequencing of subordinate goals and concepts that will take this additional subordinate goal into consideration.

(3) Content Validity--Concepts: The information content of the model can be substantially strengthened in the area of basic ecology. The nature of the hierarchical organization of natural systems above the level of the individual needs more emphasis and working definitions of species, population, community, and ecosystem need to be presented. Once that information is developed it should be easier to talk about phenomena like wildlife mortality at the population level, habitat management at the community level, and nutrient cycles and energy flow at the ecosystem level. As it stands now, some key elements of basic ecology, necessary to assure a sound understanding of the basic ecology which underlies wildlife management practices, have been neglected. Other facts or concepts related to basic ecology are rather poorly handled. See my specific comments on the proposal for some examples.

(4) Content Validity--Instructional Objectives: See my comments under Item 3, above. In addition, the model seems to assume that active, manipulative wildlife management is necessary, but the rationale for that premise is rather poorly developed. The sequencing I've suggested under Item 5 might help to develop that rationale somewhat more strongly.

(5) Syntax: (A) I recommend adding the Subordinate Goal stated under Item 2, to be inserted between the existing Subordinate Goals 1 and 2, to serve as a bridge between basic ecology and wildlife management. With insertion of the new Subordinate Goal between Subordinate Goals 1 and 2, I would leave the present sequencing of the Subordinate Goals intact, but I would change substantially the order of development of concepts. (B) In the context of their associated Subordinate Goals, I recommend sequencing the presentation of concepts as follows: Subordinate Goal 1 includes Concepts I and III; Subordinate Goal 1A (new) includes Concepts V and II (in that order); Subordinate Goal 2 includes Concept IV only; Subordinate Goal 3 includes Concepts VII and VI (in that order); Subordinate Goal 4 includes Concept VIII only. The final sequencing of concepts now has the following order, using the numbering system of the proposed model: I, III, V, II, IV, VII, VI, VIII. My rationale for this sequence is based on my perception that current human values relating to wildlife evolved from the historical/cultural association of humans with other wildlife. From those values has developed a sense of a responsibility for stewardship leading to the perceived need for active wildlife management and the need for a population of humans sufficiently well informed to evaluate management practices and options and make responsible, informed decisions about management of the wildlife resource. Elucidation of the historical/cultural processes whereby human activities and human values have become intertwined with other wildlife seems to me to be the logical bridge between the basic ecology of wildlife and wildlife management, hence my recommendation for adding Subordinate Goal 1A to address those concepts.

(6) Subjective Analysis: The proposed model represents an adequate beginning for considerations of curriculum development in wildlife education for fifth graders, but it still needs a lot of work, as I've already noted.

(7) Recommended Goals and/or Concepts: See my comments in the margins of the report and under Items 2 through 5 above.

I hope my comments are helpful, Gerri. If you have questions or wish clarification of anything I've said, I will be back in my office on 5 January. I look forward to our meeting on 9 January.

Appendix E.3

COMMENTS ON INDIVIDUAL GOALS, CONCEPTS, AND OBJECTIVES

Reference: Superordinate Goal:

ERP
Member

To have elementary school-age children develop awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment.

- Comments:
1. ". . . responsible behavior, and constructive actions . . ."
Hidden agenda? Posner
 2. ". . . develop awareness . . ."
This almost defies definition or analysis; it is too vague. Rockcastle
 3. ". . . commitment . . ."
This is also a vague term, sounds nice but in this form is difficult as a goal. Rockcastle
 4. I like the superordinate goal. But I think it would be helpful if you broke it down to indicate that it contains three kinds of goals for students:

* Awareness. Understanding of wildlife, the value of wildlife, human impact on wildlife, ways of contributing to wildlife preservation, and so on.

* Affect. An attitude of valuing wildlife, caring about the environments that wildlife require for survival, and being committed to responsible personal behavior and social action that enhances wildlife preservation.

* Action. Developing habits of personal behavior that are respectful toward wildlife; practicing skills involved in constructive social action.

This formulation no doubt reflects my own biases. But my point is that I think it should be clear to teachers and schools that you hope to have impact on all three of these areas. Given the fact that children have strong natural feelings about wildlife, and given the opportunities for positive action, it would be a great shame if schools implemented this as just a cognitive curriculum—one more information survey.

(The way the superordinate goal is now stated, it's not clear whether you plan to develop awareness and appreciation now and hope for behavioral payoff later in students' lives—or whether you want them to cross the bridge from attitude to action during the curriculum. Your very last instructional objective, "Develop a local program for your home or community to benefit wildlife," suggests you're thinking of behavior as part of the curriculum. Lickona

4. Content Validity—Superordinate Goal: The statement of the Superordinate Goal could be improved with a more explicit statement of the usual cognitive steps that might lead to a heightened perception of wildlife and wildlife management. Something like the following illustrates what I mean: To communicate information and develop skills among elementary school-age children leading to development of levels of awareness, knowledge, understanding, insight, appreciation, and commitment that result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment in general. Smith

5. ". . . skills, . . ."

What are examples of some of these skills? These really seem to be fundamental skills of reading, mathematics, and written and spoken communications. Smith

6. ". . . awareness, knowledge, . . ."

awareness—knowledge—understanding—insight—appreciation for intrinsic value Smith

Reference: Subordinate Goal (1):

To develop a student population that is knowledgeable about wildlife.

- Comments: 1. OK Posner
2. Subordinate Goal 1 does not seem to encompass the concepts identified, lacking dimensions such as the relationship between wildlife and humans and values of wildlife. As stated, it can be interpreted as having only a biological survey orientation. Duttweiler

Reference: Concept IA1.

All forms of life depend upon water, oxygen, nutrients, and/or sunlight in some combination.

- Comments: 1. Should read: "Nearly all forms of life" Rockcastle

Reference: Concept IB2.

Over a period of time, humans and wildlife must adjust or adapt to the environment, alter the environment, or perish.

- Comments: 1. How about including competition somewhere as a universal quality of living things including humans? Or do you think this one does it? Rockcastle

- Reference: Concept IB3.
- Wildlife is all around us even though we may not actually see, hear, or otherwise sense its presence.
- Comments: 1. Change "actually" to "always." Duttweiler
- Reference: Concept IC.
- Humans and wildlife are subject to many of the same environmental conditions.
- Comments: 1. Concepts IC1-IC4 seem to be of much less rigor and importance than the rest which are generally good. Rockcastle
- Reference: Concept IC2.
- Habitat is composed of many integrated components including food, water, shelter or cover, space, and the arrangement of these in relation to each other.
- Comments: 1. Definition? Rockcastle
2. In addition to the spatial component, we should also introduce the time component which makes these interactive systems so dynamic. Smith
- Reference: Concept IC3.
- The health and well-being of both humans and wildlife are dependent upon the quality of the natural environment.
- Comments: 1. ". . . quality . . ."
- How is "quality" assessed, i.e., from whose perspective? Smith
- Reference: Concept ID.
- Humans have far greater ability to alter or adjust to environments than does wildlife; thus, humans have a responsibility to consider effects of their activities on other life forms.
- Comments: 1. Good! Rockcastle
2. Are humans more adaptable than all life forms? Insects? Bacteria? Duttweiler
3. ". . . responsibility . . ."
- Why? Is this a moral obligation? The rationale for reaching this rather sweeping value judgement needs more substantive development. I think it's important to develop, somehow, in students a sense of an obligation for responsible stewardship of resources beginning with a development of the concept of what a responsible steward does. Smith

Reference: Concept II

HUMAN VALUES AND WILDLIFE

Comments: 1. If these are organized sequentially, Concept IV should precede Concept II. Smith

Reference: Concept IIA.

Wildlife has aesthetic and spiritual values.

Comments: 1. Wildlife has aesthetic and spiritual values for humans. Rockcastle

2. Add under IIA:
Humans can value and appreciate wildlife even as they harvest some of it. Rockcastle

3. ". . . spiritual . . ."
What does this mean? Smith

Reference: Concept IIA1.

The aesthetic and spiritual values humans place on wildlife vary from person to person and culture to culture.

Comments: 1. This is tricky. What ethical framework will precede this, so it doesn't come across as shallow moral relativism ("Some people like to smash frogs against rocks, some don't . . .")

Does this really need to be presented as a separate "concept"? When you deal with dangers to wildlife and the history of human behavior, it will be obvious that people differ in their values in this area. But if you lift this to the level of a "concept," you either have to seem to sanction all kinds of attitudes or explicitly reject a relativistic stance (which means an explicit judgment that some individual and cultural practices are less ethical than others). Lickona

Reference: Concept IIA2.

Human and wildlife relationships are expressed through myths, religious teachings and writings, symbols, ceremonies, and other activities.

Comments: 1. "Human and wildlife relationships . . . "

Historical? Smith

Reference: Concept IIB1.

Wildlife interacts with its environment and thereby affects the functioning of the ecological system.

Comments: 1. ". . . the ecological system."

Should read: "ecological systems."

The frequent use of "the" to qualify ecological system implies that there is only one such system, when in reality there are many possible systems. Also, how will examples of ecological systems be chosen and how will the relatively arbitrary delineation of many such systems be addressed? Smith

Reference: Concept IIB2.

Wildlife may be used as a barometer of overall environmental quality.

Comments: 1. Certain forms of wildlife may be used as a barometer of overall environmental quality. Rockcastle

Reference: Concept IIB3.

Study of the interaction of wildlife and its environment, past and present, helps humans to better understand ecological systems and the effect of human activities on those systems.

Comments: 1. ". . . to better understand . . ."

"to understand better"

Smith

Reference: Concept IIB4.

Study of the physiology, behavior, and needs of wildlife can yield insight into some of the physiology, behavior, and needs of humans.

Comments: 1. As well as a better understanding of the wildlife resource. Smith

Reference: Concept IIC.

Wildlife has social and political values.

- Comments: 1. Wildlife has social and political implications. Posner
2. This is the sort of material that I think could be sacrificed, at this age level, in the interests of streamlining the curriculum. Lickona
3. Duplication of Concept V? Smith

Reference: Concept IID2.

Throughout history, humans have utilized wildlife for food, shelter, clothing, and other products.

Comments: 1. ". . . utilized . . ." Should read: "used . . ." Smith

Reference: Concept IID3.

Human use of wildlife directly and indirectly creates job opportunities for people.

Comments: 1. To what degree, however, are these "values" of wildlife essential to human coexistence with wildlife? Is there a way to be less anthropocentric in presentation of these concepts? Rather than the dichotomy of humans and wildlife, why not develop a perspective on humans and other life forms (both plants and animals) as interdependent cohabitants of a wide range of the earth's ecosystems (some of which, antarctica for example, are virtually devoid of humans, as well as the ocean's depths). Smith

Reference: Concept IIE.

Wildlife has consumptive and non-consumptive recreational values.

Comments: 1. In some ways this is a subset of IID. Should at least identify economic aspects of recreation under IID? Duttweiler
(IID. = Wildlife has commercial and economic values.)

Reference: Concept IIF.

Wildlife has intrinsic value, although humans often only recognize values based upon human wants and needs.

Comments: 1. This one is difficult to justify, I think, because it is dependent upon the individual interpreter. Rockcastle
2. How does intrinsic value differ from ecological value or spiritual value? (The argument can be made but does it have to be in a 5th grade curriculum?) Duttweiler
3. Let's develop this point thoroughly before addressing points IIA-E. This can serve as the basis for the other more anthropocentric perspectives. Smith

Reference: Concept III.

WILDLIFE ECOLOGICAL SYSTEMS

Comments: 1. (IIIA-IIIF)

I think all of these understandings of interdependence are extremely important—but I wonder if they can't be integrated into a unit on stewardship. Lickona

Reference: Concept IIIA.

Each environment has characteristic life forms.

Comments: 1. ". . . environment . . ."

What do we mean by "environment"? Are we at the population, community or ecosystem level of organization? Before diving directly into "ecology" a sounder definitional base needs to be laid first. Smith

Reference: Concept IIIA1.

The environment, created and shaped by natural forces and modified by humans, determines which life forms can occupy it.

Comments: 1. ". . . by natural forces . . ."

Humans are not natural?
Loading the dice.

Posner

Reference: Concept IIIA2.

Each species occupies a niche within the range of environments in which it is found.

Comments: 1. ". . . occupies a niche . . ."

Should read: "has a unique role" The niche concept is laden with difficulties of interpretation. The concept can be communicated without the jargon. Smith

Reference: Concept IIIB.

All living elements of an ecological system are interdependent.

Comments: 1. ". . . an ecological system . . ."

Should read: "ecological systems."

Smith

Reference: Concept IIIB1.

Plants and animals in ecological systems live in a web of interdependence in which each species contributes to the functioning of the overall system.

Comments: 1. But systems can function in the absence of some components. Take loss of American Chestnut or Passenger Pigeon, for example. Smith

2. ". . . ecological systems . . ."

Implies discrete boundaries which may not exist in some cases.

Smith

Reference: Concept IIIB2.

Food webs and energy chains illustrate the interrelationships of all living things.

Comments: 1. ". . . energy chains . . ."

Should read: "energy flow . . ."

Smith

2. Could be refined somewhat by looking at food webs as a way of describing how nutrients cycle and energy flows among the components of food webs.

Smith

Reference: Concept IIIB3.

In a naturally functioning ecosystem, life forms and environmental factors interact to keep wildlife populations in a long-term dynamic equilibrium with each other and with their habitats.

Comments: 1. "In a naturally functioning ecosystem . . ."

What is meant here? Does it imply an ecosystem without humans?

Smith

Reference: Concept IIIB4.

Diverse plant communities tend to support diverse wildlife communities.

Comments: 1. ". . . tend to support . . ."

Should read: ". . . can support . . ."

Smith

Reference: Concept IIIB5.

Some wildlife populations exhibit cyclic patterns over time.

Comments: 1. Should read: "Some wildlife populations exhibit cyclic patterns of abundance over time."

Smith

Reference: Concept IIIB6.

Natural laws are ultimately as binding on human populations as on wildlife.

Comments: 1. Of course! Because humans are natural.

Posner

2. What are these "natural laws"? Are you thinking of the Laws of Thermodynamics for example?

Smith

Reference: Concept IIIC3.

There is a trend of continuous replacement of one natural community of life by another.

Comments: 1. ". . . continuous replacement . . ."

But rates of change are slower in mature communities, and the return cycle to a mature community is long. Smith

Reference: Concept IIIC5.

Living organisms produce both positive and negative impacts.

Comments: 1. "Living organisms . . ."

Do we include humans here? Smith

2. ". . . impacts . . ."

Should read: effects—on what? Smith

Reference: Concept IIID1.

Each habitat is suitable only to those forms that have adapted, over a number of generations, to its ecological conditions.

Comments: 1. Except for humans? Posner

2. Is overstated. What about highly successful exotics? Duttweiler

3. ". . . habitat . . ."

Really, what is meant here is community. Smith

4. ". . . to its ecological conditions."

Let's be more specific, working at the community level of organization where interrelationships are based on co-occurrence, co-adaptation, and co-evolution of community members. Smith

Reference: Concept IIID5.

Isolated ecosystems such as lakes and islands may develop specialized life forms, thus making these systems more vulnerable to environmental change.

Comments: 1. Implies all lakes and islands are isolated ecosystems.

Duttweiler

Reference: Concept IIIE.

Living things tend to reproduce in numbers greater than their habitat can support.

- Comments: 1. The whole idea that as one limiting factor is removed, another crops up . . . is important, I think. It is on this basis that one decides at which limiting factor to say, "Enough!" Rockcastle
2. True of humans? All living things? Posner
3. Why? Smith

Reference: Concept IIIE2.

Various mortality factors, such as disease, predation, climatic conditions, pollution, accidents, and shortages of life's necessities, will cause a percentage of any population to die each year.

- Comments: 1. ". . . climatic conditions . . ."
Should read: ". . . weather . . ."
- It's important to separate weather and climate because of the different time scales over which they act. Since it appears that we're at the population level of organization here, weather would be more appropriate. The result of accumulated weather effects, i.e., climate, is a significant force in shaping community structure. Smith

Reference: Concept IIIF.

Each area of land or water, and ultimately the planet, has a carrying capacity of plants and animals.

- Comments: 1. ". . . capacity of plants and animals."
Should read: ". . . capacity for plants and animals." Smith

Reference: Concept IIIF1.

Carrying capacity is determined by climatic, geological, biological, and/or behavioral factors along with human activities.

- Comments: 1. ". . . factors along with human activities."
Should read: ". . . and by human activities." Smith

Reference: Concept IIIF2.

Carrying capacity may vary from season to season and year to year.

Comments: 1. Carrying capacity may vary from season to season and year to year, and place to place (even for the same species). Smith

Reference: Subordinate Goal (2):

To develop a student population that is knowledgeable about wildlife management principles and practices.

Comments: 1. Does not necessarily follow from superordinate goal. Self-serving. Not a part of elementary education, more science and social studies. Posner

Reference: Concept IV

WILDLIFE CONSERVATION

Comments: 1. Should read: Wildlife Conservation and Management or Resource Planning. Rockcastle

Reference: Concept IVA.

Management of resources and environments is the application of scientific knowledge and technical skills to protect, preserve, conserve, limit, enhance, or extend the value of a natural resource, as well as to improve environmental quality.

- Comments: 1. ". . . to protect, preserve . . ."
- Should read: ". . . to protect, monitor, preserve . . ."
- Smith
2. ". . . to improve environmental quality."
- Should read: ". . . to improve or maintain environmental quality."
- Smith
3. "Improvement"— for which species or species group, humans or wildlife? Smith
4. But why is management perceived to be a necessary or useful activity? Smith

Reference: Concept IVA2.

Wise resource and environmental management can improve the quality of life for wildlife and humans.

Comments: 1. Wise resource and environmental management can improve and can be detrimental to the quality of life for wildlife and humans. Posner

Reference: Concept IVA5.

Natural resource management is necessary to meet the needs of people in modern-day life.

- Comments:**
1. Natural resource management or population control is necessary to meet the needs of people in modern-day life.
Self-serving. Posner
 2. Why? The basis for this premise hasn't been developed yet. Smith
 3. Is it the needs of people or of other wildlife that must be met? Smith

Reference: Concept IVB1.

Nonrenewable natural resources are those which are available on a finite basis, such as minerals and fossil fuels.

- Comments:**
1. Definition! Rockcastle
 2. Over what span of time? Smith

Reference: Concept IVB2.

Wildlife and other renewable natural resources can replenish themselves independently or with human assistance.

- Comments:**
1. Not always true.
Implies that resources will renew themselves if left alone even in disturbed environments. Duttweiler
 2. But some human activities can affect some wildlife populations to the extent that their ability to replenish themselves is compromised. This is a crucial point that should be made early in the sequence. It then could lead to the rationale for the perceived need for wildlife management in the context of responsible stewardship (especially of the uniquely human attribute of foresight). Smith

Reference: Concept IVC2.

For a wildlife population to sustain itself there must be suitable habitat to support a viable breeding population, not just a few individuals.

- Comments:**
1. Reiterate what habitat provides for wildlife. Smith

Reference: Concept IIID1.

Wildlife can be managed to alter its value to humans.

Comments: 1. What does this mean?

Smith

Reference: Concept IVD2.

Humans have learned management principles by observing natural forces and events through experimentation and research.

Comments: 1. ". . . forces and events through experimentation . . ."

Should read: ". . . forces and events and through experimentation . . ."

Smith

Reference: Concept IVD5.

Habitat management is often the best way to help threatened or endangered species.

Comments: 1. ". . . often the best way . . ."

But sometimes not. What about restricting development or preventing killing?

Posner

2. IVD5 and IVD6.

Duplicate entries and numbers.

Duttweiler
Smith

Reference: Concept IVD7.

For management purposes, wildlife has often been divided into categories such as game, nongame, endangered, threatened, furbearers, and commercial.

Comments: 1. ". . . wildlife has often been . . ."

Should read: "wildlife often has been . . ."

Smith

Reference: Concept IVE

Wildlife conservation practices depend on a knowledge of natural laws and the application of knowledge from many disciplines.

Comments: 1. The sub-sets of (E) seem weaker than those earlier in the outline. I think concepts would be more important here than are simple facts or trends.

Rockcastle

Reference: Concept IVE1.

Wildlife management practices generally developed in a progressive sequence, beginning with regulations, followed by predator control, creation of refuges, stocking programs, and habitat management.

Comments: 1. ". . . developed in a progressive sequence . . ."

From a historical perspective?

Smith

Reference: Concept IVE2.

Systematic inventory of wildlife populations did not become a common practice until the 1930s, although journals of early explorers reflect considerable variation in historic population levels.

Comments: 1. Alludes to the need for monitoring efforts, which are legislatively mandated.

Smith

Reference: Concept IVE5.

Wildlife managers use a variety of techniques in management programs, such as information, education, and regulations involving people; as well as inventory, damage control, habitat management, stocking, artificial propagation, transplanting, and direct manipulation of wildlife populations.

Comments: 1. "propagation" = "propagation"

Smith

Reference: Concept IVE6.

Regulated harvest of some wildlife is a management technique.

Comments: 1. And this is controversial!

Posner

Reference: Concept IVE8.

Some wildlife species are not native but have been introduced to the area they presently occupy. Such introductions create changes ranging from beneficial to harmful.

Comments: 1. "Such introductions create changes ranging from beneficial to harmful."

This is a value judgement based on the human perspective. One might argue that introductions of exotics into communities where they historically did not occur can only be a disruptive influence given the groundwork you've laid building ecosystem integrity around the plants and animals that have evolved to occur at a particular location.

Smith

Reference: Concept IVE10.

Acquisition, protection, improvement, and restoration of habitat are considered to be the most beneficial long-range management techniques for wildlife.

Comments: 1. By whom? Controversial.

Posner

Reference: Concept IVF5.

Private organizations, industrial interests, and individual citizens also conduct wildlife conservation activities.

Comments: 1. But only to the extent permitted by state/federal laws.

Smith

Reference: Concept IVF7.

Funds provided by consumptive users, not general tax dollars, are the primary source of income for most state wildlife management programs and some federal programs.

Comments: 1. Describe the licensing mechanism for providing privileged access.

Smith

Reference: Concept IVF9.

Wildlife agencies manage not only wildlife but also the activities of people who use wildlife.

Comments: 1. Through the licensing mechanism.

Smith

Reference: Concept IVF10.

Wildlife agencies employ persons with a variety of scientific training and vocational skills. Competition for jobs in the wildlife field is very keen, and applicants must usually have a college degree.

Comments: 1. ". . . must usually have a college degree."

Should read: ". . . must have a college degree."

Smith

Reference: Concept IVF11.

Citizens can become involved in the management of wildlife, habitat, and the environment by direct participation in the political process or through local, state, national, or international organizations.

Comments: 1. Lobbyists for and against conflict!

Posner

Reference: Subordinate Goal (3)

To develop a student population that has a sense of responsibility/stewardship for wildlife.

Comments: 1. ". . . that has a sense . . ."

Should read: ". . . with a sense . . ."

Smith

Reference: Concept V.

CULTURAL AND SOCIAL INTERACTION WITH WILDLIFE

Comments: 1. ". . . INTERACTION WITH WILDLIFE"

Should read: ". . . INTERACTIONS WITH WILDLIFE"

Smith

Reference: Concept VA.

Human cultures and societies, past and present, affect and are affected by wildlife and its habitat.

Comments: 1. (VA1-VA6.) Some of these seem to duplicate the general ones on p. 2 (Concept II).

Rockcastle

2. ". . . and its habitat."

This seems incongruous here. Wildlife habitat is our habitat too.

Smith

Reference: Concept VA3.

Members of some cultures still depend on wildlife to supply a portion of their requirements for food, shelter, and clothing.

Comments: 1. Certain economic or geographic sectors of our culture depend on wildlife for sustenance.

Duttweiler

Reference: Concept VA4.

Creative portrayal of wildlife through art, literature, dance, music, and drama is an historic as well as contemporary means of expressing human relationships with wildlife.

Comments: 1. ". . . with wildlife . . ."

And all other animals. Why separate out wildlife?

Posner

Reference: Concept VB1.

Some of the values, ethics, and historical traditions of societies are reflected in their treatment of wildlife and other resources.

Comments: 1. ". . . and other resources."

Just as important.

Posner

Reference: Concept VB2.

Wildlife management programs and policies are developed largely through political, social, economic, and scientific processes.

Comments: 1. Self-serving. Posner

Reference: Concept VB3.

Other nations and governments have different policies and philosophies relating to wildlife ownership and protection and to habitat management.

Comments: 1. Self-serving. Posner

2. ". . . philosophies . . ."

Different individual humans can have different philosophies as well. Smith

Reference: Concept VIA.

Human impacts on wildlife and its habitat are increasing worldwide.

Comments: 1. "Human impacts . . ."

Should read: "Human effects . . ." Smith

Reference: Concept VIA1.

Demand for wildlife tends to be greater than the supply available.

Comments: 1. "Demand . . ."

Consumptive? Smith

Reference: Concept VIA2.

Human intervention in the environment continues to change plant and animal distribution, diversity, and abundance.

Comments: 1. "Human intervention in the environment continues . . ."

Should read: "Human intervention continues . . ." Smith

Reference: Concepts VIB3, VIB4, and VIB5.

Economic trends plus increased human population and mobility have important influences on wildlife and its habitat.

Recreational trends affect wildlife and its habitat.

More leisure time and growing pursuit of outdoor activities are increasing the pressures on wildlife and habitat.

Comments: 1. "Habitat" should be "habitats." Smith

Reference: Concept VIC1.

Public interest and involvement in wildlife continues to grow.

Comments: 1. ". . . involvement in wildlife . . ."

Should read: ". . . involvement with wildlife . . ." Smith

Reference: Concept VIC2.

Many wildlife issues involve conflicts between different interest groups.

Comments: 1. Good. Posner

Reference: Concept VIC3.

Historically when conflict between recreational and commercial harvest of a wildlife species became severe, the commercial use has been eliminated.

Comments: 1. Good. Posner

Reference: Concept VIC4.

Native American Indians and other groups at times disagree over certain uses of and rights to wildlife.

Comments: 1. ". . . rights to wildlife."

Should read: ". . . rights of access to wildlife." Smith

Reference: Concept VIC.

Current wildlife issues and trends are complex and involve alternatives and consequences.

Comments: 1. The following concepts are not for elementary kids:

VIC.5	VIC.11
VIC.6	VIC.14
VIC.9	VIC.15
VIC.10	VIC.16

Posner

Reference: Concept VID3.

Commercial sale of wildlife and wildlife products is controversial and has worldwide implications.

Comments: 1. An opportunity to point out how fashion trends can influence commercial value of some wildlife species. Smith

Reference: Concept VIIB.

Responsible environmental actions are the obligation of all levels of society, starting with the individual.

Comments: 1. Social Studies Posner

Reference: Concept VIII.

PROBLEM-SOLVING SKILLS

Comments: 1. I think this could use some fleshing out. It's obviously less developed than the other concepts. What skills do 10-year olds need to be able to analyze a wildlife issue, propose and evaluate alternative courses of action, and implement a plan? Lickona

Reference: Concept VIIIA.

Knowledge and investigative and evaluative skills are necessary to analyze wildlife issues and evaluate alternative solutions for remediating issues.

Comments: 1. Why not separate these into 3 subtopics:

- A. Basic knowledge
- B. Investigative skills
- C. Evaluative skills

These, however, are predicated upon development of sound basic skills in reading, mathematics, and written and verbal communications. Smith

Reference: Concept VIIIA3.

Creative thinking and problem-solving skills are necessary to objectively evaluate wildlife issues.

Comments: 1. Vague. Posner

2. ". . . to objectively evaluate wildlife issues."

Should read: ". . . to evaluate wildlife issues objectively."

Smith

INSTRUCTIONAL OBJECTIVES

- Comments: 1. As written, these truly are instructional objectives rather than learning objectives. Might be helpful guidance to teachers to also identify learning objectives, i.e., exactly what do you want the kids to learn and why? Duttweiler
2. The examples of instructional objectives that are supplied seem to contribute relatively little to the development of the ideas in the document. They seem less like objectives and more like possible evaluation items. There is always the danger that when we start aiming at our indicators of success, we get neither good evidence nor good instruction. Posner
3. In general, OK. Rockcastle

Reference: Instructional Objective I.D.2.

To list both positive and negative interactions between wildlife and people.

- Comments: 1. Granted, there are some "negative interactions" between wildlife and people, but what's the rationale for making this a prominent instructional objective? Seems to give equal weight to negative and positive aspects of wildlife. Doesn't capture the substantive focus of "appreciation of wildlife." Lickona

Reference: Instructional Objective II.1.

To give examples of different human values toward wildlife.

- Comments: 1. What about "values of" in addition to "values toward"? Duttweiler
2. This seems amorphous and value-neutral to me. See above comments on problems related to making value diversity a concept. If this is retained, it will be very important to instruct teachers in how to handle it, so it doesn't come across as wishy-washy "Some people think this, some think that" Lickona

Reference: Instructional Objective III.B.1 #1.

To list ways that a mammal, amphibian, reptile, bird, insect, and fish positively and negatively impacts other species.

- Comments: 1. ". . . impacts . . ."

Should read: ". . . affect . . ."
GET RID OF THIS WORD!!

Smith

II.B.3 #1.

local wildlife species, their habitats,

em."

in an ecosystem."

gh level of organization to begin with.
level (e.g., populations or
seful for a beginning?

Smith

I.B.3 #2.

of a local wildlife species.

ate the life cycle . . ."

Lickona

I.B.6 #1.

causes of death for wildlife and humans.

ssity of this as a concept for fifth-
grimly reviewed all the factors--
idents, shortages--which assure that "a
ation will die each year" could be
for at least some children this age.
concern and controversy about school
with death, the threat of nuclear war,
press children or make them anxious

l between wildlife vulnerability and
be made in a way that is sensitive to
urity and optimism and to public
ssing human death in the elementary

Lickona

E #1.

ts of overpopulation.

Smith



APPENDIX F

ERP's First Rewrite of the Goals and Concepts for Curriculum Development
in Wildlife Education (Draft - Wildlife Education Curriculum)

Appendix F.1

Expert Review Panel
Meeting - January 9, 1987

- Introductions
- Purpose
- Superordinate Goal
- Appropriateness of wildlife education materials for fifth graders
- Break
- Coverage of curriculum
- Integration of curriculum with existing curricula
- Where to go from here?
 - Future involvement of ERP members

Minutes - January 9, 1987
First Meeting of ERP

Superordinate Goal

Discussion of the superordinate goal was integrated with discussion of the appropriateness of wildlife education materials for fifth graders. It was agreed that the superordinate goal should reflect goals in 3 areas: Knowledge - for children to understand wildlife; Affect - for children to value wildlife; and Behavior - for children to demonstrate behavior that enhances wildlife.

The ERP felt that use of the term "wildlife" was too narrow and substituted the phrase "living things."

The revised superordinate goal reads:

To have elementary school-age children develop awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning living things and the environment.

Appropriateness of Wildlife Education Materials for Fifth Graders

Discussion about the appropriateness of this curriculum for fifth graders fell into 3 categories: ecological information, wildlife management concepts, and values.

Ecological Information:

Different viewpoints were expressed regarding the breadth of coverage of ecological information. Some felt the curriculum should not focus only on wildlife, but should include all animals and plants as well. The point was made that ecological systems need to be defined with humans as a part of the system. There were others, however, who indicated that the inclusion of all life alters the focus of the curriculum. It was suggested that this concern be dealt with by nesting a focus on wildlife within a concern for all living things.

Ecological Management Concepts:

Opinions about the inclusion of wildlife management concepts ranged from those who felt the curriculum should exclude wildlife management concepts completely because they were self-serving to the state natural resource agency, to those who found them acceptable and useful in teaching fifth graders about natural resources. Discussion focused on delineating the specific aspects of instruction in wildlife management principles that were or were not objectionable. Different levels of information presentation were defined: (1) Wildlife management is a fact; (2) Humans can manage other organisms; (3) Is wildlife management necessary?; (4) How is wildlife managed?; (5) What are the established policies for managing wildlife?

It was agreed that the presentation of the existence of wildlife management as a means of resource management was appropriate information. However, value-laden discussions of whether wildlife management is necessary needed to be geared to a level that fifth graders could understand. Discussion of specific bureaucratic wildlife management policies was deemed inappropriate. It was suggested that wildlife management be presented as one means of demonstrating stewardship of natural resources, as one way to influence the environment.

Values:

Almost all ERP members agreed that a balanced set of values is not presented in the current curriculum. However, opinions differed on how to treat the value-laden nature of the wildlife education concepts. The ERP outlined the respective problems inherent within: (1) no discussion of values - e.g., the curriculum loses its impact and will not achieve its goal of developing individuals committed to the environment; (2) discussion of all types of human values of wildlife - e.g., children 10-11 years of age are not capable of ethically evaluating the worth of the range of values and teachers are not trained to deal with this level of discussion; and (3) presentation of the wildlife management profession's values - e.g., it is a form of indoctrination, not education.

This topic was intensely debated and the following solution was suggested. A curriculum should be developed that conveys to children a sense of obligation to living things. The two value positions should be: (1) think before you act, and (2) become informed. The curriculum should not indicate that wildlife management is the only way to achieve stewardship, but that it is one tool, the advantages and disadvantages of which can be discussed.

Coverage of Curriculum

Discussion regarding the extent of curriculum coverage integrated considerations of specific content areas with considerations of teachers' ability to implement such a curriculum in the fifth grade. The cognitive and moral abilities of children 10-11 years of age were addressed. It was indicated that children this age cannot handle more than 3-4 variables simultaneously which limits the amount of ecological information that can be absorbed. Ecological concepts and examples of wildlife management therefore should be simple. It was emphasized that the length of the curriculum must be dramatically cut if teachers are expected to use it.

The following curriculum format was agreed upon:

- (1) 2/3 ecological information that integrates presentation of ecological principles within considerations of the consequences of human actions, and
- (2) 1/3 management concepts that presents actual examples of wildlife management and the results of management practices.

The total curriculum should be confined to 3 pages to have the greatest possibility of being implemented by teachers.

It was suggested that important components of ecological information that should be included are: (1) the interdependence of plants, animals and their environment, (2) humans are integrated with other life; (3) the inherent worth of any organism, regardless of size, numbers, or appearance, (4) a complete life cycle of an organism, (5) negative interactions between humans and animals (the idea that animals do create problems), (6) discussion of populations and communities (ecosystems are too complex), and (7) limiting factors.

Management information should include (1) the concept that the presence of humans necessitates management, (2) provide simple examples of wildlife management, e.g., bird feeding, (3) indicate that wildlife managers manage by limiting factors, and (4) present more controversial management procedures not merely as facts, but as the basis for values discussions that would identify personal values regarding the use of these procedures.

Integration and Implementation of Curriculum

There was a strong feeling that the curriculum utilize an experiential approach. The advantages of an experiential approach were pointed out; it ignites children's interest and is the best way to affect their values and behavior. By its nature, however, it requires that more time be spent on fewer things, which limits the amount of information that can be covered in the curriculum. It was suggested that the curriculum be packaged as self-contained components (modules) that would be organized in a hierarchical order of increasing complexity. Possible ideas for modules were units on interdependence and life cycles.

Everyone agreed that the curriculum had the greatest chance of success if it were integrated with existing curricula wherever possible. The wildlife education curriculum could not only help supplement the elementary science syllabus, but the math, history, library, and social studies programs whenever appropriate.

Procedure for ERP

The following procedure was agreed upon by the ERP.

- (1) A subcommittee consisting of Verne Rockcastle and Charles Smith (facilitated by Gerri Pomerantz) is to develop a new curriculum draft;
- (2) The new curriculum will be distributed for review to the entire ERP;
- (3) Based on the ERP's review, the subcommittee will revise the draft;
- (4) The revised draft will be distributed to the full ERP; and
- (5) The entire ERP will meet to discuss the revised edition and formulate its final recommendations.

Attendees: Mike Duttweiler, Jonathan Jansan, Thomas Lickona, Verne Rockcastle, Charles Smith, Gerri Pomerantz, and William Siemer.



New York State College of Agriculture and Life Sciences
 a Statutory College of the State University
Cornell University

Department of Natural Resources
 Fernow Hall, Ithaca, N. Y. 14853-0188

Fishery Science
 Forest Science
 Wildlife Science
 Natural Resources
 Resource Policy
 and Planning
 Aquatic Science

Appendix F.3

DATE: 27 January 1987

MEMO TO: Mike Duttweiler
 Jonathan Jansan
 Thomas Lickona
 George Posner
 Verne Rockcastle
 Charles Smith

FROM: Gerri A. Pomerantz *GP*

SUBJECT: Review of Wildlife Education Materials

Enclosed are the minutes from the ERP's January 9th meeting and the Draft Wildlife Education Curriculum developed by the subcommittee of Verne Rockcastle and Charlie Smith (facilitated by Gerri Pomerantz). The subcommittee was responsible for the concepts listed under Parts I and II of the curriculum. I have added the original subordinate goals that I felt corresponded to these 2 parts.

The subcommittee formulated the new wildlife education concepts with the recommendations of the ERP in mind. Specific consideration was given to: (1) the need to integrate a sense of stewardship with the presentation of ecological information and management principles; (2) presenting concepts that did not duplicate those already presented in the NYS Elementary Science Syllabus, but would build upon existing information; and (3) the process that teachers and students would use to consider the values associated with decisions to manage wildlife.

Please review the Draft Wildlife Education Curriculum and submit your comments to me by February 6, 1987. The subcommittee is scheduled to meet on February 11 to respond to your reviews and revise the curriculum accordingly. I will mail out the Revised Wildlife Education Curriculum by February 13, 1987.

Margie Peech will be contacting you to arrange for a meeting of the full ERP during the latter part of the third week in February or early during the fourth week. This second meeting should enable the ERP to formulate its final recommendations for the wildlife education goals and concepts.

I want to thank each of you again for your time and attention. The degree of commitment demonstrated by each member in this review process is greatly appreciated.

GP:mp
 Enclosures

Appendix F.4

Draft - Wildlife Education Curriculum

Superordinate Goal:

To have elementary school-age children develop awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning all living things and their environment.

Part I

Subordinate Goal (1):

To develop a student population that is knowledgeable about wildlife.

Subordinate Goal (2):

To develop a student population that has a sense of responsibility/stewardship for wildlife.

Concepts:

- (1) All living things, including humans, have basic needs (e.g., Food - Air - Water - Space).
- (2) All living things, including humans, operate according to natural laws which are immutable and binding (Quality/Quantity considerations, Limiting Factors).
- (3) Plants and animals depend on each other in many ways.
- (4) Humans not only share their environment with other living things, but are an interactive part of that environment.
- (5) Humans, because they are able to adjust to their environment far more easily and alter it far more extensively than other living things, have the greatest responsibility for that environment.
- (6) Humans can analyze factors affecting the environment, predict future trends, and make deliberate decisions based on this information.
- (7) Because of the interdependence of plants and animals, the conditions of wildlife and wildlife habitat reflect the quality of the environment for all living things, including humans.
- (8) Wildlife is important in the cultural heritage and economic welfare of many regions and groups of people.
- (9) Trying to understand and enhance the conditions of wildlife and wildlife habitat necessitates some form of responsible stewardship, one of which is wildlife management.

Part II

Subordinate Goal (3):

To develop a student population that is knowledgeable about wildlife management principles and practices.

Subordinate Goal (4):

To develop a student population that has the ability to evaluate the quality, significance, validity and application of information about wildlife and the environment.

Concepts:

- (1) Wildlife management is the process of modifying those limiting factors that can be controlled by humans.
- (2) These limiting factors include nonliving elements, e.g., soil-air-water-space, and living elements, both human and nonhuman.
- (3) Modification of limiting factors, i.e., management activities, can include habitat manipulation, regulation of animal populations, and legal regulation of human behavior.
- (4) To be responsible stewards, humans must consider the consequences of wildlife management activities.
- (5) Modification of limiting factors will have positive effects on some wildlife and negative effects on others.
- (6) Management activities can enhance some types of human behavior and restrict others.
- (7) Because wildlife means different things to different people, decisions about the management of wildlife are complex and require careful decision making.
- (8) Careful decision making is accomplished through identifying the problem, obtaining and evaluating information, considering alternative solutions and their consequences, and making a choice.

APPENDIX G

ERP's Revised - Wildlife Education Curriculum



New York State College of Agriculture and Life Sciences
 a Statutory College of the State University
Cornell University

Department of Natural Resources
 Fernow Hall, Ithaca, N. Y. 14853-0188

Fishery Science
 Forest Science
 Wildlife Science
 Natural Resources
 Resource Policy
 and Planning
 Aquatic Science

Appendix G.1

DATE: 19 February 1987

MEMO TO: Mike Duttweiler George Posner
 Jonathan Jansen Verne Rockcastle
 Thomas Lickona Charles Smith

FROM: Gerri Pomerantz *GP*

SUBJECT: Revisions of Draft Wildlife Education Curriculum

I have compiled the individual comments of the ERP regarding the Draft Wildlife Education Curriculum developed by the subcommittee of Verne Rockcastle and Charles Smith. The comments made about each goal and concept are listed along with the response of the subcommittee. The revised wildlife education curriculum is enclosed for your review.

Without exception, the ERP was very pleased with the draft curriculum (thank goodness). The concern of George Posner that the original curriculum was self-serving to the resource management agency is no longer at issue. He does feel, however, that what should be addressed is the question of whether a wildlife management curriculum should be considered an important content area for fifth graders given the broad spectrum of school content. At the ERP's final meeting, I would like for you to consider George's concern and perhaps formulate a recommendation to DEC regarding the role of the wildlife education curriculum in the fifth grade.

Our last meeting will be on Wednesday, March 4, 1987 at 1:30 PM in 1107 Bradfield. I will be mailing you an agenda prior to the meeting.

GP:mp
 Enclosures

Appendix G.2

Comments and Revisions of Draft Wildlife Education Curriculum

1. Comment:

Should include "wildlife" in the superordinate goal. (Lickona)

Revision:

The word "wildlife" has been incorporated into the statement.

2. Comment:

Add the definitional concept of wildlife itself (as a subset of all living things) somewhere around point 6 or 7 in Part I. (Duttweiler)

Revision:

Subordinate Goal (1) now includes an example of wildlife (e.g., mostly birds and mammals).

3. Comment:

Part I, Concept 2

- a) The word immutable should be simplified. (Lickona)
- b) Use a parenthetical statement to illustrate a natural law. (Lickona)
- c) This statement is an epistemological lie (i.e., natural laws are not immutable and binding). (Jansen)

Revision:

- a) "Immutable" was changed to "fixed."
- b) Examples of natural laws were provided.
- c) The phrase now reads, "ultimately binding."
The subcommittee did not agree with Jonathan Jansen's comment. It thought that within the context of a human life span this statement is valid. For all intents and purposes, they concluded the statement in Concept 2 is true.

4. Comment:

Part I, Concept 5

Concept 5 should be broken down in the following manner so it lays out a logical connection between stewardship and the need for knowledge. (Lickona)

- (5A) People have a special responsibility for all living things and their environments.
- (5B) People have this special responsibility because they are more able to adjust to and alter their environment.
- (5C) To exercise that responsibility, people must be knowledgeable about living things and their environments.

Revision:

Concept 5, Part I, was divided into 2 separate statements. The subcommittee, however, did not agree with Tom Lickona's strategy of putting stewardship up front as a given and using stewardship as the rationale for acquiring knowledge. Rather, they felt that stewardship was the logical result of one acquiring knowledge of the interdependence of humans with their environment. The model the subcommittee used was: (1) knowledge of the facts, (2) recognition of the consequences of that factual information, and (3) establishment of a sense of responsibility after recognizing the importance of human effects on the environment.

5. Comment:

Part I, Concepts 6,7,8.
Need to be illustrated parenthetically. (Lickona)

Revision:

Examples were provided for each concept.

6. Comment:

Subordinate Goal (4)
Simplify. The word "evaluate" encompasses the notion of quality, significance and validity of information. (Lickona)

Revision:

Statement was shortened.

7. Comment:

Part II, Concept 1
The term "limiting factors" is a technical phrase that is not immediately readable. (Lickona)

Revision:

A new concept was added, Part II, Number 1, that presents the concept of limiting factors.

8. Comment:

Part II, Concept 3
The term "habitat manipulation" is a technical phrase that needs to be clarified. (Lickona)

Revision:

Examples of each category of wildlife management were included.

9. Comment:

Part II, Concept 4

- a) Should add the notion that people must be knowledgeable about wildlife management activities to be responsible stewards. (Lickona)
- b) Concept 4 should follow Concepts 5 and 6. (Duttweiler)

Revision:

- a) A statement about knowledge of wildlife management activities was included.
- b) Concept 4 was placed after Concepts 5 and 6.

10. Comment:

Part II, Concepts 5 and 6

Need examples of such management activities. (Lickona)

Revision:

Examples were provided.

11. Comment:

Part II, Concept 7

The phrase "wildlife means different things to different people" is too vague. More precision is needed or possibly an example of oppositional values. (Lickona)

Revision:

The subcommittee would like Tom Lickona to address this concept personally. It felt that an explicit statement of different wildlife values would raise the issue of "value diversity" that was originally considered objectionable.

12. Comment:

Part II

No alternatives to wildlife management are enumerated. Need to discuss some other means of stewardship. (Jansen)

Revision:

The subcommittee agrees with this criticism. It would like Jonathan Jansen to develop a concept that would address the issue.

Revised - Wildlife Education Curriculum

Superordinate Goal:

To have elementary school-age children develop knowledge, skills, and commitment to result in informed decisions and responsible actions toward wildlife and all other living things and their environment.

Part I

Subordinate Goal (1):

To develop a student population that is knowledgeable about wildlife (e.g., mostly birds and mammals).

Subordinate Goal (2):

To develop a student population that has a sense of responsibility/stewardship for wildlife.

Concepts:

- (1) All living things, including humans, have basic needs (e.g., Food - Air - Water - Space).
- (2) All living things, including humans, operate according to natural laws which are fixed and ultimately binding (e.g., laws of gravitation and thermodynamics).
- (3) Plants and animals depend on each other in many ways.
- (4) Humans not only share their environment with other living things, but are an interactive part of that environment.
- (5) Humans can adjust to and alter their environment far more than any other living thing. Therefore, humans have the greatest responsibility for that environment.
- (6) Humans can analyze factors affecting the environment, predict future trends, and make deliberate decisions based on this information (e.g., identifying sources of air pollution and taking steps to correct the problems).
- (7) Because of the interdependence of plants and animals, the conditions of wildlife and wildlife habitat reflect the quality of the environment for all living things, including humans (e.g., the presence of mercury in fish indicates industrial pollution in the Great Lakes).
- (8) Wildlife is important in the cultural heritage and economic welfare of many regions and groups of people (e.g., for generations, certain Northwest Indian tribes have depended on salmon runs).

- (9) Trying to understand and enhance the conditions of wildlife and wildlife habitat necessitates some form of responsible stewardship, one of which is wildlife management.

Part II

Subordinate Goal (3):

To develop a student population that is knowledgeable about wildlife management principles and practices.

Subordinate Goal (4):

To develop a student population that can evaluate and apply information about wildlife and their environment.

Concepts:

- (1) Scarcity of any factor essential for survival limits population growth and an abundance of all other factors makes little difference.
- (2) Wildlife management is the process of modifying those limiting factors that can be controlled by humans.
- (3) These limiting factors include nonliving elements, e.g., soil-air-water-space, and living elements, both human and nonhuman.
- (4) Wildlife management can include habitat manipulation (e.g., cutting timber, mowing), monitoring of animal populations (e.g., counting ducks on New York State lakes in winter), and legal regulation of human behavior (e.g., laws regulating the taking of wild animals).
- (5) Modification of limiting factors may have positive effects on some wildlife and negative effects on others (e.g., removing standing dead trees provides firewood for humans but deprives woodpeckers of nesting and feeding sites).
- (6) Management activities can benefit some types of human behavior and restrict others (e.g., certain motor boat regulations in Adirondack lakes restrict motor boaters but permit canoeists).
- (7) To be responsible stewards, humans must be knowledgeable about wildlife management practices and be prepared to consider the consequences of wildlife management activities.
- (8) Because wildlife means different things to different people, decisions about the management of wildlife are complex and require careful decision making.
- (9) Careful decision making is accomplished through identifying the problem, obtaining and evaluating information, considering alternative solutions and their consequences, and making a choice.

APPENDIX H

ERP's Second Revision of the Wildlife Education Curriculum

AGENDA

Wed., March 4, 1987

1. Discussion of specific goals and concepts of the revised Wildlife Education Curriculum.
2. Final recommendations regarding the Wildlife Education Curriculum.
3. Recommendations on ways to implement the Wildlife Education Curriculum in the public schools:
 - . packaging of materials
 - . infusion into the school curriculum
4. Discussion and statement about the value and relative importance of the Wildlife Education Curriculum given the broad spectrum of school content.

Minutes
Expert Review Panel Meeting
March 4, 1987

- Revised Wildlife Education Curriculum - Goals and Concepts
- Value and Relative Importance of Wildlife Education Curriculum in School Curricula

The meeting began with discussion about the specific goals and concepts of the revised Wildlife Education Curriculum (WEC). Jonathan Jansen explained his concern about presenting wildlife management as the only form of stewardship. Tom Lickona pointed out that management is discussed as one form of stewardship and that it might be useful to articulate what alternative forms of stewardship would be. Rather than listing alternative forms of stewardship, Verne Rockcastle suggested that the concept of management be broadened to get away from the traditional wildlife management focus to one that views management as any intentional change, including a decision for nonintervention.

The ERP agreed that the broader concept of management would be beneficial, especially in light of George Posner's concern that the curriculum be broad-based enough to be relevant to the concepts an elementary schoolteacher must communicate in the classroom. The broader definition of management, Tom Lickona pointed out, would open up the ways in which students could experientially learn about management and bring it onto a personal level.

With the adoption of this broader definition of management, the ERP felt that Part II of the WEC needed to be broadened to be consistent with the new focus of Part I. The concepts in Part II were therefore edited to indicate their applicability to environmental management as well as to wildlife management. The subordinate goals were also edited to reflect the personal responsibility that students have to be stewards of wildlife and the environment.

The March 9, 1987 memo details the specific changes to the WEC that were made as a result of this meeting.

The ERP agreed that the (1) broadening of the concept of management, and (2) change in focus of the second half of the WEC from solely wildlife management to wildlife and environmental management would strengthen the curriculum and increase the likelihood of its utilization in the elementary classroom. The point was made that this curriculum will be competing for classroom time with topics like nuclear war, drugs, and teenage pregnancy. Consequently, the information presented must be as relevant as possible to both students and teachers. George Posner indicated that although general ecological and environmental issues are of considerable concern, wildlife management problems are minor by comparison. It was for these reasons that the broad concept of stewardship was chosen for emphasis in the curriculum and why the management concepts in Part II were broadened to encompass environmental in addition to wildlife concerns.

Packaging of Materials and Infusion into School Curriculum

The ERP agreed to forward their individual recommendations on packaging and infusion to Gerri Pomerantz. Time did not permit any further discussion of the ways to implement the WEC into the public schools.

Final Recommendations About the WEC

Gerri Pomerantz agreed to compile the new WEC including all the changes made at this meeting and distribute it to the ERP. Final comments about the revised WEC will be made by individual ERP members to Gerri.



New York State College of Agriculture and Life Sciences
 a Statutory College of the State University
Cornell University

Department of Natural Resources
 Fernow Hall, Ithaca, N. Y. 14853-0188

Fishery Science
 Forest Science
 Wildlife Science
 Natural Resources
 Resource Policy
 and Planning
 Aquatic Science

Appendix H.3

DATE: 9 March 1987

MEMO TO: Mike Duttweiler George Posner
 Jonathan Jansen Verne Rockcastle
 Thomas Lickona Charles Smith

FROM: Gerri Pomerantz *GP*

SUBJECT: Wildlife Education Curriculum--Second Revision

Attached is the second version of the Wildlife Education Curriculum that includes the changes made as a result of the ERP meeting on March 4. The specific changes include:

- (1) Substituting the word "people" for "humans" in concepts 1,2,4,6, and 7 in Part I.
- (2) Editing of concept 9, Part I,
- (3) Adding concepts 10 and 11, Part I, to reflect a broader definition of management.
- (4) Editing Subordinate Goal 3 to combine knowledge with evaluation.
- (5) Adding a new Subordinate Goal 4 to address stewardship,
- (6) Editing concept 1, Part II, for clarity of meaning,
- (7) Editing concepts 2-9, Part II, to broaden the perspective from wildlife management to environmental management,
- (8) Adding a new concept (No. 8, Part II) to address new Subordinate Goal 4.

I have provided 2 sets of examples to reflect wildlife and environmental management in concept 4, Part II. A similar balance of examples was requested for concepts 5 and 6, Part II. The environmental management activities described in the examples of these two concepts reflect consequences for both wildlife and people and therefore I felt achieved the broader application desired by the 2-part distinction. If you feel these examples do not adequately address your concerns please suggest an alternative illustration.

I plan to compile the minutes from Wednesday's meeting and distribute them shortly. In the interests of time, however, I am sending this on ahead to give you each a chance to respond while your thoughts are still fresh. In addition to your final review of the curriculum, please include your comments regarding (1) the "packaging" of wildlife education materials and (2) the infusion of the wildlife education curriculum into the elementary school program.

I have greatly appreciated the time, energy, and honest critique you have given this process. Even though I may have appeared a bit exasperated toward the end of our last marathon, I think it is no small feat that you were able to come up with a curriculum that embodied the concerns of such a diverse group. Thank you all again for hanging in there and for extending yourselves.

GP:mp
Enclosures

Wildlife Education Curriculum
(Second Revision)

Superordinate Goal:

To have elementary school-age children develop knowledge, skills, and commitment to result in informed decisions and responsible actions toward wildlife and all other living things and their environment.

Part I

Subordinate Goal (1):

To develop a student population that is knowledgeable about wildlife (e.g., mostly birds and mammals).

Subordinate Goal (2):

To develop a student population that has a sense of responsibility/stewardship for wildlife.

Concepts:

- (1) All living things, including people, have basic needs (e.g., Food - Air - Water - Space).
- (2) All living things, including people, operate according to natural laws which are fixed and ultimately binding (e.g., laws of gravitation and thermodynamics).
- (3) Plants and animals depend on each other in many ways.
- (4) People not only share their environment with other living things, but are an interactive part of that environment.
- (5) Humans can adjust to and alter their environment far more than any other living thing. Therefore, humans have the greatest responsibility for that environment.
- (6) People can analyze factors affecting the environment, predict future trends, and make deliberate decisions based on this information (e.g., identifying sources of air pollution and taking steps to correct the problems).
- (7) Because of the interdependence of plants and animals, the conditions of wildlife and wildlife habitat reflect the quality of the environment for all living things, including people (e.g., the presence of mercury in fish indicates industrial pollution in the Great Lakes).
- (8) Wildlife is important in the cultural heritage and economic welfare of many regions and groups of people (e.g., for generations, certain Northwest Indian tribes have depended on salmon runs).

- (9) Trying to understand and enhance the conditions of wildlife and wildlife habitat necessitates some form of responsible stewardship.
- (10) Stewardship involves the decision to intervene or not. Intervention may take several forms, one of which is management of living things; another is management of nonliving things; still another is education.
- (11) Management can be carried out by individuals, community groups, or government agencies.

Part II

Subordinate Goal (3):

To develop a student population that is knowledgeable about wildlife and environmental management principles and practices and can evaluate and apply that information.

Subordinate Goal (4):

To develop a student population that can exercise responsible stewardship toward wildlife and the environment.

Concepts:

- (1) Scarcity of any factor essential for survival limits population growth, in which case an abundance of all other factors makes little difference.
- (2) Wildlife and environmental management is the process of modifying those factors that can be controlled by people.
- (3) These factors include nonliving elements, e.g., soil-air-water-space, and living elements, both human and nonhuman.
- (4) Wildlife and environmental management include monitoring (e.g., counting ducks on New York lakes in winter; measuring acidity of mountain lakes), manipulation (e.g., cutting timber, mowing, burning; water diversions such as dams), and regulation (e.g., laws regulating taking game animals; air and water pollution standards).
- (5) Wildlife and environmental management may have positive effects on some wildlife or aspects of the environment and negative effects on others (e.g., removing standing dead trees provides firewood for humans but deprives woodpeckers of nesting and feeding sites).
- (6) Management activities can enhance some types of human behavior and restrict others (e.g., protecting wetlands enhances opportunities for waterfowl hunting but restricts agricultural and commercial development).
- (7) To be responsible stewards, people must be knowledgeable about wildlife and environmental management options and be prepared to consider the consequences of management activities.

- (8) Responsible stewardship also includes personal and community action that benefits wildlife and the environment.
- (9) Because people sometimes disagree about how to manage the environment and because wildlife means different things to different people, decisions about the management of wildlife and the environment are often complex and controversial.
- 10) Careful decision making is accomplished through identifying the problem, obtaining and evaluating information, considering alternative solutions and their consequences, and making a choice.

PROGRESS REPORT

STATE: NEW YORK
PROJECT NO.: W-146-R:12

PROJECT TITLE: Public Attitudes Toward Wildlife and Its Accessibility

STUDY NUMBER AND TITLE: IX - Enhancing Public Benefits From Wildlife Management Through Education and Communication

JOB NUMBER AND TITLE: IX-1 - Formalization of DEC's Wildlife Education Objectives

JOB OBJECTIVE: To assist in the formalization of DEC's wildlife education objectives for youth and adult audiences.

JOB DURATION: 1 July 1986 - 20 June 1987

ABSTRACT: Project 146 staff assisted DEC's Bureau of Wildlife (BOW) in identifying and evaluating wildlife education objectives and instructional strategies to communicate the ecological basis and purposes of wildlife management to students in elementary school. DEC's new thrust in wildlife education coincides with the introduction of a new elementary science syllabus in New York State public schools. The new science syllabus, with its strong ecological emphasis, provides an excellent opportunity for discussion of wildlife management concepts, and wildlife in turn can be a primary vehicle to explain fundamental ecological principles to students.

This report describes the process used in the formulation of DEC's wildlife education objectives and the subsequent evaluation and revision of the objectives by a panel of education and natural resource professionals. The major issues considered during this process are summarized.

The results of the curriculum development process are the goals and concepts embodied in the "Wildlife Education Curriculum" (WEC). The WEC builds upon the ecological principles presented in the New Elementary Science Syllabus, emphasizes the need for students to be responsible stewards of wildlife and the environment, and discusses the role of wildlife and environmental management as a means of demonstrating responsible stewardship.

To encourage utilization of the WEC by elementary schoolteachers, the review panel recommended that: the curriculum be infused with existing school science, math, social studies, and language arts programs; lesson plans be packaged as independent modules; and an experiential approach be used in classroom implementation.

It is now up to the BOW to review the WEC and form its own opinion about its content and suggested implementation. If the BOW is satisfied with the outcome of the ERP, the next step in this study is to form an interagency task force to help implement the curriculum in the public schools.

Purpose

This report documents the development of wildlife education objectives for an elementary-level curriculum proposed for use in the New York State public schools. It describes the procedures used in the curriculum development and outlines the major issues that were considered.

The results of the curriculum development process are the goals and concepts embodied in the "Wildlife Education Curriculum" (WEC). The WEC is being submitted to the Bureau of Wildlife (BOW) for review. The BOW's opinion of this curriculum is sought, as well as a decision by the BOW on whether to proceed with the next phase of this study.

Background

Project 146 staff is assisting DEC's Bureau of Wildlife (BOW) in identifying and evaluating wildlife education objectives and instructional strategies that will communicate the ecological basis and purposes of wildlife management to students in elementary school. The DEC, as the state agency responsible for the management of wildlife, believes that without public understanding of wildlife management principles, practices, and purposes, support for agency programs will be minimal. The agency has therefore made a commitment to public education, recognizing that before people can understand the rationale for resource management programs, they must first have an adequate comprehension of basic ecological principles underlying management.

DEC's new thrust in wildlife education coincides with the introduction of a new elementary science syllabus in New York State public schools. The new science syllabus, with its strong ecological emphasis, provides an excellent opportunity for discussion of wildlife management concepts, and wildlife in turn can be a primary vehicle to explain fundamental ecological principles. The need to implement the new elementary science syllabus in the classroom will