

Missouri's System for Planning Wildlife Research Projects

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Abstract: A formal system was developed in Missouri for reviewing the design of wildlife research projects. The criteria used to develop the system are described, as are the 15 steps in the planning process. The system was developed to place more emphasis on the planning stages of wildlife research project preparation and to aid biologists in designing studies that will have a high probability of success.

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Planning is critical to successful research. A large amount of time and energy must be spent in defining the research problem, stating clear, precise goals and objectives for the study, designing an approach to meet the stated objectives, and exploring alternatives and methods with fellow biologists. The results of these planning efforts often ensure that collected data can be analyzed, objectives are met at the desired level of accuracy and precision, and budgeting and reporting are easier. In addition, planning becomes very critical if monetary support for research is low or faces major reductions.

In Missouri, a formal system was developed for wildlife project design and review to not only aid the project leader in study design, but to inform fellow biologists and administrators of study goals, objectives, approaches, and expected benefits of proposed studies. The system was designed to help in setting priorities for project budgeting and implementation and to ensure a higher probability of research success. The purpose of this paper is to describe Missouri's system for planning wildlife research projects.

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Criteria for System Design

The following criteria were used in designing the project planning system:

1. The system must show the necessary steps from problem definition to budgeting, including problem definition, goal and objective setting, study design, project review, and a ranking process for funding study plans.
2. The system must be flexible allowing for steps to be deleted or skipped that will not jeopardize the quality and integrity of study design.
3. The system must allow for changes in goals, objectives, and study design. This flexibility will ensure that review suggestions, current issues, and Department priorities are taken into account before project implementation.
4. The system must be designed to encourage all wildlife research biologists, biometricians, supervisors, and Wildlife Division administrators to have a role in the project planning process. Suggestions, insights, and editorial remarks of these individuals can help ensure a project's success.

The System for Project Planning

The project planning system begins with defining a problem and ends with the project being funded (Fig. 1). The procedure includes literature reviews, prospectus preparation, proposal preparation (using Federal Aid guidelines), reviews and editing by research staff, biometricians, research supervisors and administrators, and prioritizing of projects by the research supervisors.

The following are detailed explanations of each step in the process:

1. Problem Definition

The problem to be investigated must be defined in precise terms that communicates its identity, nature, and depth (Phenicie and Lyons 1973).

2. Review of State-of-Knowledge of Problem

A review of the state-of-knowledge concerning the problem should be conducted. Many sources should be used including literature, fellow wildlife biologists and biometricians, nationally known experts, etc. This information may provide possible solutions to the problem or aid in structuring study goals and objectives.

3. Is Enough Known to Solve the Problem?

With the information gathered from step 2, a question must be answered, "Is there enough information known to solve the stated problem?" If the answer is "yes," then a report may be prepared and disseminated to appropriate audiences. If the answer is "no," then goals and objectives for a study may be defined.

4. Define Goals and Objectives of Study

Defining goals and objectives of a study is 1 of the most important and most difficult steps to accomplish. It may take several attempts before the most appropriate goals and objectives are established. The goals and objectives may at first be too

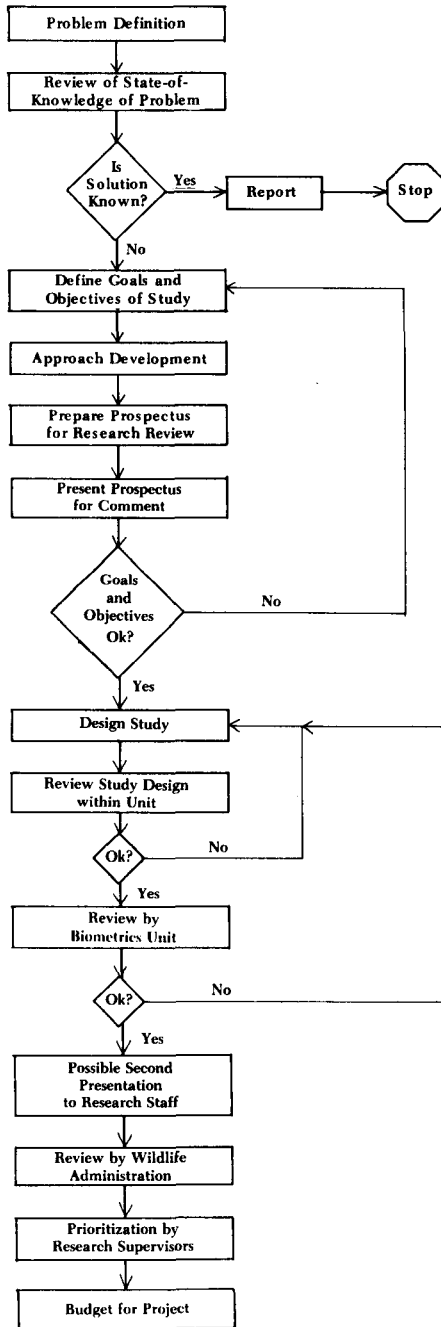


Figure 1. The wildlife research project planning process.

broad to be accomplished with the time, manpower, and budget available; however, if techniques such as step-down planning (Phenicie and Lyons 1973) are used, broad goals and objectives may be divided into several smaller and more manageable units.

A study goal is a statement of the scope of what is to be accomplished within a project. An objective for a study must state what is to be accomplished, at what rate and quantity, and specify a recognizable end point so progress and attainment can be measured. It also must be attainable given the time and resources available (U.S. Dep. Int., Fish and Wildl. Serv. 1982). To meet these requirements, objectives must identify the units being measured, quantify the products or outputs, give the time frame, and, where appropriate, the general location where the project is to be conducted. The more specific the study objectives, the easier the design and approach phases will be to formulate.

Examples of vague versus specific objectives follow: To study the food habits of white-tailed deer in Missouri (vague); To determine the volume and composition of plant species eaten by white-tailed deer in the Mark Twain National Forest during the summers of 1986–88 (specific).

5. Approach Development and Selection

After the goals and objectives for a study have been formulated, possible approaches should be examined that might be useful in solving the problem. These should be examined to determine if the parameters to be measured are appropriate for meeting the objectives. Literature, fellow wildlife biologists, and even experts from other disciplines should be contacted for their ideas. The approach that will allow the project objectives to be met in the most efficient manner feasible should then be selected.

6. Prepare Prospectus for Review

After the problem has been defined, the goals and objectives stated in detail, and a possible approach determined, a written prospectus is prepared for review by the Wildlife Research Section staff. The purpose of the prospectus is to inform the reviewing biologists of the identity, nature, and depth of the problem and to solicit comments concerning study design and other possible approaches. It should be complete, but should not be considered a final document for project implementation. This prospectus should include:

Title.—Study and job titles being proposed for the study.

Needs.—Description of the problem and justification for project. Goals should be listed for the study, and any background information that may be helpful.

Objectives.—Precisely stated objectives are essential.

Expected Benefits.—Expected benefits as they relate to the overall problem.

Outline of Approach.—Suggested approach and formal hypotheses that are to be tested for each objective. Background information and appropriate references would be helpful, too.

7. Present Prospectus for Comment

There are 2 stages within this step. The first is to deliver the written prospectus

to the Wildlife Research staff for review. The purpose is to initiate thinking about the problem and possible solutions or techniques that may be used. The second stage consists of a verbal presentation and discussion of the project at a regular staff meeting. The purpose of this session is to stimulate thinking by actively involving fellow biologists and to improve the study design using their input. Constructive criticism and open-mindedness should be the essence of the meeting.

8. Goals and Objectives Refinement

The goals and objectives for the study should be re-examined to make any refinements necessary based on staff input. If no refinements or only minor changes are needed, then the project leader is ready to design the study in detail. However, if the goals and objectives of the study need major revision, then the project leader should repeat Steps 4-7.

9. Design Study

The project leader is ready to design a detailed study plan for the project. This detailed study plan should supply sufficient information so an assistant or another biologist will be able to complete the project without further interpretation from the project leader. The plan should indicate resources to be used (people, facilities, and materials); assumptions being made about sampling, observation, and analyses; analyses to be made (laboratory and statistical); sample sizes and tolerance limits for measurements; time schedules; and budgetary requirements. The project leader may need to consult with fellow biologists, other experts, and biometricians in completing the study design. The end product of the process should be a document that is ready for final review.

10. Review Study Design

The study plan should be reviewed for completeness by research supervisors. Supervisors should examine the study plan for missing items and faulty scheduling or budgeting. When the study plan is fully accepted by the supervisors, it should be sent to the biometrics staff for statistical review.

11. Review by Biometrics Unit

In this review, biometricians will examine plans for compatibilities among sample sizes and desired limits of tolerance, soundness in the experimental or sampling designs, compatibility among objectives, hypotheses and experimental or sampling designs, and soundness in any quantitative aspects of the proposed project. This review will not be a formal critique of the appropriateness of the study or problem, only an evaluation of the approach from a quantitative viewpoint.

12. Possible Second Presentation to Research Staff

Any project that is substantially altered in step 7, 10, or 11 should be verbally presented a second time to the wildlife research staff at a regular staff meeting. This presentation is to inform the staff of the final goals, objectives, and approaches that were chosen to solve the problem. The presentation should be much shorter with fewer comments and less discussion than during the initial presentation.

13. Review by Wildlife Administration

The study plan should be forwarded for review to the Division Chief and the

Superintendents of the other Sections within the Wildlife Division, as appropriate. Their review will be of an informative nature rather than a critical review for content. However, as with any review they may find shortcomings within the study plan and recommend changes.

14. **Prioritization by Research Supervisors**

The study plan is now ready to be ranked with other completed plans for budgeting and implementation. This responsibility lies within the wildlife research supervisory staff.

15. **Budget for Project**

At this step, the project awaits in priority until it can be funded. After funding, it becomes the responsibility of the project leader to implement the project as designed.

Discussion

This paper presents a system that was designed to place more emphasis on the planning stages of wildlife research project preparation. The Division has had less than 2 years of experience using this planning process, so we cannot report the success of reviewed projects. However, the research staff has been receptive to the planning process and helpful improvements to projects have been made by applying collective thinking and experience to a problem. The planning process provides an atmosphere, particularly during the verbal presentation portions, that stimulates ideas or new approaches not previously used. Further, the staff has become more aware and involved in the research of peers and the direction of the Section in general.

Literature Cited

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