4 Development of a research plan

Summary

This chapter is a case study of the application of the five processes of research planning and the development of a conceptual and propositional analysis. A research plan does not spring from the mind complete and perfectly formed at the first attempt. Research planning involves refinement and reorganization of ideas.

Ashley Steel started her planning with ideas that piles of coarse woody debris (CWD) washed up on a riverbank by a flood would provide shelter and habitat for birds and small mammals. Not all wildlife biologists agreed with her. The process of developing a research investigation meant that she had to specify and organize her initial ideas into a theoretical framework and make exploratory investigations of uncodified knowledge.

Steel constructed hypotheses and tested whether animal use of different types of CWD piles was different. As typical of field investigation, the results led to further research and, particularly, the need to refine concepts that can be measured more effectively.

After completing her Masters research, Steel reflected that two things in particular would have aided this planning process: (1) a pilot study, which would have improved field measurements; and (2) more extensive criticism from scientists with areas of specialist knowledge, which would have helped the conceptual analysis.

4.1 Introduction

This chapter describes the evolution of a research plan. It starts with the imprecise, incomplete first ideas of an investigator and shows how these evolve into a plan with defined objectives. The aim of planning – a set of axioms, postulates, and data statements – was kept continuously in mind although it was not achieved at the first attempt.

Each of the five processes involved in research planning (Chapter 2) is identified as it is used:

(1) Defining a research question.
(2) Applying creativity to develop new research ideas.
(3) Ensuring the proposed research has relevance to prior scientific knowledge.
(4) Ensuring the proposed research is technically feasible and can be completed with available resources.
(5) Determining how conclusions can be drawn.

You must start with Process 1, and planning is not finished until Process 5 is complete. But you should not think of applying each process just once, nor necessarily in the sequence listed here. In this example, the five processes are discussed in the sequence 1, 4, 3, 2, and 5, although aspects of Processes 4 and 2 interrupt the investigator's consideration of Process 1 before 4 and 2 are fully developed. These five processes together provide a deliberate, conscious questioning of the assumptions made, of the questions asked, and of the ideas and terms used in describing both assumptions and questions. A satisfactory plan is usually the result of many revisions.

4.2 Process 1: Defining a research question

4.2.1 The first description

The first task is to write a Background and Introduction statement of your questions and why they interest you. This first written description, for private use or discussion with a sympathetic critic, is a way for you to explore why you view a research problem in a particular way.

Steel made just such a description at the start of planning a Master's research topic (Box 4.1). The text has deliberately not been edited since the planning process. I am extremely grateful to Ashley Steel for permission to illustrate the development of her ideas and for her reflective criticisms of them after she had completed her thesis. Our scientific culture emphasizes the value of the scientific paper written for publication in a peer-reviewed journal, and that rarely shows the development process.

No literature was cited in the text of Box 4.1, and this is deliberate. At this stage, ideas come from ecology foundation classes, field observations, suggestions of supervisors or others experienced in the research area, and the scientific literature (Fig. 3.4). A conceptual and propositional analysis reviews all these ideas. If, at the very start of writing a plan, you attempt to support all ideas with literature citations then either only those ideas supported by the literature, the codified knowledge, will be written down, or the interpretation of the literature may be biased to support what it really does not. If either of these happens, the planning document is incomplete because the assumptions from field observations and other less formal sources, the uncodified knowl-

Box 4.1. Steel's first description of background and introduction

Small mammal use of the coarse woody debris piles on the north fork of the Skykomish River

Although there has been much research on the function of coarse woody debris (CWD) in small streams, there has been little research on the function of large piles of woody debris in or near large rivers. In a natural system, there are many debris piles. These piles may be an important link between upland, riparian, and aquatic communities. Forest management may impact on the distribution of these piles; yet, the effects of forest management on these piles are unknown. This study proposes to investigate large piles of woody debris on the north fork of the Skykomish River in Washington.

There are many important questions, answers to which will be necessary for both a more complete understanding of river ecology and an improved management plan. My project will be a first step in answering one of these questions. I will focus on the following problem: do large piles of woody debris supply critical resources for upland communities by providing habitat for small mammals and/or food resources for insectivorous birds? I will document the postwinter colonization of debris jams by small mammals and postwinter use of debris jams by birds that feed on resident insects. The pattern of small mammal colonization will demonstrate whether debris jams are used when small mammal populations are at their lowest (i.e., optimal habitat) or whether debris jams are used only when small mammal populations are high (i.e., suboptimal habitat). The pattern of bird use will be an indicator of the importance of woody debris habitat for insects and also an indicator of the dependence of higher levels of the food chain on the insect resource. I will gain information that describes the attributes of debris piles that make them more or less suitable as habitat for insects and mammals by comparing the colonization of piles that are at the edge of the forest versus piles on cobble bars and the colonization of new piles (1990 flood) versus preexisting piles.

edge, which are frequently at the very heart of the research, remain inadequately defined, and their significance may be overlooked.

Many observations and ideas came together to act as the basis for this research. Steel rafted the Skykomish River in Washington State. A recent flood had deposited large amounts of woody debris on the river banks. Although the river is protected with State of Washington Wild and Scenic Status, there was talk of dynamiting piles of woody debris to increase access