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On The Importance of Wildlife Field-Based Inventories in Forest Management

CONSERVING BIODIVERSITY IS AN IMPORTANT OBJECTIVE OF TODAY'S forestry companies. In their efforts to meet this objective, companies must identify mature and old forest stands that will be retained within managed landscapes. The selection of these stands is important as they must meet the needs of many animals and plants, including species at risk. However, which stands should be retained? For example, in the Prince George Forest District, there are approximately 240 bird and mammal species; approximately 25% of them are associated with mature and old-growth forests (Proulx, unpublished data). Which stands should be protected to accommodate the needs of a majority of species, including those at risk? The selection of these forest stands should not be done at random or on the basis of a literature review.

After nearly 40 years of field work, I believe that the selection of forest stands for biodiversity conservation must be based on thorough, multi-year inventories of species and their habitats under various environmental conditions. By knowing the seasonal distribution of species, forest managers could then integrate coarse filter management strategies, which address the needs of a variety of sympatric wildlife species, with fine filter management strategies for species at risk.

The first step in developing an effective inventory program is to properly define the objective of the program. For example, the objective could be "to identify winter (a critical season for the survival of species) habitat use by species X, Y and Z." Depending on the defined objective, inventories may be extensive to cover all animal taxa (e.g., Ruggiero et al. 1991), or limited to one (e.g. Proulx 2009) or many indicator species, including species at risk (Proulx 2005). After reviewing what is known about these species, biologists must attempt to make some preliminary predictions on species' habitat use and determine how the inventories will be conducted to gather scientifically sound datasets across landscapes. Various methods exist to assess habitat use. Capturing and radio-tracking animals may significantly contribute to our understanding of habitat use but these methods are expensive and usually involve only a few animals. Furthermore, to be captured and radio-tagged may be a stressful experience for some animals, and this could affect the quality of the data (e.g., Cattet et al. 2008). Researchers may use non-invasive methods that will provide information on the seasonal distribution of species in various habitat types, including snowtracking (Proulx and O'Doherty 2006), camera-traps (Mace et al. 1994) and bird point-count stations (Imbeau et al. 1999), which are among some of the techniques used to study species distribution, habitat use and even population densities. Non-invasive methods, however, may not allow one to assess a species' habitat use according to gender and age classes.

In central BC, I investigated the possibility of identifying high-quality habitat areas for American marten *(Martes americana)*, fisher, *(Martes pennanti)*, wolverine *(Gulo gulo)*, grizzly bear *(Ursus arctos)* and mountain caribou *(Rangifer tarandus)* using predictive distribution maps based on forest inventory databases and a knowledge of the species. I inventoried (snowshoed) marten (Proulx et al. 2006), fisher (Proulx 2006a) and wolverine (Proulx 2004) in late winter, during consecutive years and under different environmental conditions. I used spring aerial inventories to study the distribution of grizzly bears (Proulx 2006b), used snowtracking to determine habitat use by caribou and completed my dataset with observations from Ministry of Environment researchers. All these inventories allowed me to delineate two specific areas within the managed landscape where these indicator species' high-quality habitats overlapped (Proulx 2005). Further inventories showed that these areas sustained the greatest diversity of bird species associated with old-growth forests (Proulx 2006c) and plant communities at risk (D. Bernier, Ecora, unpublished data). In these two areas, various habitat conservation measures (e.g. old-growth management areas, reserves, wildlife habitat areas) could be implemented. Also, logging activities could be reduced in these sensitive areas at the expense of adjacent areas with less biodiversity potential — where timber removal may be increased in a compensatory manner.

Successful biodiversity management programs are those that are based on field inventories where we let the animals show us where they live during critical periods of the year. Unfortunately, some managers use quasi-spatial forest management models to retain discrete 'representative' ecosystems independent of species' specific habitat requirements (e.g. Bunnell et al. 2003, Huggard 2004, MSRM 2004). In order to save time and money, other managers will also use models to predict the distribution of species and habitats. Unfortunately, these models are often based on untested assumptions and they use data that do not take into account regional differences in the ecology of species. One just has to remember Habitat Suitability Index (HSI) models which often generated questionable results (e.g. Laymon and Barrett 1986). As Noss (1996) pointed out, we have no shortage of fabulous models and supercomputers; what we lack in many cases is good field data to plug into the models. Effective biodiversity conservation and forest management planning cannot be achieved without proper wildlife field-based inventories.

A comprehensive list of citations is available on the ABCFP website.

Gilbert Proulx is a wildlife biologist who has studied populations and habitats of ungulates, rodents and carnivores in North America and tracked mammals in Africa, South America and Asia. He is a field-oriented scientist and his activities focus on the study and management of wildlife in forest and agriculture ecosystems. He has published more than 120 scientific articles and 13 textbooks and field guides.