



U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Wildlife Services

U.S. Government Publication



BOOK REVIEW

The Eurasian Beaver Handbook: Ecology and Management of *Castor fiber*. Róisín Campbell-Palmer, Derek Gow, Ruairidh Campbell, Helen Dickinson, Simon Girling, John Gurnell, Duncan Halley, Simon Jones, Skip Lisle, Howard Parker, Gerhard Schwab, and Frank Rosell. 2016. Pelagic Publishing, Exeter, U.K. 202 pp. \$49.07 paperback. ISBN 978-1-78427-113-8.

Like its congener in North America (North American beaver [*Castor canadensis*]), the Eurasian beaver (*Castor fiber*) was locally extirpated from many parts of its range, largely because of overharvest and changing land use practices in the presence of an increasing human population. Similarly, both species also have responded well to changes in environmental awareness and wildlife management practices. Presently, both species are managed for the ecosystem services that they provide and the conflicts, or disservices, they create with humans (e.g., excessive flooding). The release of *The Eurasian Beaver Handbook: Ecology and Management of Castor fiber* (i.e., *Eurasian Beaver Handbook*) occurred at an opportune time because the public has growing interest in beaver ecology in the context of climate change. *Eurasian Beaver Handbook* was written by 12 individuals from 4 countries, the combination of which makes for a well-rounded, comprehensive guide.

The handbook consists of 8 chapters and 8 appendices. Each chapter is supported by key concept bullets at the end, which summarize each chapter. Chapters 1 and 2 set the stage for the remaining text by describing the authors' aims and purpose, and providing a brief history of beavers in Europe, including beaver reintroduction in Britain. Much of the book "...addresses the experiences gained from beaver restoration in Europe, but draws from practical experiences in North America where beaver populations have also recovered" (pg. 4). This is an important note for the reader to remember because references from North America are often used in the absence of similar examples from Europe. Although most beavers in Europe are Eurasian beavers, the authors point out the inadvertent release of North American beavers in Finland, Karelian Russia, Belgium, Germany, and Luxembourg.

Chapter 3 gives an overview of several aspects of beaver biology and ecology, highlighting similarities and differences between species where appropriate. Topics include taxonomy and distribution, anatomy and appearance, breeding and young, habitat and territoriality, diet and feeding, behaviors, parasites and diseases, and population biology. The authors also include a separate section on North American beaver introductions. Although the authors do a fine job of describing beaver ecology, basing statements on their cumulative experience and citing numerous sources, their use of terms such as insufficient habitat and low-quality habitat suggest that the reader should seek additional information from cited sources.

Chapter 4 (Legislation) addresses laws, statutes, and regulations related to beaver management in Europe.

Although the authors note that the framework for beaver protection can be found in the Convention on the Conservation of European Wildlife and Natural Habitats, most of the chapter is focused on current legislation in Britain, including >20 pieces of legislation found in Table 4.1. Although similar legislation is missing from other European countries, the authors caution readers to consult with statutory authorities and seek legal advice when planning beaver-related management.

Chapters 5 (Effects of Beavers) and 6 (Managing Beaver Impacts) make up the largest chapters in the book. The first 4 sections of chapter 5 primarily address positive values of beavers by describing beavers as ecosystem engineers, interactions with species of high conservation value, beaver effects at a catchment scale, and beavers in landscape-restoration projects. Although the authors address several benefits that beavers provide, they acknowledge "...it is also important to accept that their presence can sometimes conflict with human interests and impose a cost in terms of resources (including time and financial), especially in intensively managed landscapes" (pg. 41). The final section of chapter 5 addresses negative values of beavers as they affect managed land use. Subsections address beaver damage to agriculture, horticulture, woodland and forestry, fisheries, engineered environments, and recreational areas and water bodies. Chapter 6 describes techniques to reduce negative impacts of beavers while managing for positive values. Beaver impacts are divided into 3 categories, each with associated management activities: damming, burrowing, and foraging. Chapter 6 also contains a section on how to manage beavers. Each of these 4 sections is broken into subsections that address ecology, benefits, issues, management options, and animal-welfare considerations.

Identifying and monitoring beavers can be difficult because of their secretive, nocturnal habits; however, there are some reliable techniques available. Chapter 7 (Survey and Monitoring) offers guidance for using non-invasive monitoring techniques to document habitat use, estimate population size, and map distribution. Because future beaver reintroductions are likely in Britain, the authors offer features to consider in assessing sites for possible beaver release. They also provide references to full protocols that have been used successfully in Scotland.

Chapter 8 (Learning to Live with Beavers) is a fitting final chapter for the handbook because beavers are a species that are often at odds with people when stakeholder levels of acceptance are exceeded (e.g., excessive flooding damage). The authors share examples of improving public relations and educating the public on beaver management to reduce human-wildlife conflict. They also provide examples and give recommendations for including beavers in socioeconomic planning (e.g., ecotourism value). As beavers continue to recolonize areas throughout Europe by dispersal and reintroduction, the authors believe that future management should be practical

and adaptive, rather than a rigid, license-based system. They also submit that more research is warranted in the potential role of beavers in wetland restoration. This research need, and the need for more public education on beavers, is also warranted in North America.

The remainder of the handbook consists of 8 appendices. Appendix A supports Chapter 7 and describes methods to identify beaver use by field signs including teeth marks, felled and gnawed trees, bark stripping, grazed vascular plants, feeding stations, foraging trails, lodges and burrows, food caches, dams, canals, scent mounds, feces, and tracks. This is an extremely helpful tool that will allow practitioners to improve their beaver survey methods.

When handling beavers is necessary for management (e.g., relocation or reintroduction), one should be prepared to give beavers a thorough health assessment. It also is important to know the potential risks to human health when handling beavers or working in beaver-occupied wetlands. Appendix B describes several known and potential parasites, bacteria, fungi, yeasts, and viruses associated with beavers. They range from harmless ectoparasites such as the beaver beetle (*Platypyllus castoris*) to possible zoonoses like cryptosporidiosis, giardia, and leptospirosis.

The remaining appendices (C–H) provide additional details for managing beaver impacts and monitoring (chapters 6 and 7), although references to appendices are often lacking in the main body text. Several beaver management techniques introduced in chapter 6 are described in more detail in

Appendix C. Appendix D is a chart that may be used as a decision support tool to apply various management options based on beaver activity. Appendix E provides specifications for a beaver enclosure fence, which may be used to temporarily hold beavers during a relocation project. Trademark names of several management devices described in Appendix C are found in Appendix F. Appendices G and H provide examples of beaver fieldwork assessments and beaver survey data sheets, respectively. Overall, the appendices support the main chapters of the handbook and provide the reader with tools that can be used for management.

In summary, I recommend *Eurasian Beaver Handbook* for land managers, policy writers, and landowners interested in managing European landscapes that include, or may potentially include, beavers. The size of the handbook is small enough that it could be carried in a small pack in the field (24.3 cm × 17.0 cm × 1.1 cm). Although this book focuses on the European beaver, practitioners in North America also could benefit from reading this book to compare management styles, tools, and techniques.

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