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ENDANGERED SPECIES: CANADA'S DISAPPEARING WILDLIFE. By CLIVE ROOTS. Markham, Ontario: Fitzhenry & Whiteside, 1987. 89 p., 59 black-and-white drawings. Hardbound. Cdn\$22.50.

Endangered species share a high profile in the public arena with large birds and mammals. Disappearing wildlife are of great concern to 84% of society (Filion *et al.*, 1983). They are symptoms of our abuse of this planet. Author Roots claims to "have produced a testament to what Canada once had and a warning of what it may lose if its legacy of life is not cherished" (from the jacket cover). Unfortunately the testament is flawed in so many ways that they make this book difficult to recommend.

To the book's credit, it chronicles not only birds (23 species) and mammals (27 species), but the often ignored amphibians (12 species), reptiles (18 species), and fish (22 species). Unfortunately no plants or insects are presented. After a one-page introduction each species has a brief text. There is no general discussion of endangered species. The 50 species of birds and mammals receive most of the attention for 69 pages, while the other 52 species are covered in 17 pages. Each species is illustrated with a black-and-white line drawing by Celia Godkin. Some illustrations are excellent, while others are mis-proportioned.

The author did not appear to keep a tight definition of the species that are included. Some species are extinct, such as Passenger Pigeon, while others are common and increasing, such as Merlin and black bear. Several mammals, such as wapiti, pronghorn and bighorn sheep, have well-managed populations and cannot properly be considered part of "Canada's disappearing wildlife."

The book does alert the reader to the major causes of declines of species in Canada. Historically market hunting was a major factor in the decline of many species. Habitat loss is the major factor today and is identified as a problem for several species. Toxic chemical concerns are more difficult to identify as species decline, but they are a problem for peregrine falcons and implicated for burrowing owls. Road kills, introduced herbivores, introduced predators and egg collectors are less important. Disturbance of wildlife especially at the nest site is not stressed and should be, for example, with White Pelicans.

Wildlife authors must strive to educate the public and not perpetuate inaccurate broad statements. In this book hunters are identified frequently but incorrectly as a threat to several species. For example, "Nevertheless, its [Hudsonian Godwit] habit of trying to mob hunters and other predators makes [present tense] the godwit easy prey for the shotgun" (p. 10). Why are hunters singled out as objects of mobbing behavior? Godwits are not under threat from today's hunters. Historically market hunting for large shorebirds was a major concern, but this has stopped and should not be confused with today's sport hunting. Likewise, "Winter then does what clumsy hunters have failed to finish" (p. 13) to injured Ross's Goose. One could argue that hunters' kill is of concern for some species, but hunters have contributed a great deal to wildlife conservation. The recurrent theme of hunters causing species' declines is unwarranted with today's wildlife management.

The author does not present an enlightened view of wolves. The author states that the grey wolf "is feared by reputation, praised

by legend and often misunderstood by layman" (p. 52). The last sentence of this account does little to create a better understanding. "Usually the result of starvation or rabies, such attacks (on humans) show that despite the wolf's resemblance to the domestic dog, it is best left the beast it is at heart."

Many birds and their nests are protected in Canada by the Migratory Bird Convention Act. There is no endangered species legislation that could protect all threatened wildlife. The Hudsonian Godwit is not "Protected in Canada as a rare bird" (p. 10). Rather, it is protected as a migratory bird, along with all other shorebirds.

There is little mention of constructive action that has been taken to save wildlife. The author did not include conservation actions in his list of objectives of the book, but I feel it would have been a stronger effort if the reader had learned of some recovery efforts.

The author does not define his use of the terms endangered, threatened and rare. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which was established in 1977, has created a set of definitions that now have broad national support. In addition the status of many species has been determined by COSEWIC. Burrowing Owl is classified as threatened, not rare as stated (p. 14). The Piping Plover is endangered, not "considered to be threatened in Canada" (p. 29). At least six species are said to be extinct in regions of Canada. This is a misuse of the word extinct, which means to no longer exist anywhere. The term extirpated correctly describes the local and regional disappearance of a species.

Some terminology should be defined for the general reader or not used; for example, a reference to the origins of antelope from the "Eocene Epoch" does not tell the reader that this was 40 to 60 million years ago.

The book suffers from poor editing. Besides spelling errors, e.g., "racoan" (p. 40) and "Halioeetus" (p. 22), there is repetition, such as "they found Funk Island" (p. 4) in two consecutive sentences and on page 50 the kit (swift) fox's alleged inability to flourish where man has settled is repeated in the first and last of four paragraphs of the swift fox account. Likewise in the Burrowing Owl account the first and last of four paragraphs discuss why this owl is rare.

The Burrowing Owl account is also inaccurate. This owl is said to be rare in the first paragraph "because of its habit of nesting near highways and airport runways" (p. 14). While road kills may be a local problem, it is not thought to be a major cause of declines. Then in the last paragraph of the account, "burrowing owls are rare, victims of their tastes for nesting sites and the use of agricultural chemicals that, naturally, drain into their burrows." The application of agricultural chemicals would never be at a dosage that would result in actual flows into depressions. Pesticides are a problem through direct exposure or secondary poisoning from insects, particularly grasshoppers. No mention is made of the shooting of these owls when ground squirrels are being eliminated.

There are many other incorrect statements — the major drawback of the book. Here are some examples. Trumpeter Swan populations number 11 000 to 12 000 (Shandruk, 1987), not several hundred, as stated on page 13. The experimental fostering of Whooping Cranes to Sandhill Cranes has not been successful, since no whoopers have paired or bred (Kuyt, 1987, and pers. comm.). Historical estimates of Whooping Crane numbers are about 1300 (Allen, 1952), not "the thousands" quoted (p. 20). Another incomprehensible statement, "John James Audubon bagged seven [Whooping Cranes] in one day in 1810 — more than all the chicks that have survived during decades of conservation and breeding during this century" (p. 20). In fact over 20 chicks have survived each year since 1986 (E. Kuyt, pers. comm.). Whooping Cranes mature at age 4 (Kuyt, 1987), not 5 to 7 years. Both Bald Eagle and Golden Eagle nest in eastern Canada (Cadman *et al.*, 1987), not just in western Canada as stated. The Prairie Falcon breeds commonly in Saskatchewan and its populations have not been "decimated by agricultural chemicals," although pesticide residues have been found in these birds' eggs (unpubl. data). It is stated that Merlins "occasionally . . . winter

as far north as Edmonton" (p. 27). In fact Merlins have been a permanent resident of Edmonton for over twenty years, and in December 1986, 40 Merlins were counted on the Christmas Bird Count, more than in any other count in North America in the history of these counts! It is stated that the Peregrine Falcon is a non-breeder "from the Gulf of St. Lawrence to the Gulf of Mexico" (p. 27). While this was true twenty years ago, there are four pairs in Canada (unpubl. data) and 56 pairs confirmed on territory in eastern U.S. (Cade and Dague, 1987). Although many of these references and those that follow appeared in 1987, the same year that the book was published, the information is available elsewhere in other publications.

The statement that the "Cougar territory has contracted along with herds of White-tailed Deer" (p. 49) does not agree with published accounts of the expansion of White-tailed Deer over most of North America since 1908 (Hesselton and Hesselton, 1982). Wolf families (packs) rarely mingle in winter, contrary to what is stated (Parasido and Nowak, 1982). Herds of adult elk or wapiti are segregated by sex in winter, spring and summer (Peek, 1982), which hardly warrants the conclusion that they are "a clearly male dominated society" (p. 56). In the bison account the numbers are wrong. There are over 2000 Wood Bison in the Mackenzie Bison Sanctuary, not 500 as stated. The Wood Bison has little chance for survival in Wood Buffalo National Park, since over 6000 Plain's Bison were transferred there in 1925 to 1928 (Reynolds, 1987). The Plain's Bison left Wainwright before World War Two, not after 1960 (p. 60). I could go on but there is little need.

This book has a lofty and admirable objective, which makes it difficult to criticize; but authors, editors and publishers have a responsibility to ensure texts are grammatically correct and factually accurate. They have failed in this book. Consequently, I cannot recommend this book to any audience.

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A REVIEW OF ARCTIC GRAYLING STUDIES IN ALASKA, 1952-1982. By ROBERT H. ARMSTRONG. Together with INDEXED BIBLIOGRAPHY OF THE HOLARCTIC GENUS *THYMALLUS* (GRAYLING) TO 1985. By ROBERT H. ARMSTRONG, HAAKON HOP and JULIA H. TRIPLEHORN. Biological Papers of the University of Alaska, No. 23. Fairbanks: University of Alaska, 1986. 110 p., 3 figs., 6 tables. Softbound. No price indicated.

This monograph consists of a review of studies of Arctic grayling in Alaska (1952-1982) and a seemingly exhaustive bibliography (to 1985) of the Holarctic genus *Thymallus* (grayling). The primary intent of the monograph is to assemble and review the large number of published papers and relatively inaccessible research reports on grayling, therefore providing the first bibliographical update on the genus in approximately 20 years.

Armstrong's review and synthesis of data available on Arctic grayling in Alaska primarily is directed towards fisheries management and includes sections on sport harvest, stocking, life history, migrations, age and growth, feeding ecology, and population estimation. A strength of this contribution is the inclusion in the synthesis of numerous documents, like Federal Aid annual reports, that are not easily obtained elsewhere. This review concludes with a clear statement that identifies major gaps in knowledge of Arctic grayling biology and speculates on how this information void may severely hamper future management attempts. Our major criticism of the review stems from the exclusive use and discussion of literature pertinent to the management of grayling. Clearly, the synthesis would have benefited by an attempt to draw parallels and distinctions among Arctic grayling and other salmonid species.

The major component of this monograph is a 92-page worldwide bibliographic listing of 1314 references on the grayling genus *Thymallus*. Researchers will find this index most helpful, as the introduction clearly describes how to use the various indexed sections of the bibliography. Even the abstracting services and key words used for the computer searches are provided, so that researchers could conceivably conduct a similar search of the post-1985 articles not included in the monograph. Although the bibliography is compiled alphabetically by author, key word indices that categorize articles by taxonomy, geography and subject matter are given. These indices greatly facilitate the ease and speed with which the bibliography can be searched for specific information; however, many of the larger categories would have benefited by the use of sub-headings. Each bibliographic listing includes basic reference information (e.g., title, author, date, etc.), as well as an indication of whether an English translation or summary of the article is available.

The review is aimed at researchers specifically interested in the management of Arctic grayling, while the bibliography is designed as a general reference aid for anyone working on the genus *Thymallus*. Although the audience for this review and bibliography is limited, researchers requiring information on grayling will likely find the monograph an invaluable, and inexpensive, method for accessing this widespread reference material.

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