

ferences in plumage colour. Simultaneous playing of Xeno Canto recordings of both species showed that magpie calls are varied and similar.

The other photograph that caught my attention was of two American Crows. One is remarkably smaller than the other. Again McLaren uses subtle plumage characters and call to identify this bird as a runt American Crow. This time I was happy with the identification as the likely vagrant, Fish Crow, has a clearly different call and an observable divergence in appearance. We need to remember there can be small individuals.

Many years ago I visited a rising star birder and was surprised to see a bulletin board covered in weather maps. This person has repeatedly been in the right

place at the right time, due to this studious approach. McLaren too includes a substantial discussion of weather patterns in NS and how these link to bird movements. This is an area we could all benefit from, by paying more attention to the role weather plays.

I really enjoyed reading this book. I brought back good memories and I learnt a lot from the identification discussions. The text on Status and I.D. Issues is clear and informative without being repetitive or stuffy. It will make a fine present for your favourite birding friend.

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The ROM Field Guide to Freshwater Fishes of Ontario

By E. Nicholas, E. Mandrak, and M. Burrige. 2009. Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario M5S 2C6. 462 pages. 29.99 CAD. Paper.

This guide covers the 128 native fish species in Ontario along with 17 species of established exotics. The Introduction indicates that it will enable the reader to identify species in the field. To this end, the book is replete with over 500 colour photographs of all the species, often as many as five for each species.

The book has short introductory sections on factors influencing distribution, habitats, observing fishes, how to use the book, further information (books and internet sources), anatomical figures and, at the end, illustrations and short descriptions of fishes that may occur in Ontario, a short glossary, a checklist, an index to common and scientific names, a list of photographers and illustrators, acknowledgements, and short blurbs about the authors.

Fifty-one pages are devoted to keys and the rest of the book, 355 pages, to the species accounts.

The keys are innovative in that they group fishes by a single illustrated character (initially eel-like body, barbels, adipose fin, one dorsal fin without spines, dorsal fin with one or more spines) and then each of these five headings have up to 3 subheadings. Within the subheadings a single character may identify a species or family of fishes although some require up to 3 characters to separate them. Members of the Carp and Minnow family, Cyprinidae, appear in 4 places (barbels, spineless dorsal fin with forked tail and belly keel, spineless dorsal fin with no keel, and spiny dorsal fin), evidence of their diversity. This works well and narrows down the possibilities.

The next section comprises Comparative Photographs which are reached from the key by a page number. This can be confusing as several unrelated fishes are grouped together and the heading of each page does not repeat the key characters. Page 40, for example, is reached from two key groups under "adipose fin" and "spiny dorsal fin". The species are two ciscoes (Sal-

monidae), a smelt (Osmeridae) and a silverside (Atherinopsidae) – the heading for the page is "Silvery fishes with a soft dorsal fin, no overhanging snout, and no keel". The latter two species are quite distinctive but there are no characters separating the two ciscoes. Later, in the species accounts, the authors do point out that "To the untrained eye, it is virtually impossible to tell all ciscoes apart". In the key, the smelt and silverside are given a page number for their species account, but not here in Comparative Photographs. This requires some work to locate the descriptions and maps of the species from this point as the index lists the brook silverside under "silverside, brook", for example. Generally, this comparative section requires some skill to use and is not always successful, e.g., "Redhorses with red tails" has one species without a red tail, indicative of the variation that can be found in fishes but confusing for the reader. The difficult group "Carps and Minnows" has 9 sections, two of which are "Minnows with large scales (36-54 lateral scales)" and 5 pages later "Minnows with large scales (39-55 lateral scales)" which is confusing. Some characters used are correct but might require some thought by the neophyte reader, e.g., under eel-like fishes, two lamprey species are distinguished by >2 or <3 bicuspid lateral circumoral teeth. The teeth are illustrated, which helps, but >2 meaning 3 or more, and <3 meaning 1 or 2, could have been expressed in this more familiar fashion.

Generally, it is difficult to see how this Comparative Photograph section can work for the reader in families where there is a high diversity in species but close similarity in appearance. The fact that the senior author of the book has taught regular fish identification courses indicates how tricky some identifications can be. Ideally, the Comparative Photographs should have been a continuation or subsets of the initial keys, although this would have necessitated an extensive

nested arrangement in such a diverse group as Carps and Minnows.

The book could have had true anatomical identification keys to difficult and speciose families which would help bridge the gap between the angler and amateur naturalist looking at a fresh fish just caught and needing a quick identification, and the biologist with access to a microscope and preserved specimens needing an accurate and more reasoned identification. Nonetheless, with patience and practice, most Ontario fishes can be identified using this guide.

Each of the 24 family accounts is preceded by a section giving illustrations of key characters referred to in the species accounts, clarifying structures that are not always apparent in colour photographs or not easily understood when expressed in words. The family has a one-page general account. In some families more could be added here, e.g., under each of the two gar species, the same sentence about their adhesive snout disc when young is repeated and should have been on the family page, giving more space for information on individual species.

Each two-page species account is headed by the common name and the scientific name, an explanation of the meaning of the scientific name, a colour photo-

graph of the fish on the white page background, a short section with some informative note about the fish such as distribution, anatomy, behaviour, relationships, etc., a description of the fish (anatomy and colour), a comparative section on similar species, an Ontario shaded distribution map, short sections on feeding, reproduction and habitat, letter and number codes that explain conservation status, and a two-line table giving maximum age, Ontario average length, and Ontario record and world record lengths, and sometimes weights. Other colour photographs in the account show adults, juveniles, close-ups of heads, eggs, fish in a nest, etc., mostly in a natural (or aquarium) setting. Species descriptions are alphabetical by common name so unrelated fishes (in body form) occur next to each other, e.g., smallmouth and largemouth bass are related species that an observer would want to distinguish but are separated by 4 unrelated species accounts.

The book is an excellent introduction to the fishes of Ontario and is packed with information. The authors have carried out a difficult task in an exemplary manner and are to be congratulated for their efforts in presenting this fauna to a wide audience.

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Population Demography of Northern Spotted Owls

By E. Forsman and 26 co-authors. *Studies in Avian Biology* No. 40, Cooper Ornithological Society. University of California Press, 1445 Lower Ferry Road, Ewing, New Jersey 08618 USA. 105 pages. 35 USD. Cloth.

This well-researched and informative monograph used data from 11 long-term studies, ranging from 17 to 24 years in duration. Three study areas were in Washington, five in Oregon and three in California. Owls were trapped most often with a noose pole or snare pole. The number of captures/resightings per study area varied from 583 to 3777, involving 24,408 recaptures and resightings of 5,224 marked Spotted Owls, nearly five per adult. This giant data set for a rare species demonstrates a biennial cycle, with unexplained higher fecundity in even-numbered years.

The study areas were large and covered 19,813 km², ~9% of the range of the Northern Spotted Owl. There was strong support for declining adult owl survival on 10 of the 11 study areas, with these declines most evident in Washington and Oregon. Reproduction and recruitment were insufficient to balance losses due to mortality and emigration; the average rate of Northern Spotted Owl population decline in all study areas combined was a worrying 2.9% per year.

There was also evidence of climatic effects (Pacific Decadal Oscillation and Southern Oscillation/El Nino Index) and of weather effects (early nesting season precipitation and early nesting season temperature).

Since about 1970, government agencies in the Pacific Northwest have attempted to maintain viable popu-

lations of Northern Spotted Owls, Marbled Murrelets and red tree voles, resulting in controversial reductions in the harvest of valuable old forests on federal lands. The Northern Spotted Owl, "the poster child" for conservation of old-growth and mature forests on federal lands, was listed as a threatened subspecies in 1990.

The more recent invasion of Barred Owls into the range of the Spotted Owl has elevated the concern. Apparent survival of Spotted Owls was negatively correlated with the presence of Barred Owls on the study area on six of the study areas.

Three possible data biases were identified: 1) permanent emigration of adults is rare because adult site fidelity is high; 2) variation in recapture rates is low because survey effort is relatively constant; 3) band loss bias is absent because band loss is close to zero; from more than 6,000 owls banded with standard aluminum bands or with colored bands, only two colored bands and no aluminum bands were lost.

The statistical analysis of these combined studies is exemplary. The monograph demonstrates the basic importance of bird banding as a tool for monitoring bird populations, identifying the reasons for their fluctuations. The results consistently identified loss of habitat and competition from Barred Owls as important stressors, the need to preserve as much high quality



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