

**title**                    **THE WORLD OF FRESH WATER**

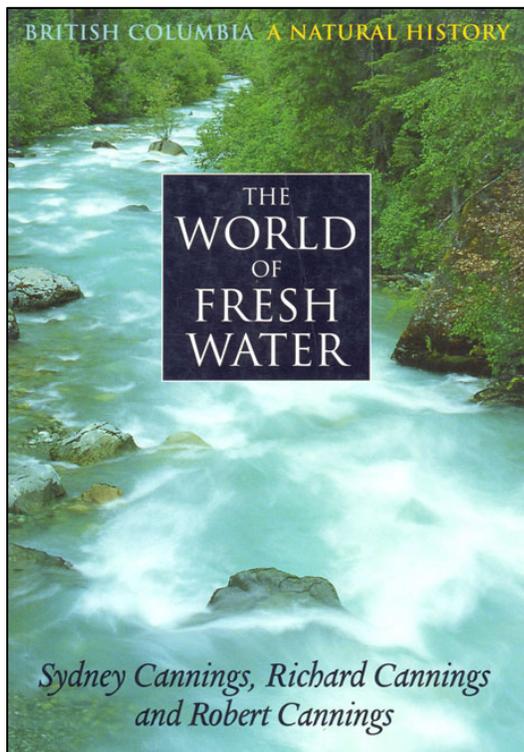
one of a series derived from their 1996 book  
*British Columbia – A Natural History*

**author**                    **Sydney, Richard, & Robert Cannings**  
B.C. writers – see below

**category**                Natural Science / British Columbia

**publisher**                Greystone Books, Douglas & McIntyre  
1998 trade paperback edition, 118 pages  
ISBN 1-55054-635-X  
<http://www.greystonebooks.ca/>

**of note**                    Born in 1948, Robert A. Cannings is not to be confused with his twin brothers Richard and Sydney Cannings, both of whom also publish in the field of natural science (see below). Robert A. Cannings has published *Dragonflies of British Columbia and the Yukon* (Royal British Columbia Museum, 2002) and the *Systematics of Lasiopogon* (Royal British Columbia Museum), about 'robber' flies in northern B.C. With his twin brothers he also co-authored *Birds of the Okanagan Valley, British Columbia* (Royal BC Museum, 1987). With Andrew P. Harcombe, he published *The Vertebrates of British Columbia: Scientific and English Names* (Royal British Columbia Museum, 1990). Heritage Record No. 20.



Born on March 31, 1954 in Penticton, Richard Cannings holds an Honours BSc in Zoology and a MSc in Biology. He has worked as a Consulting Biologist and has received several awards including the Bill Duthie Booksellers' Choice Award in 1997 (with his twin brother Sydney) and B.C. Biologist of the Year in 1996. Richard (Dick) Cannings was the curator of the Cowan Vertebrate Museum at the University of British Columbia for 15 years and is now a consulting biologist living in Naramata, BC. Cannings supplied the text for White Rock photographer Graham Osborne's *Vancouver Wild: A Photographer's Journey through the Southern Coast Mountains* (Greystone, 2006).

**who will be interested in this book?**

Anyone interested in the biology of BC streams, rivers, ponds, and lakes.

**why read this book?**

A concise, introductory look at the fresh water biology of BC presented in a very readable manner with illustrations and detailed sidebars.

A list of nature organizations and books for further reading are given.

**review / outline by** Lance Brown, [vistadelsol@telus.net](mailto:vistadelsol@telus.net)

### Overview

For anyone wanting an introduction to fresh water biology in BC, the Cannings have written a book that is both a reference and a good read. They state they want to both entertain and educate and they have succeeded.

While opening eyes to aquatic life around us, they also tell us how much is unknown about so much of this landscape. They present the information framed as a personal story, making it all the more readable.

This book is the first of a series of books derived and expanded from their previous larger book on the natural history of BC.

An interesting quote:

*“... rivers and the inhabitants of the watery element were made for wise men to contemplate and fools to pass by without consideration.” Izaak Walton, The Complete Angler*

## Chapters & Points of Interest

### Introduction

- there has never been an organized, comprehensive survey of the native fishes of BC
- little is known about much of BC's fresh water ecosystems

### Part 1: Moving Water

#### *Cold Mountain Streams*

- in winter, small stoneflies leaving their larval skins in the water, moving to snow banks
- a side bar on how tiny creatures cope with water currents
- blue-listed Bull Trout (Dolly Varden), Longnose Dace minnows, Tailed Frogs, Pacific Giant Salamander, Water Shrew, Pacific Water Shrew, American Dipper, Harlequin Duck

#### *Warm Streams*

- Pacific Spiketail, Grappletail, Olive Clubtail, Boreal Snaketail, dragonflies
- fresh water sponge Spongilla; Spongilla fly

#### *Rivers*

- streams are small enough to be influenced by their surroundings
- rivers are big enough to be their own, independent systems – trees on their banks contribute relatively little of rivers' total nutrients
- small coastal rivers are fed by winter rainfall flows
- interior rivers are fed by snow melt freshet flows
- northwest rivers are fed by summer glacial melt flows
- some rivers (like Thompson) flow into lakes, depositing silt, and then flow clear
- other rivers (like the Fraser) flow silty all the way to the ocean
- a side bar on the Eulachon – gifts of grease

#### *Pacific Salmon*

- 5 species in BC: Chinook, Coho, Sockeye, Pink, and Chum
- all share basic life cycle, with many variations; is a great connecting agent of BC ecology
- a side bar on a giant in peril: the White Sturgeon

### Part 2: Still Water

#### *Rich Lakes, Poor Lakes*

- BC is not dominated by lakes: Atlin Lake, the largest is not in Canada's top 50 lakes
- although 16,000 lakes, less than 2% of BC is covered with fresh water
- lakes rich in nutrients such as nitrates and phosphates are crammed with life – eutrophic

- lakes that are free of nutrients are called oligotrophic – clear, oxygen rich, but little life
- big, deep, lakes tend to be nutrient poor because of large volume

#### *Warm Water, Cold Water*

- a lakes seasonal water temperature affects the mixing of water layers and aquatic life
- a side bar on Beaver Ponds – the engineering of wetlands

#### *Lake Life*

- a look at the life at the shoreline, in open waters, and in the dark depths
- side bars on Swimmers Itch; Shore-spawning Kokanee; Zooplankton; Salamanders versus Trout; Insects Respiration Under Water; Whirligig Beetles; Dragonfly Watching

#### *Ephemeral Ponds*

- specialized residents of seasonal ponds
- a side bar on Painted Turtles

#### *Saline Lakes*

- few plants or animals can adapt to these conditions but some do
- a side bar on Mahoney Lake, near Penticton

#### *Bogs & Fens*

- are peatlands or wetlands where the substrate is primarily organic matter
- bogs are dominated by peat mosses, often nutrient-poor and acidic
- fens are dominated by sedges, grasses and mosses other than peat, less acidic and receive nutrient-bearing ground water and are more plant and animal friendly
- a side bar on Burns Bog

#### *Hot Springs*

- full of specialized life like the Vivid Dancer damselfly, Hotwater Physa snail, Lake Chub
- development of hot springs has spelled disaster for many of these species

#### *Riverside Forest & Meadows*

- these riparian forests are home to a diverse community of animals and plants

#### *Epilogue – The Future*

##### *Lost & Vanishing Ecosystems*

- humans love water but abuse aquatic ecosystems more than any other
- the many land use changes in BC have affected

##### *Vanishing Salmon*

- habitat loss, dams, etc have affected salmon populations
- a side bar on the Salish Sucker

##### *Climate Change*

- many unknowns as to affects, but rising water temperature is predicted as are changes in precipitation patterns

##### *Introduced Species*

- 19 species of exotic fish live in BC waters today; Eurasian Water-milfoil; Purple Loosestrife; the failure of the introduction of Opossum Shrimp for Kokanee

##### *What We Can Do*

- protect rivers, lakes, and wetlands; reduce power and water consumption; reduce chemical use

##### *Contributing Your Knowledge*

- Streamkeepers and Wetlandkeepers programs

### *Developing a New Perspective*

- stop treating water as a commodity and start looking at it as a community
- know and understand it

*other review* Mark Hume, from the BC fly fishing web site, <http://www.arivernever sleeps.com/>

We wade in it, float on it, swim in it and drink it. But for most of us, the most important thing about fresh water is that we fish in it. Despite spending countless hours immersed in fresh water, however, many of us come to understand very little about the aquatic environment. We know when the hatch comes on, and the main food sources of the trout we pursue - but that frog that slips by our float tube, that plant that brushes the surface of the water as we pass....that spider that scurries across the surface, and then dives under! What was that?

Many of use can't identify the birds that sing to us, let alone correctly identify the sound of distant tapping woodpecker for what it really is - a Spotted Frog, croaking quietly in the weed bed.

For anyone who has ever fished in British Columbia, or anywhere in the Pacific Northwest, this small book, put together by three remarkable brothers, is a treasure of knowledge that can greatly broaden our appreciation of the natural world.

It is not written for fishermen, but is meant for anyone who is interested in the aquatic world. It may be better for all that, for a book written by fly fishermen would likely focus on the elements of nature that are of the greatest interest to anglers, while ignoring things such as the Greater Bladderwort, an unusual carnivorous plant, which I have paddled through in my float tube, unaware that it was snapping up insects stirred up by my feet.

This book casts a wide net, and introduces us to a richer world than we might otherwise be aware of.

It has sections of moving and still water, and is jammed with interesting facts about aquatic insects, plants, birds and reptiles.

Although the Cannings are all scientists - Sydney is a zoologist, Richard a consulting biologist and Robert a curator of entomology - they have not fallen into the trap of using technical language. Their book is written simply, clearly and it reflects the obvious love they have for nature.

"Let's get into a canoe and paddle around a lake - imagine one of the popular fishing lakes in the Interior - and have a look at the life within it," the write in introducing one section. The authors then go on to give you a tour of the aquatic world, from the shallow, warm shoreline to the depths beyond.

They explain how to quickly tell the difference between Bulrushes and Cattails, and then explain the life that revolves around this shoreline vegetation.

You learn that Red-winged Blackbirds like to nest in Cattail colonies, while Yellow-headed Blackbirds favor bulrushes. Muskrats, you are told, are giant voles that play a vital role in keeping the marsh beds open, so that other plants and animals can move in.

Some of the most interesting sections, at least for a fly fisher, involve the descriptions of insect life.

"Swimming in short bursts along the bottom with the bugs and beetles are a host of what most of us would call freshwater shrimp. Although these are crustaceans, they are not true shrimp - they are the amphipods Gammarus and Hyaella. They breed prolifically in productive lakes like this one that are rich in calcium.

The Gammarus that have orange brood pouches on their undersides are pregnant females, which are especially favoured by trout.

“Offshore, in deeper water than the bulrushes and Cattails, are other rooted aquatic plants - gorgeous Yellow Waterlilies and pink-headed Water Smartweeds, to name two of the common, obvious ones...Along the bottom are masses of shrubby-looking water plants - but on close examination we find that they are a type of green algae called Chara. This alga is brittle and crunchy, with a skeleton of calcium carbonate, and its presence tells us that the lake is rich in calcium.”

Almost every page holds revelations, even for someone who, like me, likes to spend a lot of time observing nature while on the water. The Cannings look upon the aquatic world with eyes of highly trained scientists and they explain this fascinating world that helps us see things to which we would otherwise be blind.

The World Of Fresh Water should be required reading for anyone who fishes in the West.