

## Book Reviews

*Pacific Salmon Life Histories*, edited by C. Groot and L. Margolis. Vancouver: University of British Columbia Press, 1991. xv, 564 pp. Maps, plates, tables. \$65.00 cloth.

Since the retreat of the glaciers 9,000 years ago, the five species of Pacific salmon in North America, and the same five plus two additional species in Asia, have been at the heart of North Pacific coastal cultures. The coming of extra-continental immigrants to North America in the middle of the last century did not change this basic truth, although it certainly added several new dimensions to it. Despite the changes, the lives of British Columbians continued to be inextricably bound up with the fluctuating tide of prosperity moving up the rivers each year from the ocean. One of the more enlightened new dimensions, albeit slow to take form initially, was the intensive study of the salmon's natural history, its life cycle and migration pattern, and the factors controlling these processes. The important change was that salmon came to be viewed by the naturalist as an entity to be studied in its own right and not merely as an adjunct to man. The unravelling of the complex life histories of these incredible creatures is due to the dedicated life work of countless men and women. As a result of contributions from individuals and agencies in all the countries concerned (frequently spearheaded by British Columbian institutions), as well as the expenditure of many millions of research dollars, an immense amount of information has been accumulated. This accumulated knowledge of the life-history of the various species has been distilled and reduced to order in this landmark treatise.

The work is accessible to anyone with a very basic knowledge of biology. It is completely straightforward and factual and unencumbered by technical jargon. Each of the seven species is treated by individual authors, and both editors and authors are to be congratulated on maintaining a uniformly high standard throughout. Each aspect of life is dealt with in detail, from geographical distribution, through spawning and incubation,

early life in freshwater, migration, life in the open ocean, and the return to freshwater to spawn. This scarcely makes for easy reading, for the detail is encyclopaedic and to be fully assimilated only through long-term study. *Pacific Salmon Life Histories* thus provides an invaluable platform from which to launch new investigations, although, as with most works of this kind, it inevitably reports only on work carried out several years prior to the date of publication. Like the *Britannica*, an annual year-book is almost essential to keep the publication up to date if it is to be of immediate use to managers and others interested in the most recent trends.

It is certainly required reading for all interested in salmon life-history, but a word of caution to those who might expect to find a discussion of the current problems of the fishing industry, or the effect of environmental change on salmon populations. Neither does the book deal with other aspects of salmon biology, except in passing reference, such as physiology, genetics or the “enhancement” of runs through hatchery incubation and rearing, fertilization and stream improvement. It is strictly concerned, as it clearly states in the title, with “life histories.” However, the book does provide the immense factual background of variation and variability within and between species, between years and between regions, against which all managerial and political problems must be resolved.

If the job of science is to “extract the essential features from the clutter of detail in the unhappily stochastic real world” as Paul Erlich suggests, then the book is somewhat less satisfactory. A section treating the salmon as a genus in which species differences and similarities are discussed would have been most welcome and of great assistance in bringing everything into clearer focus. What is remarkable about the salmon as a genus is its luxuriance or plenteousness; its burgeoning vitality as life is continually renewed in one of the most extravagant and abundant forms known, only to end in death when the short allotted life-span runs out. Many of the facets distinguishing individual species are variations on a theme with considerable overlap in detail, and the genus as a whole seems to be well fitted to the job of vacuuming up as much as possible of the annual production of small creatures such as copepods, shrimps and shrimp-like organisms, squids, swimming shell-less molluscs, and small fishes. Coho, for example, feed preferentially on fish but also eat invertebrates, whereas in pinks and sockeye the reverse is true. Throughout the North Pacific the species intermingle in their migrations as they comb the vast area of ocean north of 40 N. latitude leaving no swirl or gyre unexplored. They then segregate to their individual birthing streams with undeviating precision, where again

the various species, each with somewhat different requirements, explore the total potential.

In view of all the different nuances in behaviour and physiology, why, one wonders, would not a single variable species have sufficed equally well to do the same job? However, the job of biologists is not to redesign nature, rather it is to try and understand her as we find her. In a world context one is reminded of the "species swarms" of Cichlid fishes in the African Great Lakes, which feed mainly on very similar diets for most of the year, although displaying great differences in morphology. The question is, how are resources apportioned between species and are there critical resources which have determined speciation? Strict interpretation of the concept of "one species-one niche" begins to look a little tattered around the edges, for there appears to be a degree of mutual tolerance between the species that allows the genus to function as an effective whole, rather than as a group of competing species.

The other great enigmas of the genus are the great fluctuations in abundance, as for example, between odd and even years in pinks, or the four-year cycle of the sockeye, and secondly the death of all species following a fixed life span. We can only stand in awe of the sheer profligacy of a nature which destroys her handiwork at the peak of its abundance. Only the may-flies and cicadas work on a similar fixed schedule of increasing biomass, mass reproduction and then death. Why? Is such a fluctuating and determinant life history geared to maximizing production in an open system? Such life history may be contrasted with the trend toward equilibrium shown by fish in more confined waters with their long indeterminate life-span and high, relatively constant biomass? Could it be that lessons for our growth-oriented industrial society nestle within the basic biology of ecological systems?

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*Water in Sustainable Development: Exploring Our Common Future in the Fraser River Basin* (Vol. 2), edited by Anthony H. J. Dorsey and Julian R. Griggs. Vancouver: Westwater Research Centre, Research Program on Water in Sustainable Development, University of British Columbia, 1992. xvii, 288 pp. \$25.00 paper.

Many people look forward to the publication of another monograph by the Westwater Research Centre of the University of British Columbia. The monographs always combine the theoretical with the practical, make