ENVIRONMENTAL CONTAMINANTS in WILDLIFE

Interpreting Tissue Concentrations

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Dedication

This book about interpreting the significance of environmental contaminant residues in fish and wildlife is dedicated to Lucille F. and William H. Stickel. The Stickels pioneered the use of tissue residues analysis as a means of determining whether animals found dead or sick in the wild had been exposed to pesticides or other contaminants. Therefore, a synthesis of methodology and knowledge in contaminant residue interpretation for the use of fish and wildlife biologists provides a fitting opportunity to honor the important contributions of Bill and Lucille Stickel to the field of environmental contaminant research.

The Stickels began their careers at the Patuxent Wildlife Research Center in the early 1940s. During the next four decades, they conducted numerous important studies that provided the basis for the present approaches to the evaluation of the biological and ecological effects of environmental contaminants on wildlife populations and habitats. Until their retirement in 1982, the Stickels were tireless workers for the cause of wildlife conservation, in general, and for the control of environmental pollution, in particular. Their legacy is, in part, the scientific research and scholarly publications that form the foundation for this book.

Lucille was instrumental through her personal research in bringing sharp focus to the effects of pollutants on wildlife and the environment. In addition, she served very capably and effectively as Director of the Patuxent Wildlife Research Center from 1972 to 1981. As a Senior Scientist in the Department of the Interior, she also served on many national and international advisory panels as the U.S. Fish and Wildlife Service expert on environmental contaminants. Lucille was the recipient of many awards, including the Department of the Interior's Distinguished Service Award, The Wildlife Society's Aldo Leopold Award, and the Federal Women's Award.

Bill was also recognized as a pioneer in research on environmental contaminants. He was widely known and respected for his innovative experimental studies, his objectivity in the interpretation of research results, and his development of practical management applications of research findings. Bill also made many behind-the-scenes contributions that fostered contaminant research, such as conducting tours, responding to information requests, managing the reprint collection, and disseminating publications. Bill also devoted countless hours to advising younger members of the staff about projects and pitfalls in contaminant research. He received many professional awards for his communications within the scientific community.

Both Lucille and Bill Stickel dedicated their lives to developing the world-renowned scientific reputation of the Patuxent Wildlife Research Center. Their influence on the selection of scientific staff and on the conduct of high quality research was profound. Many of these environmental contaminants scientists, after over two decades of contaminants research, are still employed at the Center. Others that they hired and trained have continued their contaminant work in other parts of the U.S. Fish and Wildlife Service or in other agencies and academia.

Much of the research conducted by the Stickels relates directly to the purpose of this book, namely, the interpretation of contaminant residues in the tissues of wildlife. They published a long series of articles demonstrating that carefully controlled laboratory studies could be used to establish the brain concentrations of organochlorine pesticides that cause death in birds. Once established, these concentrations could then be compared with the concentrations in the brains of birds found dead in the field. Many references have been made in this book to this pioneering work of the Stickels in establishing what is now known as diagnostic brain residues of organochlorines in birds.

In addition, Bill and Lucille conducted many other studies related to the importance of measuring contaminant residues in wildlife. Some examples are the following:

- Several studies to measure the rate of accumulation and loss of various contaminants from the tissues of birds.
- A study of the effectiveness of different forms of tissue preservation in giving accurate readings of contaminant levels.
- A study to determine how to correct residue readings for loss of moisture occurring in eggs collected in the field.

They also recognized the challenging analytical problems involved in accurate chemical determinations of contaminant residues in animal tissues and fostered the development of a strong analytical chemistry staff and laboratory. Part of this chemistry laboratory has evolved into the present Patuxent Analytical Control Facility, which now serves the needs of the management arm of the U.S. Fish and Wildlife Service to acquire quality data on contaminant residues in fish and wildlife.

Bill and Lucille were practical in their assessments of contaminant threats to wildlife. They recognized that the mere presence of a pesticide or other pollutant in the habitat of a wildlife species did not, by itself, tell anything about the hazard of that contaminant to that species. The chemical had to get into the animal first before there was any chance of harm and, even then, had to accumulate in the animal to the extent that it could cause harm. This concept, which is so fundamental to wildlife toxicology and is the focus of this book, was never lost in their thinking.

Although the Stickels authored numerous scientific papers and technical publications, their individual and collaborative efforts extended significantly beyond to deep personal commitments to natural resource stewardship and the responsible use of pesticides in environmental management. They took great interest in conservation affairs and issues. They financially supported various environmental causes and organizations, especially the Nature Conservancy protection of the Center's diverse wildlife habitats, and they took a keen interest in the plants and animals inhabiting the Center. As Center Director, Lucille added 1760 acres to the Patuxent Wildlife Research Center and designated three large forested tracts as Research Natural Areas.

In recognition of the long-term professional service by the Stickels, the U.S. Fish and Wildlife Service authorized renaming the Chemistry and Physiology Laboratory at the Patuxent Wildlife Research Center as the William H. and Lucille F. Stickel Laboratory. Stickel Laboratory was dedicated on the occasion of the Center's 50th anniversary celebration in 1989. Appropriately, the scientific and administrative offices for the Environmental Contaminants Research Branch were consolidated in Stickel Laboratory. This building also houses the Patuxent Analytical Control Facility.

I had an opportunity to meet and work with Bill and Lucille Stickel, first as a student at Iowa State University and later as a wildlife research biologist for the U.S. Fish and Wildlife Service. When I became Chief of the Service's Division of Wildlife Research, I gained an even deeper appreciation for them personally and professionally. I am grateful for the invitation to write a dedication for this book as a way of recognizing the significant scientific contributions of our friends and colleagues, Bill and Lucille Stickel.

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