

PREFACE TO AND ACKNOWLEDGMENTS FOR THE JOURNAL OF WILDLIFE DISEASES SPECIAL SUPPLEMENT: ADVANCES AND IMPROVEMENTS IN WILDLIFE WELFARE

This special supplement was borne of numerous formal and informal discussions among wildlife professionals (wildlife veterinarians, wildlife biologists, disease ecologists, zoologists, and ethicists among many others) with a keen interest in assessing the current status of wildlife welfare and was written with an eye toward providing a broad audience with the means to continue improving wildlife welfare into the future.

Dr. Daniel Mulcahy was instrumental in getting this project started, and contributed countless hours in seeing it come to completion. Dan's career has been highlighted by his tireless work to improve the welfare of wildlife, and to ensure that scientific results are communicated broadly. We could not have prepared this supplement without Dan's help, and we are very grateful for his generosity and his friendship. We could not have prepared this supplement without the input and wisdom of: Dr. James Mills, Editor for the *Journal of Wildlife Diseases*; Dr. David Jessup, Executive Director for the Wildlife Disease Association (WDA); Dr. Thierry Work, President of WDA; Dr. Carol Meteyer, Chair of the WDA Small Grants Program; Mr. Bill Toffelmeier, Allen Press; and Ms. Julia Mitchell, Allen Press. Dr. Mills was always just an email away to provide friendly and timely advice to the editorial board when issues arose, and for that we are very grateful! Financial support for this project was provided by the Wildlife Disease Association (Small Grants Program, Wildlife Veterinary Section, and general fund), the American Association of Wildlife Veterinarians, and San Diego Zoo Global.

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We are very happy to present the information compiled by researchers who share an interest in advancing and improving wildlife welfare. Our hope is that the information presented here will encourage wildlife professionals across the globe to enhance their awareness of wildlife welfare challenges and solutions and will stimulate additional work and publications on critical welfare topics not covered. We have a responsibility to continuously improve the way we observe, monitor, capture, restrain, handle, and release the wildlife we have dedicated our lives to protect—for their sake and ultimately for ours.

Field anesthesia is often necessary for both invasive and noninvasive procedures on wild animals. **Chinnadurai et al.** outline a minimum standard of care for field anesthesia and analgesia and that will serve as a resource for Institutional Animal Care and Use Committees, biologists, veterinarians, and other researchers planning projects that involve free-ranging wildlife in field conditions.

Researchers must often think outside the box and develop new methods, or apply established methods in new ways, in order to measure stress and other capture-related impacts on wildlife. For example, it is difficult to assess the physiologic impact of

techniques used when brown bears (*Ursus arctos*) are captured and handled for research and management purposes. The report by **Fandos et al.** investigates the use of leukocyte coping capacity (LCC) to quantify the stress response of capture and handling in brown bears in Scandinavia.

The manuscript by **Fiorello et al.** provides an excellent review of the components to consider when planning any type of field surgery on free-ranging wildlife. It is written in such a manner as to be useful to both veterinarians and biologists alike. This document should be widely distributed to anyone who regularly handles wildlife to ensure that there is a broad understanding of why it is time to raise the bar for field-based surgery in wildlife and how this can be achieved.

Minimizing adverse impacts of wildlife capture and handling is important both for ensuring quality results and for responsible animal use in research; however, impacts must first be identified before they can be ameliorated. **Harms et al.** measured blood parameters in birds immediately after capture in mist nets or after a 45–60-min delay to assess the impacts of a brief holding period commonly practiced in large-scale bird banding operations. Their results suggest that for some species, a delay between capture and sample collection may improve data quality; however, researchers must be aware that that time spent in a holding bag is time lost to the captives for other important activities.

Replacement, Reduction, and Refinement (the 3Rs) are important pillars in conforming to animal welfare laws and regulations as well as directly enhancing the well-being of experimental animals. Initially developed for laboratory studies, **Lindsjö et al.** show how the concepts of the 3Rs can be expanded and used in studies on wild animals and make recommendations as to training of personnel and early involvement of 3R concerns when planning research on wild animals.

Miller et al. provide a framework for quantifying factors associated with stress and maladaptation in recently captured white rhinoceros. By assigning a metric to observations and applying it to a timeline, this methodology aims to augment welfare by standardizing decision making. This allows for early intervention and improved outcomes for rhinos that are not adjusting to captivity.

O'Brien et al. provide data documenting the safety of capture methods used worldwide for several different species of waterfowl. Overall injury rates were very low; however, some species and traps were found to have a greater risk of injury. In addition, they describe methods that they use to minimize risk to the bird and also reduce hazards for wildlife biologists.

In one of a relatively small number of investigations on the use of anesthetics in fish, **Silbernagel and Yochem** tested the efficacy and safety of 10% eugenol in two species of marine finfish, *Atractoscion nobilis* (white seabass, WSB) and *Seriola lalandi* (California yellowtail, YT). After a successful laboratory trial, eugenol was administered to wild *Paralabrax maculatofasciatus* (spotted bay bass), *Paralabrax nebulifer* (barred sand bass), *Paralichthys californicus* (California halibut), *Triakis semifasciata* (leopard shark), and *Mustelus californicus* (grey smooth-hound). The work reveals the importance of using scientific method in the investigation of the safety and efficacy of drugs and especially the necessity of confirming both in multiple species.

Along the West Coast of Barbados, a unique relationship has developed between endangered green sea turtles (*Chelonia mydas*) and humans. **Stewart et al.** investigate how tourism-based human interactions are affecting the overall health of a foraging population of *C. mydas* and determine potential health risks these interactions may create for the turtles. A food-supplemented group of turtles was found to have changes to body condition, vitamin, mineral, hematologic, and biochemical

values. Based on these results, recommendations are made to decrease negative behaviors and health impacts for turtles as a result of this provisioning.

The use of tranquilizers and sedatives is a common practice with captive wildlife to reduce stress, morbidity, and mortality associated with capture and restraint; however, these techniques are not uniformly applied to free-ranging wildlife. **Wolfe and Miller** discuss the use of drugs and drug combinations, along with modified capture, holding, and release techniques, to help calm recently captured animals

with the goal of improving short-term and long-term survival. The authors provide several case examples that outline the successful use of neuroleptics in wild ungulates.

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