

**GUIDELINES FOR VETERINARIANS INTERESTED IN *IN SITU*
CONSERVATION AND FREE-RANGING WILDLIFE HEALTH PROJECTS**

Updated 19 June 2009

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OVERVIEW

Many veterinarians are interested in the health and conservation of free-ranging wildlife. Our specialized knowledge of, and training in immobilization and anesthetic procedures, surgical techniques, humane animal care, pathology, epidemiology and disease processes, prevention and control can be a valuable addition to conservation projects. Contributions from veterinarians are especially pertinent today as emerging and reemerging diseases become increasingly important challenges to the conservation of wildlife as well as to human and domestic animal health. These guidelines were developed to provide zoo and wildlife veterinarians with a basic guide of how to get involved in free-ranging wildlife health and conservation projects as well as to provide resources for potential project funding sources, web links to pertinent agencies and sites, and related materials. This is a living document that will be updated and expanded over time.

The guidelines are divided into five sections:

- 1) [Introduction](#);
- 2) [what you should do before embarking on any *in situ* wildlife conservation and health project](#);
- 3) [links to other guidelines and useful resources](#);
- 4) [references](#) of papers related to zoo veterinarians in *in situ* conservation projects;
- 5) [contact organizations and persons](#).

INTRODUCTION

Working as a veterinarian on free-ranging wildlife health and conservation projects requires many skills. Effective communication is one of the most important of these skills. It does not matter if you are a great veterinarian if you cannot effectively communicate with project colleagues, collaborators and others (e.g., politicians, local people) with a stake in your project. People have different realities that are dependent on their education, training and life experiences. Therefore, communicating across these realities can be half the challenge of executing your project. Whether you are making arrangements with the local community prior to starting a project or providing technical advice on the proper placement of telemetry devices in an amphibian, it is imperative that you are an effective communicator.

In the field of ecology, [disease ecology](#) is one of the fastest growing disciplines, which has resulted in a number of elegant disease studies led by ecologists. Zoo and wildlife veterinarians, as highly trained and educated animal disease specialists, should strive to incorporate themselves into this arena as our discipline has much to bring to this growing field. However, it should be understood that these projects should be approached from

the population or [ecosystem](#) perspective rather than focusing on individual animals. What may work in [zoo](#) or [domestic animals](#) may not be practical in free-ranging [wildlife](#).

Several veterinary schools and zoos have been moving towards [“One Health”](#), “Ecosystem Health” or “One medicine” approaches, and the [AVMA has recently embraced the “One Health” concept](#). This expanding field is by definition integrative, requiring ecologists, biologists, human medical practitioners and veterinarians to work together. These multidisciplinary teams are very good places to look for opportunities to become involved in the field.

When embarking on *in situ* projects, we must not sell our profession short and “jump” at any chance to get our hands dirty in the field. This is not to say we are above volunteer positions and many of these valid opportunities may be a first step for getting experience in the field setting and providing our services to worthy conservation efforts. We also must refrain from intermittent involvement in field projects as this attitude and behavior often gives biologists a poor view of veterinary commitment to *in situ* conservation efforts. Being part of the team is essential. Most importantly, we must be able to clearly articulate and demonstrate why we are important to an *in situ* project and how our participation, collaboration and/or leadership on a project will benefit all involved, both animals and people.

WHAT YOU SHOULD DO BEFORE EMBARKING ON ANY IN SITU WILDLIFE CONSERVATION AND HEALTH PROJECT

- 1) Training – Our core veterinary training has prepared us to offer basic medical skills and a broad knowledge base that can be instrumental for many wildlife conservation projects. Many of us also have degrees in biology, zoology or ecology, giving us a solid foundation for concepts in field biology. Within our advanced training, including internships and residencies, we have acquired many additional skills that are specific to work with free-ranging wildlife. This said, we must not only recognize these strengths, but also understand our limitations if we are to be a truly valuable and respected member of a project team. Our contributions should not be delivered with a “better than thou” attitude, but with a different than thou attitude, as we contribute a skill set that adds to the skills, knowledge and expertise of the biologists, ecologists, conservationists, agency or land management personnel, and veterinary school faculty with whom we work. Keep in mind that many of our non-veterinary colleagues who are already working in the field or advising a project in some other capacity hold advanced degrees and may have extensive experience in many fields. They are usually going to be the experts on the species with which you are working. It is inherent in human nature that they will be more likely to respect you for your contributions if you respect them for theirs. As you talk to and work with other wildlife professionals, you will begin to discover how much you do not know. For subjects on which you need additional knowledge and training (e.g., ecological concepts, animal trapping, field biology principles) knowledge can be obtained by

- reading appropriate literature (e.g., [Conservation Biology](#), [The Auk](#), [Journal of Wildlife Management](#), and many others including a number of excellent textbooks), by learning from the biologists and other professionals with whom you work, or even by taking courses in the appropriate subject material. Aside from the factual knowledge colleagues from other disciplines might have, their disciplines ([ecology](#), [wildlife management](#)) have provided them with a different set of perspectives with which to approach their fields. Understanding these perspectives is paramount to building a working relationship, as wildlife conservation encompasses not only [host-pathogen relationships](#), but also [human-animal interactions](#), host-environment interactions, as well as other epidemiological factors and a large host of social, economic, and political realities.
- 2) Know what skills you can bring to a project, and don't forget to ask biologists and other collaborators what they want and expect from your participation.
 - a. Veterinary technical skills (e.g., clinical, [wildlife contraception](#), pathology, [epidemiology](#), [animal behavior](#), nutritional requirements, captive care [especially pertinent to many [endangered species recovery programs](#)], and [zoonotic disease](#))
 - b. Veterinary intellectual skills (principles of asepsis, principles of immunology, animal welfare, pathology processes, principles of microbiology, the art of triage)
 - c. Animal welfare training and knowledge (e.g., understanding the [AVMA approved methods of euthanasia](#) for the different taxa)
 - d. Study design and data analyses
 - e. Writing skills
 - f. Language skills
 - g. Educational skills (e.g., training field workers in necropsy and sampling techniques)
 - 3) Know the issues that are prominent in the field of wildlife conservation, health, and medicine in order to better understand the framework and priorities of the numerous agencies and organizations already involved with *in-situ* conservation. Information on prominent [disease issues](#) and [handling protocols](#) related to wildlife conservation can be obtained from websites such as those listed below. It may also be good to reach out to other [veterinary professionals](#) to learn more about the history of the problem at hand from their perspectives. Know about the specific species and ecosystems with which you will be working. Again, realize that working with free-ranging wildlife is vastly different than working with the same species in a captive setting.
 - 4) Know what time commitment you wish to bring to a project. What projects are you interested in and how do you fit in such projects? Do you wish to simply lend your "vet" skills to someone else's project (e.g., animal handling and welfare) or do you want to be involved in the design, planning, and data analyses components of the project? If you hope to initiate and lead a project, make sure you have done your homework and solicited the appropriate help from relevant

- experts (e.g., ecologists, biologists, toxicologists, etc). If you would like to be a collaborator, be sure to think carefully about what types of things you will be able to bring to the table, and that you understand and address at the beginning of the collaboration issues such as data sharing and authorship order in expected publications. You also must be aware of what potential [funding sources](#) are available for your project. Think about whether there are accessory funding sources and expertise in the zoo (or other veterinary) community that you or your zoo (organization) can tap into and bring to the project that would not otherwise be available, or whether your presence as a named collaborator on the project can open other funding possibilities. Work out with your zoo, agency or institution whether the organization is going to support some of the work via donation of your time or the time of other staff. Don't forget that zoo staff can be quite valuable to a project also, and bring their own valuable sets of skills, and that your role could be enhanced by coordinating and overseeing their efforts. If there is zoo support of these types, determine what level of acknowledgment the zoo expects from your collaborators.
- 5) Know the language, culture, and politics within the region you wish to work. This is true whether you will work in Thailand or Tennessee! Remember that you are a guest in their country/state/field site, and act accordingly. Field work requires collaboration on more than just the science; be prepared to assist with all aspects of the work, whether or not you are asked to do so. This includes the "dirty work" like setting up camp, preparing equipment, and clearing trails. A great deal of respect and camaraderie can be obtained simply by cleaning the dishes without being asked.
 - 6) Consider hiring local people to assist in research projects in developing or remote areas. This may involve simply paying for lodging, hiring someone for cooking or laundry, training field assistants, or paying local hunters/trackers for their assistance. A few dollars a day infused into a local economy can make a difference and foster goodwill between the communities and researchers. This can bring you a better and valuable understanding of the cultural and social environment in which you are participating. Traditional knowledge shared with you can expand the perspective and value of scientific work, and increase the applicability of the results to the local communities. Returning to the communities with results when available, or failing that, communicating with them the results of your research will do a tremendous amount to pave the way for future seasons, future researchers, and simple empowerment of and respect for the local people.
 - 7) Know the rules, regulations and [permits](#) specific to your project. To work in many countries you must have permits to conduct wildlife work in addition to visas for entry into the country. In some areas, such as the Canadian arctic, you must also have the agreement of the local communities to conduct research within their hunting grounds. To transport both study materials (e.g., anesthetic agents) and biomaterials (e.g., blood), there are a number of permits that must be obtained from a number of agencies (e.g., [DEA](#), [USFWS](#), [CITES](#), [USDA](#)). There are also

items such as [formalin](#), gas anesthetics, and other agents that are prohibited by the [TSA](#) or restricted when traveling by air. When veterinarians [travel abroad](#) with controlled drugs ([immobilization drugs](#)), they need to consider the law of the country they are in and the law of the country or countries to which they are traveling. Further information regarding regulations in the United States can be found in the [DEA](#) section below. Your country's representatives in the country to which you are traveling should be contacted for information specific to that country. At a minimum, while traveling with controlled drugs it is important to have copies of your veterinary license, DEA license, and invoices for the drugs you are carrying. Drugs should also be in their original packaging. Additionally, many countries will have restrictions on what can enter their borders and/or have duty charges for equipment to enter.

- 8) Be prepared to address the media. When working with wildlife, especially endangered species, the media will be interested, and often want to speak to the veterinarians involved.

RESOURCES ON-LINE

LINKS TO ORGANIZATIONS OF INTEREST

Association of Avian Veterinarians – www.aav.org

The Association of Avian Veterinarians (AAV) website contains a blog for discussion of avian disease, clinical issues, links to CE courses, audio and video casts, meetings announcements, conference proceedings, fact sheets and brochures on various bird health and bird care subjects, and links to helpful information. AAV also supports research through a small grants program.

Association of Reptile and Amphibian Veterinarians – www.arav.org

Objectives of the Association of Reptile and Amphibian Veterinarians (ARAV) are to advance programs for preventative medicine, husbandry, and scientific research in the field of veterinary medicine dealing with reptiles and amphibians, and to promote the conservation and humane treatment of all reptilian and amphibian species through education, captive breeding and preservation of reptilian and amphibian habitats

The ARAV publishes information in several ways. The Journal of Herpetological Medicine and Surgery is the main source of information for members. In addition, the ARAV publishes the Proceedings from the annual ARAV conference and provides handouts on various topics. Their website has an extensive listing of journal articles on various disease and clinical care issues in reptiles and amphibians. These articles are typically in abstract form with the reference with some handouts and publications available for download. The website also contains links to other veterinary sites, and sites that are related to conservation of reptiles and amphibians in the wild. The

organization has a small [grants program](#) to support both research into both clinical and conservation issues of reptiles and amphibians.

American Association of Wildlife Veterinarians – www.aawv.net

The AAWV website (www.aawv.net) provides [job listings](#) and [educational opportunities](#) for veterinarians and veterinary students in the wildlife veterinary field, and could be a resource for contacts regarding work in various conservation areas. The website has links to a variety of publications that can be useful in understanding certain issues (e.g., feral cats and wildlife, endangered bighorn sheep risk assessments, etc), diseases (e.g., chronic wasting disease), member spotlights, as well as links to [grant programs](#) such as the Oiled Wildlife Care Network's competitive grants program. There are also many links to other national and international organizations, universities, and other groups that are active in the fields of wildlife conservation and wildlife health.

Association of Zoos and Aquariums – www.aza.org

The AZA website provides information on [current job announcements](#). While the majority is for work related to captive animal collections, there are often postings for positions involved with conservation, ecology, and field research. Although Animal Conservation Reports are available to members only there are a number of Animal Health-related links including 1) government agencies such as APHIS, NOAA, USFWS, NSF, IMLS, CFIA, CSW that affect Zoos and Aquariums (http://www.aza.org/RC/RC_GovtRel/index.html), and 2) Conservation Programs Database (<http://www.aza.org/CAND5/index.html>) – information and links to TAG, SSP, PMP, 3) [funds/grants](#), 4) conservation programs (amphibian, ocean, elephant), as well as links to conservation committees and other resources <http://www.aza.org/ConScience/index.html>. Links for resources for conservation educators (professional development, standards and policies, visitor research) can be found at <http://www.aza.org/ConEd/index.html>. The website also has information on upcoming conferences, calls for papers, and summaries of previous meetings. Finally, the Resource Center provides links for Development (funding programs, research), Finding People (AZA staff, conservation program leaders, related organizations), Funding Sources, Government Relations, Listserv Email Discussion Lists (member only), Public Relations Sample Documents.

American Association of Zoo Veterinarians – <http://www.aazv.org>

The AAZV website contains lists of SSP and TAG advisors. There are numerous committees, some of which have relevance to free-ranging wildlife, such as the Infectious Disease Committee. Some of these committees have useful publications on their websites. Some resources on emerging diseases are also available on the site, as well as listings of [job openings](#), meetings, and some [grant opportunities](#).

Canadian Association of Zoo and Wildlife Veterinarians – <http://www.cazwv.org/>

CAZWV is the Canadian resource for news, education, immobilization courses, and [job openings](#) regarding zoo and wildlife veterinary medicine.

Canadian Association of Zoos and Aquariums – <http://www.caza.ca/>

Information about Canada’s zoo community and involvement in conservation research can be found at <http://www.zooaction.ca/Home-Accueil.asp>.

International Union for Conservation of Nature (IUCN) – <http://cms.iucn.org/>

The home page has press releases, news articles of conservation interest, and basic info about the IUCN itself. The Red List page, <http://www.iucnredlist.org>, is an important resource and readily searchable. It contains common names, conservation status, basic habitat and range data for many species, and includes virtually all species known to be at risk. The site also has summary tables of species at risk by country, region, and taxonomic group. The Resources page, <http://cms.iucn.org/resources/index.cfm>, has links to IUCN publications, and a downloadable catalogue of IUCN publications, including Status Surveys and Conservation Action Plans for various taxa. These latter are required reading before embarking on a conservation project. There is also a section on “Tools for Organizations,” which has numerous worksheets and calculators useful in conservation science. These are valuable for environmental risk assessments, reintroduction or translocation plans, and similar projects. Finally, the Media page (<http://cms.iucn.org/media/index.cfm>) has information regarding press releases, fact sheets, and interviews.

Wildlife Disease Association – www.wildlivedisease.org

The WDA “About Us” tab brings the reader to information on the organization’s history, focus, and members. The publications tab has a link to the Journal of Wildlife Diseases, the premier journal in the field that is the official publication of the WDA, as well as a link to the WDA quarterly newsletter and various documents such as resolutions and the WDA constitution. The next tab, meetings, lists national and section WDA conferences as well as other upcoming meetings of interest to wildlife practitioners. There are also links to proceedings from meetings since 1996. The sections tab has contact information for each of the geographic WDA sections, as well as the wildlife veterinarian section (which links you to the AAWV website). The education page has descriptions of the student awards and some student activities, but no actual educational programs – these are listed on the opportunities tab, along with [job openings](#). The links tab has a very extensive list for a wide range of organizations.

The Wildlife Society (TWS) – <http://www.wildlife.org>

The Wildlife Society’s mission is to represent and serve the professional community of scientists, managers, educators, technicians, planners, and others who work actively to study, manage, and conserve wildlife and its habitats worldwide. The

members of TWS manage, conserve, and study wildlife populations and habitats. They actively manage forests, conserve wetlands, restore endangered species, conserve wildlife on private and public lands, resolve wildlife damage and disease problems, and enhance biological diversity. TWS members are active across the United States, Canada, and Mexico, as well as internationally.

The products of The Wildlife Society include essential, practical, and objective information for wildlife professionals. They provide research, policy information, and practical tools in print, most notably *The Journal of Wildlife Management* and *The Wildlife Professional*, and electronic forms, along with vibrant professional networks that allow solutions to wildlife conservation and management challenges to be anchored in science. TWS also supports 19 different working groups.

Of particular interest to veterinarians are the Wildlife Diseases Working Group and the Wildlife Toxicology Working Group.

1) The Wildlife Diseases Working Group provides a forum for networking and communication among wildlife professionals interested in management, research, education, and administration of wildlife disease issues. The Working Group serves as a clearinghouse for information and expertise on wildlife diseases for TWS members, government agencies, and other professional organizations. The goals of the Working Group are to enhance awareness and understanding of research and management on wildlife diseases and of how increased interactions between wildlife, humans, and domestic animals that result from globalization impact wildlife populations and human economies.

2) The Wildlife Toxicology Working Group works to bring greater awareness and understanding of the risks posed to wildlife populations as a result of chemical contaminants in the environment. The Working Group assists TWS members in advancing their knowledge of the principles of wildlife toxicology and procedures for responding to wildlife kills or major exposures of wildlife to environmental contaminants. The Working Group conducts special sessions and workshops at The Wildlife Society's Annual Conference and other forums.

LINKS TO WILDLIFE HEALTH STRATEGIES AND INITIATIVES

Australian Wildlife Health Network (AWHN) – www.wildlifehealth.org.au

The AWHN is an initiative of the Australian Government and is managed under the Department of Agriculture, Fisheries and Forestry. It is working towards a nationally integrated wildlife health system for Australia and works to facilitate collaborative links in the investigation and management of wildlife health. A newsletter is produced weekly summarizing information on disease events, investigations, relevant publications, conferences and positions vacant around the world with a focus on the Australasian region. Recent information on disease issues is available via links on the website as are factsheets, a bibliography and links to sites such as the Australian Registry of Wildlife Health (ARWH) (<http://www.arwh.org/ARWH/home.aspx>). The ARWH is a diagnostic and resource centre focusing on detecting and diagnosing endemic, emerging and exotic diseases of wildlife that could have impacts on Australia's trade/economy, biodiversity,

tourism and human health. Both the AWHN and the ARWH are based at Taronga Zoo in Sydney, Australia.

The AWHN is a good contact for finding projects that may require veterinary involvement or for finding zoo and wildlife veterinary contacts within Australia.

National Animal Health Strategy (Canada) –

http://www.healthyanimals.ca/english/wg-gt/index_e.shtml

The development of the NAHS is a collaborative process between various governments, industry, universities and animal health organizations. Partners from these different areas have formed working groups to help define Canada's current animal health system as well as discuss elements and issues that could be part of the strategy. There are working groups for wildlife as well as Zoos, aquariums and wildlife rehabilitation centers.

American Veterinary Medical Association – <http://www.avma.org/onehealth/>

The American Veterinary Medical Association (AVMA) has a “One Health” webpage which contains the final report for the AVMA's One Health Initiative Task Force.

One Health Initiative – <http://www.onehealthinitiative.com/>

Plant, animal, human, and ecosystem health are inextricably linked, and recognition of this has led to the concept of “One Health” or “One Medicine” designed to bring together multiple disciplines including human and veterinary medicine and other sciences. The goal is to link and integrate paradigms, foster collaboration, and to more effectively share and combine resources to investigate disease occurrence.

This site brings together a variety of information regarding One Health including publications <http://www.onehealthinitiative.com/publications.php> and the Florida Department of Health One Health newsletter <http://www.onehealthinitiative.com/newsletter.php>.

LINKS TO WILDLIFE HEALTH AND DISEASE INFORMATION

Canadian Cooperative Wildlife Health Centre –

http://www.ccwhc.ca/en/CCWHC_home.php

The Canadian Cooperative Wildlife Health Centre (CCWHC) is an organization encompassing Canada's veterinary colleges. Its purpose is to apply the veterinary medical sciences to wildlife conservation and management in Canada. The organization is also dedicated to developing and using knowledge of wildlife health and disease to improve human health and the health of domestic animals. The CCWHC coordinates Canada's

national wildlife health surveillance program and provides educational programs, information, and consultation to both government and non-government agencies, as well as to the public.

Government of British Columbia –

<http://ilmbwww.gov.bc.ca/risc/pubs/tebiodiv/capt/index.htm>

British Columbia, Ministry of Environment, Lands and Parks, Resources Inventory Committee (1998) *Live Animal Capture and Handling Guidelines for Wild Mammals, Birds, Amphibians and Reptiles*. Standards for Components of British Columbia's Biodiversity

Centers for Disease Control – <http://www.cdc.gov/>

The Centers for Disease Control, among other services, provide health advice and information for U.S. visitors to foreign countries <http://www.cdc.gov/travel/default.aspx>. General travel information is provided as well as information specific for each country. The CDC website is primarily concerned with diseases of human concern; however, many wildlife species can have or carry zoonotic diseases including rabies, H5N1 Highly Pathogenic Avian Influenza, swine brucellosis, and others. Specific information regarding these diseases, including prophylaxis, treatment, and avoiding exposure can be found on the CDC website. Other information at the CDC website includes workplace safety and health, environmental health, and emergency preparedness and response.

U.S. Department of Agriculture –

<http://www.usda.gov/wps/portal/usdahome>

Under the Agriculture tab there are sections on Avian Influenza with information on pandemic avian flu, informational documents and reports, as well as recent news articles on avian flu. There is also a site to report sick or dead wild birds. The site has many pages with technical details of testing methodologies, descriptions of monitoring programs, guidelines for those traveling to endemic regions, and documents discussing the global impact of this disease.

Also under the Agriculture tab is a tab on Animal health. This contains links to the National Animal Disease Center (Ames, Iowa) which performs research on certain livestock diseases. There are abstracts of ongoing research projects under the Research tab, and a cursory overview of selected diseases. The Animal Health Surveillance tab has information on the National Animal Health Reporting System. The most useful portion of this site is the list of OIE Reportable diseases, and status of these diseases in the US, including the last reported case.

Also under the Agriculture tab is the Conservation tab, which has a link to the National Resources Conservation Service (NRCS). There is a Wildlife Biology site that can be accessed from the Conservation Technology page (also part of the NRCS). This page contains many documents and reports, mostly relating to landowners and conservation.

The Natural Resources and Environment page: http://www.usda.gov/wps/portal/!ut/p/_s.7_0_A/7_0_1OB?navtype=SU&navid=NATURAL_RESOURCES contains a lot of background information. There is a link to topographic maps and guides, which brings you to the US Forest Service and USGS resources. There are further links to pages on water conservation, policies, invasive species, soil conservation, irrigation, and plants. There are also links back to the NRCS, that has backyard conservation tips. There is also a Wildlife tab that links you to several reports on wildlife and livestock issues. The Research and Science tab has links to the Avian flu pages, as well as databases of plant and phytochemical information.

Under Travel and Recreation, there is a tab for guidelines on importing animals. This is only for live animal; for animal products, see the Veterinary Services page of APHIS.

U.S. Geological Survey – <http://www.usgs.gov/>

USGS is not a "regulatory" agency in regard to fish and wildlife. The USGS website is a massive resource containing important and relevant updates on wildlife health and emerging diseases. The National Wildlife Health Center <http://www.nwhc.usgs.gov/> has links to the Wildlife Disease Association and other groups that constantly update an enormous database. The USGS International Programs Website <http://international.usgs.gov/index.htm> covers regional efforts involving Africa, Asia, Canada and Polar Regions, Europe, Global, Latin America and the Caribbean, the Middle East, and Central Eurasia. Contacts for project leads are provided.

Wildlife Conservation Society-Field Veterinary Program – http://www.wcs.org/sw-high_tech_tools/wildlifehealthscience/fvp

This page has an overview and a large amount of health information on diseases such as Ebola, Avian influenza, and Foot and mouth disease. There is information on specific programs of WCS that focus on connections among livestock, human, and wildlife health. This group of pages is interesting and has many nice conservation stories in them.

LINKS TO WILDLIFE HANDLING PROTOCOLS/PROCEDURES

Canadian Council on Animal Care - Care and Use of Wildlife Guidelines – http://www.ccac.ca/en/CCAC_Programs/Guidelines_Policies/GDLINES/Guidelis.htm

These guidelines were developed over a period of several years by a subcommittee including wildlife veterinarians, zoo veterinarians and wildlife biologists from practice, government and academia, as well as a public member from the Canadian Humane Society. They were published in 2003 after an extensive review process

involving all levels of government, academics and users. All Canadian universities engaged in animal research *ex situ* or *in situ* must abide by the relevant CCAC guidelines.

Contents include information on collecting, restraint, marking, medical / surgical procedures, moving and holding, euthanasia, human Safety, and other information.

Ornithology Guidelines –

http://www.nmnh.si.edu/BIRDNET/GuideToUse/Guidelines_2d_edition.pdf

Last updated in 1997, these guidelines are divided into 10 sections: 1) Introduction; 2) Permits; 3) Investigator Impact; 4) Collecting and trapping; 5) Marking; 6) Transport; 7) Housing and Captive Breeding; 8) Minor manipulative procedures; 9) Major manipulative procedures; 10) References. The guidelines are very strong on permit and legal issues and this is where the zoo veterinarian will probably benefit the most. On page 7 Table II-1 a list of permit and issuing agencies in the USA is provided, however there also is international contact information and guides on how to apply permit and legal information in an international setting. The guidelines are rather basic related to veterinary techniques and often state that one should always work with a qualified veterinarian. They provide the AAWV, AAZV and AAV as links of how to find qualified veterinarians, stating that AAWV and AAZV are the best sources as veterinarians in AAV are more interested in pet bird medicine. The guidelines also give lots of examples of how investigators themselves can cause environmental and avian disturbances and offer means to minimize these impacts. That said, much of the guidelines refer to kill studies but provide ways to execute these humanely. There is a section on the prevention, diagnosis, treatment and control of animal diseases but again this section is very general and basic for the zoo veterinarian.

Wildlife Contraception Center at St Louis Zoo –

<http://www.stlzoo.org/animals/scienceresearch/contraceptioncenter/>

The center provides information on safe, effective means of contraception, as well as new tools for contraception in both captive and free-ranging species.

Wildlife Conservation Society – http://www.wcs.org/sw-high_tech_tools/wildlifehealthscience/fvp/168570?preview=&psid=&ph=.../mailto%3Areply%40wcs.org

This site contains numerous pages with specific information. The most valuable and useful are the field equipment, tests and sampling, manuals and papers, and links pages. The field equipment area has lists of commonly needed supplies, as well as contact information for companies that sell or distribute these items. The tests and sampling area has information on permits for biological samples, as well as guidelines for sample storage. The manuals and papers site contains a variety of pages, including necropsy guides, additional permit guidelines, and other documents.

LINKS TO WILDLIFE HEALTH CENTERS AND DIAGNOSTIC LABORATORIES

National Wildlife Health Center – www.nwhc.usgs.gov

The NWHC is part of the USGS and the website can be accessed from USGS (see below). The home page has links to hot topics, news items, and specific disease outbreaks. There is a Disease Information tab on the left with a list of important diseases of North American wildlife. There is a summary page with information on each disease as well as links to various news articles, photos, and other resources relevant to that particular disease. One page is devoted not to a specific disease but to amphibian decline in general. The next tab is for Mortality Events, where you can find reports and information about such events as well as report on an event. The next two tabs are self-explanatory; they feature NWHC research and publications. Many of the publications are quite useful, including the Field Manual of Wildlife Diseases, necropsy manuals, and wildlife health reports. The Education tab does not currently contain much of interest. The related resources tab is a list of links to other organizations, and the final tab is contact information and basic facts on the NWHC.

Southeastern Cooperative Wildlife Disease Study –

<http://www.uga.edu/scwds/index2.htm>

The SCWDS website has information about the services provided by SCWDS as well as the names of personnel and information for prospective veterinary externs and graduate students. There is a link where you can purchase the Field Manual of Wildlife Diseases for the Southeastern States. If you are working on a species indigenous to the southeast, the range maps for many species can be found on the Wildlife Distribution Maps link. There is also a link for the SCWDS newsletter.

UC Davis Wildlife Health Center – <http://www.wildlifehealthcenter.org>

The Wildlife Health Center is a division of the School of Veterinary Medicine at the University of California, Davis. Their programs are varied and include the intersection of wildlife disease (especially emerging infectious diseases) and wildlife conservation with human factors such as urban sprawl, oil spills, overfishing, derelict fishing gear, traffic, toxins, and overuse of wild areas.

Zoonotic disease focuses include avian influenza, West Nile Virus, and various diseases at the intersection of people, livestock, and wildlife (including in parts of Africa). Endangered species research includes a focus on human and other factors negatively affecting sea otter populations along the west coast. Another focus is on community outreach, education, and involvement in solving conservation and wildlife disease problems. Their website contains extensive listings of links of conservation interest that are helpful to veterinarians working in the field. These include links to Government agencies, certain industries with conservation impacts (such as the oil industry), conservation organizations and sources of conservation information, wildlife rehabilitation organizations and specific facilities, veterinary information, other

veterinary organizations, and veterinary schools, other academic institutions involved with conservation, and zoos and aquaria

Programs that are managed by the Wildlife Health Center and have links on the site include The SeaDoc Society, The Oiled Wildlife Care Network, The Southern California Ecosystem Health Project, Emerging Issues in Ecosystem and Wildlife Health, California Wildlife Action Plan. They also offer and manage a number of competitive grants programs that have links on the website.

LINKS TO INFORMATION ON CONTROLLED DRUGS

Drug Enforcement Agency – <http://www.deadiversion.usdoj.gov/>

The DEA is a [United States Department of Justice law enforcement agency](#) tasked with combating [drug smuggling and use within the U.S.](#) Not only is the DEA the lead agency for domestic enforcement of the [drug policy of the United States](#) (sharing concurrent jurisdiction with the [Federal Bureau of Investigation](#)), it also has sole responsibility for coordinating and pursuing U.S. drug investigations abroad. The DEA has a registration system in place which authorizes medical professionals, researchers and manufacturers access to "[Schedule I](#)" drugs, as well as Schedules 2, 3, 4 and 5. Authorized registrants apply for and, if granted, receive a "[DEA number](#)". An entity that has been issued a DEA number is authorized to manufacture (drug companies), distribute, research, prescribe or administer (veterinarians) or dispense a controlled substance. (<http://www.deadiversion.usdoj.gov/drugreg/index.html>) is the web address to apply for registration to use controlled substances. Many states or regions have field office locations. A list of offices can be accessed at http://www.deadiversion.usdoj.gov/offices_n_dirs/fielddiv/index.html

LINKS TO INFORMATION ON INTERNATIONAL TRAVEL

Centers for Disease Control – <http://wwwn.cdc.gov/travel/default.aspx>

The Centers for Disease Control provide health advice and information for U.S. visitors to foreign countries. General travel information is provided as well as information specific for each country. This information includes travel notices currently in effect, safety and security, vaccination recommendations, endemic diseases, items to bring, and other health-related information.

Transportation Safety Administration – <http://www.tsa.gov/>

The Transportation Safety Administration (TSA) provides guidance for travelers using commercial transportation (e.g. airlines). It is important to note that some items routinely used by wildlife researchers cannot be brought on an airline (either checked or

carry-on). Examples include formalin, formaldehyde, and alcohol. <http://www.tsa.gov/travelers/airtravel/prohibited/permitted-prohibited-items.shtm#11>. Further information regarding items prohibited on airlines can be found at the Federal Aviation Administration (<http://www.tsa.gov/travelers/airtravel/prohibited/permitted-prohibited-items.shtm#11>).

LINKS TO PERMITS

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) – (<http://www.cites.org/>)

CITES is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. CITES works by subjecting international trade in specimens of selected species to certain controls. All import, export, re-export and introduction from the sea of species covered by the Convention has to be authorized through a licensing system. Each Party to the Convention must designate one or more Management Authorities in charge of administering that licensing system and one or more Scientific Authorities to advise them on the effects of trade on the status of the species.

The species covered by CITES are listed in three Appendices, according to the degree of protection they need.

Appendices I and II

Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

Appendix III

This Appendix contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade. Changes to Appendix III follow a distinct procedure from changes to Appendices I and II, as each Party's is entitled to make unilateral amendments to it.

The website, <http://www.cites.org/>, is full of good information and the best way to learn more is to visit the website. There are several introductory sections, and there is a databases and publication sections with many downloadable documents. Publications include the CITES Handbook, Checklist of CITES Species, Identification Manual – Fauna and Flora, The Birds of CITES and How to Identify Them, and many others. Other sections that may prove useful includes Animals Committee, Export quotas, Identification manual, CITES Registers, National reports, Guidelines for transport, Terminology, Useful links, and Reference list.

U.S Department of Agriculture –

http://www.aphis.usda.gov/vs/ncie/pdf/gen_inst.pdf

General information about permits can be found near the bottom of the page under Reports is a tab for Importing/Exporting Animals. This is a link to the Veterinary

Services page of APHIS. This is probably the most useful page on the site. Contact information for various USDA offices and state veterinarians is here, as well as information on import and export regulations.

U.S. Fish and Wildlife Service –

<http://www.fws.gov/permits/overview/overview.shtml>

All permits can be obtained online and applications should be made to the closest state office. The page contains four primary sections: 1) International Affairs – where one can find applications for CITES importation permits, summaries and reports on international wildlife treaties, specific international acts such as rhino, tiger, panda, marine mammal and Lacey Act information, and the entire Endangered Species Act. A section describes programs world-wide, and specifies efforts in each region. Africa, Latin America, Asia, Mexico, Russia and India all have specific project fact sheets and program descriptions going back to the 1940s in some cases. <http://www.fws.gov/international/dicprograms/lac.htm> ; 2) Endangered Species permits and applications. Information on all permits is easily available, and some specify whether a separate state wildlife permit is also necessary (it usually is). Permits apply to work in the US or signatory countries to wildlife treaties. <http://www.fws.gov/angered/permits/index.html> ; 3) Law Enforcement. This section also contains an important sub-section if you chose to work abroad. A description of other conventions affecting wildlife (World Heritage Convention, Convention on Biological Diversity, Convention on Migratory Species of Wild Animals, the RAMSAR Convention on Wetlands, and the UN Convention on Climate Change). <http://www.cites.org/eng/resources/links.shtml> ; and 4) Migratory Birds and Eagle Permits, which are a separate process in the US. <http://www.fws.gov/permits/mbpermits/birdbasics.html>

LINKS TO FUNDING SOURCES

Don't forget your own zoo, NGO or veterinary hospital.

Association of Avian Veterinarians conservation grants

<http://www.aav.org/2008researchGrant.html> The AAV supports research through a small grants program (maximum \$10,000)

American Association of Reptile and Amphibian Veterinarians

http://www.arav.org/ECOMARAV//timssnet/news/arav_grantlisting.cfm

The ARAV Conservation & Research Committee has up to \$3000.00 available to fund clinically oriented and/or conservation research projects involving either reptiles and/or amphibians.

Association of Zoos and Aquariums

http://www.aza.org/AnMgt/Documents/Ded_Funds_Application_2008.pdf

The AZA takes applications to manage funds in support of a WCMC-approved AZA Conservation Program Committee (SSP, TAG, CAP, SAG).

Funding for Zoo and Aquarium Conservation and Science Research Projects

(<http://www.aza.org/RC/FundingSources/index.html>) – provides links for grant programs and foundations for research and conservation projects.

AZA CEF funds (<http://www.aza.org/ConScience/CEFInformation/>)

AZA Mazuri funds

<http://www.aazv.org/displaycommon.cfm?an=1&subarticlenbr=73>

American Association of Zoo Veterinarians

<http://www.aazv.org/displaycommon.cfm?an=7> AAZV grants and awards section

A variety of small grants, mostly for captive wildlife projects.

Cleveland Metroparks Zoo

<http://www.clemetzoo.com/conservation/grants/>

Disney Wildlife Conservation Fund

<http://www.dwcf-rfp.com/>

International Iguana Foundation

<http://www.iguanafoundation.org/article.php?articleID=18>

Morris Animal Foundation

<http://www.morrisanimalfoundation.org/scientists>

Wildlife section with funds up to \$50,000/year

Riverbanks Zoo

<http://www.riverbanks.org/conservationcare/fund.shtml>

Sea World Busch Gardens

http://www.swbg-conservationfund.org/get_involved.html

United States Agency for International Development (USAID)

www.usaid.gov

USAID is a government agency charged with economic and humanitarian assistance throughout the developing world. While individual projects such as those resulting from a disaster may require veterinary assistance (e.g., to assist a project in an earthquake region), the most relevant section of this site is the environment section. www.usaid.gov/our_work/environment/ and more specifically the section on biodiversity conservation

(http://www.usaid.gov/our_work/environment/biodiversity/index.html). USAID partners with: [African Wildlife Foundation](#), Conservation International, [EnterpriseWorks/VITA](#), The Nature Conservancy, Wildlife Conservation Society and World Wildlife Fund. To find a conservation project, you need to search natural resource management (NRM) projects (http://www.nric.net/pub_project/proj_pubsearch.cfm?Searchtopic=NRM) and then select your area of interest, then the country and project of interest.

There is information regarding vacant positions and private voluntary co-operation in the careers section of the website. However it may be more useful to approach the partner organizations regarding specific projects, vacancies and volunteer opportunities.

U.S. Department of Agriculture

http://www07.grants.gov/applicants/find_grant_opportunities.jsp. Note that these are very specific grants for certain regions or even specific parks. There is also a section under Reports (on the Education & Outreach page) that says Funding Opportunities, but these are strictly agricultural and none seem appropriate for wildlife research activities.

LINKS TO EMPLOYMENT OPPORTUNITIES

American Association of Wildlife Veterinarians: <http://www.aawv.net/jobs.html>.

Association of Zoos and Aquariums: <http://www.aza.org/JobListings/>.

American Association of Zoo

Veterinarians: <http://www.aazv.org/jobbankdisplaylistings.cfm>

Canadian Association of Zoo and Wildlife

Veterinarians <http://www.cazwv.org/jobopenings.htm>.

Wildlife Disease Association: <http://www.wildlivedisease.org/opportunities.htm>

LINKS TO STUDENT OPPORTUNITIES

American Association of Wildlife Veterinarians: <http://www.aawv.net/jobs.html>.

Wildlife Disease Association: <http://www.wildlivedisease.org/opportunities.htm>

FURTHER READING

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CONTACTS (ORGANIZATIONS / INDIVIDUALS)

Own organization (Zoo, NGO, veterinary hospital)

Local University

IACUC level

State wildlife (many now getting wildlife veterinarians but these vets might just want the extra hand/help and interaction with others such as from the zoo community)

Wildlife Society

Local Society for Conservation Biology chapters

Local Audubon, Nature Conservancy, other NGO chapters

Local community organizations (such as Friends of National Wildlife Refuges)

Local endangered species conservation projects.

Local practicing veterinarians who work with wildlife rehab or smaller zoos and collections may be involved in local wildlife research projects.

USGS local offices / personnel may welcome assistance or advice on wildlife projects they are involved with or contemplating.

Local colleges or universities whose veterinarians of record have some oversight of wildlife research projects (IACUC) but are unable to work in the field with researchers whose projects could benefit from veterinary presence or training in the field environment.

Contract-based organizations that provide wildlife research or management services to companies and governmental agencies can sometimes benefit from certain wildlife veterinary expertise.

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