

## REVIEW ARTICLE

# Ethical Issues Faced by Field Primatologists: Asking the Relevant Questions

LINDA MARIE FEDIGAN\*

*Department of Anthropology, University of Calgary, Calgary, Alberta, Canada*

Field primatologists face unusual ethical issues. We study animals rather than people and receive research approval from animal care rather than ethics committees. However, animal care evaluation forms are developed from concerns about laboratory animal research and are based on the “Three R’s” for humane treatment of captive experimental subjects (replacement, reduction and refinement), which are only debatably relevant to field research. Scientists who study wild, free-ranging primates in host countries experience many ethical dilemmas seldom dealt with in animal care forms. This paper reviews the ethical issues many field primatologists say they face and how these might be better addressed by animal care forms. The ethical issues arising for field researchers are divided into three categories: “Presence, Protocols and People” and for each the most frequent issues are described. The most commonly mentioned ethical concern arising from our presence in the field is the possibility of disease transmission. Although most primate field studies employ only observational protocols, the practice of habituating our study animals to close human presence is an ethical concern for many since it can lessen the animals’ fear of all humans, thereby facilitating undesirable behaviors (e.g., crop-raiding) and rendering them vulnerable to harm. Field primatologists who work in host countries must observe national laws and local traditions. As conservationists, primatologists must often negotiate between the resource needs and cultural practices of local people and the interests of the nonhuman primates. Many say they face more ethical dilemmas arising from human interactions than from research on the animals per se. This review concludes with suggestions for relevant questions to ask on animal care forms, and actions that field primatologists can take to better inform animal care committees about the common ethical issues we experience as well as how to develop guidelines for addressing them. *Am. J. Primatol.* 72:754–771, 2010. © 2010 Wiley-Liss, Inc.

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Ethics is nothing less than reverence for life [Schweitzer, 1949].

Science cannot solve moral conflicts, but it can help to more accurately frame the debates about those conflicts [Pagels, 1988].

Always do right—this will gratify some and astonish the rest [Twain, 1901].

## INTRODUCTION

When first asked to speak on ethical issues for field primatologists a few years ago, I was reluctant to tackle this topic. As a scientist, I am most comfortable with empirical evidence, whereas with ethical quandaries there are seldom straightforward, agreed-upon solutions. Furthermore, I had the hubris to believe that field primatology involved few ethical issues in comparison to laboratory research on animals. A number of experiences changed my view and ultimately led to this review paper. First, I was forced to grapple with ethical issues in my own field work and heard about similar dilemmas from my colleagues. Second, I struggled to

complete our institution’s animal care forms and wondered why many of the questions seemed unrelated to my experience of field research. Third, I began to teach a graduate seminar in Professional Skills and read about the history of ethics and animal care committees. Finally, I found during my editorship of the *American Journal of Primatology* that far more ethical issues were brought to me about field studies than about research conducted on captive primates.

There are two major components to ethical behavior in research: (1) How we conduct our work in terms of integrity and scholarly methods (e.g.,

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\*Correspondence to: Linda Marie Fedigan, Department of Anthropology, University of Calgary, Calgary, Alberta, Canada T2N 1N4. E-mail: Fedigan@ucalgary.ca

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honesty in issues of co-authorship, contributions of others and conflicts of interest; rigor in obtaining, analyzing and reporting data); (2) How we treat our subjects, and the items owned/produced by our subjects (e.g., artifacts and biological samples) and the others affected by our research. Although these two aspects for researchers are clearly related, they also involve distinct issues. Altmann [1993–1996] published a very helpful series of essays on the first component of ethical behavior and in this paper I will focus on the second area, in specific relation to field primatology.

My objectives are five-fold. First, I will describe the unusual, emotionally laden situation of primate research in relation to ethical issues. Second, I will suggest why field primatologists often find the standard questions on Animal Care and Use forms to be puzzling and irrelevant (and to which they usually respond with “n/a”, if that is allowed by the animal care committee). To this end, I examined 12 examples of Animal Care and Use forms (hereafter referred to as animal care forms) required by institutions across the U.S. and Canada. Completed versions of these forms are evaluated by institutional committees variously referred to as Institutional Animal Care and Use Committees (IACUCs) in the U.S., Animal Care Committees in Canada, Animal Experimentation Ethics Committees in Australia and Ethical Review Committees in the U.K. I will refer to them globally as animal care committees.

Third, I will briefly outline the ethical issues most commonly mentioned by my field primatology colleagues as being those that they must address during their research. I will also mention a few of the solutions that were suggested, but will not focus on solutions in this paper, which is an attempt to open a dialogue, not offer a definitive solution to this complex issue. Fourth, I will present the questions that *would* be appropriate to ask field workers but are seldom found on the forms, and I will provide the reader with an example of what an animal care form for field research might include. Finally, I will make several suggestions as to how to move forward such that the relevant ethical issues for field workers are more widely discussed and guidelines are codified and how we might participate more fully in the on-going development of animal science regulations such that animal care committees become more attuned to our particular ethical concerns.

### UNUSUAL ASPECTS OF ETHICS FOR FIELD PRIMATOLOGISTS

Most primatologists would probably agree that it is both a benefit and a bother that our study subjects are so much like us (what Nash 2005 refers to as the “paradox of working with primates”). On the one

hand, it is the very similarity of ourselves to the alloprimates (hereafter referred to simply as primates) that draws many scientists to study them or use them as models or substitutes for humans. Anthropologists have often studied the behavior and lives of primates in order to develop scenarios of how early humans might have lived and models of how humans correspond to or differ from fundamental primate patterns [e.g., Hart & Sussman, 2009; Wrangham & Peterson, 1996]. And because the other primates are NOT human, research on them is not constrained in the same way as is research on humans. Some scientists argue that it is appropriate to conduct research on animals that is beneficial to humankind but which would be unethical to carry out on humans. Researchers taking this stance, often medical scientists, believe that primates make the best available substitutes for humans in invasive research because they are so similar to us. Even researchers who study primates for their own sake and are not directly interested in the similarities between their study animals and humans benefit from the ease with which we recognize their familiar behavioral, morphological and physiological patterns.

On the other hand, the very similarities to humans that render primates an excellent substitute for us in research, also lead them to receive special attention from the media, animal rights groups and the public at large. One head of an animal care committee told me that he receives many more concerned inquiries about research on primates than any other taxon, although the institution in question does much less research on primates than on other types of animals. One could argue that the more similar to humans the animal is, the more controversy there is about how it is treated in research. A telling example of this is the singling out of the Great Apes (from hundreds of primate species and millions of animal species) with the argument that basic human rights should be extended to these apes [Cavalieri & Singer, 1993; The Great Ape Project, GAP] and with proposed prohibitions against research on these animals in Europe ([www.guardian.co.uk/science/2008/nov/05/animal-primate-research-experiments-vivisection](http://www.guardian.co.uk/science/2008/nov/05/animal-primate-research-experiments-vivisection)). Another example is the May 2007 ban on the breeding of chimpanzees for research by the National Institutes of Health in the U.S. The NIH cited financial reasons (it is very expensive to breed and house chimpanzees), but it is widely believed that the real reason for the ban were the widely signed petitions asking Congress to outlaw all research on captive chimpanzees [Cohen, 2007; Knight, 2008]. In April 2008, the Great Ape Protection Act (H.R. 5852) was introduced to the U.S. Congress as a bill proposing to prohibit all research and testing on captive Great Apes. Although it failed, it was reintroduced in March

2009 (<http://www.govtrack.us/congress/bill.xpd?bill=h111-1326>). A primatologist (or an ethicist or a philosopher) might ask on what basis the chimpanzees (or the Great Apes) should be singled out from all other primate or animal species for special treatment—why draw the line there? The Great Apes are clearly endangered, but so are many other species; therefore, the criterion for special treatment in the view of those backing these initiatives must be the animal's similarity to humans and human-like capacities. The issue of how closely the other primate species are related to us is a constant theme with which all primatologists must grapple.

Furthermore, primatology as a science falls into a unique boundary zone when it comes to ethical evaluations of our research. Because we study animals, our research is vetted by “animal care committees” (in the U.S., made up largely of biologists and veterinarians who work with captive animals) rather than “ethics committees” (made up largely of social scientists). However, field primatologists in North America are mostly trained in social science departments (Anthropology, Psychology), and usually work with local people, and they conduct research on free-ranging animals (wildlife) in their native habitats. These factors lead to very different ethical dilemmas than does laboratory research on captive animals. Nonetheless, field and captive research are usually co-mingled for evaluation by animal care committees. Animal care evaluation forms originally developed out of concerns for research on laboratory animals and are designed to assess adherence to the Animal Welfare Act in the U.S., and to the CCAC (Canadian Council for Animal Care) Guidelines in Canada and to the Animals (Scientific Procedures) Act 1986 in the U.K.; as well as for compliance with the Three R's (see below). Currently, almost all U.S. and Canadian researchers working with animals, captive or wild, are required to obtain approval of their research from animal care committees before they can receive grant funds or publish their work [Mulcahy, 2003]. Perhaps it is no wonder that researchers completing these forms before heading off for field research in host countries often say they feel like “square pegs being shoved into round holes.” Some complain of being told by animal care committees that they must use specific procedures dependent on access to modern western technology when in fact they are carrying out their work in the most remote and rustic conditions imaginable.

## **HISTORY OF ANIMAL CARE COMMITTEES IN THE U.S. AND CANADA**

I begin by briefly outlining key incidents in the historical process that led to the requirement that we have our research approved by animal care

committees, as these events occurred in the United States. The Animal Welfare Act (AWA) was passed in 1966, following a great public outcry over the treatment of animals in laboratory research. Many trace this outpouring of public concern to a string of media reports culminating in an influential 1966 exposé by *Life* magazine of abusive practices by animal dealers who sold pets to research labs [Beauchamp et al., 2008; Rozmiarek, 2007; Sullivan, 2007]. The AWA has since been amended multiple times, most recently in 2007. In 1985 important amendments to the AWA were passed, including one that required institutions to provide for the psychological well-being of captive primates [Nash, 2005]. Even earlier than the first passing of the AWA, the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC) had published in 1963 the premier edition of what is now called the *Guide for the Care and Use of Laboratory Animals*. In 1973 the first Public Health Service Policy on Humane Care and Use of Laboratory Animals (growing out of NIH policy) went into effect and it introduced the idea of local animal care committees to oversee research. In the 1980s, continuing public concern about the welfare of research animals led to laws requiring the establishment of Institutional Animal Care and Use Committees (IACUCs) as part of USDA regulations [Rozmiarek, 2007] and Public Health Service Policy [Laber et al., 2007]. Although the USDA is tasked with setting forth standards for humane care (e.g., sanitation, housing and ventilation) and minimization of pain and distress, it is prohibited from regulating the design of research or experimentation on animal welfare grounds. The latter is the task of the IACUCs, which also oversee adherence to general animal care standards [Sullivan, 2007]. Every institution that uses animals in federally funded research must establish an IACUC that consists of five members (including a veterinarian, a practicing animal research scientist, a layperson and an individual with no affiliation to the institution except for serving on the committee). The IACUC is charged with examining proposed protocols for animal research (i.e., the design of the research) in terms of its compliance with the federal policies and guidelines mentioned above.

The Canadian history of animal care committees is distinctive, although it also developed from laboratory animal science concerns. In 1961, the Canadian Federation of Biological Sciences produced a document entitled: “Guiding Principles on the Care of Experimental Animals” and in 1963, the National Research Council established a committee to investigate the use of laboratory animals for research in Canada [Olfert, 2009]. In 1967, this committee submitted a report recommending the establishment of local, peer-based institutional

animal care committees and the formation of a national body (the Canadian Council on Animal Care) to oversee these local committees and their application of standardized guidelines. In Canada, the regulation of animal use is a provincial jurisdiction and as there was no framework for federal laws to be formulated [Olfert, 2009], the formation of the CCAC and the animal care committees in Canada was not a legislated development as was the Animal Welfare Act in the U.S. Instead, the CCAC was established in 1968 as an independent body to develop and maintain national standards to be implemented by local animal care committees made up of scientists and representatives of the public [Olfert, 2009]. Thus, the Canadian system is based on local peer-and-public review rather than on top-down federal laws (Morck, pers. comm.). The outcome is nonetheless similar to what is found in the U.S. in that all animal research in Canada must be evaluated by animal care committees before it can be funded or published.

Almost all guidelines and policies on animal welfare in the U.S., Canada, and Britain were designed to take account of the “Three Rs” first articulated by Russell and Burch in 1959: replacement, reduction and refinement. In their highly influential book, “The Principles of Humane Experimental Technique”, Russell and Burch proposed that researchers should attempt to find alternatives to live animals in research wherever possible (replacement), that they should reduce the numbers of animals used in research (reduction), and that they should choose experimental procedures that minimize pain and distress (refinement).

As noted by the CCAC [2009], the Three Rs have become widely accepted ethical principles that are embedded in animal science throughout most countries of the world [<http://www.ccas.ca/en/alternatives/intro.html> and see Barnard, 2007; Dolan, 1999; Griffin & Gauthier, 2004; Schuppli & Fraser, 2005 and <http://www.nc3rs.org.uk>]. Indeed, some form of the Three Rs appear, either explicitly or implicitly, as guiding principles in every animal care form that researchers across the globe complete.

This brief chronicle of how the animal care/IACUC regulatory bodies came to be universal in North American research institutions is a history of increasing concern for, and regulation of, the use of laboratory animals. It is also a history of improvement in animal welfare of which we would all surely approve. As noted by Nash [2005], the Three Rs are the reason for important changes in U.S. federal law that came with 1985 amendments to the Animal Welfare Act. The irony is that it is this same process of improvements in the welfare of research animals that has led to field primatologists everywhere scratching their heads as they attempt to answer standard questions on the animal

care/IACUC forms that are based on the Three Rs. Questions such as: what is your rationale for using live animals in your research (replacement)? And how many animals do you need to use (reduction)? And what is your method for minimizing pain during surgery (refinement)? As argued by Barnard [2007]: “replacement cannot be a logical objective where animals themselves are the object of study.” Furthermore, “reduction” may not be an appropriate goal in observational field studies where the animals are not “used” in the sense of expending them, or where the researchers are conducting census/survey work or work in a new site and have no idea of how many animals they will eventually encounter.

Even the laudable concept of “refinement” can expose a chasm of difference between laboratory and field science. A few of my colleagues who capture their study subjects in the field for mark and release told me they have been required by their animal care committees to use specified disinfectants and other chemicals not available in the countries where they conduct their research, to wear lab coats, face masks, gloves and rubber boots while handling monkeys in their native tropical habitats and to dispose of the gloves and face masks in biohazard containers. These are researchers who work at sites with no electricity or running water and with no means to dispose of the noxious chemicals that they may not have been able to purchase and would prefer not to use in the first place. Clearly not all animal care committees would make such stipulations, but those that would impose such requirements are obviously functioning in a different research world than are field workers.

Primatologists who study animals in the wild are certainly not exempt from moral dilemma, it is rather that our ethical issues arise from an entirely different history and context than that of researchers who work with captive animals. Furthermore, unlike laboratory researchers, we have few published guidelines to advise and direct us as we encounter those field-specific quandaries. Partial but prominent exceptions are as follows: The American Society of Mammalogists’ Guidelines for the Use of Wild Mammals in Research [Gannon & Sikes, 2007], the Animal Behavior Society’s Guidelines for the Treatment of Animals in Behavioural Research and Teaching [2006], the CCAC’s Guidelines on the Care and Use of Wildlife [2003] and the Primate Research Institute of Kyoto University’s Guidelines for Field Research on Non-human Primates [2008]. Although useful for laying out very general principles for the ethical study of wild animals, these documents do not for the most part address the specific issues that arise during field research nor do they describe “best practices” for common field work methods in primatology (e.g., habituation, darting of arboreal animals).

## ETHICAL DILEMMAS EXPERIENCED BY FIELD PRIMATOLOGISTS: PRESENCE, PROTOCOLS AND PEOPLE

During the preparation of this review paper, I sent email messages to 105 field primatology colleagues and asked them to briefly tell me about ethical issues that have arisen in the course of their research projects and whether these issues are addressed in the animal care forms that they are required to complete for their institutions (Appendix A). I asked them four questions and in this paper I draw on their responses to three of them. This was not a scientific study in that I informally asked people in my circle of acquaintances about their experiences and opinions and the sample was neither random nor representative. Nonetheless, this summary is based on the opinions of many people and I was surprised by the alacrity and fervor with which they replied. Clearly this is a matter on the minds of many. A total of 60 colleagues, most of them from the U.S. and Canada, but some from Britain, Japan and Brazil, described for me the ethical dilemmas arising from their field work as well as the intellectual dilemmas resulting from their attempts to complete the required animal care forms that appear to most of them to be largely irrelevant to their actual experiences of ethical quandaries. In Table I, I have roughly categorized the issues they most commonly described into Presence, Protocols and People (the “Three Ps”). My intent is to provide the reader with a sense of how the community of field primatologists views the ethical issues we confront. The following descriptive overview grows out of their responses as well as my own experiences.

### Being There: Ethical Issues that Arise from Our Presence in the Field

#### *Disease transmission*

There are at least four ways in which the simple presence of field researchers in the habitat of our study subjects raises ethical issues and may pose risks to the animals and their environment (Table I). The most commonly recognized is that of disease transmission. As we know all too well from recent global health crises, some viruses such as “swine flu” (H1N1) can be transmitted across species. Being closely related to us, the nonhuman primates are particularly subject to our diseases and we to theirs. For example, they can become infected with fatal cases of tuberculosis, polio, measles and respiratory ailments from humans and we can develop very serious illnesses from them, such as Herpes B, simian foamy virus and SIV/HIV [Engel et al., 2006; Ferber, 2000; Gao et al., 1999; Jones-Engel et al., 2005, 2006; Nunn & Altizer, 2006; Wallis & Lee, 1999]. Ebola can be transmitted in both directions [e.g., Boesch, 2008; Le Guenno et al.,

**TABLE I. Ethical Issues Experienced by Field Primatologists: The Three Ps**

	% identifying this issue (n = 60)	Definition
<i>Presence in the field</i>		
Disease transmission	40	Transmission of disease from humans to primates and vice versa
Hygiene	15	Disposal of human waste and garbage in a sanitary manner
Intervention	32	When/if to intervene if an animal is ill or wounded or in distress
Ecosystem effects	15	Whether researcher presence deters predators and competitor species
<i>Protocols in the field</i>		
Habituation	58	Repeated neutral contact until the animal loses its fear of researcher
Provisioning	12	Providing human foods to the study subjects
Environmental degradation	22	Trail cutting and other habitat alterations
Bio-sample collection	22	Collection of hair, saliva, feces, urine, blood and/or food items for analysis
Capture, mark, and release	47	Capture via trapping, darting
Field experiments	7	Sound playbacks, feeding platforms, translocation of individuals or groups
<i>People in the field</i>		
Conflict over protection	45	Balancing needs of local people against protection of study animals
Local illegal activities	33	What to do when locals are seen performing harmful/illegal activities
Local hiring	22	Changing the local economy through hiring and purchasing practices
Community/cultural expectations	27	Meeting expectations of local people regarding behavior, dress, etc.
Tourists	15	How to handle behavior of eco-tourists and their guides
Researcher safety	7	Medical and legal risks of working in remote areas of foreign countries
Problems with other researchers	8	What to do if other researchers are seen to perform illegal activities

1995] as can pathogens such as *Escherichia coli*, *Giardia spp* and malaria (*Plasmodium spp*) [e.g., Di Fiore et al., 2009; Goldberg et al., 2007; Graczyk et al., 2002].

Nonhuman primates that become very accustomed to researchers may touch, bite or scratch them, increasing the risk of transmitting disease [Fuentes, 2006], but for many illnesses, physical contact is not necessary for transmission and close proximity or sequential contact with a substrate will suffice. It seems that the risk of inter-specific disease transmission varies from one type of primate to another and may be particularly high between chimpanzees and humans. After a decade of warnings and policy statements, [e.g., ASP, 2000; Wallis & Lee, 1999; Wolfe et al., 1998; Woodford et al., 2002], strong and well-documented cases have now been made that lethal respiratory infections were spread from researchers to the chimpanzees they were studying at three long-term field sites [Kaur et al., 2008; Kondgen et al., 2008; Williams et al., 2008], although other people in proximity with the chimpanzees were also possible vectors. Primatologists have recently become well aware of this rather horrifying possibility and much informal and formal debate has ensued as to how best to address it (see articles in special issue of *American Journal of Primatology*, 2008, volume 70, issue 8 and Gillespie et al., 2009). The risk that we might transmit disease to the very species we most desire to protect is of great concern to all and suggestions for counteractions have ranged from the simple measure of wearing masks while in the field and staying out of the field while ill to the more extreme call for a moratorium on the habituation of new study groups or even the cessation of scientific study at long-term sites. Another suggestion is that information on documented cases of inter-specific disease transmission be maintained on a website that all researchers can access, especially when designing their research protocols. We can expect that extensive discussion around this very important and emotionally loaded ethical dilemma will continue.

#### *Sanitation and the removal of refuse*

Related to the matter of disease transmission is that of sanitation practices while in the field. The most obvious is that of disposing of human waste and garbage in a sanitary manner. The daily work of field primatology often takes place in remote locations away from electricity, running water and toilets. Since our study subjects are often followed from dawn to dusk, researchers need to find the most hygienic ways possible to dispose of human excrement. One recent study documented that mountain gorillas in the Bwindi National Park, Uganda, living in overlapping habitat with people and livestock, harbor *E. coli* isolates genetically similar to those of the local humans and their cattle, some of which were resistant to an antibiotic used by local people [Rwego et al., 2008]. Another showed that gorillas, humans and livestock in Uganda are all infected with

the same assemblage of *Giardia duodenalis* and the authors attributed this to improper disposal of human fecal waste [Graczyk et al., 2002]. Some of the primatologists I interacted with indicated that they instruct everyone on their team to urinate and defecate far from primate feeding sites, to bury their feces in deep soil away from the location of the study group and to carry toilet paper back out of the study area in ziplock bags. Christophe Boesch's chimpanzee research team in the Tai Forest carries human feces back to camp [Boesch, 2008].

Some colleagues also told me that they keep all human food items out of the study group's range and/or they only consume food while out of sight of the study subjects. When field camps are established, it is also important that sanitation practices be maintained in and around them, which can be challenging without plumbing, power and trash-removal services. Less obvious and possibly less harmful, but still clearly related to the directive that we "leave nothing but our footprints" is the matter of removing research gear when we end our studies. Humans seem to shed refuse wherever we go and scientists are no exception. I have seen tropical forests littered with the remains of previous research projects—objects no longer useful to anyone, such as flagging tape, seed and insect traps, tree tags, metal stakes, and rope hanging from branches.

#### *Intervention*

Whether brought about by human actions or the forces of nature, we all have seen our study subjects injured, in poor health or otherwise at risk. Many colleagues brought up the issue of deciding when, if ever, to intervene to help the nonhuman primates that we study. It is not uncommon for us to see an infant in trouble in the field—its mother may have died or been injured or left the infant behind during a period of sudden group upheaval. If there is a chance of reuniting the mother and the infant, or if there is a nearby facility that hand-rears and rehabilitates this species, then the issue arises of whether the researcher should "rescue" the infant. Should a wounded or ill individual be treated with antibiotics or other medication? Do we base a decision to intervene on whether the injury or illness was brought about by researchers, local people, conspecifics or predators? What if the study population is clearly suffering from a severe illness that can be alleviated with a vaccine, such as the polio outbreak in the 1960s among the chimpanzees at Gombe [Williams et al., 2008]? Is there a greater moral imperative to intervene if we are studying an endangered species? What is the appropriate point at which we should cross over from our scientific role as neutral observers to that of engaged activists helping these animals to survive? Many primatologists have faced this issue during their field work.

*Ecological versus individual ethics*

Despite our best efforts, our presence in the field is never entirely without consequences for the animals we study and for the ecological community of which they are members. As noted by several colleagues, the presence of humans changes the behavior of predators and thus of predator–prey relationships. Most of us suspect that predators (at least unhabituated predators) are less likely to attack our study subjects while we are present. Isbell and Young [1993] documented that human presence reduced leopard predation on vervets. Our presence is also likely to change the nature of competitive interactions between species. This point was brought home to me once while sitting with a habituated group of monkeys at a waterhole. The monkeys were suddenly charged by a group of peccaries and were clearly being routed from the resource until I stood up and the peccaries caught my scent and turned tail. Ecological ethics is a rapidly growing field that views living creatures as “members of a biotic community” [Albrecht, 1999] and concerns itself not just with the risks of research to individual subjects but with the broader implications of human actions for the status of populations, habitat integrity and interspecific community dynamics [Marsh & Kenchington, 2004]. In our desire to understand and/or protect our study animals and groups, is it justified to put their individual interests above those of other species [Curry, 2006; Nash, 2005]?

**Research Methods: Ethical Issues that Arise from Our Protocols***Habituation*

The most fundamental, pervasive and seemingly harmless method in the ethologist’s repertoire is that of quietly following the study subjects as they travel through their home range until they become accustomed to the neutral presence of the researcher, and reduce their attention to (and presumably fear of) the human observer. Our hope is that they will then behave as they would were we not present; or as stated by Tutin and Fernandez [1991], that they will come to accept the human observer as a natural element in their environment. Williamson and Feistner [2003] defined habituation somewhat more conservatively as a reduction in the attention directed toward human observers following repeated neutral contacts. Ever since it became clear that crouching in hides would only render the observer an object of greater curiosity to nonhuman primates [e.g., Goodall 1986; Schaller, 1963], primatologists have relied on the practice of habituating our study subjects to being openly and quietly followed on a daily basis. Once they accept our presence as relatively innocuous, we are able to approach them closely enough to identify

individuals, sort out their relationships and record their behavior.

It is not an exaggeration to say that almost all field primatology relies on the practice of habituation and that we experience a feeling of accomplishment (and perhaps a feeling of “acceptance”) when our study animals finally tolerate our presence without overt signs of fear or curiosity. Nonetheless, we recognize the risks of facilitating their loss of fear of humans—if we work in an area where the primates are not protected and they do not distinguish researchers from other people, we render these animals vulnerable to hunting and injury from humans who might seek to harm them. If our study subjects range in areas adjacent to human settlements, our habituation of them may also make it more likely that they will become “pests” through crop-raiding or otherwise annoying their human neighbors while searching for food.

As described by Goldsmith [2005], there are many other less recognized costs to the practice of habituating our study subjects—the process itself can be stressful to them, especially if they live in an area where they are hunted by people and they now have to cope with the continuous presence of a human. Indeed, Woodford et al. [2002] argued that stress arising from habituation can lead to decreased reproductive success or disease owing to immunosuppression. Jack et al. [2008] documented elevated cortisol levels in capuchin groups undergoing habituation and decreases in stress responses over the habituation period. As noted in the section above, humans that are increasingly allowed by the animals to come into close proximity may inadvertently spread disease to them, and/or change the study groups’ relationship with the predators, competitors and environment around them. There are also risks to the researchers; for example, during or after the process of habituation, gorillas, chimpanzees and macaques have been known to challenge and attack the humans that are shadowing them or attempt to use the human observer as a “social tool” [Williamson & Feistner, 2003]. A large percentage of my colleagues noted that habituation, while necessary to our work, also raises ethical dilemmas. A number of them stated that it is important to maintain a minimum observer–subject distance and to avoid “over-habituating” our study subjects. As noted by Goldsmith [2005], we should habituate our study animals only to a point where they tolerate our presence but not to the extent that we become incorporated into their social group. Any assessment of habituation risks should include whether or not the animals reside in a protected area. For example, I ceased to habituate vervets on a Caribbean island (as have other primatologists) once I realized I was rendering them more vulnerable to local trappers but I continue to habituate groups of monkeys in a

national park in Costa Rica where they are protected from hunting.

### *Provisioning*

In early primate field research, the practice of putting out human foods (e.g., produce, grain, peanuts) in an accessible area of the study groups' range was sometimes used as part of the habituation process, particularly when the habitat was dense or the animals were very shy of humans. The food acted an incentive for the animals to remain in one area (usually a clearing) long enough for the researchers to have a good look at them and for the animals to become accustomed to the presence of humans nearby.

The earliest case of provisioning by a primatologist is often traced to Carpenter's work with the Cayo Santiago rhesus macaques in the late 1930s and early 1940s [e.g., Asquith, 1989; Goldsmith, 2004]. As noted by Asquith, Carpenter's provisioning of the Cayo Santiago macaques was necessary because the natural food supply on the island was not adequate to feed the imported colony of monkeys. This she refers to as "provisioning from necessity", which she contrasts with "provisioning from choice" in order to speed up the habituation process and facilitate close observation. Japanese primatologists are most closely associated with provisioning in that they baited most of the groups of Japanese macaques and later the great apes they studied in Africa as their habituation method of choice. Goodall's provisioning of the Gombe chimpanzees is another famous case of this practice and many study populations of macaques (e.g., the Barbary macaques of Gibraltar, the rhesus macaques of India) are (or were) provisioned either by local people, park managers, and/or by the researchers.

Those scientists who used provisioning as a research tool saw it as advantageous in many respects: enhanced visibility, encouraging the animals to remain in protected areas away from human crops, facilitating the use of field experiments. Nonetheless, it did not take long for the practice of provisioning by researchers to become controversial. For example, Wrangham [1974] argued that generalizations should not be made about the behavior of chimpanzees based on their actions around the feeding area and a number of Japanese as well as Western primatologists (see references in Asquith) began to argue that provisioning brings about fundamental changes in animal behavior and the loss of naturalistic data. In 1988, Fa and Southwick published an edited volume with a set of studies comparing provisioned to non-provisioned groups across a wide variety of species. These studies as well as others documented that the feeding of primates with human foods leads to developmental and demographic changes (e.g., younger age at first birth,

shorter interbirth intervals, higher survival rates, larger groups) as well as changes in behavior (e.g., smaller home ranges, less time spent foraging, increased rates of aggression).

The pendulum of opinion has swung among primatologists to the extent that provisioning is now seldom used as a research tool, except for the baiting of traps and experimental platforms with food (see below). Although the feeding of macaque groups with human foods continues across much of Asia, this is done almost entirely by local people, sometimes park personnel, who feed the animals largely as a religious/cultural act and/or for management and conservation reasons (e.g., to make them accessible to tourists, to keep them in protected areas and "out of trouble"). And sometimes the feeding continues because the primates have become dependent upon it and would face starvation without it [Fa, 1991].

Along with the scientific disadvantages that can result from the practice of supplemental feeding, there are ethical issues that arise. Although provisioning has sometimes been used to keep primates from crop-raiding, the practice of familiarizing them with human foods can actually lead to crop-raiding or the attacking of tourists for food. For example, in most national parks of Costa Rica, capuchins appear uninterested in human foods left in trash cans, but in Manuel Antonio where they have been fed by visitors and sometimes baited with produce by eco-guides to make them more visible to tourists, these monkeys often jump on park visitors and rob their backpacks in order to extract food. Across Africa and Asia, there are problems of provisioned monkeys attacking people for food. To make these animals aware of and possibly dependent upon human foods clearly renders them vulnerable to starvation if the provisioning stops. It also makes them more susceptible to human diseases transmitted with the foods.

### *Trail cutting and other environmental changes*

A number of my colleagues indicated to me that field workers may also create ethical issues by altering and potentially degrading the habitat in which the animals occur. The most common form of environmental alteration is the cutting of trails, which is often a necessity in forested habitats in order to find and follow the animals. The trails themselves may not make much of a mark on the landscape, if they are kept narrow and inconspicuous, but they do open up the area to other humans, who may use the trails to access the primates and their habitat. The use of researcher trails by others may range from the apparently innocuous, such as ecotourist guides who bring visitors to see the animals, to the very harmful, such as poachers who take advantage of the increased access to hunt and

kill local wildlife. Clearly, we should minimize the changes we make to the environment of our study subjects, and “environmental impact” statements are often part of field research permits.

### *Collecting of biological samples*

Field primatologists sometimes collect samples of the foods that their subjects are consuming (e.g., plants, insects) for later nutritional analysis in their home countries, and such collection practices are commonly regulated by export and import permits. Some countries such as Brazil are very concerned that the floral and faunal resources of their native lands not be exploited by foreigners for financial gain (i.e., patent applications) and in such cases, it can be quite difficult for a scientist to obtain export permits. Thus, primatologists who are simply seeking to better understand the behavioral ecology of their animals may find themselves caught up in larger issues of international economic and political relations and constrained by the legal ramifications of those issues.

A different set of issues arise with the collection of biological samples from the animals themselves. Until two decades ago, primatologists interested in genetic or endocrinological studies were reliant on blood and tissue samples to advance their research. Most such research was done on captive animals because of the widespread view that repeated capture of free-ranging primates for blood drawing is undesirable and detrimental to the animals' well-being. Thus, it was a tremendous breakthrough in the late 1980s, when steroids [reviewed in Strier & Ziegler, 2005] and DNA [Di Fiore & Gagneux, 2007; Morin et al., 1992] were first reliably extracted from the feces, hair and urine of free-ranging primates. These non-invasive methods for obtaining hormonal and genetic samples from wild animals are without a doubt the greatest advance for diminishing human impact in field work of the past twenty years.

For those primatologists that still need to collect blood or tissue samples, the standard animal care forms usually ask some questions directed to the capture protocol, such as the anesthetic drug to be used. Those researchers who can rely entirely on noninvasive observational methods may find that at some universities (e.g., McGill, Stony Brook, York, University of Wisconsin-Madison) they can bypass the standard animal care forms and instead complete a form for field research, or they be required to complete only one section of a standard animal care form and then move to a section for field studies only (e.g., Duke).

### *Capture, mark/measure and release*

The most invasive method that field primatologists use is surely the capture of their study animals and it was very commonly mentioned by colleagues

as raising risks for the animals and the humans alike. Whether by trapping [Jolly et al., 2003] or by darting [Glander et al., 1991], being captured is, as noted by some [e.g., Russow & Theran, 2003; Wilson & McMahon, 2006], one of the most stressful situations that a wild animal can experience. Indeed, Wilson and McMahon liken it to being captured by a predator. Primatologists are aware of the high stress levels that occur during capture and attempt to minimize trauma through various means: food rewards in traps, careful planning, training of researchers in capture techniques, presence of a veterinarian during the procedure, used of sedatives with the fewest side effects and of the lowest effective dose (i.e., a compound with a wide therapeutic index), gentle handling, conscientious monitoring of the animal as it recovers from the sedative and is released in its own home range as close as possible to its study group. From the perspective of the researcher, there are risks of being bitten or scratched or contracting disease from close contact with the captured animals, all of which can and should be minimized through careful protocols.

Now that we can obtain data via non-invasively collected fecal samples on a wide range of topics from hormonal levels to DNA to parasites and seed dispersal, one might ask why capture of our free-ranging nonhuman primates continues at all. As noted by the researchers involved, capture allows morphological measurements to be taken of captured individuals that could not be otherwise assessed, markers to be put on individuals that would not be otherwise identifiable and/or tracking devices to be placed on animals that it would not otherwise be feasible to study [Bearder & Martin, 1980; Fedigan et al., 1988; Fernandez-Duque & Rotundo, 2003; Garber et al., 1993; Glander et al., 1991; Honess & MacDonald, 2003; Juarez et al., unpubl ms]. Capture and release techniques are particularly helpful for the study of nocturnal and cathemeral primates and for species with large ranges and elusive habits. Capture is also necessary for some conservation efforts such as translocation and reintroduction of primates into areas where they are expected to survive better than in their current range [e.g., Cheyne, 2009].

As with all protocols, the researcher must carefully weigh the costs against the benefits of capture and provide convincing justification. Juarez et al. [unpubl ms] recently prepared a detailed account of the benefits and costs associated with darting and radio-collaring 142 owl monkeys over a nine year period and concluded that the negative short-term and long-term effects are minimal whereas the benefits to conservation research are profound. All animal care forms require the researcher to provide good reason for capturing, as well as justification for the number of individuals that

will be captured, and a description of how the capture method will be perfected to minimize stress. There are guidelines published for trapping techniques [e.g., Gannon & Sikes 2007; Powell & Proulx, 2003], and for placing tracking devices on animals [Wilson & McMahon, 2006]. One rule of thumb is that the device should weigh <5% of the animal's body weight [Cuthill, 1991]. However, I am unaware of any published guidelines for the darting and subsequent capture by net of arboreal animals. This lack of a common, agreed-upon, published "code of best practices" creates difficulties for the researcher and animal care committees when addressing and evaluating the risks of capture techniques for arboreal primates.

### *Field experiments*

Field experiments are relatively uncommon in primatology. And yet field experimentation is the gold standard in behavioral ecology research [Cuthill, 1991; Farnsworth & Rosovsky, 1993] and it is not uncommon for primatologists to be told by external reviewers that their research questions cannot be definitively answered via observational methods and should instead be subjected to an experimental test.

Field experimentation when it does occur in primatology, often involves the use of feeding platforms that may vary in locational features [e.g., Stone, 2007] or quantity and types of food [e.g., Janson, 1998, 2007] or provide problem-solving tasks for the animals [e.g., Garber & Brown, 2004, 2006]. The ethical issues that might arise from this research method are similar to those previously discussed under provisioning and habituation. Although experiments using feeding platforms provide a much smaller and more irregular supply of food than does provisioning, an evaluator might ask if such experiments could lead to "human food" problems that need to be considered and minimized.

It is rare for field experimentation in primatology to involve the removal of individuals for considerable lengths of time but when that does occur [e.g., Jolly et al., 2003; Kummer, 1995], it can clearly bring about changes in the remaining animals, such as in their dominance relationships. Most field primatologists would probably agree today that the removal of individuals from their groups for anything longer than a few hours is a fairly invasive protocol that needs to be carefully justified. At the other end of the field experiment spectrum are "playback" protocols during which previously recorded vocalizations are played back to study subjects to assess various cognitive skills such as the ability to discriminate among types of alarm calls or the rank and relatedness of others [e.g., Cheney & Seyfarth, 1990, 2007]. Both Cuthill [1991] and some colleagues with whom I discussed this noted that it is important for playbacks of calls (e.g., alarm calls,

infant distress calls, territorial calls) to be performed at a low frequency over time (e.g., 1/4 the natural rate) and not repeatedly targeted at the same individual. Luckily this is a case where both scientific rigor and ethical considerations lead to minimizing the number of repetitions and thus the risk of habituation to the calls or stress and changes in behavior resulting from the calls. In his review of the ethical implications of field experiments, Cuthill [1991] concluded that it is unlikely playback experiments, properly conducted, cause any lasting changes or raise any serious risks to the well-being of the study subjects.

### **People: Ethical Issues that Arise from Interactions with Other People at or near the Field Site**

Many of my colleagues indicated that they had experienced more moral dilemmas arising from human interactions than ethical issues concerning the animals and research on the animals per se. This is perhaps not surprising since we know that our concern for the welfare and protection of our study subjects and their habitats often competes with human needs, particularly with the needs of local people. Field primatologists often find themselves caught at the four-way intersection of the competing interests of the animals and their environment, the local community and government officials [e.g., Wolfe, 2005]. Many such cases have been described to me.

It is very common for primatologists working in protected areas (parks, reserves, sanctuaries) to see local people performing activities that are illegal according to the laws of the country in which they occur. Illegal activities observed by researchers include hunting (poaching), logging, cutting of brush for firewood/charcoal, gold mining, desecration of archaeological sites and trapping of primates for the pet trade. A few colleagues also told me they had observed other researchers collecting samples illegally. This obviously raises the issue of whether the researcher should report illegal activities they observe and to whom they should report them. If the poaching is occurring via traps or snares, should the researcher dismantle the snares and thus risk alienating the local hunters? It may seem obvious that a researcher should report illegal activities and indeed most of colleagues told me that they had done so, but many field workers live in and/or interact with the local community and will find living with locals difficult after reporting a member of the community to authorities. Researchers are also working in countries where they may not know all the laws and customs pertaining to hunting and logging regulations and where the local people are very poor and may badly need the resources they are illegally removing from protected areas.

Furthermore, the authorities in charge may not wish to, or be able to, enforce the regulations and thus reporting infractions may not only result in tension among all the parties but create or increase local resistance to conservation efforts. Whether or not to report such activities is indeed a quandary for many primatologists.

The pet trade is a painful situation that many primatologists encounter. Capture of nonhuman primates to be kept or sold as pets is illegal in many countries and yet it is widespread. Many colleagues told me they had seen primates illegally kept as pets, or offered for sale as pets. It is widely agreed that researchers should not offer money to a local person in such a case, as that only stimulates the market. The illegally held captive can either be reported to local authorities for confiscation, or in some cases my colleagues have obtained permits and made arrangements to confiscate the animals and transfer them to a sanctuary themselves.

Related to the problem of what to do about illegal activities are the issues that arise when we see locals or tourists or park personnel [or film crews: Pollo et al., 2009] behaving in a way that is detrimental to the animals and their environment. I have been told of many such cases, for example, harassing wildlife (throwing stones, shouting, playing very loud music, unleashing dogs on them) as well as smoking in the forest, attempting to feed the animals, dropping trash, and driving vehicles off-road. In these cases, many colleagues said they attempted to talk to people performing such activities and pointed out why these actions are harmful or they tried to interest the people in actually seeing the wildlife. I once asked a visitor to our park (from the nearby town) why he was throwing bananas at a group of capuchins in a tree and he said he wanted to entice them with food so he could see them better. I loaned him my binoculars and stayed until he had a good look. Other field scientists have told me of similar experiences although it is clear that suggesting to people that they should behave differently has to be handled very diplomatically and that not all such experiences end well. Rather than dealing with such situations only on a case by case basis, many researchers told me that they engage in educational and community activities (e.g., giving talks, leading nature walks, producing brochures and short videos) to help the local people, and the visitors, appreciate the primates and their habitats and to steer them away from harmful behaviors.

Many primatologists work in areas where ecotourism is common and experience ethical issues to do with these tourists. The costs and benefits of ecotourism continue to be hotly debated [e.g., Fennell, 2008; Fuentes, 2004; Goldsmith, 2005; Honey, 2008; Muehlenbein & Ancrenaz, 2009] and are largely beyond the scope of this review. In

addition to the previously discussed problems of visitors "behaving badly", several colleagues mentioned concerns that their trails (cut to facilitate access to their study animals) were then used by tour guides to bring visitors right up to the animals. Indeed, primatologists are occasionally tracked by tour guides with a group of tourists in tow, almost as if the scientist were the focal animal! This clearly raises the issue of whether the primatologist should submit to being followed or should protest. One solution is to maintain hidden entrances to trails and trail systems. Another is to agree to speak with groups of ecotourists about your project but only on your own terms and location.

Another common ethical issue for primatologists concerns our impact on the local economy of the places in which we work. At the very least, we purchase food and supplies and often make choices as to where we buy these items. Many colleagues mentioned that by hiring locals as assistants we change the local economy. Quandaries arise such as how much we should pay and who we should hire. If we pay wages above the local rate, that inevitably leads to jealousy and competition. If we hire only those individuals designated by the village elders we may not end up with the best assistants, but if we make our own independent choices, we may disrupt traditional hierarchies of authority. Is it okay to hire hunters? Is it okay to hire children? Should we try to spread the jobs around as widely as possible or hire only a few? What happens to our assistants when our project is over or the funds run out? It is almost impossible for a primatologist to work in the countries where our study subjects occur without having some effect on the local economy and thus encountering ethical dilemmas.

Economic effects are just one part of the larger issue of how field primatologists meet local community and cultural expectations, some of which may be quite unknown to them at least at the beginning of their projects. Meeting local expectations can include everything from recognizing that one is expected to negotiate research activities with village elders to knowing what is acceptable clothing and behavior [e.g., Mulder & Logson, 1996]. In this respect, primatological field work bears similarities to much of anthropological field work and luckily our socio-cultural colleagues have written a great deal on the difficulties of Western scholars living and working in local communities in developing countries [e.g., Armbruster & Laerke, 2008; Caplan, 2003; Fluehr-Lobban, 2003; Golde, 1986; Rynkiewicz & Spradley, 1976]. The particulars of each situation will be different, but there are some common patterns to the misunderstandings that tend to arise between local communities and visiting researchers and clearly primatologists can learn from the experiences of our predecessors about working in remote areas of tropical countries.

Finally, a few colleagues mentioned safety concerns as one of the risks of field work. There are risks whenever one is working in a remote area away from medical and law enforcement personnel and there are even greater risks in remote areas of foreign countries. One colleague turned in a local person to police after having been robbed, only to see that person being beaten by the police. Another was constantly being asked by locals to share his medical supplies and was concerned about his lack of expertise to dispense pharmaceuticals. Primatologists have been caught in local political unrest and sadly, have occasionally been assaulted and even killed at or near their field sites. Such extremes are obviously not a matter for animal care or ethics forms but the institutions at which we work are concerned about such risks and it is a matter that we should at least discuss among ourselves to develop guidelines for safe practices that may reduce these risks.

### ASKING THE RELEVANT QUESTIONS

What I have tried to do in the preceding sections is to paint a picture of the vast ocean of difference between the lab-centric animal care forms that grew out of the history of concerns for captive animal welfare and the actual ethical issues that primate field researchers commonly experience, most of which are never mentioned on the forms we are currently required to complete. This is not a case of field researchers denying that we confront many moral dilemmas while conducting our work, it is instead quite clearly a case of ships passing in the night.

From Table I, we can see that primatologists agonize at least as much, if not more, over issues that arise from our simple presence in the field and our interactions with local people, as we do over the methods that we employ to collect our data. Given the issues that primatologists say repeatedly arise for them, what would be the relevant questions to address on these forms? I suggest that we can use this self-reported list of issues from field workers to generate the relevant questions. Furthermore, some institutions in the U.S. and Canada have created “field forms” (e.g., McGill, York, Stony Brook, Duke). I have taken the field forms already in existence as well as the most common issues reported to me by my colleagues and drafted a list of what I consider to be the relevant questions for animal care committees to ask field researchers (Appendix B). I have not addressed the issue of how we should define “invasive” (or “levels of invasiveness”) versus “non-invasive” research for field researchers, although most of my colleagues consider non-invasive to mean that the research does not, to our knowledge, distress the animal [and see Goodrowe, 2003; Mulcahy, 2003]. The attached Animal Care Form for Field

Studies is very much a work in progress and I expect that others will propose changes to develop this preliminary document into a more suitable animal care form. But it is a start and it grows from the grassroots of the field experience rather than the top-down of regulatory bodies.

### SUGGESTIONS FOR WAYS TO MOVE FORWARD

One suggestion is that the International Primatological Society and/or the American Society of Primatologists could strike a committee to conduct a wider and more systematic survey of the ethical issues that commonly arise from primate field research. Further to that survey, these committees could develop manuals, codes and guidelines for the most important issues, particularly issues that are seldom dealt with elsewhere, such as how to minimize disease transmission to and from our close relatives, how to balance the needs of the local community against the needs of our study animals and so forth. One topic that is obviously in need of a clear set of guidelines concerns the capture via darting of primates, particularly arboreal primates. Those scientists with a great deal of experience capturing wild primates could develop a set of guidelines that is then regularly updated. (There is an organization based out of Wisconsin that offers short courses on capture of wildlife, including primates, see: [www.safecapture.com](http://www.safecapture.com).)

Primatologists can also join forces with ethologists who study other types of animals in the wild (e.g., mammalogists, zoologists, ecologists and wildlife biologists). That animal behaviorists who research non-primates in nature grapple with similar issues to ours regarding ethical regulation and legislation is very well demonstrated by two recent review articles published back-to-back in *Animal Behaviour* [Barnard, 2007; Cuthill, 2007]. Barnard argues that although everyone who studies the behavior of animals should be concerned on both compassionate and scientific grounds that the animals be treated humanely, the debate between animal scientists and those who would regulate (or possibly abolish) this type of research is becoming “parochialized” in only one section of animal science—that to do with biomedical and commercial research. He further asserts that now is the time to make our voices heard as researchers who study animals to better understand the world around us rather than for utilitarian purposes. Otherwise, as noted by Cuthill [2007], we may become collateral damage in the ever-escalating dispute between the biomedical—pharmaceutical industry and the animal rights groups.

The development and publication of our own field work guidelines would definitely help us to have a common voice on our own ethical issues. But what

about those questions on current animal care forms that appear irrelevant to many primatologists? I should say first of all that a minority opinion among my colleagues is that we should just leave the status quo alone and answer “non-applicable” to as many of the questions on the current forms as the committees will allow us to do. This view suggests it is better to continue going through the exercise of answering irrelevant questions (i.e., “leave bad enough alone”) rather than risk the possibility that a committee made up of non-field workers should learn what the relevant questions really are and then have them try to evaluate our responses on field issues about which they have little experience. A related view is that typical members of animal care committees will not have the expertise to evaluate how we address the human social issues. And almost no one wants to have to receive approval from both animal care AND human ethics committees.

However, we could make widely available to animal care committees the guidelines on these issues that we ourselves (through our professional societies) have developed and the committees could evaluate individual responses from field workers in light of these general guidelines. Furthermore, a number of institutions have now developed, or are in the process of developing animal care forms specifically adapted to field considerations and we could each lobby our individual institutions to do so. Finally, I suggest that we should all be willing to serve on our institution’s animal care committees ourselves and to argue to our institutions and to our funding agencies that these committees should include a field researcher when they are evaluating a field study proposal.

### **The Benefits of Field Primatology Outweigh the Risks**

To end this review on a positive note, I should add that primatologists are also universally convinced that the research they do provides many benefits to the animals, the environment and the local communities; benefits which they are quick to argue, outweigh most risks of harm. The most common benefits they mention are as follows: increased knowledge of the animals leading to better conservation practices; increased awareness and interest among the public in the primates and their environment; training, employment and other economic benefits for local people; and charitable gains for the local community (e.g., facilitation of and donations to ecotourism, schools, medical facilities and other infrastructure). One of my wittier colleagues noted that an added benefit to local people is the entertainment we provide them with our sometimes hapless behavior. Clearly, one of the relevant questions that the animal care forms do typically ask is how the benefits of the proposed

project counterbalance any risks to the parties affected.

### **ACKNOWLEDGMENTS**

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### **Appendix A**

#### **Email Message Sent to Field Primatologists**

Hello \_\_,

I am working on a review of the ethical issues that field primatologists face while conducting their research in host countries and how these issues might be better addressed by the Animal Care application forms that most of us complete for our universities or institutions

Your field work has likely provided you with experience and insights on this topic that would help me move beyond my own perspective. I will be grateful if you would briefly respond to the four questions below and email me your response. I’ll synthesize the replies I receive and will keep individual responses anonymous.

Many thanks for your help.

You can simply insert your answers below each question and then hit the reply key.

Feel free to skip any question you do not wish to answer.

1. What ethical issues have arisen (or could potentially arise) during your field research on primates? A brief listing will be sufficient.
2. Are these ethical issues addressed in the IACUC (Animal Care) forms that you complete for your institution?  
If so, how (by what questions on the form)?  
If not, what questions would address the issues you’ve listed?
3. If applicable, briefly describe an ethical issue you’ve experienced while conducting your field research and how you handled it.
4. What would you say are the benefits and possible negative effects of your field research –to the primates, the environment and the local people? What ways, if any, have you found ways to mitigate the possible negative effects?  
Again, a brief listing will be fine.

**Appendix B****Example Animal Care Form for Field Studies**

- 1) For each type of animal to be studied, provide the genus, species and subspecies names as well as the current IUCN status:

Full Latin Name	Current IUCN Status

- 2) Specify location where the study will take place (name of country, nearest town, and geographic coordinates).

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- 3) Anticipated study start date \_\_\_\_\_ and stop date \_\_\_\_\_
- 4) Has your project been reviewed for scientific merit? If so, by which agency(ies)?
- 5) Is your project being funded by a granting agency? If so, by which agency(ies)?
- 6) Does any element of your project require permits? If so, by which agency(ies)?
- A) If already obtained, provide permit number & attach photocopy.
- B) If not yet obtained, provide copy and date of pending permit application
- 7) List names, contact information and relevant training/experience for all scientifically-trained personnel involved in this research.
- 8) If you will be hiring local personnel in another country, briefly describe how you will locate, choose, pay and train these local assistants.
- 9) Provide a 300 word lay summary of your proposed study, including central research question, objective(s) and general methodology. Use terms understandable to the non-scientist.
- 10) Will your study involve:
- A) any invasive procedure (e.g., capture, handling, marking, blood sampling, provisioning, experimentation)  
Yes \_\_\_\_ No \_\_\_\_
- B) any risk of injury to the research personnel  
Yes \_\_\_\_ No \_\_\_\_
- C) any major stress on the animal  
Yes \_\_\_\_ No \_\_\_\_
- (1) If you answer no to all parts of Q 10, then complete Parts, A,B,C,D of the application
- (2) If you answer yes to any part of Q10, then complete Part E in addition to Parts A,B,C,D.

## Questions for All Field Projects

### Part A. Presence

- 1) What are the possible negative effects (risks) of your simple presence in the field on:
  - A) The behavior, survival and reproduction of the animals you study? (e.g., disease transmission).
  - B) The environment? (e.g., garbage & other human waste, trail cutting)
  - C) The local human community? (e.g., changes to the local economy)
- 2) What measures will you take to mitigate these possible negative effects?

### Part B. Procedures

- 1) List and briefly describe each non-invasive or minimally invasive method you will use to collect data (e.g., habituation, observation, fecal sampling)\*
- 2) What are the possible negative effects (risks) of these methods on:
  - A) the animals you study?
  - B) their environment?
  - C) the local people and the researchers?
- 3) What measures will you take to minimize/mitigate those possible negative effects?

### Part C. Local people

- 1) List and briefly describe any national or regional laws in the country where your research will take place that are pertinent to your field study of primates (e.g., laws pertaining to human/animal interactions, hunting, the pet trade, extraction of resources, etc.)
- 2) List and briefly describe any cultural traditions in the country where you propose to work that are pertinent to your field study of primates.
- 3) What measures will you take to observe those laws and local customs?

### Part D. Benefits

List and briefly describe the likely benefits of your research to the animals studied, the environment and the local community. Provide an argument that the benefits of your proposed research outweigh any risks to the animals, the environment and the local community.

\*Capture, marking, radio-collaring, baiting with food and any other more than minimally invasive procedure should be described in Part E rather than here.

## Part E. Questions for invasive procedures such as capture of wild animals

Answer the following questions if your research involves capture, chemical restraint, handling, marking, and/or placement of radio-telemetry equipment, experimentation or baiting with food.

- 1) If the animals will be captured:
  - A) for what purpose?
  - B) By what means?
  - C) Will chemical restraint be used? If so, what drug & what dosages?
  - D) Will a veterinarian be present? If not, how will you handle medical emergencies?
  - E) Describe the training of all personnel in these capture techniques.
  - F) How long will the animal be held captive?
  - G) Describe procedures for post-capture handling & care
  - H) How will the animal be returned to the wild?
- 2) If the animals will be marked and/or have radio-telemetric devices placed on them, or become subjects of a field experiment and/or baited with food, provide details of all procedures. For each procedure, describe a sequence of events that expresses what you will do and what will happen to the animal(s).
- 3) What measures will you take to minimize pain, stress & short/long term risks (to the animals and the researchers) of the capture, marking and experimental procedures?
- 4) Who at your field site, if anyone, has the authority to decide if an animal should be euthanized? If you have the authority, are there any conditions under which you would terminate the life of an animal? If so, what are these conditions and what method would you use?
- 5) Describe any risks of injury to animals or researchers additional to those described in the prior questions. For each risk, state what measures you will take to minimize it.

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