Animal Advocacy in the Age of Information

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Introduction

It is a very sad thing that nowadays there is so little useless information.
—Oscar Wilde

The Humane Society of the United States (HSUS) began its State of the Animals series in 2001 with the ambitious but necessary objective of evaluating the position of animals in society. Animal advocates no doubt agree about the importance of the goal, but accurately and consistently evaluating such a complex issue requires substantial time and effort. In this chapter I propose to take an important step toward that vision by evaluating the information available to animal advocates about the position of animals in society. The goal is to encourage and assist data collection and the development of information management systems that allow animal advocates to measure the impact of their efforts on society and, most important, on efforts to improve the lives of animals.

Information management involves the collection, creation, storage, distribution, and utilization of data for a specific and defined purpose. It is not simply a database or an intranet and, in fact, does not necessarily involve technology at all, although technology can be instrumental in helping to facilitate the process. Information management systems are critically important both within individual organizations and between groups with similar purposes, such as those working for animal protection. In general, the scope of this chapter pertains to shared information, with some emphasis on data that are relevant to the entire animal protection movement rather than proprietary or relevant to a single organization.

To assist the information management process, I have proposed an overall framework for categorizing and prioritizing information and research for animal-advocacy purposes. The framework includes “research categories” based on the different relationships between animals and humans and several “data types” for each category. I also provide more than fifty references to good sources of information that may be used as starting points for finding relevant data. I’ll use these and other sources to provide an overall assessment of the availability of information by category and data type. Finally, this chapter also includes a set of recommendations for individual groups and the movement overall regarding how to choose research priorities as well as generate and share important information more effectively.

Why Do Animal Advocates Need Research?

Making a significant difference in the lives of animals is predicated on the ability to access and interpret reliable information about how society sees and uses them. Without access to accurate data to determine effective campaign messaging and measure their performance, for instance, animal advocates operate in a virtual vacuum. Perhaps even more important, in most cases animal advocates do not engage in the behavior they are trying to change in other people (the target audience). For this reason and due to other inherent biases, advocates simply cannot rely only on their own perception of why the target audience thinks or behaves the way it does. Similarly, they cannot evaluate their impact on attitudes and behavior using only their hunches and anecdotal evidence. For many it has just been too long since they have walked in the
suede shoes of those they hope will switch to pleather.

Information is the basis of informed decision making. Indeed, no animal protection campaign or project should begin without first identifying and analyzing the available data on the topic or issue and, where the information is not available, collecting new data to support critical decisions. Detailed and reliable data, obtained through research, have played an important role in many successful animal-related projects and campaigns; below are a few examples.

- In New Hampshire P. Marsh, of Solutions to Overpopulation of Pets, collected and analyzed shelter intake and euthanasia data to determine the state’s primary sources of “surplus” animals: low-income residents. Using these data, the group was able to create a publicly funded and highly targeted spay/neuter program for these low-income individuals. Ongoing research and tracking of shelter data indicates that the program led to a 77 percent decline in the state’s euthanasia rate over an eight-year period (Marsh 2005).

- In New York City and Washington, D.C., The Fund for Animals conducted focus groups with fur garment owners and teenage females to test its anti-fur advertising. The qualitative research clearly showed that two of the Fund’s prototype ads—one featuring a rabbit and the other a chinchilla—did not elicit nearly as much sympathy as ads featuring a young bobcat and a fox cub. The results were used to create a more effective campaign with ads in Teen People and Seventeen magazines (Green 2004).

- Ohio-based Stop Animal Exploitation Now (SAEN) conducts detailed audits of the National Institutes of Health (NIH) database to estimate taxpayer funding of animal research. The group says that in 2005 the U.S. government gave $12 billion in funding for animal experimentation, an increase of nearly $7 billion over ten years earlier. SAEN uses the research data to help persuade policy makers that animal experiments are wasteful by combining them with details of duplicative research protocols from the NIH database (Budkie 2005).

These are just a few instances where research-driven data have been instrumental in helping animals. Effective information management can also help animal advocates level the playing field with animal-related industries and corporations, for which “data mining” (involving a detailed quantitative analysis about consumer traits, attitudes, and purchase behaviors) is all the rage. Advocates may not have resources comparable to corporations’ to devote to information management, but in this area a small investment can reap significant rewards. In most cases it is inexpensive (although perhaps time-consuming) to collect and analyze all of the publicly available data on an issue. When animal advocates need to collect primary data because there is little or no existing research, a host of inexpensive and do-it-yourself research methods can often be used.

**Knowing What Animal Advocates Need to Know**

The breadth of information that is potentially useful to animal advocates is nearly overwhelming. It includes various types of animal demographic and “usage” data, “public opinion” data, consumer behavior research, economic data, and so on. Advocates need all of these data and more for the full range of animal protection issues, including primarily companion animals, farmed animals, research, and wild and exotic animals. Any system designed to manage the information must be comprehensive (or nearly so) regarding the types of data and animal issues covered and organized in mutually exclusive categories.

Prioritization of the most necessary and practical information is essential. For some animal protection issues, there are very few data (e.g., the number of actual vegetarians and their motives), and it is necessary to carefully pick and choose the most strategic areas for conducting new research. For other animal issues, advocates have access to significant information (e.g., demographics of companion animal “ownership”), in which case the priority may be to figure out where to begin analyzing and interpreting the data. Once the initial framework is developed (see the next section), an information management system can help animal advocates understand and keep track of which data are known (and which aren’t). In all cases animal advocates’ knowledge is much improved by having a continuous historical perspective, so data collection must also be an ongoing effort.

**A Proposed Framework for Animal-Related Data**

Information is a source of learning. Unless it is organized, processed, and available to the right people in a format for decision making, however, it is a burden, not a benefit (Pollard 2000).

A framework for organizing information of value to animal advocates must be comprehensive, but it must also be as pragmatic and useful as possible. In this chapter, I recommend two general bases for data classification: (1)
research categories and (2) data types; these are described in detail in the following sections. I also briefly discuss the most likely sources of information for each data type. The framework I suggest in this chapter is intentionally oversimplified to meet the goals of practicality and comprehensiveness, but it has the potential for significantly more detail. In the future the framework can be defined in much more granular terms, including multiple subcategories for each research category and subtypes for each data type. See the next section for selected highlights by research category and data type (Table 1).

**Primary Research Categories**

Because the eventual goal is to be able to evaluate the position of (non-human) animals in (human) society, my primary basis for organizing information is the type of relationship between animal and human. Non-human animals are “used” by humans in countless ways, but most of these interactions fall within a few defined categories: animals as companions, animals as food and fiber (“farmed animals”), animals used for research, and wild and exotic animals used for entertainment and exhibition purposes. Animals who do not clearly fit into one of these topical areas can be classified as “other animals” for the sake of simplicity (examples are given below). Finally, a research category of significance to all animal advocates is, of course, information about themselves and the impact that animal advocacy is having on society’s attitudes and behavior toward animals.

**Companion Animals**

For the purposes of this discussion, the term “companion animals” includes any animal whose primary “purpose” for humans is deemed to be companionship. In the United States, this research category primarily includes dogs and cats kept as pets simply because they represent the majority of such individuals in this country. However, the category also includes other companion animals, such as birds, horses, rabbits, turtles, snakes, etc. The basis for this category is companionship between animal and human rather than species, but, of course, this does not necessarily mean the relationship is a positive one for the animal. Animals typically considered companions who are abused, neglected, or otherwise not truly considered “companions” by their owners are still treated as such for categorization purposes. However, some issues bridge this category and others, such as pets collected by “Class B” dealers (so categorized by the U.S. Department of Agriculture, or USDA, in the federal Animal Welfare Act as individuals who negotiate or arrange for the purchase, sale, or transport of animals in commerce), who then sell them to research laboratories.

**Farmed Animals**

The term “farmed animals” includes any animal raised and/or killed to produce food or fiber (e.g., clothing) for humans. Animals slaughtered for food in both industrial and small establishments comprise the majority of animals in this category, with chickens, in turn, making up the vast majority of animals slaughtered. Fish (and crustaceans), historically composed of predominantly wild animals caught in oceans, lakes, and streams, are now increasingly being farmed for food as ocean fish are dwindling in number. I also include fish caught in the wild in this category because the purpose is food production, including wild fish who are used primarily to feed farmed fish. Wild fish are increasingly being caught and killed using industrial fishing techniques (e.g., gillnets and driftnets). Farmed animals also include those who are kept in various degrees of confinement to produce items for human consumption, including hens’ eggs and cows’ milk. Finally, this category also includes animals farmed for “fiber” or textile purposes, such as ranch-raised foxes and mink who are killed for their fur coats, farmed sheep sheared for their wool, and cows used to produce leather.

**Research Animals**

The term “research animals” is used for brevity and is not meant to diminish the intrinsic value of animals kept in laboratories and subjected to experiments. This category includes any animal used for experimentation, involving medical products or procedures, household products, cosmetics, toxins and poisons, for behavior response re-

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**Table 1**

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<th>Research Categories</th>
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<td>Companion animals</td>
<td>Animal demographics and usage data</td>
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<td>Farmed animals</td>
<td>Attitudes/behavior about issues/advocates</td>
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<td>Research animals</td>
<td>Economic and financial support data</td>
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search, and in the classroom for dissection purposes. The majority of research animals in the United States are mice, rats, birds, or primates, but this category includes a great diversity of species used for experiments. Research animals, such as the beagle puppies used as test subjects (still fairly common) may sometimes overlap with other categories. Beagles in the United States are common pets, but for our purposes they are considered research animals. Similarly, animals experimented on for specific purposes, such as university-managed groups of farmed pigs, are also considered research animals because that is primarily how they are being used in this instance.

Wild and Exotic Animals
“Wild and exotic animals” include those who are used in circuses, rodeos, zoos, marine mammal parks, etc., as well as those who are hunted, trapped, or killed for “recreation” or as part of “resource management” policies. This category is unique in that some wild animals, including many endangered and threatened species, do not interact directly with humans and, therefore, do not have a relationship with them. However, these animals are clearly affected adversely by human activities through habitat loss and other circumstances, and they continue to be of significant concern to animal and environmental advocates. One of the more difficult classifications using this simple framework involves exotic animals kept as companions. This chapter considers these animals to be companion animals despite the fact that in most cases they are not domesticated. However, this classification—like all others presented in this chapter—is open to debate among those who are interested in further developing the information framework.

Other Animals and Animals in General
“Other animals” is simply a catchall research category for animal-human relationships that do not clearly fall into the more specific research categories described above. For instance, horses used in circuses may be included in this category because they would likely not be considered “wild” or “exotic,” and they are typically not used for companionship as well as performances. Opinion data referring to all animals in general, such as “How important to you is the humane treatment of animals,” where the species or type of relationship is not mentioned, would be included here. Although the vast majority of animal interactions with human beings can be described by the previous categories, an “other” category is necessary for the information framework to be comprehensive.

Animal Advocacy
Often overlooked or deprioritized among animal advocates is research about the animal-advocacy movement, organizations, and individual advocates. This research category includes any individual or group working for the protection of animals, including those focused on single species of animals or the most egregious forms of cruelty, as well as those elevating the status of all animals. It also includes local companion animal shelters and rescue groups as well as a growing number of animal sanctuaries for farmed animals and other species. Advocates often describe themselves as the “voice” of animals in human society. Research data about the animal-advocacy movement help to understand how strong that voice really is and how well various target audiences hear it. If information about animal advocacy is produced, shared, and used collaboratively among animal advocates, it will create a strong footing on which to build movement-wide strategies that allow advocates to leverage their collective impact and measure their effectiveness.

Primary Data Types
Organizing data according to the animal-issue categories just described is an obvious starting point for animal advocates, but they should also seek out and track different types of data. The informational framework I provide groups data into three broad categories: (1) animal usage and demographics; (2) attitudes and behavior regarding issues and advocates; and (3) economic and financial support data. Additionally, a truly comprehensive understanding of the impact of animal protection efforts on the status of animals in human society requires pulling together data from very diverse sources, such as industries, governments, academic institutions, and fellow advocates. In general, animal advocates need to base their knowledge management on the most reliable data currently available and develop new sources of information whenever possible.

Animal Usage and Demographics Data
Perhaps the most important numerical measure of the position of animals in society is the number of animals who suffer and are killed for human purposes, what we call “usage data.” Usage data covers a broad range of different types of information relating to the various animal protection issues or research categories described previously. For instance, companion animal “usage” includes the numbers of animals in homes as well as dogs born in puppy mills. Farmed animal usage data include the number of cows slaughtered to produce beef as well the number of hens kept in constant confinement to produce eggs. Consistently collecting, tracking, and analyzing animal usage data—for all animals
and over the long term—is an essential component of measuring the animal protection movement’s success. More examples of usage data are provided later.

It is useful to have a more detailed breakdown of which animals are used, what methods are used to house and “process” them, and other data. For example, among companion animals it is important to know how many are females and how many have been spayed or neutered. With these numbers one can better understand the breeding potential of animals in homes (and shelters) and their contribution to companion animal overpopulation. For farmed animals it is important to know how many animals are housed using different types of confinement systems, such as hens kept in “battery” cages, those in open barns, and those housed outdoors. Ideally, it is also helpful to have data organized by animal demographic groupings, including species, age, gender, etc.

In general, animal usage data are most accurately tracked by the animal use industries, as well as national and local governments, but the data are often imperfect for animal protection purposes. For instance, the most complete data covering farmed animals slaughtered in the United States are provided by USDA. USDA quantifies the number of animals living on farms and slaughtered in department inspected facilities, but the data are less than optimal for animal advocates.

The primary objective for most animal-advocacy campaigns and programs is to effect some sort of behavior change in the target audience, such as encouraging people to neuter companion animals or become vegetarians. “Consumer behaviors” include the full range of actions, inactions, and reactions of a target group or individual, but for current purposes the term must be defined broadly. In the United States, the vast majority of people “consume” animals in some way—either directly by owning, eating, or wearing them, or indirectly by purchasing products derived from animals, tested on animals, etc. Other types of behaviors relevant to animal advocacy may be less “consumer” oriented, such as the voting patterns of citizens and policymakers, the decisions of corporate executives, and the tactics of fellow animal advocates.

Because nearly all elements of U.S. society “consume” animals in some way, it may be tempting for animal advocates to think of their target audience as the “general public.” Data measuring the behavior of the public as a whole are important for long-term tracking of the animal protection movement’s impact on consumer choices. From an advocacy standpoint, however, the ill-defined and amorphous “public” is not an actionable target audience (Bishop 2004). Behavior research in support of effective animal advocacy is therefore most valuable when it relates to a specific target audience, such as high school students or state legislators. Only by narrowing or “segmenting” their target audience will animal advocates be able to significantly affect and measure changes in consumer behavior. Despite the ubiquity of animal consumption in the United States and elsewhere, animal advocacy will not be effective using “mass marketing” techniques (those that involve trying to sell the same concept to all or most of the population, typically through mass media.)

It is also critically important for animal advocates to accurately measure and completely understand the attitudes and opinions of those whom they are trying to change. Conducting attitudinal research is vital, because animal advocates simply cannot trust their own attitudes or opinions as proxies of how the target audience thinks and feels. Except in rare circumstances, they are not the people they are trying to persuade to adopt new attitudes or behavior. Animal advocates can certainly learn from their own experiences and changes in attitudes toward animals, but in general they represent a very small group of “innovators” of these opinions. Innovators, according to the “diffusions of innovation theory,” are the first 2.5 percent of a population to adopt a new concept or idea (Rogers 1962). However, the interests and motivations that persuade the rest of the population to be more compassionate toward animals may be very different from those that persuaded animal advocates as innovators. For this reason an increasing number of animal protection groups are conducting outside opinion research to support their campaigns and programs.

Reliable consumer behavior and opinion data are generally fairly sparse for most of the research categories or issues described previously, making this an essential
area of research for animal advocates in the future. In the short term, some opinion and behavior data are available for certain animal issues from industry, academic, and some animal-advocacy sources. For instance, the American Pet Products Manufacturers Association (APPMA) produces the annual National Pet Owners Survey, which details the behavior of dog and cat “owners” (e.g., if they have spayed or neutered their animals) as well as owners of other companion animals. Academic journals with a focus on social science often provide behavioral research that may be directly applicable or analogous to social marketing challenges in animal advocacy. However, there is generally very little attitude or behavior research relative to the overall importance of consumer behavior and its impact on animals.

**Economic and Financial Support Data**

Similar to industry- and government-based animal usage data, the financial success and impact of various companies and industries can be an important measure for animal advocates. In the United States, all publicly held companies are required to file quarterly and annual financial reports with the U.S. Securities and Exchange Commission (SEC) that show their financial health in a sometimes ambiguous, but relatively consistent manner. This information may be particularly useful when combined with a long-term corporate campaign, for instance, to measure the financial impact of boycotts and similar efforts, learn about parent-subsidiary corporate relationships, and/or identify which specific units of a company are performing well or doing poorly. The data may also be combined with government financial data (e.g., the Agricultural Marketing Service agency of USDA) to consistently track the overall financial health of industries that use animals.

It should be noted that, although one can learn much from industry and government economic data, significant expertise is typically required to analyze and make sense of the data. With such expertise, however, economic data can be put to very effective use. Financial data can be used proactively or reactively, such as to dismantle the economic arguments that industries use to oppose legislative or other limitations on their practices to improve animal welfare. For example, some farm industry trade groups allege that millions of dollars would be lost if legislation were to be passed requiring animal husbandry improvements, but such claims are often based on specious data. Economic data can be used to assess and correct these claims and to make independent claims about the potential financial benefits of improving conditions for animals. More examples appear later in this chapter.

Equally important as measuring the opposition’s financial health and economic claims is tracking and analyzing public and private financial support for the animal protection movement. Knowing if these sources of funding are rising or falling over time is an important indicator of support from the public and other areas. It is also necessary to understand the level of “working capital” available to the animal protection movement, the growth of which is essential to animal advocates’ success. In the United States, where capitalism is dominant and influence is often bought and sold at both the federal and state levels, animal advocates are small fish, indeed. Knowing where financial support for animal protection is coming from and how to increase that support requires access to reliable data, something that many larger organizations already do with their direct mail programs. Sharing non-sensitive financial data among organizations can also help animal advocates begin to understand the movement’s economics at a macro level.

**Other Data Types**

Animal advocates must acknowledge that the framework just described is not exhaustive—although it strives to be as comprehensive as possible—and that judgments are necessary for some types of information. For instance, academic research about the emotions and cognitive abilities of animals can help make the case to consumers, legislators, and others that animals are worthy of consideration. Such research does not fit cleanly into this framework, although it could be considered a component of or extension to animal demographic and usage data. There are other exceptions as well. If this general framework is to be used to develop a common information management system for the animal protection movement, the research categories and data types should be defined in significantly more detail. Any such system should be flexible enough to allow for new categories and data types to be added and modified as the information evolves.

**State of the Data: What We Know**

*Our knowledge is the amassed thought and experience of innumerable minds.*

—Ralph Waldo Emerson

It would be impossible to cover all of the existing data that are relevant to animal advocates or that fit into the informational framework described previously. We cannot be certain that we are aware of all existing research kept by individual organizations, corporations, etc. Indeed, it is very likely that significantly more relevant research exists, but the information may be inaccessible to the broader movement for any number of reasons.
That said, however, the assessment of available data and examples provided in this chapter stem from five years of work, including data collection, organization, and analysis across all of the research categories and data types presented. The overall assessment of available information by research category and many of the sources are based in part on a review of approximately three hundred references, including primarily consumer behavior and opinion data (Humane Research Council [HRC] n.d.). This experience and access to research data suggest that the information currently available to animal advocates is at the same time overwhelming and inadequate. The data are overwhelming in the sense that the amount of raw or unanalyzed information is plentiful for many research topics. However, the information is often unreliable or outdated, and much of it is impractical for animal-advocacy purposes. The availability of reliable and useful information is therefore generally inadequate for most research areas of interest to animal advocates. Of course, the amount of available data varies significantly by research category. There is a large amount of data for some research categories described previously, while information is sparse or nonexistent for others. Table 2 provides a rough assessment of the currently available information organized according to the framework from the previous section.

### Relative Availability and Quality of Data by Topic and Type

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<th>Animal Demographics and Usage Data</th>
<th>Attitude and Consumer Behavior Data</th>
<th>Financial and Economic Data</th>
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**Symbols:**

- § = Significant data available
- $ = Moderate data available
- e = Little or no data available

### Companion Animals

Companion animals, as a topic of research, have received more attention than any of the other research categories included in this analysis. The historical focus of the animal protection movement, particularly at the local level, has been the care and well-being of companion animals. On a national level, numerous organizations focus on companion animal issues such as pet overpopulation. At least one U.S.-based institution—the National Council on Pet Population Study and Policy—focuses exclusively on data collection for companion animals. The council’s primary goal is “to serve as a national collection point for gathering and evaluating available pet population data and relevant materials” ([http://www.petpopulation.org](http://www.petpopulation.org), n.p.). These and other sources of information can be extremely valuable when developing campaigns to protect companion animals. However, although there is more research on this issue than for some other research categories, crucial gaps remain in the available information. I examine more closely these gaps and the types of data that are most needed for more effective animal advocacy.

### Relative Availability and Quality of Data by Topic and Type

I’ll now take a closer look at evaluating the information available to animal advocates for each of the research categories and data types shown in Table 2. I cover a handful of sources for each, and I shall try to include those that I consider exemplary of the type of research that is most needed for effective animal advocacy. My purpose is not to provide a “data dump,” but rather to demonstrate how some of the more reliable data currently available fit into the research framework I have described. The sources listed may serve as a useful starting point to locate further information by topic, and I provide references and Internet links whenever they are available.

### Demographic and Usage Data

Basic demographic information for companion animals in households (e.g., number of pets in the United States, species or breed, etc.) is generally available from a variety of sources. However, many of the best sources of data are industry-based, and the research is motivated at least in part by the desire to sell pet-related products. The data from these studies are typically restricted (or available only at a significant cost), and in many cases they are too general for advocacy purposes. More specific usage data, such as the population and demographics of shelter animals, are less available. Nonetheless, animal advocates should make every
effort to analyze all available research and to generate new research where necessary in support of campaign and program development. Below are three good examples of companion animal demographic and usage research currently available.

- **U.S. Pet Ownership and Demographics Sourcebook** (American Veterinary Medical Association [AVMA] 2002). This study focused on veterinary issues, based on a survey of fifty-four thousand U.S. households, is described by the AVMA as “the largest, most statistically accurate and complete survey of the pet owning public and pet population demographics.”

- “Characteristics of Shelter-Relinquished Animals and Their Owners Compared with Animals and Their Owners in U.S. Pet- Owning Households,” by John C. New, Jr. (2000). This in-depth study included interviews with people who relinquished animals at twelve shelters in four U.S. regions and a national survey; it found that people relinquishing animals to shelters were more likely to be men and under age thirty-five.

- **The Shelter Statistics Survey 1999–1997** (National Council on Pet Population Study and Policy 2004–2006). This survey of about a thousand shelters and sheltering organizations provides detailed “usage” data regarding the sources and types of “surplus” companion animals in U.S. shelters, although the data may be too outdated to reflect current information about companion animal usage.

**Attitudes and Consumer Behavior Data**
Attitudinal and consumer behavior data relating to companion animals are more complex and multifaceted than are basic demographic and usage data. Although a reasonable amount of research is available, the findings are often too general (i.e., “public opinion”) or otherwise insufficient for companion animal advocates. Similar to demographic data, many of the best sources of companion animal attitudinal and behavior research are industry-based. However, an increasing number of animal protection groups are exploring these issues through surveys, interviews, focus groups, etc., and some third-party researchers occasionally release useful data into the public domain. Below are a few examples.

- **State of the American Pet** (Purina Corporation 2001). Survey of U.S. dog and cat owners “to determine their knowledge, attitudes and behaviors regarding pet health issues.” Strong emphasis on specific health matters, but the results also include some demographic data on companion animals and their owners.

- **Cat Owner Study** (The Humane Society of the United States 2001a). Explores behavioral differences between owners who keep cats indoors and those who keep them outdoors, including motivations for and barriers to persuading owners to keep cats indoors.

- **The Gallup Poll** (Gallup Organization 1990). Available from the Roper Center’s iPoll database. Comprehensive (but outdated) study that identifies owners’ reasons for having companion animals, the sources from which they obtained them, including “a pet shop, a professional breeder, an animal shelter, (and) was he/she a stray that just appeared,” and also covering a wide range of related behavior.

**Financial and Economic Data**
Companion animal advocates in general may be less interested in the financial and economic drivers of pet “usage,” but for some programs and campaigns, the data are essential. For instance, trend data regarding the sales and profits of “puppy mills” can help advocates understand the impact of their efforts against such operations and in favor of adopting rescued animals. Other industry-based financial data are also potentially helpful to advocates, such as the sales (in units or dollars or both) of choke collars for dogs. Perhaps more important to advocates is research about trends and sources of financial support for companion animal programs, including donations to nonprofit groups for that purpose. Although this information exists within many individual organizations for their own programs and donor bases, there are very few sources of research covering the economics of companion animal advocacy in general. Here are a few examples of financial research for companion animal issues.

- **National Pet Owners Survey** (American Pet Products Manufacturers Association 2005–2006). This biannual survey from the pet products industry details the purchase habits, sources of ownership, and “lifestyle and media habits” of pet owners. Although financially focused, the study is also a fairly reliable source for companion animal and owner demographic data.

- **Public Funding for Spay/Neuter** (St. Arnaud n.d.). Although not a data-driven study, this document describes public funding for spay/neuter programs and includes financial details of several model programs located throughout the United States. It also provides one specific example of an analysis of companion animal-related information from a financial perspective.

- **“An Interactive Model of Human and Companion Animal Dynamics: The Ecology and Economics of Dog Overpopulation and the Human Cost of
Addressing the Problem.” This technical paper provides a model to understand the dynamics of dog overpopulation and various efforts to reduce euthanasia of dogs in shelters. The economic analysis found that “a ‘no-kill’ society is an achievable goal at an acceptable human cost” (Frank 2004, n.p.).

**Farmed Animals**

The data available for farmed animals are relatively limited compared to those available for companion animals, in part because farmed animals are a more recent focus for the animal protection movement. The availability of data differs by specific topic, however, such as animals who are raised for their fur versus those who are raised for food. In the United States, animals farmed for food account for roughly 98 percent of the animals “consumed” each year; the availability of reliable data, however, is inadequate relative to the importance of the issue. This is particularly true for attitudinal and consumer behavior research about farmed animals (and related issues like vegetarianism and veganism), although a significant number of farmed animal “usage” data are available from the U.S. government. Some research is also available from farming-related industries and their trade associations, but these groups, like many others that use animals for profit, appear to be increasingly protecting information for fear that it may be used against them by animal advocates, the media, etc.

**Demographic and Usage Data**

USDA and its various research agencies are the primary source of farmed animal usage data because they require information from companies under their purview, which includes most animal farming and related businesses in the United States. However, because USDA is primarily charged with conducting food safety inspections and helping farmers market their products, the data may be less useful to animal advocates. For instance, although USDA accurately and consistently tracks farmed animal usage and slaughter data, details about the demographics, living conditions, and welfare of farmed animals are much less common. In other cases, government reports euphemize the treatment and killing of animals, using terms like “disposition” that may be confusing for advocates. Some usage data for farmed animals are available from the farming industries themselves, but typically the information is less detailed than are government data. Below are a few examples of available usage data covering farmed animals.

- NASS Publications and Databases, USDA/National Agricultural Statistics Service (NASS). NASS is the USDA agency primarily responsible for collecting and publishing farmed animal data and statistics. Usage and slaughter data are typically available by month, year, etc., and for most U.S. states. In some cases, the data are raw or presented in a less useful format for animal advocates, such as slaughter data for farmed fish, which are provided in pounds. [http://www.nass.usda.gov/Data_and_Statistics/index.asp](http://www.nass.usda.gov/Data_and_Statistics/index.asp).
- FAOSTAT and ProdSTAT Databases, United Nations Food and Agriculture Organization (FAO). The FAO provides a comprehensive database similar to NASS, but for all countries in the world; however, not all countries report all farmed animal data every year or in a consistent manner. The FAO databases are still an excellent resource for international farmed animal campaigns. [http://faostat.fao.org/site/568/default.aspx](http://faostat.fao.org/site/568/default.aspx).
- Animal Death Statistics Report (FARM 2004). The U.S.-based farmed animal advocacy group FARM periodically analyzes and publishes data from NASS. “The 2004 report, which covers data for all ‘land-based’ animals, is one of the most comprehensive resources available from an animal advocacy source.
- Commercial Slaughter Statistics (Compassion over Killing [COK] 2005). Similar to the FARM report described above, COK regularly summarizes the “commercial slaughter” of all land-based farmed animals in the United States, most recently in 2005. COK also provides direct links to USDA source documents for “livestock” and poultry slaughter statistics.

**Attitudes and Consumer Behavior Data**

Unlike usage data, information about people’s attitudes toward farmed animals and related consumer behaviors, such as vegetarianism and meat reduction, is actually quite sparse. However, a growing focus among animal advocates on farmed animals and increasing concern about farmed animal welfare among consumers is creating more interest in such research. Attitudinal and behavioral data are typically not available from animal use industries, given the potentially sensitive nature of such research regarding their practices and image in general. However, good sources of such information may include academic research studies, third-party research organizations, and, occasionally, data from government agencies. Another good source of attitude and behavior data may be other animal advocates who have conducted their own research on farmed animals and are willing to share the information. Here are a few examples of good data and other resources covering...
attitudes and behaviors relating to farmed animals.

- Farm Animal Welfare Concerns: Consumers, Retailers and Producers, Welfare Quality Project (European Union [EU] 2005). The Welfare Quality research does not include the United States, but it does represent one of the most comprehensive analyses of attitudes toward farmed animals ever conducted. The research covers detailed opinions from consumers, retailers, and producers about each species of farmed animal, for each EU country and in aggregate.

- “Pennsylvanian Voters Support Effort to Outlaw ‘Foie Gras,’” Farm Sanctuary (2006). This media release includes results from a survey of likely voters in Pennsylvania gauging attitudes toward a possible ban on the sale of foie gras (the livers of force-fed ducks and geese), that found that 80 percent of the state’s voters agreed with such a ban. http://www.farmsanctuary.org/media/pr_Pa_FG.htm.

- Vegetarianism in the United States (HRC 2005). This report provides a meta-analysis of publicly available quantitative data estimating the number of adult meat reducers, semivegetarians, vegetarians, and vegans in the United States; it also includes new findings from a national HRC study conducted in 2005. The report is available to animal and vegetarian advocates by request.

- Knowledge of and Attitudes toward Factory Farmed Animals (The Humane Society of the United States 1999). This qualitative study explored awareness of and attitudes toward factory farms, the humane treatment of farmed animals, and related issues among U.S. residents ages 25–55. Although the report is somewhat outdated, the qualitative information may still be useful for factory farming campaigns.

### Financial and Economic Data

The primary sources of financial and economic data regarding farmed animals are essentially the same as the sources of usage data—government agencies and, occasionally, advocates or animal-farming industries. Economic information covering overall farmed animal industries is typically unavailable (or very expensive), although financial data for publicly owned companies are available through the SEC. Below are several examples of research covering farmed animal economic and financial data.

- ERS Publications and Databases (USDA/Economic Research Service [ERS] n.d.). ERS is the USDA agency primarily responsible for collecting and publishing economic and trade research about farmed animals. The data include industry- and “commodity”-level economic information for domestic U.S. markets and international farmed animal trade partners.

- 2006 Annual Financial Report (Tyson Foods, Inc. 2006). Tyson Foods, a publicly held (New York Stock Exchange symbol: TSN) U.S. company, is the largest farmed animal slaughterer in the world; detailed annual and quarterly financial reports are available from the SEC.

- Feeding the Factory Farm: Implicit Subsidies to the Broiler Chicken Industry (Global Development and Environment Institute, Tufts University 2006). This research paper provides an in-depth analysis of government financial data relating to farmed animal operations, in this case implicit subsidies paid to companies that breed and slaughter “broiler” chickens.

- AMS Publications (USDA/Agricultural Marketing Service [AMS] n.d.). AMS is the USDA agency primarily responsible for carrying out domestic and international research and promotional efforts for U.S. agricultural producers, including animal farmers. AMS provides data by “commodity,” including separate categories for dairy, poultry, and “livestock.”

### Research Animals

For several reasons there is significantly less information available about animals used for research and experimentation than there is for most other research categories. Using animals for medical, cosmetics, and household product research is a primarily institutional activity conducted by governments, universities, and company laboratories. However, because U.S. laws regulating animal research do not cover mice, rats, and birds (the vast majority of research subjects), detailed usage data are typically not available for most of the animals who fall within this category. Because animal research is not directly a consumer issue (although it is indirectly; for instance, buying behaviors relating to “cruelty-free” products), the industry that drives it is generally less interested in the attitudes of consumers or in sharing its opinion research publicly. Some exceptions include data from animal protection and/or biomedical trade groups and, occasionally, third-party research organizations.

### Demographic and Usage Data

Because the U.S. government regulates the use of research animals and is a primary source of funding for animal research, it is also the primary source of related information. However, government sources do not represent all animal research occurring in the United States, and they are often limited in the amount of detail they pro-
provide. As a result reliable data regarding the number of animals used for experimentation in the United States are very limited, and basic information, such as age, gender, and species of research animals, is generally unavailable. Detailed information about the number of animals currently kept in laboratories, how long they have been there, and the specific protocols to which they are subjected is also quite rare except when government reporting requires disclosure. Below are a few examples of the available research.

- Computer Retrieval of Information on Scientific Projects (CRISP), National Institutes of Health (NIH). http://crisp.cit.nih.gov/. Updated weekly, CRISP is a “searchable database of federally funded biomedical research projects conducted at universities, hospitals, and other research institutions.” It includes research animal usage data and government grant information for all research projects funded by CRISP.

- Research Animal Publications, USDA/Animal Welfare Information Center (AWIC). (http://awic.nal.usda.gov/). AWIC is the USDA agency primarily responsible for publishing welfare-related information for animals who are covered under the Animal Welfare Act. The data available are very limited, however, and most animals used for research (including rats, mice, and birds) are not covered.

- 2002 Animals Used in Research (Stop Animal Exploitation Now 2002). This collection of statistics includes data from USDA for all major species of research animals covered under the Animal Welfare Act (excluding the majority of research animals: mice, rats, and birds).

**Attitudes and Consumer Behavior Data**

Unlike basic usage and demographic information, research about public attitudes toward the use of animals in research is available, although much of it is general and/or outdated. In the United States, animal research was a subject of significant controversy, hence the greater media and public attention in the 1980s and into the 1990s. The result is a fairly significant number of attitudinal data available from mostly academic and other relatively neutral third-party sources. However, the data are often too general (e.g., “public” attitudes) to be of much practical value for animal advocates. Below are just a few examples of the publicly available attitudinal data for this research category.

- Public Attitudes toward Animal Research: Some International Comparisons (Chicago Academy of Sciences 1994) covers basic attitudes toward animal research from residents in fifteen countries and includes differences by nationality, gender, and general scientific knowledge or literacy.

- Identifying Attitudes Related to Animal Testing in the United States (Coalition for Consumer Information on Cosmetics 1996). This somewhat outdated study of about a thousand U.S. adults compares attitudes and likely purchase behavior for cosmetic and household products tested on or sourced from animals with products not tested on animals. http://www.leapingbunny.org/pollresults.htm.

- Personality Differences between Pro- and Anti-Vivisectionists (Broida et al. 1993). This older study examined attitudinal differences between pro- and anti-vivisectionists using standard personality tests and a separate survey of opinions about animal research. Broida et al. were able to describe several correlations, including that supporters of animal research are “more likely to be male, masculine, conservative, and less empathic than those opposed to it” (Broida et al. 1993, 129–144).

- General Social Survey (GSS), National Opinion Research Council (NORC), multiple survey waves since 1972. The GSS is described as being second only to the U.S. census regarding social and attitudinal information about U.S. residents. Two past waves of the survey (1993 and 1994) asked about attitudes toward animal research, but attitudes toward other issues are not addressed, and the information may be less valuable with the passage of time. http://www.norc.org/projects/gsoc1.asp.

**Financial and Economic Data**

As with farmed animal data, the sources of financial and economic information for research animals are primarily government agencies and advocates as well as academic groups. In general, however, economic data about the use of research animals are very limited except for disclosures of the use of public funds, such as through the NIH CRISP system mentioned earlier. Financial data are available for publicly owned companies involved in animal research, but rarely is such research the company’s sole business, so relevant data may be difficult to sort out. Below are examples of research covering economic and financial data relating to animal research.

- Extramural Data and Award Trends, National Institutes of Health (updated regularly). This resource provides detailed federal grant award data, including current and long-term trends for average grant size, sources of funding, and type of...

- An Audit of the 2005 National Institutes of Health Funding of Animal Experimentation (Budkie 2005). This report provides a detailed assessment of data from the NIH CRISP database to estimate taxpayer funding of animal research and demonstrate that significant money goes to funding duplicative research. http://www.allcreatures.org/saen/articles-rep-anex2006.html.


Wild and Exotic Animals
This category includes animals who are hunted, trapped, used in circuses and rodeos, exhibited in zoos, etc., as well as animals in the wild who may not interact directly with people but are affected by human activities. The research covering wild and exotic animals come from a range of diverse sources, but the information available is fairly limited. There is a sizable body of academic research covering wildlife science, but the kind of usage, attitudinal, and economic data discussed here are relatively hard to find for wild animals and those exhibited for “entertainment” purposes.

Demographic and Usage Data
Reliable demographic and usage data for wildlife in general are essentially nonexistent except in cases where species are threatened or are approaching extinction or where specific issues have been researched. Although there is currently no single source of accurate estimates of animals living in the wild, or on the disappearance of wildlife due to human activities, there are some government and academic sources covering endangered species. For wild or exotic animals kept captive in zoos, aquariums, circuses, rodeos, and similar facilities or exhibits, few data are generally available. USDA is the regulatory entity charged with enforcing laws to protect animals in captivity and on exhibit, along with self-regulation by those involved in specialized trade associations. However, none of these sources provides detailed or comprehensive information about the number of animals kept in zoos, circuses, etc. Below are a few of the available sources of wild and exotic animal “usage” research.

- U.S. Trapping Statistics, Animal Protection Institute (API) (data are from 1986–2003). API contacted U.S. state wildlife agencies and collected data about the numbers of wild animals who are trapped in each state, then combined those findings to estimate the overall number of animals trapped in the United States, by species. http://www.bancrueltraps.com/b3_stats.php.

- Threatened and Endangered Animals Species System (TESS), U.S. Fish and Wildlife Service (FWS) (updated annually). The TESS database tracks the number of animal species currently listed by the U.S. government as threatened or endangered, but it does not include specific estimates for any wild animal populations. http://ecos.fws.gov/tess_public/Boxscore.do.

- Number of Specimens in AZA Accredited Institutions (American Zoo and Aquarium Association 2005). The primary industry trade organization for major U.S.-based zoos and aquariums conducts an annual membership survey to estimate the number of animals who are held captive in AZA-accredited facilities. However, this and most other sources do not cover the many nonaccredited “roadside zoos” and similar animal exhibits in the United States. http://www.aza.org/Newsroom/CurrentStatistics/..

- International Species Information System (ISIS) (2006). ISIS is an international nonprofit project whose primary goal is creating software to track and share demographic data for animals kept in zoos and aquariums worldwide. According to its website, “The ISIS central database contains information on 2 million animals held in zoological institutions, and some animals in the wild.” https://app.isis.org/abstracts/abs.asp.

Attitudes and Consumer Behavior Data
The availability of attitudinal and behavioral research about wild and exotic animals is highly dependent on the specific topic of interest. There is a moderate amount of research conducted about attitudes toward wildlife in general and in specific situations (e.g., “management” of Alaskan wolf populations), mostly from academic sources. Public opinion polls commissioned by animal protection groups or third-party research organizations occasionally address attitudes about the use of animals in zoos and circuses, but these studies are rare. Behavioral data such as details about the number and types of people attending zoos and circuses, and how those behaviors have changed over time are not generally available. Below are examples of publicly available attitudinal data on wild and exotic animals.

- Natural Resources and Outdoor Recreation Research, Responsive Management, Inc. (RMI). RMI is a U.S. company that works
mostly with federal agencies, state departments, trade groups, and corporations involved in activities such as hunting, fishing, and trapping, as well as outdoor recreational activities. RMI provides a wealth of research data on its website; however, only some of the data are released, often painting a picture of public opinion or behavior that is of interest to RMI’s clients. http://responsivemanagement.com/.

• **Roadside Wildlife Study** (The Humane Society of the United States 2001b). This study evaluates the perceived importance of highway-related wildlife mortality among licensed drivers, including possible ways to influence drivers’ behaviors to protect wildlife from vehicle collisions.

• **Attitudes and Values of Wildlife User Groups** (Cornell University, Human Dimensions Research Unit, Department of Natural Resources). The Cornell University’s Department of Natural Resources currently makes available more than fifty mostly academic studies on wildlife-related issues dating back to 1978; most are available for free or for the cost of printing. http://www.dnr.cornell.edu/hrdpubs/wildattp.htm.

• **Attitudes, Knowledge, and Behaviors toward Wildlife as Affected by Gender** (Kellert and Berry 1978). This very outdated study covers the differences between female and male attitudes and behavior toward wildlife, including activities such as hunting and fishing. http://www.wildlife.org/publications/index.cfm?name=bulletin.

### Financial and Economic Data

Given the lack of demographic and usage data for wild and exotic animals described previously, it stands to reason that financial and economic data for wildlife are similarly limited. This is attributable in part to the fact that wildlife-related industries are small compared to most other animal use industries. There is less publicly available information about their activities. The same is true of animals used in circuses, rodeos, and other exhibits, in part because these niche industries are already under significant scrutiny from animal advocates. Zoos and aquariums may be an exception, however, because they are often managed by or in partnership with local municipalities, an arrangement that in many cases involves more stringent financial reporting requirements. Below are a few related examples.

• **Evaluating the Economic Impact of a Dove Season in Michigan** (Garlit and Fearing 2006). This report rebuts arguments that reinstating the mourning dove hunting season in Michigan would be a boon to the local economy, concluding instead that the new season may negatively affect state revenue due to increased management costs and decreased income from non-hunting outdoor activities. http://www.stopshootingdoves.org/files/MI_Mourning_Dove_Econ_Paper_062006.pdf.

• **“Single-Species versus Multiple-Species Models: The Economic Implications”** (Fleming and Alexander 2003). This fairly technical journal article expands on the traditionally used single-species model of conservational economics to consider multiple species and, in doing so, shows that the single-species model undervalues the economic implications of other species for an overall ecosystem.

• **“Ex Post Economic Analysis of Reproduction-Monitoring and Predator-Removal Variables Associated with Protection of the Endangered California Least Tern”** (Shwiff et al. 2005). This provides a detailed analysis of the effects of changes in public funding for the protection of the endangered California least tern. The article shows that increased public funding does have a significant impact, with greater effects from reproduction monitoring than “predator control.” http://www.aphis.usda.gov/ws/nwr/docs/05pubs/shwiff051.pdf.

### Animal Advocacy

Having a separate research category for “animal advocacy” underscores the importance for advocates to evaluate data about their own actions and effectiveness, not just data about the animals they are trying to protect. The effectiveness of the animal protection movement can be measured in countless ways, and there is no doubt some disagreement about the relative importance of different metrics such as generating awareness versus changing behaviors. However, most animal advocates agree that they generally need more information to better evaluate their efforts and understand the impact they are having on the status of animals in society. A diversity of data about animal advocacy is potentially useful to the advocates themselves, including “usage” data (e.g., total membership numbers), attitudinal data (e.g., respect for advocates), behavior data (e.g., total volunteer hours), and financial data (e.g., total donations over time). More examples follow.

### Demographic and Usage Data

My application of “demographic and usage data” throughout this chapter does not easily translate to animal advocacy as a research topic. However, information about civic engagement or membership in animal
protection organizations and about animal advocates in general may be considered a part of this category. Such information is not generally available, but potentially useful data include estimates of the total number of animal advocates in the United States and a detailed breakdown of advocates’ demographics (e.g., age, gender, education level, income, etc.). It behooves animal advocates to understand the breadth and depth of their own ranks and to evaluate their “recruitment” efforts over time. Below are a few examples of such research, but the lack of recent and actionable data in general indicates just how little research has been conducted on this topic.

- “Caring about Blood, Flesh, and Pain: Women’s Standing in the Animal Protection Movement” (Munro 2001). This article includes a review of previous surveys of animal advocates to identify differences by gender and to describe any divergence or convergence of the relationship between gender and likelihood of being an animal advocate.

- Civic Involvement Survey, American Association of Retired Persons (AARP) (1996). This somewhat outdated AARP study included a single question about respondents’ self-reported membership in “environmental or animal protection groups,” with 13 percent replying “yes.” The sample included fifteen hundred respondents, divided evenly between those over age fifty and those under age fifty. [Link](http://www.ropercenter.uconn.edu/ipoll.html).

- Membership of U.S. Adults in Animal and Environmental Organizations (Kellert and Berry 1981) (data are from 1976). This study is outdated but provides an overview of membership in animal protection organizations from several studies before 1976.

**Attitudes and Consumer Behavior Data**

The attitudes and behavior that are relevant to animal advocacy include the opinions and actions of advocates themselves as well as the attitudes and actions of target audiences toward such advocates. Research describing the opinions of animal advocates is fairly uncommon, partly because it is difficult to obtain a representative sample of such a small group of people spread throughout the United States. However, there is an increasing focus among animal-advocacy groups and others on the “public opinion” of the animal protection movement, including feelings about specific tactics and the overall respect for or credibility of advocates. Research can also provide useful data about the level of general interest in volunteering for animal protection organizations, or an estimate of the actual number of hours volunteered over a given period. Below are several examples of relevant sources of attitudinal and behavioral data.

- *Humanitarian Youth Culture Study* (Label Networks 2006). This recent study of U.S. youths ages 13–24 asked about their interest in volunteering for national nonprofit organizations, including People for the Ethical Treatment of Animals (found to be the number one choice among youths of all U.S. nonprofit organizations) and “the humane society” as possible answers. [Link](http://69.93.14.237/humanitarian-study-2006.cfm).

- *The Kindness Index* (Best Friends Animal Society 2006). The Best Friends annual survey is primarily a measure of attitudes toward animal-related policies among U.S. voters but also includes several direct questions about attitudes toward the animal protection movement and efforts to prevent harm and cruelty toward animals. [Link](http://network.bestfriends.org/Campaigns/BFDay/KindnessIndex.aspx).

- The Gallup Poll (Gallup Organization 2000). Available from the Roper Center’s iPoll database, the Gallup Poll occasionally includes animal-related questions; in this case the poll asked about respondents’ support for the goals of various social justice movements, including the “animal rights movement.” Seventy-two percent said they agreed with its goals, and 25 percent said they disagreed.

- *Attitudes and Dispositional Optimism of Animal Rights Demonstrators* (Galvin and Herzog 1998). This small-scale and slightly outdated study measured the attitudes of activists attending the 1996 march for the animals in Washington, D.C., including their opinions about the goals of the animal rights movement and “optimism” about achieving those goals. [Link](http://psyeta.org/sa/sa6.1/GALVIN.html).

**Financial and Economic Data**

Financial data of relevance to animal advocates include donations and other monetary gifts to animal protection groups, which provide the working capital for the animal protection movement. Such data are generally available for major U.S. nonprofit organizations due to the federal government’s requirements for financial disclosure. However, in-depth analyses of the existing data have been relatively infrequent, and in general there is little sense of the long-term trends in donations and other forms of contributions to animal protection efforts. Other relevant data include the funding available to organiza-
tions established to oppose animal protection efforts, such as the many industry trade groups that work to discredit animal advocates. Below are two examples of financial data of relevance to animal advocacy.

- Distribution of Foundation Grants by Subject Categories (Foundation Center n.d.). Multiple years available. The Foundation Center regularly studies U.S. giving patterns and offers summaries of research results online, including a breakout of “animals and wildlife.” Animal advocates may be most interested in the Foundation Giving Trends report (see the “Gain Knowledge/Research Studies” section) or the general grants statistic page.

- Giving and Volunteering in the United States 2001 (Independent Sector 2001). This report provides a comprehensive review of donations and volunteerism in the United States, but the free summary available online includes only generalized data and does not break out animal protection as a separate category.

**Research Road Map: What We Need to Know**

*To know, is to know that you know nothing. That is the meaning of true knowledge.*

—Confucius

Most of the data available about animal protection issues are produced by nonadvocacy sources, typically industries, governments, and academic institutions. However, a growing number of animal-advocacy groups are collecting and using their own data through both primary research and in-depth analysis of secondary data. Much of the research conducted by animal advocates is considered sensitive or proprietary, as one might expect given that it typically focuses on the activities or programs of a single organization. Although that trend will likely continue, a handful of collaborative research projects in their early stages may serve as possible models for sharing information. For now, however, there is no movement-wide research strategy, and developing a “road map” for all animal-advocacy research is essentially a new concept. Developing such a road map for the entire movement is perhaps an overly ambitious goal, but here I take some early steps by making recommendations about the types of information that individual groups and the movement in general should prioritize.

The needs of independent animal protection groups are different from those of the overall movement, and the research recommendations for each are unique as well. Below I offer several general guidelines that may be helpful to individual animal-advocacy projects while acknowledging that research priorities are unique for each situation. I also provide suggestions for movement-wide research priorities and recommendations for increasing collaboration among animal advocates and democratizing access to important information. Most important, when choosing research (and campaign) priorities, animal advocates need to maintain focus on the bottom line, which is changing behavior and attitudes to benefit animals. In all cases, data collection should be in support of this goal, including identifying where it is possible to create such change and how to go about doing so most effectively. Animal advocates are best served by recognizing the importance of accurate and reliable information when planning and executing their campaigns. But I do acknowledge that advocates must also choose research priorities judiciously by investing in information that directly supports the most important campaign decisions.

**Research Priorities for Organizations**

The most valuable data for animal advocates generally involve information that supports specific decisions about particular issues or campaigns. Similarly, most of the research conducted for advocacy purposes will be for specific organizations and/or oriented around particular campaigns or programs. The suggested “research road map” discussed in this section will be different for every individual animal protection organization, because every group has unique campaigns and, therefore, unique informational requirements. It is impossible to define the research priorities of individual groups without a lengthy and involved process, and I will not attempt to do so here. However, the following five general principles may provide guidance to animal advocates regarding how to use research and information management most effectively for their individual campaigns and programs.

1. **Include research early in the planning process.**

   Whether an organization’s campaign planning process is formal or informal, it is important to consider research priorities as early as possible. Research is almost always recommended as the first stage of any major planning process, including the initial stage, to decide which campaigns warrant major investment. For instance, a community-based spay/neuter program should make every effort to collect intake and adoption data from local shelters before beginning its program so that it can begin to understand the data’s impact versus the baseline. Similarly,
program designed to increase vegetarianism among college students should begin by seeking out all available information about how many students are currently vegetarian, how many are interested in vegetarianism, etc. Effective campaign planning and evaluation are driven by access to reliable information, and animal-advocacy organizations should consider their research needs as a first step in the planning process.

2. Identify and set clear research needs and objectives.
When incorporating their informational needs into campaign and program planning, animal advocates must set very clear research objectives to help distinguish between needs and desires. For the curious advocate, there is no shortage of potentially interesting research questions for every animal protection issue and research category discussed here. But not all of this information is relevant to the decisions that are critical to the campaign’s success, and the challenge is to identify and prioritize the most important research needs. One useful approach is “backward marketing research,” which involves identifying a project’s desired outcomes and impact and then working backward to identify the research that will be needed to achieve and measure that impact (Andreasen 2002). Whatever technique is used, animal advocates must identify the information that is most critical to the success of each campaign and then prioritize collecting that data first and foremost.

3. Begin by examining secondary research.
It is important to begin every research project with an examination of all available information on the topic at hand. This may include a quick overview of the publicly available data or, in some cases, purchasing existing research reports created by companies, third-party research organizations, etc. There are several excellent sources of publicly available opinion data, for instance, including the Roper Center for Public Opinion Research’s iPOLL database. iPOLL contains nearly a half-million questions asked in public opinion surveys dating back to 1937 and offers free results on a limited basis to trial users (for more information, see http://www.ropercenter.uconn.edu/ipoll.html). Another source specific to animal issues and including mostly attitudinal and behavioral research is the HRC database, with references and brief descriptions of about three hundred separate studies (http://member.humanresearch.org/db.php). Although existing information and research data are generally fairly sparse for animal protection issues, a focused effort to seek out available information almost invariably yields at least some results. This secondary research can have a marked impact on improving early campaign planning decisions and increasing overall effectiveness.

4. Make a proportional investment in primary research.
For many situations involving animal-advocacy campaigns, the available secondary data are too limited or outdated to support the decisions that need to be made. When the investment of time and money in the campaign is substantial, animal advocates should consider conducting primary research. Making a “proportional” investment in research simply means ensuring that the focus on data collection and evaluation is commensurate with the importance of the campaign. For small projects or campaigns, secondary research may be sufficient, or advocates can use do-it-yourself research techniques. For large projects, such as ballot initiatives or advertising campaigns that may involve thousands of hours and millions of dollars, primary research is almost always warranted. In these cases the use of an outside research consultant usually makes sense because of the expertise he or she brings to a project. Nonprofit organizations are naturally more frugal, but among for-profit corporations it’s not unusual to spend 10–20 percent of a total project budget on preliminary research and follow-up evaluations.

5. Conduct regular evaluations of research efforts.
Just as animal advocates should continually evaluate the effectiveness of their campaign and program activities, they should also evaluate the impact of their research efforts. Data collection and analysis are potentially useful tools for every stage of a project, from planning through execution and including evaluation. But research itself, like time and money spent directly on campaigns, should be demonstrated to have a reasonable return on investment. By auditing their research activities and regularly updating their research plans, animal advocates can achieve a much better understanding of their overall efforts. More generally, animal-advocacy groups should take a holistic approach to information management within their organizations, so that answers to important research questions are available when needed. For instance, many larger animal protection groups use intranets to communicate with employees and share information. However, there is significant room for improvement to realize the full potential of these technical tools to develop research systems that are accessible to decision makers, employees, volunteers, and other stakeholders.
Research Priorities for the Movement

Suggesting research priorities for the overall animal protection movement is ambitious and requires addressing potentially uncomfortable questions about the movement’s campaign priorities. For instance, applying a proportional sense of utilitarianism would suggest that animal advocates focus almost exclusively on those animals who are dying and suffering in the greatest numbers. In the United States (and globally), this would clearly mean a focus on farmed animals, especially chickens and other poultry. However, the animal protection movement generally is not guided by utilitarian principles. And if advocates are to become more utilitarian, as I suggest, then animal advocates must also face other challenges, including how they define and measure animal suffering and how they evaluate the impact of their advocacy efforts.

Research priorities for the animal protection movement must be not only utilitarian but also focused on data that support achievable goals with a reasonably high chance of success. For example, efforts to ban relatively infrequent types of animal abuse, such as cockfighting or “canned” hunts, have been successful in most states and generally have strong public support. Research in these areas can help identify ways to continue the existing momentum to marginalize the most egregious types of animal abuse. In general, many different campaigns and issues can benefit from more effective research. Information management for the animal-advocacy movement can be used to help improve existing campaigns and priorities and help identify effective advocacy strategies for the future. However, all animal-advocacy efforts, including research, must be planned and prioritized according to the likely benefit to animals to ensure that animal advocates are investing their time, energy, and financial resources appropriately.

Data collection for the overall movement is, of course, different from data collection for individual animal-advocacy organizations. While the overall focus should still be on research that is actionable, there is also a need for the movement to collect “baseline” information for all of the categories and data types discussed previously. Such information may not be immediately useful for individual groups, but collecting it is nonetheless essential to the success of the animal protection movement. Moreover, for each of the various types of baseline data mentioned in this section, it is valuable for advocates to have as much historical and/or trend data as possible. Achieving widespread consideration of animals in public discourse and policy will be a long process. Animal advocates must take a similarly long-term view by making it a priority to collect and analyze longitudinal data to identify important changes and trends. In many cases, where advocates are essentially starting from scratch, this means first identifying the most important measures of long-term success for organizations and the overall movement.

Once the most important metrics are identified, advocates must commit to initiating new research that may involve many decades of data collection and analysis to evaluate long-term changes in animal usage, attitudes, behavior, etc. Of course, this is not an easy undertaking, but by establishing baseline data for the most important and actionable animal protection issues, advocates can become much more effective. Furthermore, if organizations also focus on centralizing the creation and maintenance of this baseline information, animal advocates can also begin to work from the same “playbook” and create unified, research-driven strategies to measure and improve animal advocates effectiveness. Collecting and sharing this baseline data can potentially serve as a model for collaborative information management. The following is a short list of recommended priorities for the types of baseline data that should be collected, shared, and regularly updated.

Animal Usage and Demographic Data

Baseline data are needed for all of the animal protection issues or research categories described earlier. Whenever the data are available, all baseline usage research should be broken down by species, gender, and age of the animal. The most important baseline data will be unique for each research category, but several common areas are recommended as key priorities, including: (1) number of animals “used” (e.g., in shelters, on farms, in laboratories, in zoos, etc.); (2) number of animals killed (e.g., euthanized, slaughtered, etc.); and (3) the types of conditions in which the animals are kept (e.g., isolated versus group housing; various degrees of confinement, types of experiments performed, etc.).

Attitude and Behavior Data

Collecting baseline attitudinal and, especially, behavioral research is one of the relatively few times when it makes sense to survey the general public. Although attitudes can be vague and/or defined amorphously over time, behavior lends itself to establishing baselines because it can be measured more consistently. My key recommendations include: (1) perceived importance of animal protection relative to other issues (e.g., civil rights, economic conditions, etc.); (2) perceived credibility of and respect for animal advocates; (3) number of people engaging in animal-related actions or behavior (e.g., “owning” animals as pets, eating
animal products, becoming vegetarians, volunteering, voting on animal issues, etc.); and (4) the demographics, motivations, and other details of people engaging in those actions.

**Economic and Financial Data**

Baseline financial data that are of most value to animal advocates are probably those that describe financial support for the movement, although the economic performance of animal use industries is also of interest. Following are my recommended research priorities for collecting baseline financial data: (1) total donations to animal protection groups and causes (currently measured, but only in aggregate and by outside sources); (2) where available, a detailed breakdown of financial support by source and by animal issue supported; and (3) financial performance of the primary companies and industries that use animals (e.g., income of the largest animal farms, research laboratories, pet stores, etc.).

Collecting baseline data such as those just described should be a top priority for the overall animal protection movement, but more targeted “above-baseline” data are equally as or even more important. Because such above-baseline data are generally unique for each research category and data type discussed in this chapter, there are truly an overwhelming number of potential research priorities. The solution, as mentioned earlier, is to narrow the focus of one’s research (and overall advocacy efforts) to understand a specific issue or target audience and to yield actionable information that helps produce the greatest impact for animals. While these things are often difficult for animal advocates to determine in advance, a systematic approach to research and strategic planning can help them decide what information is most valuable for their campaign. In this section, I take a similar but broader approach to recommending above-baseline research priorities for the overall animal protection movement, by research category.

The majority of research conducted for animal-advocacy purposes is and should be on behalf of specific organizations or campaigns, because such data are typically the most actionable. The specific research priorities for individual organizations and their unique campaigns are probably best left to the campaign managers and issue experts to determine. However, my experience collecting and analyzing data for all of the research categories described previously suggests a list of potential research priorities for each category and data type. Tables 3, 4, and 5 include my overall recommended research priorities using the same framework discussed throughout this chapter. While I feel that these recommendations are important by themselves, I provide them also because they serve as examples of the types of information that should be considered and prioritized by animal advocates.

Note that I have intentionally kept the recommendations to a handful for each research category and data type due to space limitations. However, there are certainly other data that would be valuable for animal-advocacy purposes. Also note that, although the recommended priorities are described in general terms, such information is most helpful to advocates when focused by issue, audience, etc. My presumption is that most of the recommendations that follow will be specific to a target audience, community, issue, or tactic, but data collected at the national level may also be useful to advocates.

**Collaborative Information Management**

Throughout this chapter I have urged animal advocates to consider data collection and information management to be key priorities for their projects, organizations, and the movement overall. To achieve this, however, animal advocates must also find ways to share results with the broader animal protection community. Simply sharing and organizing the information currently held by individual groups would dramatically increase access to data that most organizations currently do not even know exist. Sharing research data is particularly important for nonprofit organizations and social movements, where valuable information can be leveraged for the benefit of the movement overall, in addition to individual campaigns. Similarly, the financial constraints faced by animal advocates clearly dictate that they need to avoid duplicating research efforts whenever possible. Currently there is no mechanism in place to know what data have already been collected by other organizations.

In addition to sharing existing sources of information with each other, animal advocates should also work to collaborate more frequently and more effectively on generating new research data. Collaboration makes good financial sense, of course, but it also has the effect of helping to identify mutual interests and opportunities to work together on campaigns and programs. By literally buying into syndicated research projects (where multiple groups join together on a single research study and share the findings), animal-advocacy groups can save significant money. But they also often achieve a common understanding of the research topic and how to make effective use of the informa-
tion to improve conditions for animals. In most cases centralizing research data and investing in syndicated studies will probably be driven by the larger and better-funded animal protection organizations. Those groups should be strongly encouraged to share their research data with the entire animal-advocacy community and invest in new research with the intent of making it generally available to fellow advocates.

To facilitate sharing information and developing collaborative research projects, animal advocates should also invest in centralized information systems that provide access to important data. As stated earlier, there is no single road map or research strategy for the animal protection movement. Similarly, there are no central information repositories that include data of relevance or value to animal-advocacy work, although some groups are making efforts in this area. Organizations like the HRC and others are purposefully building collections of research data and other information, but these efforts are somewhat limited compared to the immense task at hand. A centralized information management system for storing and making accessible data from multiple groups would need to be well planned and executed. Technically, however, such a system is fairly easy to achieve.

The bigger question is whether animal-advocacy groups (and their supporters) understand and acknowledge the importance of reliable information enough to invest time and money to create and maintain such a system. Following are a few specific recommendations that animal advocates should consider to more effectively collaborate on research projects and share important data.

### Establish research working groups.
Animal advocates should begin by working together to identify the most important informational needs of the overall animal protection movement and agree on priorities. One idea to facilitate collaboration is to establish “working groups” for each animal issue to identify mutual research priorities and methods of funding and collecting the most essential information. These research working groups would need to include research specialists, topical experts, and a diverse group of animal advocates representing the various elements of the movement (e.g., both national and local or grass-roots organizations).

### Conduct syndicated studies.
Whenever it makes sense to do so, animal advocates should collaborate on data collection and

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**Table 3**

**Usage and Demographics Research Priorities, by Category**

<table>
<thead>
<tr>
<th>Research Category</th>
<th>Recommended Research Priorities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Companion animals</strong></td>
<td>• Number of animals currently in shelters, nationally and by community</td>
</tr>
<tr>
<td></td>
<td>• Number of adoptions by shelter and for target communities</td>
</tr>
<tr>
<td></td>
<td>• Number of healthy and adoptable animals euthanized</td>
</tr>
<tr>
<td></td>
<td>• Number of animals spayed/neutered, nationally and by community</td>
</tr>
<tr>
<td></td>
<td>• Primary sources of unwanted and “surplus” animals</td>
</tr>
<tr>
<td><strong>Farmed animals</strong></td>
<td>• Number of animals slaughtered and/or kept confined on farms</td>
</tr>
<tr>
<td></td>
<td>• Number of farms and types of operations, such as family vs. corporate</td>
</tr>
<tr>
<td></td>
<td>• Number of animal deaths resulting from diseases, transport, etc.</td>
</tr>
<tr>
<td></td>
<td>• Living conditions, such as type of housing, group or individual, etc.</td>
</tr>
<tr>
<td></td>
<td>• Slaughter conditions, including handling and stunning processes</td>
</tr>
<tr>
<td><strong>Research animals</strong></td>
<td>• Number of animals in laboratories, by species (including mice, rats, and birds)</td>
</tr>
<tr>
<td></td>
<td>• Number of companies and institutions currently testing on animals</td>
</tr>
<tr>
<td></td>
<td>• Types of experiments or protocols most frequently conducted</td>
</tr>
<tr>
<td></td>
<td>• Living conditions such as type of housing, group or individual, etc.</td>
</tr>
<tr>
<td></td>
<td>• Types of purposes or end products driving animal research</td>
</tr>
<tr>
<td><strong>Wild and exotic animals</strong></td>
<td>• Numbers of animals in zoos, circuses, rodeos, and other exhibits</td>
</tr>
<tr>
<td></td>
<td>• Conditions for exhibited animals, such as housing, travel schedules, etc.</td>
</tr>
<tr>
<td></td>
<td>• Numbers and species of animals trapped, hunted, fished, etc.</td>
</tr>
<tr>
<td></td>
<td>• Specifications regarding types of traps used, forms of hunting, etc.</td>
</tr>
<tr>
<td><strong>Animal advocacy</strong></td>
<td>• Number of current members of animal protection groups</td>
</tr>
<tr>
<td></td>
<td>• Number of current animal advocates, actual and self-reported</td>
</tr>
<tr>
<td></td>
<td>• Analyses of the demographics of members and advocates vs. overall population</td>
</tr>
<tr>
<td></td>
<td>• Analyses of time allocated to different animal protection issues</td>
</tr>
</tbody>
</table>

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**Animal Advocacy in the Age of Information**
analysis. The benefits of forming research syndicates (groups of organizations with similar objectives) are many, but they include primarily cost savings and greater unity. Identifying the critical research areas and highest priorities for syndicated studies could be the responsibility of the research working groups just described. Syndicated research ideas could be generated by the working groups and posted for comments and/or commitments of funding from other advocates.

- **Centralize data storage and sharing.** There are opportunities to improve information management within every animal-advocacy organization and within the overall animal protection movement. Within organizations sharing information this may be as simple as printing a list of the data and research studies available to employees or building an intranet research database. For the overall movement, deciding what information is included in such a database and who receives access to it may be more difficult to determine. Nonetheless, greater sharing of information is essential to fully leverage the impact for the benefit of animals. Ideally, this would include investing in the technology needed to centralize storage of and access to relevant data and a willingness among organizations to share their information with like-minded groups.

## Summary and Conclusions

Knowing a great deal is not the same as being smart; intelligence is not information alone but also judgment.

### Table 4

<table>
<thead>
<tr>
<th>Research Category</th>
<th>Recommended Research Priorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companion animals</td>
<td>• Number of people adopting vs. purchasing companion animals</td>
</tr>
<tr>
<td></td>
<td>• Number of people who have spayed/neutered their animals</td>
</tr>
<tr>
<td></td>
<td>• Motivations and barriers to adopting vs. purchasing animals</td>
</tr>
<tr>
<td></td>
<td>• Motivations for and causes of relinquishing animals to shelters</td>
</tr>
<tr>
<td></td>
<td>• Motivations for and barriers to having animals spayed/neutered</td>
</tr>
<tr>
<td>Farmed animals</td>
<td>• Awareness of farmed animal treatment, exemption from laws, etc.</td>
</tr>
<tr>
<td></td>
<td>• Motivations for and barriers to greater concern for farmed animals</td>
</tr>
<tr>
<td></td>
<td>• Number of people consuming animal-free foods and clothes</td>
</tr>
<tr>
<td></td>
<td>• Motivations for and barriers to choosing animal-free foods and clothes</td>
</tr>
<tr>
<td></td>
<td>• Willingness of consumers to pay more for less inhumane food products</td>
</tr>
<tr>
<td></td>
<td>• Willingness of farmers to implement less inhumane systems</td>
</tr>
<tr>
<td>Research animals</td>
<td>• Awareness of research animal treatment, exemption from laws, etc.</td>
</tr>
<tr>
<td></td>
<td>• Motivations for and barriers to greater concern for research animals</td>
</tr>
<tr>
<td></td>
<td>• Motivations for and barriers to choosing cruelty-free products</td>
</tr>
<tr>
<td></td>
<td>• Number of people buying cruelty-free cosmetic and household products</td>
</tr>
<tr>
<td></td>
<td>• Willingness of researchers to use non-animal alternatives</td>
</tr>
<tr>
<td></td>
<td>• Willingness of policymakers to mandate use of non-animal alternatives</td>
</tr>
<tr>
<td>Wild and exotic animals</td>
<td>• Awareness of conditions for animals in circuses, zoos, etc.</td>
</tr>
<tr>
<td></td>
<td>• Number of people who attend zoos, circuses, rodeos, and other exhibits</td>
</tr>
<tr>
<td></td>
<td>• Number of people who participate in fishing, hunting, trapping, etc.</td>
</tr>
<tr>
<td></td>
<td>• Motivations for and barriers to engaging in activities that affect wild animals</td>
</tr>
<tr>
<td></td>
<td>• Willingness of consumers to choose alternatives, such as animal-free circuses</td>
</tr>
<tr>
<td>Animal advocacy</td>
<td>• Awareness of animal-advocacy organizations and their efforts</td>
</tr>
<tr>
<td></td>
<td>• Identification of the most/least supportive groups within the population</td>
</tr>
<tr>
<td></td>
<td>• Perceived credibility of and respect for animal advocates</td>
</tr>
<tr>
<td></td>
<td>• Motivations for and barriers to giving to or volunteering for animal groups</td>
</tr>
<tr>
<td></td>
<td>• Motivations and attitudes of animal advocates and their supporters</td>
</tr>
</tbody>
</table>
ment, the manner in which information is collected and used.

—Carl Sagan

Animal advocates can apply to animal-related information management the old environmental activist slogan, “think globally, act locally.” By thinking globally, animal advocates will learn to develop campaigns in the context of more and better information and to base research priorities on the needs of the entire movement. Thinking globally also involves prioritizing the collection of baseline and long-term data, as discussed earlier in the chapter. By acting locally, on the other hand, animal advocates will also base their research priorities and advocacy efforts on the specific issue and/or target audience that yields the most benefit for animals. Baseline data are essential for providing context, but the most useful and actionable data are localized to the needs of a specific program or campaign.

For many animal protection campaigns and for the movement in general, information is underused despite its importance for evaluating effectiveness and understanding the influence of other factors on the status and well-being of animals. The bottom line is that access to accurate and reliable information is essential for advocates to produce effective campaigns that achieve real change for animals. It is not enough just to know a great deal: animal advocates must also be smart and use good judgment when seeking out and applying that knowledge.

### General Resources, Databases, and Publications


#### Table 5

**Economic and Financial Research Priorities, by Category**

<table>
<thead>
<tr>
<th>Research Category</th>
<th>Recommended Research Priorities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companion animals</td>
<td>• Financial income and health of pet industries, breeders, stores, etc.</td>
</tr>
<tr>
<td></td>
<td>• Money spent on companion animals, including health expenditures</td>
</tr>
<tr>
<td></td>
<td>• Donations to companion animal groups and related issues</td>
</tr>
<tr>
<td></td>
<td>• Analyses of the impact of reducing overpopulation on local economies</td>
</tr>
<tr>
<td></td>
<td>• Analyses of different economic models for companion animal programs</td>
</tr>
<tr>
<td>Farmed animals</td>
<td>• Financial income and health of animal-farming industries, companies, etc.</td>
</tr>
<tr>
<td></td>
<td>• Money spent on vegan, vegetarian, and less inhumane animal products</td>
</tr>
<tr>
<td></td>
<td>• Money spent on most inhumane products, such as veal or foie gras</td>
</tr>
<tr>
<td></td>
<td>• Donations to farmed animal and vegetarian groups and related issues</td>
</tr>
<tr>
<td></td>
<td>• Analyses of the economic consequences of industrialized animal farming</td>
</tr>
<tr>
<td></td>
<td>• Analyses of government subsidies and international trade data</td>
</tr>
<tr>
<td>Research animals</td>
<td>• Financial income and health of companies involved in animal research</td>
</tr>
<tr>
<td></td>
<td>• Money spent on cruelty-free products compared with alternatives</td>
</tr>
<tr>
<td></td>
<td>• Donations to anti-vivisection groups and related issues</td>
</tr>
<tr>
<td></td>
<td>• Analyses of public and private funding for animal research</td>
</tr>
<tr>
<td></td>
<td>• Analyses of financial gains or losses using non-animal alternatives</td>
</tr>
<tr>
<td>Wild and exotic animals</td>
<td>• Financial health of industries related to hunting, fishing, zoos, circuses, etc.</td>
</tr>
<tr>
<td></td>
<td>• Money spent on alternatives (e.g., non-animal circuses, wildlife watching)</td>
</tr>
<tr>
<td></td>
<td>• Donations to wild and exotic animal groups and related issues</td>
</tr>
<tr>
<td></td>
<td>• Analyses of the economic impact of limiting hunting and other activities</td>
</tr>
<tr>
<td>Animal advocacy</td>
<td>• Total financial support or “working capital” available to advocates</td>
</tr>
<tr>
<td></td>
<td>• Funding available to “opposition” groups, such as trade associations</td>
</tr>
<tr>
<td></td>
<td>• Analyses of public and private funding for animal protection efforts</td>
</tr>
<tr>
<td></td>
<td>• Analyses of the money allocated to various animal protection issues</td>
</tr>
<tr>
<td></td>
<td>• Analyses to rebut the economic arguments of animal use industries</td>
</tr>
</tbody>
</table>


**Literature Cited**


The Case Against Dog Breed Discrimination by Homeowners’ Insurance Companies

Larry Cunningham

This essay was originally published in the Connecticut Insurance Law Journal (Vol. 11, No. 1, 2004–2005). The views expressed in this essay are the author’s own.

In spring 2003 I moved from Virginia to Texas to begin work as a tenure-track faculty member at Texas Tech University School of Law. I brought my two dogs with me: Saffy (a four-year-old mixed breed whose parents were a fluffy red Chow Chow and a big black Labrador retriever) and Semona (a two-year-old rotweiler). Neither Semona nor Saffy has ever bitten anyone. Neither has shown any aggressive tendencies. Both are extremely playful and friendly animals.

After I placed a bid on a house in Lubbock, Texas, I began the search for homeowners’ insurance—a process that I thought would be straightforward and easy. Much to my surprise, dozens of insurance companies denied my application outright. The reason? Semona is a rottweiler and Saffy is half-Chow. Rottweilers and Chow Chows are on the “blacklist” of dog breeds. Some insurance companies believe they, along with pit bulls, huskies, Doberman pinchers, and other specified breeds, are more likely to bite humans and, in turn, cause liability claims to be brought against their owners. Even mixed breeds, like my half-Chow, Saffy, are blacklisted. This practice is known by many dog owners as “breed discrimination.”

Thankfully, the story ended happily for my dogs and me. After weeks of calling nearly every insurance agent in Lubbock, I was able to obtain insurance through the Texas Farm Bureau, an organization that advocates for farmers and farming issues. Had it not been for the Farm Bureau, I would have found myself on the horns of a horrible dilemma: whether to buy a home or give up my dogs. Anyone who knows me can confirm that this dilemma would have been easy to resolve: I would have chosen my furry family members over home ownership. Sadly, however, many Americans are finding themselves in similar positions and are opting to give up their dogs to animal shelters.

Breed discrimination by insurance companies is on the rise in the United States. Insurers are refusing to write homeowners’ policies for people who own breeds that the insurance industry considers to be dangerous. Their decisions are based solely on the breed of the animal, not the individual characteristics of the particular dog. Dog bites are certainly a public health concern. However, the insurance industry’s approach to the problem is based on faulty assumptions and improper use of dog-bite statistics.

The insurance industry has prejudged entire breeds of dogs as being “too risky,” instead of taking a more reasonable dog-by-dog approach to risk assessment. Major veterinary and breed registry organizations have strongly opposed breed discrimination in insurance. Authors of scientific studies on dog bites have even argued against the use of their data to support breed-based decision-making by insurers and legislatures. Dog owners across the country have spoken out about the horrible choice they have been forced to make between obtaining insurance and keeping their dogs.

There has existed a historic tension between risk classification and social policy. Classification and insurability decisions are usually “actuarially justified”—that is, the insurance company has identified a statistical correlation between a characteristic and increased risk. Actuarial justification is frequently cited by insurers as a reason to avoid social regulation. Insurers exist to make a profit for their shareholders. They do so by minimizing risk, which, in turn, minimizes claims paid out.

Actuarial justification is only the first step in determining the social
propriety of a proposed underwriting mechanism. Social utility of the risky conduct must also be considered. Statutes across the United States are replete with examples of legislatures overruling actuarially justified practices in favor of competing social policies. “Red-lining” is a classic example. Actuaries identified statistical correlations between living in certain neighborhoods and increased risk for claims against homeowners’ policies. As a result, insurance companies began to refuse to write policies in these high-risk neighborhoods. The neighborhoods in question were often economically depressed and occupied by members of racial or ethnic minorities. Legislatures and courts stepped in to prohibit red-lining, despite the actuarial justification for the practice.4

Breed discrimination is a different animal altogether. Even without considering the high social utility of pet ownership, insurers have been unable to demonstrate an actuarial justification for discriminating based on breed. As the multidisciplinary Task Force on Canine Aggression and Human-Canine Interactions concluded, “[D]og bite statistics are not really accurate, and they do not give an accurate picture of dogs that bite.”5 The popular notion that pit bulls and rottweilers are inherently more likely to bite is simply not supported by the available statistics.

When the social utility of pets is added to the equation, breed discrimination becomes even more unreasonable. Dogs and other domesticated animals provide immeasurable joy and happiness to the families that own them. Even some components of the legal system itself have evolved to recognize pets as being more than mere chattel.6 In addition, the failure to obtain homeowners’ insurance is a death knell for homeownership—no insurance, no mortgage, no house.

My argument is quite simple: decisions regarding the provision, rating, termination, or renewal of a homeowners’ insurance policy should not be based on ownership or possession of a particular breed of dog unless there is evidence of dog-specific risk. Insurers would concedeably be actuarially justified in charging higher premiums or declining coverage for people who own dogs that have unjustly bitten in the past. After all, the best predictor of future behavior is past behavior. Breed discrimination, as it currently stands, is not actuarially justified because scientists have not been able to accurately determine whether certain breeds are inherently more dangerous, or, instead, whether a breed’s high population is making it appear that the breed is more dangerous.

The consequences of breed discrimination could not be greater. Homeowners’ insurance is the gatekeeper to homeownership. Without homeowners’ insurance, a buyer cannot get a mortgage. For most Americans, if a person cannot obtain a mortgage, he cannot buy a home.

In Part I of this article, I give an overview of the problem: dog breed discrimination by insurers, as well as a related problem of breed-specific legislation by some states. In Part II, I analyze the major scientific studies on dog bites, showing that no one has adequately proven that some breeds are more inherently dangerous than others. In Part III, I show that breed discrimination and breed-specific legislation are opposed by most veterinary and animal protection groups. Part IV demonstrates that insurers have been ignoring the unique and special role that pets play in millions of American homes. I draw upon not only the profoundly personal arguments advanced by myself and others, but also the way in which the law itself is evolving by recognizing pets as more than mere property. Part V shows how the insurance industry is a highly regulated industry that subjects itself to legislative control where, as here, the public is being harmed by underwriting decisions not driven by actuarial justification. I also offer a number of alternatives to breed discrimination.

I. Dog Breed Discrimination

Breed discrimination in insurance is a recent phenomenon that was preceded by the enactment of “breed-specific legislation” (BSL) by some state legislatures and municipalities. Both breed discrimination and BSL are a perceived response to highly publicized attacks by certain breeds, particularly pit bulls.

Highly Publicized Attacks by Pit Bulls

In the 1980s there were a number of high-profile attacks on humans by pit bulls. These attacks led to a near-hysterical reaction by members of the communities that were affected by the attacks and by the legislators who represented them.

In March 1984, pit bulls attacked Angie Hands, a nine-year-old girl in Tijeras, New Mexico.7 The dogs bit her right leg to the bone, ripped flesh from her arms, and tore her ear in half.8 She had been attacked by her uncle’s four pit bulls in between her bus stop and her home.9 The small community of Tijeras, located outside of Albuquerque, responded with an outright ban on pit bull ownership.10 Dog owners challenged the law in court, but the law was upheld as a constitutional exercise of the town’s police power.11
The attack on Angie Hands followed a number of other pit bull attacks around the country. A four-year-old girl was killed in Oregon City, Oregon, when she fell into a yard where a pit bull was chained. Two pit bulls mutilated their owner in Edgemere, Maryland. A recent, widely publicized attack in San Francisco has also brought the issue of aggressive dogs to the forefront of public attention. In January 2001, Diana Whipple was mauled to death by two Presa Canario dogs. The dogs were owned by a pair of lawyers. Evidence at the owners’ murder trials showed that the dogs had tried to attack other people and animals in the past. Both defendants were convicted and served prison time. A subsequent civil lawsuit brought by Ms. Whipple’s mother was settled out-of-court.

“Breed-Specific Legislation”

Highly publicized pit bull attacks in the 1980s led to knee-jerk reactions by many communities. Attacks led to editorials, which led to swift and spontaneous legislative action that was based on neither good science nor good law. BSL began to emerge in the 1980s and early 1990s. These laws targeted specific breeds for regulation or, in some cases, outright bans. BSL is on the rise in the United States. States and municipalities across the country have considered—and, in some cases, enacted—breed-specific legislation designed to protect the public against dog bites. Commonly, these statutes and ordinances have banned, or placed restrictions on, pit bulls, rottweilers, Doberman pinchers, Chow Chows, German shepherds, and shar-peis.

Ohio has aggressively targeted pit bulls for regulation. Ohio law declares any dog that “[b]elongs to a breed that is commonly known as a pit bull dog” is automatically a “vicious dog.” “Vicious dogs” must be penned or tied up when on their owners’ premises. If off-premises, they must be tethered, caged, or muzzled. Owners must obtain liability insurance to provide coverage in the event of a bite. BSL has also occurred at the local municipal level. Denver passed an outright ban on the ownership, possession, keeping, control, maintenance, harboring, transportation, or sale of pit bulls. A “pit bull” is defined as an American pit bull terrier, American Staffordshire terrier, Staffordshire bull terrier, or any dog displaying the majority of physical traits of one of those breeds. This ordinance is in addition to Denver’s “dangerous dog” ordinance that regulates “[a]ny dog with a known propensity or disposition to attack unprovoked, to cause injury or to otherwise endanger the safety of humans or other domestic animals.” “Dangerous dogs” must be confined while at home and must be leashed and muzzled while traveling.

Not all states have followed the BSL trend. Some legislatures have prohibited BSL enacted by municipalities. Florida enacted a statute that permits localities to regulate dogs “provided that no such regulation is specific to breed.” Some legislators have attempted, without success, to repeal this anti-BSL statute in response to several highly publicized attacks. Minnesota also has the following prohibition against BSL:

A statutory or home rule charter city, or a county, may not adopt an ordinance regulating dangerous or potentially dangerous dogs based solely on the specific breed of the dog.

Court challenges to BSL have been largely unsuccessful. Opponents of BSL have brought lawsuits claiming the legislation is unconstitutional because it violates due process (substantive and procedural), the Takings Clause, equal protection, and the vagueness doctrine. Plaintiffs have challenged BSL on due process grounds by arguing that there was no “rational relationship” to a legitimate legislative goal or purpose. Courts have ruled that BSL is a rational response to a perceived problem of dog bites by certain breeds. They have also rejected plaintiffs’ arguments that the statutes and ordinances do not provide dog owners with sufficient notice and an opportunity to be heard, which are the requirements for procedural due process. The Tijeras ordinance, for example, provides that a pit bull may be destroyed by the village only after a hearing to determine whether the dog is, in fact, a pit bull. Plaintiffs have also contended that BSL amounts to a taking without just compensation. Courts have rejected this argument, noting that personal property is subject to regulation under the police power of a state.

Challenges based on vagueness have argued that identifying a dog’s breed is difficult. Most courts have found BSL to be sufficiently specific to enable a reasonable dog owner to determine if his or her dog is covered by the particular statute. Plaintiffs have also alleged that BSL violates equal protection by singling out pit bulls but not other breeds. Courts have noted that pit bull ownership is not a “suspect classification,” and, therefore, BSL need only have some reasonable basis to be constitutional. Courts have concluded that sufficient evidence exists to support a finding that pit bulls can be regulated by legislatures and municipalities.

One significant decision found BSL to be unconstitutional. In American Dog Owners Association, Inc. v. City of Lynn, the Massachusetts Supreme Judicial Court upheld a trial court’s finding that the City of Lynn’s attempt to regulate pit bulls was unconstitutional. The Court noted that it is particularly problematic to determine a dog’s breed. The Court held,

[T]here is no scientific means,
by blood, enzyme, or otherwise, to determine whether a dog belongs to a particular breed, regardless of whether “breed” is used in a formal sense or not.46

The Court upheld the trial court’s finding that animal-control officers had no real standards to identify pit bulls, in part because they had no training in breed identification.47 The ordinance included a ban on mixed-breed dogs that contained “any mixture” of pit bull.48 This provision was likewise found to be unconstitutional since it is scientifically “impossible to ascertain” whether a dog is part pit bull.49 The report stated, “[A]nimal lovers have a term for what the insurance company did. They call it ‘breed discrimination’—arbitrarily punishing all dogs of certain breeds because some are vicious.”50 In the months that followed, several newspaper stories discussed the prevalence of breed discrimination and documented the effects this practice has had on families.51

The practice of breed discrimination produces absurd results. Consider the case of Chris and Norm Craanen of San Antonio, Texas.52 They own a twelve-year-old dog named Bukarus. He is a rottweiler, a breed often targeted for discrimination by insurance companies. Yet, Bukarus does not pose much of a threat: he is deaf, partially blind, and has arthritis.53 Despite his bite-free history, his owners lost their homeowners’ insurance.54

Some of the most well-known insurers are engaging in breed discrimination.55 Some insurers have outright bans on specific breeds,56 while others take a more realistic and logical dog-by-dog approach. These decisions are predicated on insurers’ assessment of relative risk.57 The “usual suspects” for breed discrimination are pit bulls, rottweilers, German shepherds, Doberman pinschers, Chow Chows, wolf hybrids, and Presa Canarios.58

The Humane Society of the United States (HSUS) has documented an increase in the number of people being denied insurance because they own certain breeds of dog.59 As a result, The HSUS has started collecting data through the Internet, in the hopes of eventually convincing the insurance industry that there are alternatives to the current practice and that it must stop.60 To achieve their goal, The HSUS and the American Society for the Prevention of Cruelty to Animals (ASPCA) have created a joint grass-roots campaign designed to educate the insurance industry.61

The Reaction of Insurers

While some communities and states have responded to dog bites with breed-specific legislation designed to regulate or outlaw certain breeds, insurance companies have also reacted to the problem of dog bites in a breed-specific manner. Dubbed “breed discrimination” by dog owners, insurance companies have started making coverage and renewal decisions based on one’s ownership of certain breeds of dog.

A Rise in Breed Discrimination

During 2003 and 2004, the media brought breed discrimination to light. The CBS Evening News with Dan Rather aired a story in June 2003 that featured a family that had difficulty obtaining insurance because they owned a dalmatian.52 The report stated, “[A]nimal
demonstrate in Part II, however, the industry’s reliance on the CDC studies is misplaced. Even the authors of the CDC studies have stated that breed discrimination is wrong and is not supported by scientific evidence.74

The industry has also pointed to the large amount of money that has been paid out in recent years for dog-bite claims.75 The Insurance Information Institute (III), a trade group of the insurance industry, stated that in 2002 $345.5 million was paid out in dog-bite liability claims, up from $250 million in 1995.76 The group argues that dog-bite lawsuits are on the rise and juries are awarding larger claims.77 It claims, therefore, the need to curtail its risk.

The industry’s cost statistics are misleading, however. The III states, “[D]og bites now account for almost one quarter of all homeowner’s insurance liability claims costing $345.5 million.”78 Some perspective is in order. For every $100 in premiums, insurers spend $77 paying claims. Of that $77, the overwhelming majority ($72, or 93.5 percent) is spent on paying property damage claims. Liability claims only amount to $5, or 6.5 percent, of total claims.79 Even then, dog bites only constitute a percentage of that figure. Put into perspective, the money paid out in dog-bite claims is negligible when compared to the overall amount of money paid out for other types of claims. Damage due to lightning, fire, and mold all individually account for more claims payouts than all liability claims combined.80

The insurance industry has not been consistent in the reasons for its defense of breed discrimination. One report from the III’s website seems to defend breed-specific responses based on the aggregate claims paid81 and stories of several high-profile and tragic bites.82 However, in a newsletter of veterinary medicine, the III defended breed discrimination on the basis that certain breeds cause more damage when and if they do bite.83 Ultimately, a spokesperson for the III conceded, “[t]he industry isn’t positioned to determine which dogs should be deemed vicious....[W]e’re certainly not dog experts or veterinarians.”84 This, however, has not stopped many insurers from engaging in breed discrimination.

Some Exceptions to the Rule?
It appears that not all insurers have followed the breed discrimination trend. DVM reported that Nationwide Insurance changed its breed discrimination policy in October 2003. While Nationwide now insures all dog owners, it specifically excludes dog bites from its liability coverage.85

State Farm’s national representatives have repeatedly stated that the company does not practice breed discrimination.86 However, when I searched for homeowners’ insurance in 2003, a State Farm agent in Lubbock refused to even take my application because of the breeds I owned.

Other Instances of Breed Discrimination
There are other examples where a person’s ownership of a particular breed of dog can have negative consequences. Families seeking to adopt children can face roadblocks if they own dogs that belong to certain breeds. In Massachusetts the Adoption and Foster Care Unit of the Department of Social Services will not place children in homes with certain breeds of dog.87 The state relied upon data provided by the insurance industry when it made its decision to discriminate based on breed.88 Some airlines also practice breed discrimination by prohibiting some dogs from flying, even though they are stored in cargo and in a closed carrier.89

II. The Lack of Scientific Evidence
Numerous scientific studies have attempted to identify the number of annual dog bites, the dogs most likely to bite, the people most likely to be bitten, and the circumstances under which bites are most likely to occur. Such studies have not reached a uniform consensus and have left us with more questions than answers. Even the studies that have attempted to report on breeds’ proclivity to bite have cautioned that their research is incomplete and should not be used to justify breed discrimination by legislatures or insurers.90

CDC Statistics
The CDC commissioned a number of studies during the 1980s and 1990s to determine the scope and nature of the problem of dog bites in the United States.

Fatality Studies
Four separate studies attempted to chronicle the number of fatal dog bites during the periods of 1979–1988,91 1989–1994,92 1995–1996,93 and 1997–1998.94 The studies were specifically limited to fatal dog attacks because fatality statistics are easier to track.95 Non-fatal bites were excluded from the studies, although other scientists have attempted to use emergency department reports and other sources to determine the number of nonfatal bites per year.96

The authors combed three sets of sources in an attempt to determine the number of fatal dog bites per year. First, they searched NEXIS for news reports of dog bite-related fatalities.97 Second, they used the National Center for Health Statistics’ (NCHS) single-cause mortality tapes (SCMTs) to identify deaths where the underlying cause was listed as a dog bite.98 Finally, the authors supplemented
these reports with information collected by The HSUS to help identify the breed of dog involved in each incident. From these three sources, the authors tried to piece together the number of people who died each year in the United States from dog bites.

The authors concluded that dog bites caused approximately seven deaths per year per hundred million people. They discerned no identifiable trend that would indicate an increase in the incidence of fatal bites over the years of the studies. During the first reporting period (1979–1988), approximately 70 percent of victims were under the age of ten. Males, under the age of twenty-nine, were more likely than females to be victims. These findings as to age and gender were consistent throughout the study periods.

Many of the fatal bites of children involved horrific attacks on the very young. A three-week-old girl was killed in her crib by the family’s Chow Chow. A two-year-old boy in South Dakota wandered into a neighbor’s yard, where he was attacked and killed by two German shepherd-wolf hybrids. The elderly were also victims of several fatal attacks. In March 1996 two rottweilers killed an eighty-six-year-old Tennessee woman. One month before the assault, the dogs had attacked and injured the same woman.

In the twenty-year period of the CDC studies, the breed responsible for the most number of bites has changed. From 1979 to 1980, Great Danes caused the most number of fatalities, with three deaths for the period. However, four breeds were tied with two deaths each: pit bulls, rottweilers, huskies, and malamutes. In 1981 pit bulls took over as the breed with the most number of fatal bites. Pit bulls remained in that position until 1993, when rottweilers began causing approximately ten fatal bites per two-year reporting period. The last available reporting period, 1997—1998, shows that rottweilers caused ten fatal bites per two-year period, while pit bulls caused six, and Saint Bernards caused three. During the twenty-year study, ninety deaths were excluded because the breed was “unavailable.”

The authors of the CDC studies acknowledged that the methods they used in their studies had a number of limitations. NEXIS, they pointed out, was not designed for scientific research. News reports would only be flagged if their text contained certain keywords. Further, reliance on NEXIS assumes that newspapers accurately reported the breed of dog involved in a particular attack. SCMTs have a one- to two-year lag time, which means that some fatalities may have been missed. The authors believed that, on average, their methods only uncovered approximately 74 percent of dog-bite-related fatalities.

Even if one accepts the CDC statistics as definitive on the subject, they have a number of other limitations in answering the question of whether certain breeds are more dangerous than others. First, the studies were limited to fatal dog attacks. Second, the breed of the dog could not be accurately determined in every case. Finally, the number of fatal attacks per year is so low that it is problematic to statistically extrapolate conclusions from the data. For example, in the first two years of the study (1979–1980), Great Danes accounted for the most number of fatal bites (three). Four breeds, however, followed closely behind with two fatal bites each (pit bull, German shepherd, husky, and malamute). It would be statistically questionable to conclude that Great Danes were inherently more dangerous than the other breeds, based on a net difference of only one fatality.

### Nonfatality Studies

The CDC fatality studies acknowledged that, while death rates for dog bites do not appear to have increased over time, nonfatal bites were becoming more of a public health problem. The CDC conducted a study of nonfatal dog bites in 2001. The study used data from the National Electronic Injury Surveillance System-All Injury Program (NEISS-AIP) to identify the number of nonfatal dog bites during the 2001 calendar year. NEISS-AIP collects data from initial visits to emergency departments (EDs) across the country. NEISS-AIP data are drawn from a nationally representative sample of NEISS hospitals. The CDC analyzed every case where “dog bite” was listed as the external cause of injury.

In total, NEISS-AIP data revealed that hospital EDs treated 6,106 patients for dog-bite-related injuries during 2001. Since the NEISS-AIP data did not include every hospital in the nation, the authors used these data to extrapolate to the general population. They estimated that 368,245 people were treated for dog-bite-related injuries in 2001. The largest cohort of victims was children between the ages of five and nine. Boys, under the age of fourteen, were more likely than girls to be seen in EDs for dog-bite-related injuries.

The NEISS-AIP data included narratives for many of the attacks. One case involved a four-year-old who was bitten by a dog guarding her puppies. Another involved a three-year-old girl who was bitten when she tried to take away a dog’s food. A thirty-four-year-old man was bitten while trying to break up a dogfight. Some victims were bitten by their own dogs. A twenty-seven-year-old woman was bitten by her dog after he had been hit by a car and became dis-
The study created a control group of dogs to try to determine whether certain characteristics (such as breed) made a dog more likely to bite.\textsuperscript{144} Using a multivariate statistical analysis, the study concluded that biting dogs were more likely than control dogs to be German shepherds or Chow Chows, male, intact (not neutered), and reside in a house with one or more children.\textsuperscript{145} Denver had (and still has) a ban on pit bulls, so it is not surprising that no cases involved that breed.\textsuperscript{146}

The authors acknowledged that their results had several problems. First, they were only able to speak to owners of approximately half of the biting dogs. They excluded cases in which the victim did not seek medical attention. In this respect, the authors believed that seeking medical attention was a “surrogate” for “real bites.”\textsuperscript{147} The authors did not verify the breeds of the dogs involved, but, instead, “identified predominant breed as whatever breed the owner considered the dog.”\textsuperscript{148} Because of the small number of bites per breed, the authors could not assess the statistical significance of breeds other than German shepherd and Chow Chow.\textsuperscript{149}

Another CDC study attempted to determine the frequency of dog bites by conducting a random telephone survey of households.\textsuperscript{150} The authors used the Injury Control and Risk Survey (ICARIS), a random-digit-dialing telephone survey.\textsuperscript{151} They asked each adult respondent whether he (or his children) had been bitten by a dog in the previous twelve months and whether the victim had sought medical attention.\textsuperscript{152} Out of 5,328 completed interviews, ninety-four adults and ninety-two children reported being bitten in the previous twelve months.\textsuperscript{153} Of these, twelve adults and twenty-six children sought medical care.\textsuperscript{154} From these data, the authors extrapolated that 1.8 percent of the American population (4,494,083 people) had been bitten in the previous twelve months, and 0.3 percent had sought medical attention.\textsuperscript{155} This shows that nonfatal bites are a public health problem that “is five orders of magnitude greater” than fatal dog bites.\textsuperscript{156} The study concluded that several factors had no statistical significance on the likelihood of being bitten: census region, urbanicity, race/ethnic group, and household income.\textsuperscript{157} The study did not attempt to correlate between the number of bites and the breed of dog. The authors acknowledged that the study relied on the self-reporting of data, which were not validated, and that they received a poor response rate (only 56 percent of people responded to the survey).\textsuperscript{158}

### Other Studies

Other studies have attempted to document the total number of dog bites and the number of bites per breed.

A study of ED visits for dog-bite injuries\textsuperscript{159} confirmed many of the conclusions of the previously discussed CDC study of ED visits.\textsuperscript{160} The study noted that a lack of a national reporting system for dog-bite injuries makes gathering and analyzing data on the subject difficult.\textsuperscript{161} The authors, in reviewing the literature on the subject, found that previous studies concluded that between 0.3 percent and 1.1 percent of all ED visits are due to dog-bite-related injuries.\textsuperscript{162} To determine the true percentage, they collected data from the National Hospital Ambulatory Medical Care Survey (NHAMCS), a random surveying instrument that is used to calculate the number of ED visits per year.\textsuperscript{163} They estimated that between 1992 and 1994, 3,333,687 annual visits were made to EDs seeking medical treatment for dog-bite-related injuries.\textsuperscript{164} This amounted to 0.4 percent of all ED visits nationwide.\textsuperscript{165} Looking at the monetary cost of dog bites, they found that
the average cost for a dog-bite-related ED visit was $274, resulting in an annual cost of $102.4 million. The study, however, did not address the question of whether certain breeds are particularly more dangerous than others. This is partly due to the unavailability of data through NHAMCS. Moreover, the study most likely undercounted the number of non-fatal dog bites because victims may have sought treatment from places other than EDs.

Other studies have attempted to examine the problem at a more localized level. A July 1991 study found that dog bites were responsible for 0.3 percent of all ED visits at The Children’s Hospital of Philadelphia. Of those visits, 77 percent involved cases where the victim knew the biting dog. The study found one statistically significant conclusion: more pit bull injuries were the result of unprovoked attacks as compared to such attacks by other breeds. “Unfortunately, the absence of reliable dog breed-specific population figures prevent[ed] the calculation of breed-specific injury rates.”

An October 1997 study tried to determine the number of dog bites in Allegheny County, Pennsylvania (Pittsburgh), by using the “capture-recapture” method of statistical analysis. The authors found that 790 dog bites were reported to the Allegheny County Health Department in 1993. Using the capture-recapture method, along with log-linear modeling, the study concluded that the number of unreported dog bites was 1,388 (with a 95 percent confidence interval of between 1,010 and 1,925). The authors cautioned, however, that the self-reporting sources are problematic in that “whether or not a case is reported depends largely on the severity of the event and the attitude, knowledge, or education level of the victim.” Accordingly, the authors suggested that the actual Pittsburgh dog-bite incidence rate must be higher than that found in the study.

Another survey in Pennsylvania polled children in order to determine an overall bite rate from the perspective of bite victims. The survey, conducted in 1981, found that 46.1 percent of children reported that they had been bitten by a dog during their lifetime. The study concluded that “Being bitten by a dog is a rather common occurrence for children, especially those between the ages of seven and twelve years, and the event is greatly underestimated by official bite statistics.” Nevertheless, the authors did not attempt to catalog bites per breed.

Unfortunately, not all scientists have used statistically sound methods to draw conclusions about the relative dangerousness of breeds. Two physicians, Lee E. Pinckney and Leslie A. Kennedy, from the Department of Radiology at the University of Texas Southwestern Medical School and Children’s Medical Center, sent letters to the editors of 245 major newspapers requesting copies of all stories about dog-bite-related fatalities. Although the number of fatalities reported by the responding newspapers between March 1966 and June 1980 totaled seventy-four, of the seventy-four fatalities, sixteen were caused by German shepherds, nine by huskies, eight by Saint Bernards, six each by bull terriers and Great Danes, and five by malamutes. The remaining dog-bite fatalities were caused by a variety of breeds, including ten attacks by mixed breeds and five attacks by dogs of unknown breeds. In addition to acquiring bite fatality statistics from newspapers, the authors used American Kennel Club (AKC) registration data to compare the relative number of fatalities per breed.

The CDC authors criticized the Pinckney/Kennedy study as being “primarily anecdotal” rather than “systematic” in its approach. Indeed, Pinckney and Kennedy conceded that their database was “incomplete” and “may not be entirely reliable.” Their data depended on newspaper reports, which may themselves be incomplete or inaccurate. Thus, the authors said their data required “cautious interpretation.” An example of such “cautious interpretation” is represented by the authors’ observation that even though German shepherds were involved in more fatalities than any other breed in the study, such large frequency could be reflective of the fact that German shepherds had the highest AKC registration of any large breed. Hence, the use of AKC data to draw comparisons between breeds is problematic, as demonstrated by the high number of registrations for breeds such as German shepherds, and low number of registrations for a popular breed, such as the pit bull.

William Winkler’s study in 1977 has also been criticized for its lack of scientific method. His “study” involved compiling news reports from eleven dog-bite-related fatalities from January 1974 through December 1975. From these data, he made various conclusions about the breeds responsible, finding that, “not unexpectedly,” German shepherds were the breed most often responsible for fatal dog attacks. Because Saint Bernards were responsible for two deaths during this twenty-four-month period, he concluded, “[t]his relatively uncommon breed may be a greater hazard than others.”

A common thread running through several studies is the attempt to extrapolate conclusions about breeds based on limited data. For example, an April 2000 epidemiological study in Philadelphia used reports from the Department of Health to conclude that between 1995 and 1997 there were approximately 5,390 bites.
authors concluded that pit bulls, German shepherds, and rottweilers combined were responsible for 59 percent of bites each year. The authors felt comfortable drawing this conclusion despite the fact that they could not determine the breed in 74 percent of cases.

The Unknown Origin of Aggressiveness

Despite all of the research and studies on the subject, scientists and veterinarians cannot state with certainty or confidence why certain dogs are more aggressive than others. It seems that a particular dog may be aggressive because of a variety of factors. According to the American Veterinary Medical Association’s multidisciplinary Task Force on Canine Aggression and Human-Canine Interactions, “A dog’s tendency to bite depends on at least five interacting factors: heredity, early experience, later socialization and training, health (medical and behavioral), and victim behavior.”

While breed (as an inherited characteristic) is one component of predicting a dog’s dangerousness, it is not the only factor. There is no way to scientifically determine whether a dog is likely to bite in the future, any more than psychologists can predict whether certain people will commit crimes of violence. The exception to this rule is the axiom that the best predictor of future behavior is past behavior. For this reason, many veterinary and scientific groups support “dangerous dog laws” that target individual dogs who have demonstrated a propensity to bite or attack innocent victims. The problem with BSL and breed discrimination is that legislatures and insurers have attempted to prophylactically determine which breeds are most likely to bite without any evidence of individual dangerousness.

Numerators and Denominators in Dog-Bite Statistics

To date, no scientific study has been able to resolve what I term to be the problem of “numerators and denominators.” A person wishing to determine whether certain breeds are more likely to bite than others must first determine the number of bites per breed (the numerator) and then compare that number to the total number of dogs of that breed in the general population (the denominator). This can be expressed as a ratio:

\[
\text{Relative Dangerousness} = \frac{\text{Number of Bites by Breed}}{\text{Total Population of Breed}}
\]

This ratio (RDR) allows for a comparison between breeds. The higher the RDR, the greater the probability a particular breed has to bite. It allows for a comparison of “oranges to oranges” and “apples to apples.” Otherwise, it is likely that highly popular breeds will appear to be more dangerous, when in fact the number of bites is reflective of the overall population of the particular breed.

A study that tried to extrapolate breed data from the previously discussed CDC studies agreed that the proper method for determining a breed’s dangerousness was the use of a comparative ratio: Ideally, breed-specific bite rates would be calculated to compare breed and quantify the relative dangerousness of each breed. For example, 10 fatal attacks by Breed X relative to a population of 10,000 X’s (1/1,000) imply a greater risk than 100 attacks by Breed Y relative to a population of 1,000,000 Y’s (0.1/1,000). Without consideration of the population sizes, Breed Y would be perceived to be the more dangerous breed on the basis of the number of fatalities.

Using the RDR normalizes the effect of a breed’s popularity, or lack thereof. Dogs of popular breeds are going to bite more often simply because there are more of them. A January 1997 article warned that, as dalmatians become more popular, people should expect to see more bites from that breed. This is not to say that dalmatians are inherently more dangerous than other breeds. Rather, an increase in their population should also result in a proportional increase in bites from that breed. Similarly, the Pinkney/Kennedy study cautioned that, despite the fact that German shepherds accounted for the most number of deaths, their finding must be read in conjunction with the popularity of the breed, as evidenced by AKC registrations of the same time period.

The problem of numerators and denominators is that it is difficult—if not impossible—to accurately determine the number of bites per breed and the number of dogs in a particular breed. Without an accurate count for either the numerator or denominator, one runs the risk of stigmatizing an entire breed as “overly dangerous” based on the breed’s absolute number of bites, instead of examining the breed’s number of bites relative to its overall population.

The Numerator Problem

The principal problem in determining the total number of bites by a particular breed is that there is no national reporting system for dog bites. The CDC studies demonstrate that, while fatal dog bites are easier to track than nonfatal bites, even the methodology used to uncover fatalities misses approximately 26 percent of cases. Further, news accounts—on which the CDC relied, in part, to deter-
mine the number of fatal dog bites and the breeds involved—may be biased toward reporting attacks by certain breeds.\textsuperscript{216}

The numerator may also be biased against dogs who cause more damage, while ignoring breeds that bite more often but do not cause victims to seek emergency treatment.\textsuperscript{217} If a dog bite does not cause serious injury, it is not likely that the victim would seek medical treatment.\textsuperscript{218} This then skews the results of studies that use emergency department visits to track the incidence of dog bites.\textsuperscript{219} “The problem with self-reporting sources is that whether or not a case is reported depends largely on the severity of the event and the attitude, knowledge, or education level of the victim.”\textsuperscript{220} Studies that have used random sampling\textsuperscript{221} are equally problematic because they, too, depend on accurate self-reporting of their sample groups. The low response rates of these studies also lead to questions about the accuracy of the results that are extrapolated to the general population.\textsuperscript{222}

\textbf{The Denominator Problem}

No one knows how many dogs are present in the United States at any one time. This should not be surprising, as even the constitutionally mandated\textsuperscript{223} decennial census of human beings is known to undervalue people.\textsuperscript{224}

Determining the true number, or even an accurate estimate, of dogs can be problematic. While many dogs are kept as household pets,\textsuperscript{225} others are used as service animals or guard dogs; kept in animal shelters or animal stores; or simply allowed to wander the streets as strays. The dog population is constantly changing and moving, which makes obtaining an accurate count difficult and expensive.

Even if it was possible to determine how many dogs exist in the country at any one time, the problem then becomes how to determine how many of those dogs belong to each breed. Determining the breed of one dog is difficult enough.\textsuperscript{226} To take a census of all dogs and identify their breeds would be an impossible task.

Some scientists have suggested using AKC or municipal registration data to determine the number of dogs in a particular breed in a particular community.\textsuperscript{227} However, one study concluded that city registrations account for only 29.1 percent of all dogs.\textsuperscript{228} Further, owners of breeds considered “dangerous” may be reluctant to register their animals.\textsuperscript{229} This may be particularly true of dogs used for illicit purposes, such as those owned by drug dealers, dogfighters, and gang members.\textsuperscript{230}

AKC registration data is also problematic because the AKC only registers purebred dogs\textsuperscript{231} and depends on owners taking the initiative to register their dogs.\textsuperscript{232} Mixed breeds, for which there are numerous combinations, are not eligible for registration.\textsuperscript{233} Pit bulls are often registered with organizations other than the AKC. If owners do register them, they register with the United Kennel Club or the American Dog Breeders Association.\textsuperscript{234} If a breed is undervalued in the denominator of the ratio, it will make a breed appear more dangerous than it actually is.\textsuperscript{235}

\textbf{The Problem of Breeds}

Breed is a human construct that is used to conveniently group dogs based on similar physical characteristics.\textsuperscript{236} There is no scientific test to determine a dog’s breed.\textsuperscript{237} The only way to determine a dog’s breed is to examine its heredity. This task is made possible but is expensive and time-consuming.\textsuperscript{238} If a dog is registered with the AKC,\textsuperscript{239}

As examples of the problem of defining and identifying breed, consider the ease of huskies and pit bulls. “Husky” refers to a class of dogs, not any one particular breed. Siberian huskies, Alaskan malamutes, and Samoyeds are all considered to belong to the “husky” family, yet they are all different breeds.\textsuperscript{240} Similarly, there is no AKC-standard breed called “pit bull.” “Pit bull” is a collective classification of the American Staffordshire terrier, Staffordshire pit bull terrier, and bull terrier.\textsuperscript{241}

Scientists have not been able to determine if victims of dog bites can accurately report the breeds of dogs that attacked them. Many scientists, particularly the CDC authors, have stated that misidentification is a likely problem, especially under the stress of a dog attack.\textsuperscript{242} Part of the problem may be that as a particular breed gets a reputation for dangerousness, some victims jump to the conclusion that they were bitten by a dog of that breed.\textsuperscript{243}

Even under ordinary, low-stress conditions, many people have difficulty identifying a dog’s breed.

For the average person anything with prick ears and blue eyes automatically becomes a “husky”….Any smooth coated brown dog, medium sized, and muscular becomes a “pit bull”….Any tall dog becomes a Great Dane, fuzzy or hairy, and it’s a Chow Chow. If it’s black and tan and heavy, it’s arottweiler, etc.\textsuperscript{244}

One survey of bite reports found that medium-sized black and tan animals were likely to be recorded as German shepherds. Stocky, short-haired dogs were listed as pit bulls. Media reports of pit bull attacks are often accompanied by pictures of boxers or pugs instead of American Staffordshire terriers.\textsuperscript{245} One entertaining website, called “Find the pit bull,” displays twenty-one pictures of purebred dogs and challenges the user to identify the pit bull among them.\textsuperscript{246}

Even veterinarians and other experts have difficulty determining
whether a particular dog belongs to a particular breed.247 This was a central concern of the Massachusetts Supreme Judicial Court in American Dog Owners Association v. City of Lynn.248 The Court declared the city of Lynn’s pit bull ordinance to be unconstitutional in part because the animal-control officers designated to enforce the ordinance used conflicting and subjective standards to determine and identify breed.249

The problem of mixed breed complicates the issue even further. In determining a relative dangerousness ratio, it is unclear how to count mixed breeds.250 Should they be counted once per breed? Not at all? Create a new category for each possible combination of breeds? Aside from how to use the raw data on attacks by mixed breed, there is the additional problem of misidentification by laypeople.251 Victims sometimes inadvertently report mixed-breed dogs as purebreds due to the heat of the moment and their lack of training in identifying subtle breed characteristics.

There is good reason to believe that the raw data being used to calculate relative dangerousness ratios are incomplete and inaccurate. If the data being input into the calculation are flawed, the results (claiming to show some breeds are more dangerous than others) are equally flawed.253

The Problem of “Just Cause” Bites
Even if an accurate count could be obtained of the number of bites per breed, there is the additional problem of how to handle “just cause” bites in the resulting statistics. If the purpose is to determine which breeds are inherently more dangerous, just by virtue of the breeds themselves, then the statistics should exclude bites by the dog that were justified. If a rottweiler bites an intruder who is attacking the homeowner, we would expect the rottweiler to be praised for defending its owner. This is not the type of bite that we should be trying to prevent. It is also not the type of bite that is likely to lead to an insurance claim. Similarly, if a dog is being physically tormented by a neighborhood child who is poking it in the eye, we would not deny that the dog has an inherent right to defend itself by growling, snarling, barking, or biting back.254 These are “just cause” bites, bites in which the dog has a legitimate reason to defend itself or its owners.

It is possible that the statistics are being skewed because property owners who wish to purchase “guard dogs” may be self-selecting certain breeds based on the popular notions of relative dangerousness. Guard dogs are trained to protect property by scaring away would-be intruders and, if necessary, to bite an actual trespasser. Owners who desire to have guard dogs may rationalize the purchase of one breed over another based on the degree to which they subjectively believe that the dog will be “mean” or “scary.” This creates a self-fulfilling prophecy. The “scarier” a breed is considered by a community, the more likely a dog of that breed will be purchased for protection, used for protection, and actually bite an intruder. This will skew the statistics in a way that purports to show that the particular breed is, in fact, inherently more dangerous.

Despite these concerns, it appears that the studies to date have not excluded this category of bites from their datasets.255 This is a fatal flaw in the statistics, for it confuses the issue between inherent dangerousness (due to breed) and legitimate animal behavior.

Breed Switching by Bad Owners
Assume for the moment that an accurate relative dangerousness ratio could be determined for each breed, and that it could be scientifically determined that certain breeds are inherently more dangerous than others. What about the owners? Does this not excuse them from the responsibility to properly train and care for their pets?

The reality is that there is a wide spectrum of responsible pet ownership. For some people, occasionally providing food and water for a dog is considered sufficient. On the opposite end of the spectrum, some people spend thousands of dollars on luxuries such as pet spas, advanced dog agility classes, and elaborate beds. Somewhere in the middle of the spectrum are people who actively ensure that their pets have food, water, and shelter; get exercise; are well trained; and receive adequate veterinary care.

Unfortunately, a small percentage of pet owners breed and use their pets for illicit purposes. They intentionally seek out vicious dogs who will attack and maim humans and other animals.257 Dogfights are attended by dog enthusiasts, gang members, and drug dealers who will purposely select, breed, and train dogs to be vicious. The purpose may be to intimidate rivals (in the case of gangs and drug dealers), to defend illegal drugs (in the case of drug dealers), or to make money (in the case of promoters of dogfights).258 For some, having a vicious dog is simply a status symbol.259 In order to make dogs into vicious weapons, they use “revolting and painful techniques to bring the animals to the verge of bloodlust.”260 Drug dealers in Philadelphia during the 1980s had pit bulls named “Murder, Hitler, and Scarface.”261 They wore collars that concealed crack, cocaine, and money.262 In Chicago, gang members “brandish[ed] their fierce pit bulls just as they would a switchblade or a gun.”263

Current statistics do not take into consideration the degree to which the source of a dog’s aggressiveness is the torturous upbringing
described above, as opposed to the dog’s breed.264 In those situations, the problem is clearly with the dog owner—not the dog itself or its breed. These problem owners are dangerous with any breed of dog.265

One solution would be for insurers to write policies that exclude injuries related to dogfighting. This would limit the claims paid out for these high-risk animals, yet it would leave potential plaintiffs without an adequate source of compensation. This result might be a socially acceptable solution because of the unclean hands of the “victims.” If dogfighting exclusions are incorporated into standard homeowners’ insurance contracts, the language should be narrowly written to exclude only those bad faith actors who, as a matter of social policy, should not be rewarded or compensated for injuries attendant to an illegal activity. The key would be to write language that would still protect innocent passersby.

One of the arguments against BSL is that once a breed becomes banned, problem owners will simply switch to another breed.266 In the 1930s, pit bulls were far from considered a “vicious breed.” In fact, a pit bull named “Pete” starred in the Our Gang films of the time.267 Fifty years ago the Doberman was considered the most vicious dog.268 During the 1980s the focus turned to pit bulls.269 In short, today’s public target may be tomorrow’s favorite pet, and vice versa.

Do the Insurance Companies Have Better Data?
It is quite possible that one or more insurance companies have their own proprietary data purporting to show that one breed or another is disproportionately responsible for bites. I am skeptical that their data would be any better than the CDC’s. The problems associated with the CDC and non-CDC studies are inherent to the problem of trying to determine the number of bites per breed and the number of dogs per breed.

III. The Widespread Opposition to Breed Discrimination
Breed discrimination by insurance companies and breed-specific legislation by state and local governments have attracted national attention and outrage by veterinarians, animal groups, and dog owners.

The American Veterinary Medical Association’s Task Force on Canine Aggression concluded that BSL and other breed-specific actions are “inappropriate and ineffective.”270 The Task Force consisted of a diverse coalition of veterinarians, academics, physicians, insurers, representatives from animal rights advocates, CDC scientists, and lawyers.271 The Task Force agreed that to properly determine the relative dangerousness of breeds, one must first determine the number of bites per breed and the total population of each breed. As noted above,272 the accurate calculation of both numbers is an immense challenge.273

The Task Force rejected the notion that a dog’s breed is the sole determinant of dangerousness. “[A] dog’s tendency to bite depends on at least five interacting factors: heredity, early experience, later socialization and training, health (medical and behavioral), and victim behavior.”274 They also pointed to the problems of mixed breeds, misidentification of breeds, and shifting popularity of breeds.275 The Task Force also expressed concern about making decisions based solely on breed, since there is a lack of scientific means to identify breed.276 The Task Force recommended, instead, that local governments focus on individual dogs and dog owners.277

The very scientists who have authored studies trying to determine a link between breed and aggressiveness oppose breed discrimination and BSL. In many of the CDC studies, the scientists cautioned against using their incomplete data on attacks to make knee-jerk legislative or policy decisions based solely on breed.278 They pointed to the lack of reliable data on bites per breed (the “numerator problem”) and the absence of a reliable count of dogs per breed (the “denominator problem”).279

Animal groups have also opposed BSL and breed discrimination. The AKC has taken a strong stance against breed discrimination by insurance companies:

The American Kennel Club believes that insurance companies should determine coverage of a dog-owning household based on the dog’s deeds, not the dog’s breeds. If a dog is a well-behaved member of the household and the community, there is no reason to deny or cancel coverage. In fact, insurance companies should consider a dog an asset, a natural alarm system whose bark may deter intruders and prevent potential theft.280

The AKC also issued this statement concerning BSL:

The American Kennel Club (AKC) strongly supports dangerous-dog control. Dog-control legislation must be reasonable, non-discriminatory, and enforceable as detailed in the AKC Position Statement.

To provide communities with the most effective dangerous-dog control possible, laws must not be breed specific. Instead of holding all dog owners accountable for their behavior, breed specific laws place restrictions only on the owners of certain breeds of
dogs. If specific breeds are banned, owners of these breeds intent on using their dogs for malicious purposes, such as dog fighting or criminal activities, will simply change to another breed of dog and continue to jeopardize public safety.281

In response to a perceived rise in breed discrimination, The HSUS and the ASPCA developed a grassroots campaign to educate the insurance industry.282 Both groups oppose breed discrimination.283 Other groups that have spoken out against breed discrimination include the American Veterinary Medical Association, the American Dog Owners Association, the Westminster Kennel Club, and the American Humane Association.284

IV. The Unique and Special Role of Pets in Society

For at least twelve thousand years, the history of the domestic dog, Canis familiaris, has been intertwined with that of human beings.285 The law has generally treated dogs as mere property286—or worse, as nonproperty.287 As the popularity of dogs as pets has grown, the law has responded in kind by recognizing the importance of dogs, cats, and other pets. The insurance industry, by practicing breed discrimination, has failed to appreciate the unique and special role of dogs to their owners and to society. This section is offered to provide some context for the implications of breed discrimination. This is a problem that has the potential for affecting a large segment of the population and for having damaging effects on the mental, physical, and emotional health of people.

The Growing Popularity of Pets

Population

A study estimated that in 1998 there would be 53.6 million dogs in the United States, a 2.1 percent increase since 1991.288 Approximately 34.3 percent of homes have one or more dogs.289 Dog owners are thus a significant portion of the United States population. They are also a significant pool of customers (actual and potential) for insurers.

Spending

To understand the scope and power of the pet-owning population, consider the amount of money that is spent on pets each year. In 1998, Americans spent $11.1 billion on veterinary care alone, a 61 percent increase from 1991.290 There are more than 35 “pet vacation resorts” where dogs and cats can go to be pampered.291 There are also more than 650 pet cemeteries in the United States, indicating the extent to which owners will go to memorialize their pets.292

Dogs: Members of the American Family

Breed discrimination ignores the reality that most pet owners consider their pets to be members of their immediate family.293 Indeed, this “coexistence has contributed substantially to humans’ quality of life.”294 Dogs were initially domesticated to be work animals, assisting humans with farming, herding livestock, and providing security at night.295 In time, dogs became “four-legged members of the family.”296 Some dogs provide assistance to humans with disabilities.297 Service dogs serve as a tangible resource for people, not just a source of companionship.298 Dogs can have positive effects on the health of their owners,299 such as alleviating loneliness and depression, reducing high blood pressure, and addressing obesity.300 On the other hand, these effects must be balanced against the negative health effects of dogs, such as bites and the transmission of zoonotic diseases.301 When the positives are weighed against the negatives, at least one physician has concluded that dogs probably are beneficial to human health.302 Some owners will forgive their own health in order to care for their pets—a demonstration of how much pets mean to some owners. “Most physicians are familiar with at least one example of a person refusing hospitalization...because there was no one else in the home to care for their pet.”303

The loss of a pet can have profound effects on an owner. A number of organizations provide bereavement support for people whose pets have died,304 and at least three greeting card companies make sympathy cards specifically for the loss of a pet.305

Breed discrimination forces pet owners to choose between their homes and their dogs. Forcing owners to make this choice represents a significant misunderstanding of the role of pets in our society. For some pet owners, giving up a pet is like losing a child, sibling, or spouse.

The Consequences of Breed Discrimination

When a dog bites, it can have lasting consequences for both the dog and its owner’s family. When an insurance company refuses to insure or renew a household based on a particular breed of dog, it, too, can have far-reaching consequences.

Most people do not respond appropriately if their dog bites someone. Most punishment is too severe and too late to be of any value to the dog in preventing future occurrences.306 The dog is
usually isolated from the family and visitors. By limiting interaction with humans, the dog does not learn how to deal with people appropriately. Isolation may also lead to inadequate medical care, which may in turn lead to serious health problems for the dog.

Some owners abandon their dogs or euthanize them either out of frustration at not being able to correct aggressive behavior or because an insurance company tells them to do so in order to get homeowners’ insurance. When BSL goes into effect or insurance companies discriminate, it causes some owners to purposely assume a sheltered and low profile in the community to avoid being caught with an unauthorized pet. Shelter drop-offs are common after BSL goes into effect or insurers begin to discriminate based on breed. The humane society in Atchison, Kansas, reported a 40 percent increase in drop-offs of rotweilers because of breed discrimination. This is unfortunate because many shelters can only keep dogs a certain number of days before euthanizing them. Breed discrimination can have a chilling effect on ownership of certain breeds, which means certain breeds are not likely to be adopted and will have to be euthanized.

Breed discrimination will likely have an effect on homeownership in states that permit this practice. Homeowners’ insurance is the “gatekeeper” to homeownership. Without homeowners’ insurance, a person cannot get a mortgage. Without a mortgage, most people cannot buy a house. An insured who chooses to lie about a dog’s breed or the existence of a dog altogether is committing policy fraud, running the risk of criminal prosecution and the complete cancellation of his or her policy.

**Pets: More than Mere Property**

The problem of breed discrimination should be viewed in light of modern developments in animal law, which is beginning to recognize that animals are more than mere property. Until recently, the legal status of animals was governed by 1897 Supreme Court case, *Sentell v. New Orleans & C.R. Co.* The case involved a Newfoundland named Countess Lona who was killed by a railroad car. Her owner brought suit against the railroad for negligence. The railroad defended by relying on a statute that prohibited an owner from recovering for more than the declared value on the animal’s registration form. An owner whose dog was not registered could not recover anything for the loss of or damage to the animal. Countess Lona’s owner brought suit, challenging the constitutionality of the law.

The Supreme Court held that the statute was constitutional as a valid exercise of the state’s police power. The Court declared that dogs are a form of quasi-property that is “imperfect or qualified” in nature. The Court relied on the common law rule that dogs could not constitute stolen property for purposes of larceny statutes. The common law held that wild animals had no property value until killed or subdued. Domesticated animals, such as horses, cattle, sheep, and other “work” animals, were considered “perfect and complete” property. Dogs fell in a third category, that of “cats, monkeys, parrots, singing birds, and similar animals, kept for pleasure, curiosity, or caprice.” The Court saw no useful, social value for dogs, except for companionship, which the Court dismissed as unsatisfactory for the establishment of a property interest. Thus, the Court held that property interests in animals are on a continuum: wild animals (animals *ferae naturae*) on one end, domesticated animals (such as horses, cattle, and sheep) on the other end, and dogs somewhere in between. To the *Sentell* Court, dogs hold “their lives at the will of the legislature, and properly falling within the police powers of the several states.” The Court concluded, “It is purely within the discretion of the legislature to say how far dogs shall be recognized as property, and under what restrictions they shall be permitted to roam the streets.”

The question of the legal status of dogs and other pets has recently been addressed by courts in the context of family disputes. *Bennett v. Bennett* and *Arrington v. Arrington* typify the majority rule with respect to the “custody” of pets upon their owners’ divorce. In both cases, divorcing couples sought both custody and visitation of their dogs. In *Bennett* the trial court awarded legal custody of the dog, Roddy, to the husband, with the wife receiving every-other-weekend and holiday visitation rights. Subsequent squabbling between the parties led the Court to modify its order to have the parties swap custody of the dog every month. The appellate court reversed the trial court’s order and affirmed the *Sentell* doctrine: “While a dog may be considered by many to be a member of the family, under Florida law, animals are considered to be personal property.” The court found that the trial court lacked authority to order visitation rights in mere property.

The court in *Arrington* reached a similar conclusion. *Arrington* involved a custody dispute over Bonnie Lou, “a very fortunate little dog with two humans to shower upon her attentions and genuine love frequently not received by human children from their divorced parents.” The trial court had awarded custody of Bonnie Lou to Mrs. Arrington. Mr. Arrington appealed, claiming he should have been appointed “man-
aging conservator” (primary guardian) of Bonnie Lou. The Court held that managing conservatorships were designed for humans, not animals. The Court held, “A dog, for all its admirable and unique qualities, is not a human being and is not treated in the law as such....A dog is personal property, ownership of which is recognized under the law.”

There is an indication that the legal status of dogs and other pets may be beginning to change. In *Raymond v. Lachmann*, the court had to determine the custody of a cat named Merlin. The defendant originally owned Merlin, but left him for one and a half years with a former roommate, the plaintiff. During that time, the plaintiff renamed him “Lovey” and grew to be quite attached to him. The trial and appellate courts both held that Lovey should remain in the custody of the plaintiff, who had taken care of him for a lengthy period of time. What is remarkable about this case is that the court used a “best interests of the cat” standard to decide the issue. The court discarded strict application of property law and in its place adopted a version of the “best interests of the child” standard from (human) family law. The court held:

Cognizant of the cherished status accorded to pets in our society, the strong emotions engendered by disputes of this nature, and the limited ability of the courts to resolve them satisfactorily, on the record presented, we think it best for all concerned that, given his limited life expectancy, Lovey, who is now almost ten years old, remain where he has lived, prospered, loved, and been loved for the past four years.

Some courts have also recognized that pets are more than mere property in the context of tort awards. In *Corso v. Crestford Dog & Cat Hospital, Inc.*, a New York City civil court judge awarded $700 in damages to the owner of a deceased poodle. The dog had been euthanized by the defendant, on instructions from the plaintiff. "The plaintiff had arranged for an elaborate funeral...including a headstone, an epitaph, and attendance by plaintiff’s two sisters and a friend." When the plaintiff opened the casket, however, she saw the body of a dead cat. She brought suit, alleging that she had suffered emotional distress as a result of the incident. The Court held that the plaintiff was entitled to sue not just for the market value of the dog (for conversion of her property) but also for her mental anguish and suffering in seeing the cat instead of her dog. The Court stated:

This court now overrules prior precedent and holds that a pet is not just a thing but occupies a special place somewhere in between a person and a piece of personal property....A pet is not an inanimate thing that just receives affection it also returns it....To say that [the poodle] is a piece of personal property and no more is a repudiation of our humanness. This I cannot accept.

*Dicta* in other cases demonstrate that courts are beginning to rethink the concept that pets are mere property. In *Bueckner v. Hamel*, the Texas Court of Appeals had to decide the amount of damages to be awarded the owner of then-deceased dogs, a dalmatian and an Australian shepherd. The defendant shot the dogs while they were chasing a deer. The plaintiffs brought suit to recover damages for the loss of their property, which the trial court found “had special value to the Plaintiffs and were loved as pets by the Plaintiffs." The majority concluded that “Texas law recognizes a dog as personal property”—a holding consistent with *Sentell*. The majority went on to hold that the plaintiffs could recover only for the loss of value of prospective puppies but only in the context of how much the animal itself would be worth as breeding stock.

A concurring judge took a broader view of damages in the case. He said the award for damages should be based on “the intrinsic or special value of domestic animals as companions and loved pets.” The market value was inadequate to compensate the plaintiffs for the full extent of their loss. "It is common knowledge among pet owners that the death of a beloved dog or cat...can be a great loss." He called for the acknowledgment of pets as a special form of property based on the relationship between humans and their pets:

Many people who love and admire dogs as family members do so because of the traits that dogs often embody. These represent some of the best of human traits, including loyalty, trust, courage, playfulness, and love. This cannot be said of inanimate property. At the same time, dogs typically lack the worst human traits, including avarice, apathy, pettiness, and hatred....Losing a beloved pet is not the same as losing an inanimate object, however cherished it may be. Even an heirloom of great sentimental value, if lost, does not constitute a loss comparable to that of a living being. This distinction applies even though the deceased living being is a nonhuman.

Juries have been following this trend. In cases where harm had been done to pets, juries have been awarding damages as high as $35,000. In contrast, the average award in the early 1990s was only a few hundred dollars.
V. Breed Discrimination Should Be Ended Through Legislation or Administrative Regulation

A central principle of insurance law is that insurance companies operate at the pleasure of the states. Indeed, the organization of an insurance company and the conduct of the business of writing insurance is not a right but a privilege granted by the State subject to the conditions imposed by it to promote the public welfare. The power to regulate insurance is so strong that a state may take over the entire business of insurance if it decides it is in the public interest to do so.

States have the power to regulate insurers as an exercise of their police power. Although insurance law is governed in part by contract law, it is also quasi-public in nature. States have the power not just to regulate insurance contracts, but also to declare the terms and conditions of those contracts and to impose additional duties and obligations. On the other hand, when a state does not regulate a particular practice of the insurance industry, companies are free to contract as they see fit.

States regulate and legislate insurance on behalf of the public interest. Regulations counterbalance free market forces to protect the public at large. Some states prohibit unfair and deceptive trade practices. Some administratively set rates. In determining whether a rate is reasonable, states will look to see if the rate is based on “legitimate cost factors.” Some states require insurers to write policies for particular risks, even though the marketplace may have determined such insureds are poor risks or that they are simply uninsurable.

In 1997 D.S. Hellman evaluated the widespread practice of the time of insurers in denying health, life, and disability coverage to victims of domestic abuse. She presented a compelling and detailed analysis of the philosophical and legal implications of this practice, ultimately concluding that state legislatures should intervene and prevent underwriting decisions based on a customer’s history of domestic abuse.

Hellman’s analysis started with the premise that insurers had been able to draw an actuarially justified conclusion that domestic abuse victims were, from a statistical standpoint, more likely than others to be victimized in the future and, thus, to result in claims against their insurers. Domestic abuse victims were a higher risk—so high, the insurers concluded, that the insurance pool could not bear to have them as a risk, no matter how high the premium. Breed discrimination is an entirely different problem altogether. There is a lack of statistically and scientifically sound data to show that certain breeds are more dangerous than others. Even if such data existed, a plausible case could be made that the breed of a family’s dog should not be used as a factor in underwriting.

Insurers’ Duty

In making underwriting decisions, insurers decide which of many risks to insure in order to protect their fiscal solvency and profitability. When an underwriter decides not to insure a particular risk, the would-be insured is left to find insurance elsewhere. If no insurer will underwrite or accept the risk, the result may be a cost-shifting to society or the loss of an economic opportunity to a consumer.

The question then becomes which factors an insurer may consider in making its underwriting decisions. Insurance is a highly regulated industry. It does not operate in a regulatory vacuum, free to let the give-and-take of the marketplace decide who gets insurance, how much coverage they get, and how much it will cost them. There is social utility in making insurance available to the highest number of people possible. Insurance allows people to buy homes, afford health care, and drive automobiles. The high stakes and high social utility of insurance have historically justified strict government regulation of the industry.

All states require underwriting decisions to be based on actuarially sound data. In Maryland, for example,

An insurer or insurance producer may not cancel or refuse to underwrite or renew a particular insurance risk or class of risk for a reason based wholly or partly on race, color, creed, sex, or blindness of an applicant or policyholder or for any arbitrary, capricious, or unfairly discriminatory reason.

Maryland law also provides that underwriting must be accomplished “by the application of standards that are reasonably related to the insurer’s economic and business purposes.”

Actuarially justified underwriting is not only the law, it is good business. By accurately separating out risks into “not insurable” and “insurable” (and, then, in turn, separating out insurable risks into various risk classifications), actuarially justified underwriting promotes efficiency and profit. Consumers are not allowed into the insurance pool when the likelihood of loss is so high that inclusion of their risks threatens the viability of the pool itself. For those insureds allowed in the pool, actuarially justified underwriting pro-
motes efficiency by assigning low premiums to low-risk insureds and high premiums to insureds more likely to have a claim.390 This creates a market incentive for low-risk insureds to participate in the pool as opposed to engaging in adverse selection.391 Accurate risk classification also maximizes profits for the insurer. By eliminating the highest-risk insureds from the pool, an insurer keeps premiums low for the low-risk insureds who remain. An insurer that does not maintain its “classification edge” faces the potential of having its low-risk insureds leave to join other companies that are able to charge lower premiums due to better risk classification decisions.392 The insurer is stuck with its high-risk insureds as well as the high-risk insureds who migrate over from the insurer’s competition.393 This means that the insurer is not maximizing its profitability.

How much statistical correlation is required for a rating factor to be “actuarially fair”? How legitimate do “legitimate cost factors” have to be?394 Certainly, perfect 1:1 correlation is not required.395 Thus, I do not suggest that insurers must be able to demonstrate that every Chow Chow will have an unjust bite in its lifetime. Risk classification necessarily will involve some “false positives.”396 Otherwise, insurers would be very limited in the classifications they could use, there would be insufficient stratification of the rate pool, and the dangers of moral hazard397 and adverse selection398 would increase dramatically. On the other end of the spectrum is the insurers’ position, that any correlation is sufficient.399 This is not an economically viable position for an insurer, since low-risk insureds may be incorrectly classified as high-risk customers, and high-risk insureds might be priced out altogether.400 For example, my ownership of a rottweiler and a half-Chow put me in an irrationally high-risk classification—so high that every insurer except the Farm Bureau declined to provide coverage. The dozen or so insurers that I contacted in Lubbock who declined to provide coverage lost out on what would otherwise be a low-risk insured, simply because they adhered to a hypothesis (rottweilers and Chow Chows are more dangerous than other dogs) that has not been scientifically proven. In my case, the insurer who used a more actuarially sound rate classification structure (the Farm Bureau) benefitted by offering a low-risk consumer a low-risk premium, thus gaining a market advantage over its competition.401

I do not believe there exist sufficient data for an insurer to even justify a weak correlation between breed and bite risk. Insurers should work to minimize the risk of false positives so as to “fine tune” their risk classifications to the greatest extent possible.402 Risk classifications should be sufficiently refined so as not to be overbroad. Excluding all dogs would clearly be overbroad and would come with high social costs. Excluding some breeds is also unsound, based on my review of the scientific literature.403 What I propose—and what the Task Force on Canine Aggression and Human-Canine Interactions proposed404—is the refinement of breed-specific actions by legislatures and insurers to control and regulate “dangerous dogs.” Dangerous dogs are those who have demonstrated (on an individual, dog-by-dog basis) a propensity for violence. This would be actuarially fair because adequate evidence exists that a dog with a history of unjustified bites is likely to be dangerous in the future.

As demonstrated in Part II, there is insufficient evidence to support the insurance industry’s argument that certain breeds bite more often. In other words, the current risk classification (by breed) is too general and is generating too many false positives while at the same time having unnecessary social costs. A spokesperson for the III recently conceded, “[T]he industry isn’t positioned to determine which dogs should be deemed vicious.... [W]e’re certainly not dog experts or veterinarians.”405 Unless and until the industry can demonstrate that different breeds have different relative dangerousness ratios with some degree of accuracy, breed discrimination should be opposed by the general public, insurers themselves, and regulators.

### Arguments to Support Regulation in the Public Interest

The law is full of examples where “actuarially fair” factors have nevertheless been prohibited in underwriting because of overriding public interests. Statistical correlation between behavior and risk, therefore, is only the first step in a much bigger, public policy analysis. Drive-through deliveries,406 preexisting medical conditions,407 civil rights,408 and witness intimidation409 are all examples of where otherwise actuarially justified practices were prohibited by state legislatures and courts due to overriding interests in equality, health, and fairness.

Part IV demonstrated the importance of dogs and other pets in society. Pets provide physical and emotional benefits to humans and are not mere property. Even if breed discrimination were actuarially justified, I think a plausible argument would exist that the practice should be regulated because of the public interest in protecting animal-human bonds.

There is an additional, and arguably more important, social value that is compromised by breed discrimination: homeownership. Most home buyers require homeowners’ insurance in order to purchase a home. This requirement comes from mortgagors, who
require some protection in the event their security (the home itself) is destroyed, damaged, or otherwise made unavailable for collection. As the Seventh Circuit stated in *American Family v. American Family Mutual Insurance Co.*, “No insurance, no loan; no loan, no house; lack of insurance thus makes housing unavailable.”

The issue in *American Family* was a practice known as “red-lining” where homeowners’ insurance companies were charging higher rates, or declining to write insurance altogether, based on geographic location of insureds. The boundaries (“redlines”) that defined the no-insurance zones frequently fell along racial and socioeconomic lines, and the NAACP brought suit alleging that this practice was discriminatory and illegal. The Seventh Circuit held that red-lining violated the Fair Housing Act, a statute passed by Congress to prohibit discrimination in the housing market.

It is quite possible that red-lining was actuarially justified; that is, it may have in fact cost insurance companies more to write policies in certain areas than others. This, however, did not end the inquiry for Congress or the Court of Appeals. The Seventh Circuit held that homeowners’ insurance is a service that has the power to make homeownership available. If a plaintiff can demonstrate that an application for homeowners’ insurance was rejected or unfairly rated on the basis of race or another prohibited factor, the practice constitutes discrimination in housing.

Homeownership is a worthwhile public interest. People who own their homes develop roots in a given community. A homeowner is less likely to leave than is someone who is in a year-to-year or month-to-month lease. The homeowner, therefore, has a personal investment in the well-being of the community. Homeownership provides an incentive for civic involvement and community-wide improvement. For many families, homeownership is the way to accumulate wealth for the future. Home equity can be borrowed against for emergencies, higher education, or retirement. The family home is often the most significant component in an estate after a parent dies.

Breed discrimination should, thus, be viewed in a larger social context. There is a high social cost when someone is denied homeowners’ insurance: he is unable to buy a home. The social harm in preventing the dream of homeownership must be weighed against the small risk of a dog-bite claim. There are over fifty million dogs in the United States, yet only a few dogs have been responsible for biting people.

This is not a simple matter of deciding to throw away the family trampoline or forego the purchase of an in-ground pool. Pets are not merely property. To make people choose between the family pet and homeownership is unfair, unnecessary, and goes against an important social value: homeownership.

### How Else Can Insurers Control Risk?

Let me assume for the moment that insurers could demonstrate with some degree of actuarial confidence that some breeds are more likely to bite than others. Could there be other ways of controlling this risk, short of outright denial of coverage?

#### Exclusions

When I was shopping for homeowners’ insurance, one of the first questions I asked insurers was whether they would write a policy with an exclusion for dog bites. I did this because I was desperate—I needed insurance and I was willing to assume the risk that my dogs were not dangerous and were not likely to bite someone. Insurers still turned me away. They refused to write a policy with a dog-bite exclusion in it.

There are several good reasons why exclusions may not be good public policy or wise business sense. Exclusions operate to the detriment of third parties, those would-be plaintiffs who are injured and need compensation for their loss. Exclusions would create pockets of plaintiffs who would, in effect, have no way to satisfy a judgment if they could prove liability. This is not an insignificant public policy, for the same reason that states require certain professionals to have liability insurance and drivers to carry minimum limits on their automobile policies to provide a source of recovery for third parties in the event of a legitimate claim. If we exclude dog bites or even those dog bites from breeds we can prove are the most dangerous, we would run the risk of creating a special class of plaintiffs who would have no source of recovery. Plaintiffs would have to turn to other sources in order to have their basic medical needs met.

Exclusions are also bad for business because they make insurance less attractive to consumers. A person with cancer is a much higher risk than a healthy individual. If a health insurer began excluding coverage for cancer treatment, few employers or individual consumers would purchase that company’s insurance. My decision to try to bargain my way into the insurance risk pool by excluding dog bites from coverage was, in reality, pretty stupid. In the rare event that I was found liable for one of my dogs biting someone, I would be solely responsible for the judgment against me. I would lose whatever equity I had in my house, my car, my savings, and I could have my wages garnished. In retrospect, an exclusion would not have been a good choice for me.
Insure but Reclassify
Another option would be for insurers to write policies for families with “dangerous” breeds but charge them higher premiums. Risk classification is an accepted practice in the insurance industry. By separating and grouping people of similar risks, insurers keep rates low for the desirable, low-risk insureds, and insure adequate resources in the event that high-risk insureds cause a claim. I would have the same objection to high-risk classification for owners of certain breeds as I would for outright refusals to insure, that is, the lack of actuarial justification for the practice of breed discrimination. Classifying certain dog owners in a higher category is unfair because it places those insureds in an artificially higher rate bracket. This is economically inefficient, although perhaps more profitable for the insurer.

Where I think risk classification could work is if insurers could demonstrate—to the veterinary and CDC communities with a sufficient degree of scientific certainty—that certain breeds, when they do bite, cause more damage. It is hypothesized, for example, that the jaw structure of pit bulls causes them to inflict more injury than other breeds. This would still be breed discrimination but, in my view, an acceptable form of risk classification—provided there is a scientific/veterinary basis for the conclusion. To date, the studies in this area have focused on determining the number of bites per breed, not the amount of damage per bite.

I believe insurers would also be actuarially justified in classifying homeowners based on whether or not they own a dog, period. One does not need to be an actuary to state that a dog owner is more likely than a non-owner to have a bite claim against him. Insurers could simply classify all dog owners at a higher rate level because they are more likely to have claims against them. Let’s be clear: this is not what is going on right now. The current practice of breed discrimination is to differentiate among breeds, even though there is no statistical evidence to prove that certain breeds are more dangerous than others. This creates an artificial risk classification that charges owners of certain breeds more than others.

If all dog owners were classified at a higher rate than non-dog owners, I think there would be a great public outcry. Then the social value of dogs as pets—and as security alarms on four paws—would come to the forefront of the debate.

Allow the Marketplace to Correct Itself
If, as I conclude, there are no reliable data to support breed discrimination, then there is a market of consumers (owners of rottweilers, pit bulls, etc.) being overcharged or not served altogether. This creates an economic inefficiency. An insurer with good business judgment would seek to corner this underserved market by writing policies with low-risk premiums.

There are a number of reasons why the market is not correcting itself. The number and identity of people being affected by breed discrimination is unknown. Without these data it would be difficult for an insurer to market itself to those consumers. Also at work is the fact that insurers try to market themselves to the lowest-risk consumers. Although these consumers pay lower premiums, they are responsible for fewer claims. Every insurer tries to maximize its number of low-risk insureds while maximizing the number of high-risk insureds who are serviced by its competitors. The insurance industry as a whole appears to be caught up in this breed discrimination hysteria. Individual companies may fear that the assumptions behind breed discrimination are in fact true and therefore see little incentive to market themselves to people they view as high-risk. For these reasons, it is unlikely that the marketplace will correct itself to end breed discrimination.

Other Solutions
Preventing law-abiding homeowners from obtaining insurance is not the answer to the problem of dog bites. Better and more effective alternatives exist.

Collect Better Data
An initial first step would be to improve surveillance and reporting of dog bites. Until accurate numbers for the numerator and denominator in the relative dangerousness ratio can be ascertained, insurers and governments will be without realistic data on which to base meaningful decisions. The need for more accurate data collection has been championed by the very scientists who have tried to calculate the scope of the dog-biting problem. In addition, studies should be commissioned to determine if certain breeds, when they do bite, cause more physical injury or damage.

Enforce Existing Laws Against Dogfighting and Dogs at Large
There are existing laws that, if enforced more vigorously, could reduce the number of dog bites. Dogfighting explains why some dogs are vicious. This underground industry brings some dogs “to the verge of bloodlust.” By shutting down criminal organizations of illegitimate breeders, promoters, and owners, local governments could take a first step toward reducing bites by dogs that have been purposely bred to be dangerous. The ARC and other groups support the use of existing laws to break up dogfighting rings.

Many attacks appear to be caused by strays or dogs who have been per
mitted to run off-leash.\textsuperscript{435} The enforcement of existing laws against “dogs at-large” could reduce the number of bites.\textsuperscript{436} While these laws exist in many places, they are not adequately enforced.

Owners are sometimes to blame for socializing a dog to be dangerous or for permitting it to get into situations where it can cause injury. Dogfighting, leash, and at-large laws address the root of the problem, which is irresponsible dog ownership. A dog is just as good as his owner trains him to be. One problem dog can be seized and destroyed. One problem owner, however, can continually breed, adopt, or purchase dog after dog. Replacing one dog with another, or one breed with another, will not help to reduce the overall problem of owner irresponsibility.\textsuperscript{437} Existing laws can and should be used to address the behavior.

**Regulate Problem Dogs with Existing “Dangerous Dog” Laws**

Some dogs, as a result of socialization (or lack thereof), bad temperament, or genetics, demonstrate that they are dangerous. They have a history of bites or attacks against people or other animals.\textsuperscript{438} By regulating these individual dogs, municipalities can focus their efforts on the specific dogs likely to cause injuries in the future.\textsuperscript{439} Instead of targeting an entire breed, governments can address the handful of dogs who are really the problem.

There are existing laws that permit local governments to regulate, or in some cases seize and destroy, dogs who have demonstrated a propensity to bite without just cause. Michigan enacted a statute to permit local governments to seize “dangerous animals” and have them tattooed, insured, fenced, sterilized, destroyed, “or any other action appropriate to protect the public.”\textsuperscript{440} The statute provides due process protections to the owner—requiring a hearing by a judge and a finding of dangerousness before a disposition is ordered.\textsuperscript{441} A dangerous animal is one who, without just cause,\textsuperscript{442} bites or attacks a person, or a dog who bites or attacks and causes serious injury or death to another dog while the other dog is on the property or under the control of its owner.\textsuperscript{443} Oklahoma has a similar statute that allows for heightened regulation of animals declared dangerous by their conduct,\textsuperscript{444} but prohibits local governments from enacting breed-specific legislation.\textsuperscript{445}

“Most of the approximately 55 million dogs in the United States never bite or kill humans.”\textsuperscript{446} Dangerous-dog laws are narrowly tailored to address the real problem, which is the small percentage of the overall dog population that is responsible for bites, injuries, and deaths.\textsuperscript{447} Dangerous-dog laws exist in many states. Insurers could work with local governments to fund additional animal-control officers or work with owners of dangerous dogs to help take steps to prevent future dangerous acts.\textsuperscript{448}

**Educate the Public, Particularly Children, about Animal Behavior**

Insurers and local governments could partner together to educate the public about proper ways of socializing and approaching dogs. Proper training is essential for a family with a new dog.\textsuperscript{449} Public education about the importance of neutering can reduce the incidence of dog bites\textsuperscript{450} because a disproportionate number of bites are caused by intact dogs.\textsuperscript{451} New owners should also be educated about the steps in picking the right dog for a household.\textsuperscript{452} “[T]here is no all-around best breed.”\textsuperscript{453} Certain breeds will be more compatible with certain types of families.\textsuperscript{454} Children must also be educated about dealing with dogs safely.\textsuperscript{455} At least one study has demonstrated the effectiveness of public education as a way to improve children’s behavior around and toward dogs.\textsuperscript{456} The study, conducted in Australia, examined the reactions of children, ages seven to eight, to a dog that was tied up in their playground.\textsuperscript{457} Half of the study group received a thirty-minute classroom lesson seven to ten days before on how to safely approach and treat dogs.\textsuperscript{458} Researchers observed the reactions of the children to the dog.\textsuperscript{459} The group that received the classroom instruction displayed greater precautionary behavior than did the control group. While 79 percent of the control group hastily patted the dog and tried to excite it, only 9 percent of the group that received instruction did so.\textsuperscript{460}

**Conclusion**

While dog bites are serious events for those who are bitten, the dog-bite problem is not the public health crisis that the insurance industry has made it out to be. Some perspective is in order. The number of fatalities due to dog bites is very low when compared to the number of people who die from heart disease, cancer, accidents, suicide, and diabetes. Likewise, nonfatal bites are responsible for a small number of injuries when compared to other accidental, unintentional injuries. Falls (11.5 million), motor vehicle accidents (4.3 million), drugs (3.3 million), sports (2.0 million), insect bites (1.7 million), bicycle accidents (1.4 million), poisoning (.7 million), and knives (.6 million) all individually outrank dog bites (.5 million) as public health problems.\textsuperscript{461} Similarly, claims paid out by homeowners’ insurance companies for dog bites are miniscule when compared to payouts for property damage. Damage due to fire, water, wind, and theft represents much larger
problems for homeowners’ insurance companies.

One way to eliminate the entire problem of dog bites would be to outlaw all dogs. Without dogs, there would be no dog bites and no dog-bite-related insurance claims. While this would result in an elimination of the perceived financial burden to insurers, it would not be “practical, realistic, or desirable” to the average layman, scientist, or dog owner. Unless we as a society are willing to disregard the social and health benefits of dogs as pets, then we must be willing to accept a certain number of bites. While “[t]he dog bite problem as a whole is not preventable, it is controllable,” Better alternatives to breed discrimination exist, such as education and enforcement of existing dangerous dog laws.

With over 34 percent of households owning at least one dog as a pet, dogs have become valued four-legged members of our society. To the families that love them, pets are not mere chattel. Refusing to write homeowners’ insurance policies, therefore, should be a narrowly curtailed remedy, limited to those families that own dogs who have proven to be dangerous to life or property. The insurance industry has chosen to paint with a very broad brush. Breed discrimination is an overreaction, an attempt to solve a small problem by prejudging all dogs of certain breeds as likely to be dangerous in the future. When insurers develop underwriting standards and decide which risks to insure, they have a responsibility to the public interest. Insurers do not contract with consumers in a vacuum. A long history of state regulation of the industry serves as a backdrop for this issue. Underwriting decisions should be the product of reason, not speculation. In other words, if insurers are going to engage in breed discrimination, they better have hard science to back up their practice.

The science behind dog bites is inconclusive at best. Most of the scientists authoring studies on dog bites have acknowledged that their data are incomplete and should not be used to enact breed-specific legislation or to deny insurance to families with certain dogs. No study has accurately or completely determined the number of bites per breed, or the number of dogs per breed. Without these numbers, it is impossible to compare breeds on the basis of dangerousness. Insurers who are making judgments about certain breeds are doing so without adequate scientific evidence. This is the Achilles’ heel of breed discrimination; by acting without adequate evidence, the insurance industry has left itself open to regulation by the states.

State regulation is necessary to correct this injustice in the marketplace. Insureds are being shut out of entire markets because of the near-hysteria that has gripped the insurance industry. This is not a new phenomenon for the industry. In the past insurers have cut benefits and denied applications for insurance based on fiscal cost-benefit analyses that have had collateral social and health consequences. It was more costly to keep new mothers in the hospital for forty-eight hours. Our society came to the recognition, however, that discharging new mothers and their newborns within six hours of delivery was against public policy. Legislatures stepped in to correct the injustice in the marketplace, knowing full well that it would cost the industry more money. The same should be done here.

To the insurance industry, breed discrimination reflects a belief that denying coverage to families with certain breeds of dogs will save them money. Insurers have not produced scientific proof that dogs of certain breeds bite more often or cause more damage. The evidence simply does not exist because of the problems of data collection that I have highlighted here. The irony is that insurers who are practicing breed discrimination are turning away good customers who pay premiums. Legislative action to correct this practice will benefit both families with dogs and the shareholders of insurance companies.

Legislative action in this area is both appropriate and necessary. What happened to me is happening across the country to thousands of other families. To some insurers, dogs are mere property—like an old can of paint that can be left behind when a family moves. The truth is that dogs are members of the American family and deserve to be treated as such. When families are forced to make the choice between owning a home and having a dog, some have no choice at all; they must give up their beloved pet to an animal shelter. There are documented increases in “shelter drop-offs” due to breed discrimination. These animals cannot be housed indefinitely, so many have to be euthanized.

The social cost to families is too much to ride on incomplete statistics and hunches by insurance executives. Legislative action is necessary. Luckily, many state legislators have become aware of this problem and have taken steps to end breed discrimination. Pennsylvania enacted a statute prohibiting breed discrimination, which states the following:

No liability policy or surety bond issued pursuant to this act or any other act may prohibit coverage from any specific breed of dog.

New York is considering legislation that would outlaw breed discrimination as well. Bill 6761 would prohibit insurers from refusing to issue or renew, canceling, or charging or imposing an increased premium or rate for owning a dog of a specific breed. A New Hampshire bill would prohibit nonrenewal or cancellation of a policy...
“based solely on the insured owning a certain breed of dog.” 146
Other states should follow suit and enact legislation or administrative regulations to prohibit the practice of breed discrimination.

Notes

1 The Farm Bureau provides a number of services to its members, including insurance and banking. See Texas Farm Bureau, http://www.texasgzb.org (accessed July 7, 2004).

2 On the other hand, renting would not necessarily have been an easy task either. Many landlords prohibit certain breeds from living on their property or forbid dogs altogether. Obtaining renters’ insurance would also have been difficult because of breed discrimination by insurance companies.

3 See infra Part IV. for a discussion of the effects of breed discrimination.


8 Ibid.

9 Ibid.

10 Ibid.

11 Ibid.


13Bayles, supra note 7, B16.

14 Ibid.


18 For a list of communities that have adopted or are considering BSL, see Jan Cooper, “Breed Specific Legislation,” http://www.rott-n-chatter.com/rottweilers/breedspecific.html (accessed June, 2004).

19 Ibid.


22 Ohio Revised Code Annotated § 955.22(c) (West 2004).

23 Ibid. § 955.22(d)(2).

24 Ibid. § 955.22(E).

25 Denver, Colorado, Revised Municipal Code § 5-55(a) (2003). This ordinance provides several exceptions, including a grandfather clause, possession by animal shelters or humane societies, public exhibition, or transportation through the city. Ibid. § 5-55(c).

26 Ibid. § 5-55(b)(2). For an analysis of the problem of defining “pit bull,” see infra notes 240-241 and accompanying text.

27 Ibid. § 8-52(a)(1).

28 Ibid. § 8-52(c)-(d).


30 See Grey, supra note 17, 418.


34 Garcia, supra note 12, 267; Grey, supra note 13 (1988), 279, 280–93.

35 See, for example, Garcia, 767 P.2d at 358. Since dog ownership is not a “fundamental right,” BSL need only meet the “rational relationship” test. She is constitutional. Sullivan, supra note 34, 281.

36 See, for example, Garcia, 767 P.2d at 358–62.

37 See, for example, ibid., 361.

38 Ibid.

39 See, for example, ibid., 361–63.

40 See, for example, Hearrn v. City of Oceand Park, 772 P.2d 758, 762–65 (Kan. 1989).

41 See, for example, ibid.

42 See, for example, ibid., 766.

43 See, for example, ibid.

44 533 N.E.2d 642 (Ohio 1989).

45 The ordinance prohibited the sale of pit bulls and required the registration of any pit bulls within city limits. Ibid., 644. Transportation of pit bulls was permitted only if they were muzzled and leashed. Even then, they could only be transported to a veterinarian. Ibid., 644.

46 Ibid., 644. For further discussion of the problem of identifying dogs by breed, see infra Part II.


48 Ibid., 646.

49 Ibid.

50 Ibid.


53 Ibid.


Breed discrimination is not confined to American insurers, either. Reports have also come from Canada describing the practice there by Canadian insurance companies. “Calgary Man Denied Home Insurance Renewal Due to the Type of Dogs He Has,” *Canadian Press* (accessed May 12, 2004), 1A; “Due to the Type of Dogs He Has,” *The Canadian Press* (accessed May 12, 2004), 1D; Charles Toutant, “Insurance Industry Points to Rising Construction Costs and Natural Disasters, Such as Wind and Hail, as Principal Causes for the Rise in Premiums,” Ibid.

Davis, supra note 58, 36 (quoting Alexander Soto, spokesperson for the Insurance Information Institute, a trade group of the insurance industry).


Hattaway, supra note 59.

III, Dog Bite Liability, supra note 66.

Nationalwide Insurance stated to USA Today that it relies on CDC data to support its breed-specific policies. McMahon, supra note 55, 03a.

Hattaway, supra Part II.

III, Dog Bite Liability, supra note 66.

Hattaway, supra Part II.

III, Dog Bite Liability, supra note 66.

Hattaway, supra Part II.

III, Dog Bite Liability, supra note 66.

III, Dog Bite Liability, supra note 66.

III, Homeowners Insurance, supra note 65.

III, Homeowners Insurance, supra note 65.

Ibid. A plausible argument could be made that dog bites are a preventable risk, in a way that damage due to fire, mold, and theft are not. Property damage claims are the result of true accidents—unforeseeable acts for which insurers have little to no control over. Dog bites are one small way in which insurers can try to minimize risk. In reality, big-ticket risks can be controlled. Insurers could decide, for example, not to insure a home unless it has smoke detectors. This would provide an incentive for people to install smoke detectors, which would, in turn, reduce the number of fire-related claims. Insurers could also just refuse to write policies for homes where there is a high risk of wind or hail damage. Any risk is controllable, but only to the extent that the insurance market can bear the loss of this business.

As shown, supra, while the industry’s aggregate figures may sound “scary,” they misstate the scope of the dog-bite problem in the larger context of total claims paid.

III, Dog Bite Liability, supra note 66.

Davis, supra note 58, 36 (“We just know that certain breeds, when they do attack, tend to cause a lot more damage when they do bite, not because they bite most often.”); Randall Lockwood and Kate Rindy, “Are ‘Pit Bulls’ Different? An Analysis of the Pit Bull Terrier Incident Costs and Other Sources to Classify Deaths. There is a category of deaths just for dog bites: “E906.0.”

NCHS uses reports from hospitals and other sources to classify deaths. CDC 1989–1994, supra note 17.

Hattaway, supra note 70, 1114.

Hattaway, supra note 70, 1114.

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Hattaway, supra note 70, 1114.

Ibid. The courts, however, declined to exercise jurisdiction and instead deferred to ongoing proceedings before the Maryland Insurance Administration. Ibid., 597. The owners had filed a complaint with the MIA alleging that the insurance company’s practice of breed discrimination is inconsistent with Maryland law. Ibid., 596–597.

Stephanie Davis, “ASPCA/HSUS Campaign Tackles Insurance Industry,” *DVM: The Newspaper Magazine of Veterinarian Medicine* 34 (November 2003), 1. (“Some household name insurers sometimes either have canceled or refused to write homeowners’ policies for individuals with certain dog breeds.”)


See *infra* Part I, for the insurance industry’s arguments in favor of breed discrimination.

Davis, supra note 58.

Sodergren, supra note 59.


Davis, supra note 58.


III, Homeowners Insurance, supra note 65.

III, Dog Bite Liability, supra note 66. The insurance industry points to rising construction costs and natural disasters, such as wind and hail, as principal causes for the rise in premiums. Ibid.

Davis, supra note 58, 36 (“We don’t discriminate or deny coverage based on breed of dog.”); McMahon, supra note 55; Hattaway, supra note 70, 1114.


Sodergren, supra note 59.

Ibid.

Davis, supra note 58, 36 (“We don’t discriminate or deny coverage based on breed of dog.”); McMahon, supra note 55; Hattaway, supra note 70, 1114.

Philip Phillips, supra note 85.

Infra Part III.


Ibid., 838.

See infra Part II.


Ibid. The NCHS uses reports from hospitals and other sources to classify deaths. CDC 1979–1988, supra note 91, 1489.

The NCHS uses reports from hospitals and other sources to classify deaths.


The HSUS reports are particularly detailed and are believed to be the most accurate in determining the true breed of a biting dog. CDC 1995–1996, supra note 93. The HSUS staff reviewed police reports, animal control reports, statements by dog owners and victims, and photographs. Ibid.


Victims were often elderly, suggesting that “the main victims of fatal dog bites were the very young and very old, those least able to
I call “just cause” bites. The last two digits. They called numbers until an eligible control dog was found.

The Sachs/Sinclair study attempted to piece together the data on attacks by breed from the previous three studies as well as new data from 1997 and 1998. Ibid., 837.

Emergency Departments—United States, Dog Bites-Related Injuries Treated in Hospital result in SCMT coding and are more likely to than nonfatal bites because fatal attacks result in 28 percent of the deaths during the study period.

The authors, Gershman and Sacks, were with the CDC at the time.

Supra Part II. for a discussion of what I call “just cause” bites.

Kenneth A. Gershman, Jeffrey J. Sacks, and John C. Wright, “Which Dogs Bite? A Case-Control Study of Risk Factors,” Pediatrics 93 (1994), 913. Two of the three authors, Gershman and Sacks, were with the CDC at the time.

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148Ibid., 317. The survey included children in preschool to twelfth grade.

3. The study went on to find that children’s attitudes toward dogs were not affected by being bitten: “Children appear to accept being bitten by dogs much as they do other accidents such as falling off a bike. Being bitten had little influence on their liking for dogs.”


Ibid., 194.

Ibid.


Ibid., 1499. For further discussion of the problem of breed misidentification, see infra Part II. 115


Ibid. (Fatal attacks are easier to track than nonfatal bites because fatal attacks result in SCMT coding and are more likely to be reported by the news media).


Ibid.

Ibid.

Ibid. This accounted for approximately 28 percent of the deaths during the study period.


Ibid., 1489. 112 For further discussion of the problem of breed misidentification, see infra Part II.


Ibid. (Fatal attacks are easier to track than nonfatal bites because fatal attacks result in SCMT coding and are more likely to be reported by the news media).


Ibid., 1491.

Ibid.

See supra note 101 and accompanying text.

CDC 1989–1994, supra note 17, 894. They estimated that, in 1994, 1.8 percent of the population was bitten by a dog and 0.3 percent of the U.S. population sought some medical care for a dog bite.


The NEISS-AIP is operated by the U.S. Consumer Product Safety Commission.

Ibid.

Deaths were excluded from the study.

Ibid.

Ibid.

Ibid.

Ibid.

Ibid.

Ibid.

Ibid.

Ibid.

Ibid.

Ibid.

See infra Part II.

CDC: Nonfatal, supra note 123.

See infra Part II. for a discussion of what I call “just cause” bites.

Kenneth A. Gershman, Jeffrey J. Sacks, and John C. Wright, “Which Dogs Bite? A Case-Control Study of Risk Factors,” Pediatrics 93 (1994), 913. Two of the three authors, Gershman and Sacks, were with the CDC at the time.

Ibid., 913.

Ibid., 914.

Ibid., 914.

Ibid., 913.

Ibid. To create a control group, the authors used the first five digits of a biting-dog owner’s phone number and randomized...
In the report, the CDC notes that the popularity of rottweilers has increased in recent years, with a particular focus on fatalities involving AKC-reccognized breeds. The report discusses the challenges in determining the cause of attacks, including the difficulty in identifying the breed of a dog involved. It is noted that the representation of breeds in fatalities may not accurately reflect the actual risk posed by different breeds.

The report also mentions the American Kennel Club registration data, noting that while rottweilers are among the breeds with the highest registration numbers, they are not associated with the highest number of fatalities. The report points out that the representation of breeds in fatalities is subject to change over time.

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County 1979). 338, 340 n.1 (Tex. 2000) (citations omitted);

...and in a large measure prescribe the terms and conditions of such contracts, and it may impose duties and obligations incident to the relation created by the contract or the negotiations for a contract different from those arising or existing under other contracts, and it may prohibit the parties from altering such duties or obligations.” In Bbekken, the North Dakota Supreme Court had to decide whether a beneficiary of a life insurance policy could enforce the policy even though the insurance company had not acted promptly in writing the policy before the deceased died. The Court held that the insurance company had breached its duty to act promptly on the deceased’s application and ordered the company to pay the beneficiary. Ibid., 218.

One court has stated, “Such regulation, even down to ‘the minutest particular in the interest of the public,’ has never been questioned.” Blue Cross & Blue Shield, 674 N.E.2d, 1126 (quoting People v. Fornos, 30 N.E. 492 [N.Y. 1892]).


342Ibid., 694.

343Ibid., 694.

344Ibid. The Court noted, however, the dogs can be considered property for purposes of the Act’s conversion.

345Ibid.

346Ibid.

347Ibid.

348Ibid.

349Ibid., 530–31.

350Ibid., 531.


352Ibid., 370.

353Ibid.

354Ibid.

355Ibid.

356Ibid., 371.

357Ibid., 373 (J. Andell concurring).

358Ibid.

359Ibid., 376.

360Ibid., 377.

361Ibid., 377–378.

362Willings, supra note 290.


...for older people (who pose a greater risk) in essence discriminated against the young. Ibid., 394–395. Since state law did not prohibit discrimination based on age or life expectancy, the Alabama Supreme Court held that the insurance company did not do anything illegal.

367Blue Cross & Blue Shield, 674 N.E.2d, 1126 (stating that the conduct of insurance companies is subject to conditions imposed by the state to promote public welfare).


...the rates charged by insurance companies must now deviate from those established by state authority. Rates may not be unreasonable, excessive, inadequate, or discriminatory.” In states where rates are regulated, insurers bear the burden of proving the reasonableness of their rates. Ibid., § 69(b). Legislatures can prohibit discrimination against insureds of the same “class.” Ibid., § 64. Some states provide a private cause of action to enable insureds to recover for unfair trade practices or violations of rate regulations. Ibid., § 45.


370Ibid. § 25. Most states require insurers to contribute to an “assigned risk plan” that writes “high-risk” policies for drivers who cannot get insurance in the free market, often because of DWI convictions. See, for example, Texas Insurance Code Annotated art. 21.81 (2004–2005).


372If a person cannot obtain health insurance, his or her health care costs shift to the public (through Medicare or Medicaid) or to hospitals, which may be required to treat every patient regardless of the ability to pay. In the latter case, the costs are likewise shifted to the public because hospitals must increase costs for paying customers (and their insurers) in order to make up for their losses from their nonpaying customers. Ibid., § 390.

373In the case of breed discrimination, the latter results. If I had not been able to secure insurance with the Farm Bureau, I would have lost out on a significant economic opportunity—the ability to purchase a house. See infra Part V.B. for a discussion of insurance as gatekeeper to homeownership. In the altern-
tive, I could have given up my dogs, which likewise would have been a significant loss of happiness and opportunity. 383See Stone, supra note 380, 386 (stating that insurance is the primary mode people provide for needs not affordable through normal work income).


388Ibid., § 27-501(a)(2).


391Baker, supra note 389, 373.


393Baker, supra note 389, at 377.

394See, for example, 43 American Jurisprudence 2d ed., § 43 (2003).

395Hellman, supra note 376, 380.

396Id., 378.

397Moral hazard is the change in incentives that can result because an individual is protected by an insurance contract. Baker, supra note 389, 373. Insurers without a sufficient personal investment in a particular risk—through co-insurance, for example—may be more likely to engage in the risky conduct in a negligent manner.

398Adverse selection is the tendency for low-risk insureds to drop out of insurance pools altogether, unless administrators provide financial incentives for them to remain in the pools. Ibid., 375–376.

399See Hellman, supra note 376, 380.

400Ibid., 380–381.

401Ibid.

402Ibid., 380 (noting that “statistical discrimination is justified when the social utility, including the cost to the insurer of employing a particular classification, could not be increased by further refinement of the classification,” a view expressed by Steven Meitzen in “The Ethics of Statistical Discrimination.” See supra note 17, 421; 23, 261).

403Frederick Schauer argues that BSL and breed discrimination are justified practices. Frederick F. Schauer asserts that BSL and breed discrimination are justified practices. He then goes on to argue that BSL and breed discrimination, while both underinclusive and overbroad, are justifiable from the perspective of statistical correlation and the need to protect people from dangerous events. Ibid., 59. As I have demonstrated, however, the correlation between breed and dangerousness is weak at best. See supra note 2 Part II. Schauer’s citation for his proposition is several of the CDC studies that have been discussed in this article. Schauer, supra, at 59 n.7; see supra Part II. Yet, these very studies cautioned that their data were incomplete and that it would not be statistically sound to make generalizations about breeds. See supra Parts II & III.

404Task Force, supra note 5, 1737.

405Davis, supra note 58, 36 (quoting Alexandra Soito, spokesperson for the III).


A Michigan court declared unlawful the practice of refusing to write automobile insurance for adults under twenty-one unless they resided with parents. Detroit Automobile Inter-Insurance Exchange v. Commissioner of Insurance, 326 N.W.2d 444, 445 (Mich. Ct. App. 1982). The Court found that this practice fixed the status of automobile trade practices law, which permitted refusing to insure a group “only if the cost is unreasonable.” Ibid., 447. The Court affirmed a central notion of insurance law that the free market is not the sole determinant of insurance rates. The court stated, “The mere fact that one group is more expensive to insure than another does not preclude fixing a reasonable rate.”

Plaintiffs have also relied on federal law for relief against discrimination in the provision of homeowners’ insurance. In National Fair Housing Alliance, Inc. v. Prudential Insurance Company of America, 208 F. Supp. 2d 46 (D.D.C. 2002), a U.S. district judge held that discrimination by a homeowners’ insurance company on the basis of race, color, religion, sex, handicap, familial status, or national ori-
gin was made illegal by the Fair Housing Act and implementing regulations from HUD. Ibid., 55–56.

409 At least one court has stated, as a matter of public policy, that insurers may not engage in witness intimidation. In Dorman v. Medical Protective Co., 394 F.2d 57 (6th Cir. 1968), an insurance company cancelled a dentist’s malpractice policy after he testified against another dentist who was insured by the same company. Ibid., 59. The court acknowledged that insurance policies are not contracts but are contracts to public policy concerns. Ibid. In this diversity-of-citizenship case, the Court looked to the law of Ohio and found that the defendant-insurer had violated Ohio’s public policy against witness intimidation. The Court noted the need for expert testimony; the existence of statutes against intimidating witnesses; from testifying, and the potential chilling effect of the defendant’s behavior, and awarded judgment to the dentist. Ibid., 61–63.

410 Of course, if a person can purchase the house through cash on hand, then securing a mortgage unnecessary and obtaining homeowners insurance is “optional.” A prudent homebuyer would nevertheless purchase homeowners’ insurance to protect his or her investment in the event of catastrophic loss.

411 1978 F.2d 287 (7th Cir. 1992).

412 Ibid., 297.

413 Ibid., 290.

414 Ibid., 298.

415 Ibid., 297–298.

416 Ibid., 290–291.


418 Ibid.

419 Ibid.

420 Unless, of course, he is independently wealthy and does not need a mortgage.


422 See, for example, New York Insurance Law § 5303 (McKinney 2003) (New York’s assigned risk plan).

423 Hospitals, Medicare and Medicaid, and health insurers would thus bear the cost for treatment. See Stone, supra note 380, 394 (making a similar argument regarding human diseases).

424 Ibid., 392.


426 See Lockwood and Rindy, supra note 83.

427 In this respect, the use of the term “discrimination” is a bit of a misnomer. All forms of risk classification are acts of discrimination in a literal sense. See Hellman, supra note 376, 378 (“Because all insurer classifications are ‘discrimination,’ understood non-pejoratively, one must ask why use of this classification is ‘plain, old fashioned,’ ‘profoundly unjust[,] and wrong’[null] ‘discrimination’”).

428 Baker, supra note 389, 377.

429 These are alternatives that could be col- laborative endeavors among animal groups, governments, and insurers. At least one insurer, State Farm, has publicly stated its willingness to find proective solutions to the problem of dog bites. See Hattaway, supra note 70.

430 See, for example, Sacks et al., supra note 150, 53; CDC 1979–1998, supra note 94, 840; Winkler, supra note 194, 425.

431 Some scientists have suggested that some breeds are more dangerous because, when they do bite, their jaw structure and other physical characteristics cause them to inflict more pain and physical injury. See Lockwood and Rindy, supra note 83, 36.

432 Brand, supra note 230, 60.

433 Sacks et al., supra note 150, 53 (supporting enforcement of existing laws to regulate dangerous dogs and dog fighting); CDC 1979–1998, supra note 94, 840 (arguing lawmakers to focus their efforts on dog owners, not dogs or breeds); CDC 1989–1994, supra note 17, 894 (same).


436 “To prevent [dog] bites,” suppose the Part II F. Yet, the social cost of having forward-looking regulations—such as BSL and breed discrimination—comes at a very high cost to families that own dogs, particularly those that are seeking to purchase a home. See supra Part IV. Further, individualized, dangerous-dog prosecutions do have a prophylactic effect. Like tort law, dangerous-dog laws indirectly encourage owners to take reasonable steps to prevent injuries. In this respect, dangerous-dog laws can serve as a deterrent against negligent or intentional misdeeds.


438 Ibid. (neutering can reduce aggression).

439 See Gershman et al., supra note 139, 914 (finding a statistically significant relationship between number of bites and intact dogs).

440 Hart and Hart, supra note 449, 1130.

441 Ibid.

442 Ibid. An aggressive dog, for example, might do well with an assertive family.

443 This conclusion has been supported by several scientists. CDC 1989–1994, supra note 17, 894 (calling for education of bite victims and children); Sacks et al., supra note 150, 53 (education programs needed on dog behavior prior, since 1979–1987); supra note 94, 840 (education needed for children); Gershman, supra note 139, 916 (suggesting education programs for children as a method to reduce bites and other attacks); CDC 1995–1996, supra note 93, 466 (discussing public education as a strategy towards reducing bites); Task Force, supra note 5, 1739 (education is key); Hunthausen, supra note 306, 1135 (public education a necessary component of bite prevention). Education is also supported by the AKC, American Kennel Club, “American Kennel Club Statement on Dangerous Dogs,” http://www.akc.org/toe/dip/legislative/dangerous.cfm (accessed June 8, 2004). Other groups support heightened efforts to teach responsible dog ownership and dog safety. OVDO, supra note 51. Educa-
tion is also supported by the insurance industry. Hattaway, supra note 70, 1144 ("I believe that the insurance industry has a role in promoting responsible pet ownership, including education, to help reduce this national problem"); III, Dog Bite Liability, supra note 66 (recommending that homeowners educate their children not to approach a sleeping or eating dog).

456Simon Chapman, et al., “Preventing Dog Bites in Children: Randomised Controlled Trial of an Educational Intervention,” British Medical Journal 320 (2000), 1512–1513. Children are more likely than adults to be the victims of dog bites. CDC 1979–1988, supra note 91, 1490 (70 percent of fatal dog bites were in children under ten years old); Saeks and Kresnow, supra note 150, 52–53 (children account for approximately half of all people who seek medical attention for dog bites); CDC 1979–1998, supra note 94, 836 (most victims of fatal dog bites are children); CDC 1995–1996, supra note 93, 463 (80 percent of fatality victims were children); CDC Nonfatal, supra note 123 (children between five and nine years old are most likely to be victims of nonfatal dog bites).

Some have speculated that children are more likely to be victims than adults because of their small stature and inability to defend themselves. See CDC 1979–1988, supra note 91, 1492 (young and old are most at risk to be victims of fatal dog attacks).

457Ibid., 1512.

458Ibid.

459See ibid.

460Ibid., 1513.


463That would, I suppose, lead more people to get cats as pets. However, there is evidence to suggest that cat bites are more dangerous than dog bites because of the high rate of infection associated with them. See Los Angeles County Animal Care & Control, “Cat Bites,” http://animalcontrol.co.la.ca.us/html/pages/petownerinfo/Catbite.htm (accessed June 9, 2004) (one million cat bites are reported each year in the United States; cat bites can be especially dangerous for children, the elderly, or those with suppressed immune systems); Cynthia B. Whitney, “Ouch!—More Than You Ever Wanted to Know About Cat Bites,” http://www.thecatsite.com/cat_snips/snips.php?ca=bites (accessed June 8, 2004) (reporting that 50 percent of cat bites get infected and that one out of 170 people will be bitten by cats each year); NBC11.com, “Cat Bites Can Be Deadly: Woman Hospitalized After Bite,” http://www.nbc11.com/print/2191468/detail.html (accessed May 9, 2003) (describing the ordeal of a woman who had a “brush with death” after being bitten by her cat; she required hospitalization for a week); Sound Medicine, “Dog versus cat bites,” http://www.soundmedicine.iu.edu/archive/2002/quiz/animalbites.html (accessed July 27, 2002) (50 percent of cat bites are infectious, compared to 20 percent of dog bites; cat teeth can penetrate more deeply and transmit bacteria more easily). In spite of these data, however, the insurance industry has not tried to outlaw cats as pets. Why not?

464Beaver, supra note 461, 1148.

465Ibid.

466Pennsylvania Consolidated Statutes Annotated 3 § 459-507-A(d) (West 2004).


Free-Roaming Dogs in Developing Countries: The Benefits of Capture, Neuter, and Return Programs
Jennifer Jackman and Andrew Rowan

Introduction

As a result of human population growth, poor waste disposal management, the absence of responsible dog ownership policies, and heightened awareness of animal welfare and disease issues, increased attention is being given to the problem of free-roaming dogs. The population of dogs worldwide may be as high as 500 million (Hsu, Severinghaus, and Serpell 2003). Dog-to-human population densities vary from 2.2 dogs/hundred people in urban Zambia (DeBalogh, Wandeler, and Meslin 1993), to 15.8 dogs/hundred people in rural Tanzania (Cleaveland et al. 2003), to 21.3 dogs/hundred people in Kathmandu, Nepal (Kato et al. 2003), and to more than 30 dogs/hundred people in white communities in South Africa (Odendaal 1994) and rural villages in Mexico (Orihuela and Solano 1995) (Table 1).

Free-roaming dog populations have emerged as both animal welfare and public health problems in developing countries. Free-roaming dogs face high mortality, malnutrition, starvation, disease, and abuse; account for 99 percent of cases of rabies transmission worldwide (WHO 2004); and are associated with more than sixty other zoonotic diseases (Beck 2000; Reeece 2005). Additional social problems with free-roaming dogs include road accidents, fighting, noise, bitten children, fecal contamination, spread of rubbish, and uncontrolled breeding.

Public health and animal protection advocates share an interest in reducing dog population growth, improving the health of dog populations, and increasing responsible dog ownership. Approaches to free-roaming dog population management have changed over the past twenty years. Until recently, capture and kill policies prevailed as the primary dog-control method. While even today removal of dogs continues to be a component of dog control in some countries, the World Health Organization (WHO), leading researchers, and animal protection groups have condemned dog removal policies as ineffective and cruel.

Vaccination, habitat control, and responsible pet ownership, including sterilization, are now replacing the capture-and-kill focus of dog control. In 1992 WHO and the World Society for the Protection of Animals (WSPA) issued guidelines for dog population management that recommended dog population surveys; adoption of national legislation to regulate registration, vaccination, identification, sales, and breeding; public education, subsi-
dized neutering; and improvements in veterinary education to include early gonadectomy (Leney 2002).

More recently animal protection organizations have launched capture, neuter, and return (CNR) programs. Modeled on trap, neuter, and release (TNR) programs for cats in the United States, these programs seek to limit population growth and improve dog welfare. Widespread adoption of CNR programs for dogs, along with changes in human behavior and environment, offers a sustainable remedy for both disease and animal welfare problems posed by free-roaming dogs in developing countries.

This chapter provides an overview of animal welfare and public health problems associated with free-roaming dog populations and strategies to resolve these problems. Placing CNR programs in the context of earlier dog and rabies control methods, the chapter explores CNR’s potential to overcome some of the shortcomings of earlier approaches and to improve

Table 1
Dog Populations in Developing Countries, Number of Dogs per Hundred People

<table>
<thead>
<tr>
<th>Country</th>
<th>Dogs/100 People</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Urban</td>
</tr>
<tr>
<td>Argentina—La Pampa</td>
<td>18.30</td>
<td>18.3</td>
</tr>
<tr>
<td>Bolivia—Santa Cruz</td>
<td>25.00</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>6.25</td>
<td></td>
</tr>
<tr>
<td>Bali</td>
<td>19.20</td>
<td></td>
</tr>
<tr>
<td>Kenya—Machakos District</td>
<td>13.00</td>
<td>13.0</td>
</tr>
<tr>
<td>Mexico—Miacatlan</td>
<td>33.60</td>
<td>33.6</td>
</tr>
<tr>
<td>Mexico</td>
<td>14.30–16.70</td>
<td></td>
</tr>
<tr>
<td>Mexico—Hermasillo</td>
<td>12.50</td>
<td>12.5</td>
</tr>
<tr>
<td>Peru—Pacoraos</td>
<td>16.70</td>
<td>16.7</td>
</tr>
<tr>
<td>Philippines—Sorsogo Province</td>
<td>26.30</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>Asian/Colored</td>
<td>13.00</td>
<td></td>
</tr>
<tr>
<td>Black Urban</td>
<td>6.70</td>
<td>6.7</td>
</tr>
<tr>
<td>Black Rural</td>
<td>15.00</td>
<td>15.0</td>
</tr>
<tr>
<td>White</td>
<td>35.00</td>
<td></td>
</tr>
<tr>
<td>S. Africa—Soweto</td>
<td>8.10</td>
<td>8.1</td>
</tr>
<tr>
<td>S. Africa—Maboloka</td>
<td>9.00</td>
<td>9.0</td>
</tr>
<tr>
<td>Sri Lanka—Mirigawa</td>
<td>17.50</td>
<td>17.5</td>
</tr>
<tr>
<td>Tanzania—Serengeti District</td>
<td>15.80</td>
<td>15.8</td>
</tr>
<tr>
<td>Thailand</td>
<td>14.90</td>
<td></td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>15.40</td>
<td></td>
</tr>
</tbody>
</table>
animal welfare, reduce dog population growth, and prevent the spread of rabies and other canine-transmitted diseases. Constraints and current debates on current implementation of CNR programs are also examined.

**Functions and Dynamics of Dog Populations in Developing Countries**

Cultural differences in views of dog ownership and the role of dogs in society influence the prevalence of dogs, the condition of free-roaming dogs, and dog-control policies. In some developing countries, dogs are revered. In Bali, for example, dogs are an important part of mythology, are treated with reverence, and are given ceremonial food offerings (Peacock 2005a). In Bali and many other developing countries, cultural traditions prohibit or oppose euthanasia, and the development of a network of shelters is impractical. Dogs may also be a status symbol for upper-income families in some countries (Reece 2005). The health and psychological benefits of canine companionship have been amply documented in both developing and industrialized countries (Beck 2000). In still other countries and cultural settings, particularly in some Muslim societies, dogs are reviled and are less visible. For example, it has been estimated that there are fewer than a hundred thousand dogs in all of Cairo, a Muslim metropolitan area of eleven million plus (E. Hilby, personal communication with A.N.R., 2006). These numbers would give a dog density of 0.09 dogs per hundred people—by far the lowest density ever recorded (Table 1). Finally, in some countries, dogs are considered to be food (Reece 2005).

Dogs living with humans may be classified into three or four categories: pets, community dogs, strays, and ferals. In developed countries the majority of dogs are pets (i.e., they are allowed in the house, given names, regarded as part of the family, and never eaten). Those dogs that are not pets are either stray animals or true ferals (a very small percentage). Except in some traditional communities (e.g., Native American), there are no community dogs.

In most developing countries, the main function of dogs is to protect property. Dogs in Soweto, South Africa, are used primarily to guard livestock and property and to hunt (McGrindle et al. 1999). In Machakos District, Kenya, 99 percent of households say that guard duty is their dogs’ primary function (Kitala et al. 2001). In Zimbabwe 60 percent view dogs as guards, and 73.1 percent see dogs as a deterrent to wildlife that they perceive as pests, such as elephants, baboons, lions, and leopards (Butler 2000). In fact, in Africa increases in dog populations may reflect heightened security concerns (Cleaveland 1998). In New Providence, Bahamas, security is also the main reason for keeping dogs for 50.4 percent of households (Fielding and Plumridge 2005). In the Thungsong District of Thailand, 83 percent of households keep dogs as guard animals (Kongkaew et al. 2004). In Miacatlan, Mexico, 65 percent of households reported having a dog for security reasons (Orihuela and Solano 1995).

Patterns of dog ownership in many developing countries differ from those in the United States and other industrialized nations. In developing countries most dogs are community dogs who are affiliated with neighborhoods rather than with individual owners. WHO characterizes dogs in developing countries as restricted dogs, semirestricted family dogs, neighborhood dogs, and feral dogs (Reece 2005). Based on their level of reliance on humans for food, shelter, and care, dogs are fully dependent (restricted dogs), semidependent (family dogs and neighborhood/community dogs), or not dependent (feral/stray dogs).

Increasingly, researchers agree that most dog populations depend at some level on referral households (Leney and Remfry 2000). Only a small proportion of dogs in South America, Asia, and Africa rely on markets, slaughterhouses, dumps, and restaurants as their sole sources of food (Leney and Remfry 2000; Reece 2005). An estimated 10 percent of dogs are not associated with particular households (Bogel and Meslin 1990). A Zimbabwe study concluded that all dogs are at least semidependent on people and that none is completely “ownerless” (Butler 2000). In Chad, ownerless dogs comprise only 1.1–10.6 percent of owned dogs (Kayali et al. 2003). A 1999 survey in Bangkok found that 20 percent of dogs are ownerless (WHO 2001).

Dogs without a referral household have the lowest reproductive and pup survival rates. These unassociated dogs “do not play a significant role in the reproductivity of this population” (Bogel and Meslin 1990, 282). Instead, free-roaming dog populations are maintained by recruitment from owned populations (Boitsni et al. 1995; Leney and Remfry 2000; Matter and Daniels 2000; Fielding, Samuels, and Mather 2002).

Association of dogs with particular neighborhoods or individual households determines the extent to which these animals are deemed to be accessible to vaccination and sterilization programs. Unreachable strays had been assumed to represent 30–70 percent of the dog population (Cleaveland et al. 2006). However, in Katmandu Valley, Nepal, 86–97 percent percent of dogs are accessible (Bogel and
Joshi 1990). Researchers in studies around the world have confirmed that at most 15 percent of dogs may be inaccessible to vaccination (Cleaveland et al. 2006).

Nonetheless, the majority of dogs in developing countries face few restrictions on their movements. In Machakos, Kenya, 69 percent of dogs are never restricted (Kitala et al. 2001). In the Thungson District of Thailand, 74 percent of dogs are allowed to roam freely (Kongkaew et al. 2004). In New Providence, Bahamas, 73 percent of households keep their dogs outside, and 43 percent of households allow at least one dog to roam (Fielding and Plumridge 2005).

While most dogs may depend on a particular household or neighborhood, the resources provided at “home” sites are often insufficient. Most dogs roam to forage for food since they are not fed daily by owners (McCrindle et al. 1999; Kitala et al. 2001; Fielding, Mather, and Isaacs 2005). Owners also allow dogs loose because they believe unrestricted dogs can better protect property (Fielding, Mather, and Isaacs 2005).

The Welfare of Free-Roaming Dogs
Free-roaming dog populations suffer from extremely poor welfare. The New Providence, Bahamas, animal control unit’s visual inspection of 328 dogs indicated that 70 percent are suffering from disease (Fielding, Mather, and Isaacs 2005). Echinococcosis, toxocara, parvovirus, heartworm, leptospirosis, and venereal tumors are among the diseases that plague free-roaming dogs (Boitsni et al. 1995; HSI 2001; Fielding, Mather, and Isaacs 2005). Many dogs have infectious skin diseases, such as mange, along with secondary bacterial infections. A study in Mexico found that 34 percent of stray dogs had mites and 23 percent suffered from Demodex canis (RodriquezVivas et al. 2003). In a rural community in South Africa, 51 percent of the dogs had a serious clinical condition; of this population 10 percent were acutely ill and half were chronically ill (Rautenbach, Boomker, and De Villiers 1991). Because of their undeveloped immune systems, puppies are particularly susceptible to diseases (Robinson 2000). Free-roaming dogs constantly face starvation, malnutrition, and dehydration (Matter and Daniels 2000; HSI 2001). Dogs also are poisoned, harassed by people, and hit by vehicles (HSI 2001; Hargreaves 2002).

Dogs contract rabies. The length of time between a dog being exposed to rabies and exhibiting symptoms is two to eight weeks (Wandeler and Bingham 2000), at which time he becomes aggressive and seeks other animals to bite (Wandeler and Bingham 2000). Dogs die from rabies within two to three days from the onset of symptoms. In addition to dog rabies deaths, the fear of rabies has resulted in the inhumane killing of dogs who are unfamiliar or who are suspected of having rabies (Cleaveland et al. 2006).

As a result free-roaming dogs have high rates of mortality. The life expectancy of dogs in Zimbabwe communal lands is 1.1 years (Butler 2000); 71.7 percent of dogs died in their first year. Of households with dogs in the Machakos District, Kenya, 67 percent reported that a dog had died recently and a replacement was being sought (Kitala et al. 2001). In New Providence 35 percent of the dog population is lost each year (Fielding and Plumridge 2005). Of households surveyed in Bali, 31 percent had a dog die in the previous year. Very few dogs die of old age (Butler 2000); nutritional, parasite, and disease problems account for high mortality rates, especially in puppies (Matter and Daniels 2000). Pups also are often left unattended, which increases their risk of predation (Matter and Daniels 2000). Because of high mortality rates, dog populations are skewed toward younger dogs. In the Machakos District, Kenya, half of the dogs are less than one year old (Kitala et al. 2001).

Dogs receive little veterinary care in developing countries, which contributes to the spread of disease and high mortality among dogs. Only 40.5 percent of households surveyed in Zimbabwe said they would take their dogs to the veterinarian if they were ill; 12.8 percent would try to cure their dogs with traditional medicine; and the remainder would seek no treatment (Butler 2000). Dogs who are allowed to roam are even less likely to receive veterinary care. Restricted adult dogs in New Providence are more likely to be spayed than are those kept outside (Fielding and Plumridge 2005). The health of fenced dogs is much better than that of free-roaming dogs, since the former are not exposed to fighting and communicable diseases (Fielding, Mather, and Isaacs 2005). In Thailand researchers found that dogs kept in the house are more likely to be vaccinated than those who are allowed to roam freely (Kongkaew et al. 2004).

Female dogs are less likely to be vaccinated, sterilized, or licensed than are males. Only 15 percent of male dogs—but no female dogs—in the Machakos District, Kenya, are sterilized (Kitala et al. 2001). Of male dogs 35 percent are vaccinated, compared with only 20 percent of females. In Zimbabwe, only 0.7 percent of females are spayed, compared with 16.3 percent of male dogs who are neutered (Butler 2000). In Bali only 11 percent of female dogs are neutered, compared with 44 percent of males (Margawani and Robertson 1995). Exceptions to this trend are New Providence, where similar sterilization rates are reported for female and male dogs (Fielding and Plumridge 2005), and Thailand, where female dogs have a higher sterilization rate.
than do males (Kongkaew et al. 2004). In addition, in New Providence more male dogs (59 percent) than female dogs (41 percent) are licensed (Fielding, Mather, and Isaacs 2005).

Female dogs also have shorter life spans. Higher female mortality is related to lower levels of care provided to female dogs. Female dogs are more likely to be abandoned (Fielding, Mather, and Isaacs 2005) and are killed as puppies to avoid pregnancies (Boitsni et al. 1995; Matter and Daniels 2000). People also dispose of female dogs in estrus to disband groups of male dogs (Matter and Daniels 2000). In the Machakos District, Kenya, the life expectancy of male dogs is 3.5 years; for female dogs it is 2.4 years (Kitala et al. 2001). The median age of dogs in New Providence is 1.5 years for females and three years for males (Fielding, Mather and Isaacs 2005).

In most developing countries, preferences for male dogs and higher mortality of female dogs result in sex-based population imbalances (Matter and Daniels 2000). In Istanbul, Turkey, there are 6.8 male dogs for every female dog (WHO 1998b). In Thailand the ratio of male to female dogs is 2:1 (Kongkaew et al. 2004). Of dogs kept in Bali, 85 percent were male (Margawani and Robertson 1995). When it responded to the post-tsunami disaster that hit Sri Lanka in 2004, Humane Society International (HSI) veterinary relief teams found that male dogs outnumbered females by 3:1.

Preferences for male dogs are related to the belief that they make better guard dogs (Kitala et al. 2001). Owners also want to avoid responsibility for dogs in estrus or for litters (Margawani and Robertson 1995; Hsu, Severinghaus, and Serpell 2003). In addition, people choose male dogs more often as pets (Boitsni et al. 1995).

Overpopulation itself is a welfare problem for dogs. In addition to the physical consequences of repeated pregnancies, lactation, and competition for food, overpopulation of dogs results in human society devaluing them. Dogs who can be obtained for little or no cost are at the greatest risk of abandonment (Hsu, Severinghaus, and Serpell 2003). As Thorton (1992, 660) has stated, “Not allowing the excess [in companion animals] is the only effective way to address their welfare.”

Human Health Risks and Free-Roaming Dogs

Rabies

Free-roaming dogs who suffer from disease and overpopulation pose risks of zoonoses, contact injuries, and environmental pollution to human populations (Beck 2000). Rabies is the most lethal of canine transmitted diseases. Despite the development of a rabies vaccine more than a hundred years ago, WHO (2004) reports that half of the world’s human population is at risk for rabies. Every fifteen minutes one person dies from rabies, and three hundred are exposed to the disease (Rupprecht, Hanlon, and Hemachudha 2002). Rupprecht, Hanlon, and Hemachudha (2002, 327) state, “[f]rom a global health perspective...rabies is the most important viral zoonosis.” Ninety-nine percent of rabies deaths take place in developing countries (WHO 2004). Fifty-six percent of rabies deaths are in Asia and 44 percent in Africa. Rabies mortality ranges from 0.001 per hundred thousand in the United States to eighteen per hundred thousand in Ethiopia, with mortality levels of 0.01 in South Africa, 0.47 in Thailand and Vietnam, 0.57 in Sri Lanka, 1.75 in Bangladesh, and 2–4 in India (Haupt 1999) (Figure 1). Bangladesh, India, and Pakistan are among the countries with the highest incidence of rabies (WHO 2001), and half of all human rabies deaths occur in India (WHO 1996).

Dogs are the main rabies vector in Africa and Asia (WHO 2001), and younger dogs pose a greater bite and rabies risk. A study in Thailand found that 62 percent of rabid dogs examined are younger than one year old (Mitmoonpitak, Wilde, and
Tepsumetanon 1997). U.S. studies have found that younger dogs are more likely to bite and their bites are more severe (Wright 1991).

Male dogs are responsible for 59–70 percent of bites (Wright 1991). The rabies virus is more prevalent in male dogs, and the sex of the dog is identified as a risk factor in Bolivia (Widdowson et al. 2000). Differences in bite rates and rabies fatality rates between female and male dogs likely stem from the fact that canine aggression is hormonally related (Lockwood 1995). Unneutered males have particularly high bite rates (Lockwood 1995).

A study of medical records at Centro de Salud in Mexico found that 65 percent of bite victims were bitten at their residence, 32 percent in public locations, and 2 percent at their workplace (Eng et al. 1993). Nolan (2006) noted that domestic dogs cause more serious bites than do feral dogs. These data confirm U.S. studies that have found that dogs owned by neighbors have the highest victim rate and that bites by stray dogs are over-reported (Beck 2000).

Some estimate that only 3 percent of rabies deaths are reported in developing countries (Knobel et al. 2005). Rabies is underreported because patients seek treatment from traditional healers, causes of death are often not reported to central authorities, and rabies may be unrecognizable to medical staff without laboratory confirmation (Cleaveland et al. 2002). An Indian household survey found that only 36.4 percent of residents said they would visit a doctor if they were bitten by a dog (Singh and Choudary 2005).

To compensate for underreporting of rabies, some researchers use dog bite statistics to predict numbers of rabies deaths. Using a dog-bite probability model, 55,270 deaths per year or 1.38 deaths per hundred thousand people are predicted (Knobel et al. 2005). These fatalities include 19,713 deaths in India, 2,336 in China, 9,489 in other parts of Asia, and 23,705 in Africa.

Eighty-four percent of rabies deaths are in rural areas (WHO 2004). In India there are an estimated 2.49 deaths per hundred thousand people in rural areas, compared with 0.37 deaths per hundred thousand people in urban areas. In Africa there are 3.60 deaths per hundred thousand in rural areas, compared with 2.00 per hundred thousand in urban areas (Knobel et al. 2005).

Poverty is also associated with rabies vulnerability. An Indian survey involving twenty-one medical colleges found that 87.6 percent of adults who died of rabies between 1992 and 2001 were poor (Sudarshan 2005). The risk of canine rabies in Mexico is greater in lower-income areas (Eng et al. 1993). Poor children also face great risk. Children under the age of fifteen comprise 40–60 percent of rabies victims (WHO 2001). Half of the world’s malnourished children live in rabies-endemic areas (Sampath et al. 2005).

At the same time, rabies is 100 percent preventable for both humans and dogs. Deaths occur when dog bites go unreported, unrecognized, untreated, or are discovered too late (WHO 2001). The lack of awareness about rabies among the public, health practitioners, and authorities; the shortage of rabies immunoglobulins and funding for modern vaccine; and the lack of priority given to canine rabies control have undermined rabies-prevention efforts (Dodet 2006).

As a result of improvements in postexposure treatment (Mitmoonpitak, Wilde, and Tepsumetanon 1997), rabies deaths did decline in the 1980s and 1990s. Ten million people currently receive postexposure treatment each year (WHO 2002). Predicted deaths worldwide without postexposure treatment would be 327,160 (Knobel et al. 2005). While rabies cases have declined in some areas of the world, they have increased in others. The rabies situation in Sri Lanka worsened after the 2004 tsunami because of increases in the number of ownerless dogs (Dodet 2006). The Philippines also has seen an increase in rabies deaths (WHO 2004).

Difficulties in controlling the spread of rabies have been associated with the migration of people and dogs from infected areas. WHO (2004) attributes the spread of rabies to the growth of dog populations in sub-Saharan Africa associated with human population growth and movement. Movement of infected animals into new areas produces outbreaks (Rupprecht, Hanlon, and Hemachudha 2002).

Other Canine-Transmitted Diseases

Free-roaming dogs are associated with a variety of other bacterial, viral, and parasitic infections that may pose a risk to humans. Echinococcosis and toxocariasis are among the most prevalent of these health hazards (Chomel and Arzt 2000; Overgaauw and van Knapen 2000) and often occur in low-income areas (Rubel et al. 2003).

Echinococcosis (hydatid disease) is a common parasitic infection in dogs in developing countries that results from improper livestock slaughter practices (Jiminez et al. 2002; Seimenis 2003; Reece 2005). Sheep, goats, camels, cattle, pigs, and horses serve as intermediate hosts (Meslin et al. 2000). Dogs contract echinococcosis by consuming the offal of infected livestock near slaughterhouses or areas of home slaughter. Young dogs (ages three to twenty-five months) and female dogs are more likely to be infected with echinococcosis (Moro et al. 2005). In endemic areas, 1–40 percent of cattle, 1–80 percent of sheep, and 0.2–50 percent of dogs may be infected (Meslin et al. 2000). The disease spreads to humans through ingestion of dog feces. In humans the disease develops in the
liver (70 percent), lungs (20 percent), or elsewhere in the body (10 percent) (Jenkins, Romig, and Thompson 2005). Echinococcosis can cause serious illness or death.

The disease is most prevalent in the Middle East and North Africa (Sadjadi 2006), Western and Central Asia (Jenkins, Romig, and Thompson 2005), the Mediterranean (Jimenez et al. 2002; Seimenis 2003), and sheep-rearing areas in South America and Australia (Meslin et al. 2000) (Table 2). The highest prevalence of echinococcosis is found in Tibetan populations in Sichuan Province, China (Li et al. 2005). In endemic areas, 2–20 people per hundred thousand contract echinococcosis (Meslin et al. 2000). In hyperendemic areas, up to 12 percent may be infected.

**Table 2**

<table>
<thead>
<tr>
<th>Place</th>
<th>Percentage of Dogs Infected</th>
<th>Humans/100,000</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algeria</td>
<td>9.4–12.0</td>
<td>2.26</td>
<td>Seimenis (2003)</td>
</tr>
<tr>
<td>China—North Central Xinjiang</td>
<td>82.3</td>
<td>80.00</td>
<td>Jenkins, Romig, and Thompson (2005)</td>
</tr>
<tr>
<td>Egypt</td>
<td>3.0–10.0</td>
<td>4.29</td>
<td>Seimenis (2003)</td>
</tr>
<tr>
<td>Morocco</td>
<td>35.0–48.4</td>
<td>5.20–7.10</td>
<td>Seimenis (2003)</td>
</tr>
<tr>
<td>Peru—Pacaraos District</td>
<td>51.0</td>
<td>Not available</td>
<td>Moro et al. (2005)</td>
</tr>
<tr>
<td>Tunisia</td>
<td>30.0–68.0</td>
<td>1.50–2.05</td>
<td>Seimenis (2003)</td>
</tr>
<tr>
<td>Uruguay—La Poloma</td>
<td>20.0</td>
<td>Not available</td>
<td>Cohen (1998)</td>
</tr>
</tbody>
</table>

Toxocara canis is a common dog roundworm that is spread indirectly through dog feces. Analysis of dog fecal samples revealed toxocara infection rates of 36 percent in Pretoria, South Africa; 19 percent in Jordan; 13.5 percent in Santiago, Chile; and 10.5 percent in La Plata, Buenos Aires (Rubel et al. 2003). Dog infection rates range from 3.5 percent in adults to 79 percent in puppies (Overgaauw and van Knapen 2000). Puppies often acquire the disease through their mothers. Toxocara eggs do not become infectious until three weeks to several months after their introduction to the environment (Overgaauw and van Knapen 2000); infectious eggs can survive up to a year. The disease is transmitted through contaminated soil and unwashed hands. Children ages one to three are especially susceptible to exposure.

Improved hygiene, public education, removal of feces, enhanced health of animals, and reduction in free-roaming dog populations can significantly reduce disease transmission of both echinococcosis and toxocariasis from dogs to humans (Rubel et al. 2003). Reduction in the proportion of puppies in the population also helps to control toxocariasis spread (Rubel et al. 2003).

**Free-Roaming Dogs: Risks to Livestock and Wildlife**

Free-roaming dogs also may present predation and disease risks to both livestock and wildlife. While some claim that free-roaming dogs may prey upon livestock, Boitsni et al. (1995) concluded that feral dogs actually pose little threat to domestic animals. A study of the relationship between dogs and wild carnivores in Zimbabwe found that the small body weight and group size of dogs make them poor predators (Butler, du Toit, and Bingham 2004). However, others have expressed concern that stray dogs may harm civet populations in Hong Kong (Dahmer 2002) and iguanas, giant tortoises, and flightless cormorants in the Galapagos Islands (Matter and Daniels 2000).

The disease risk of free-roaming dogs to livestock and wildlife is of greater concern. WHO (1996) estimates that 25,000–27,000 domestic production animals contract rabies as a result of exposure to dogs or other rabies vectors. While dogs pose little predation threat to African wildlife, leopards, lions, and hyenas do prey on dogs. Wild carnivore predation on dogs creates the risk of disease transmission for rabies, distemper, and parvovirus (Butler, du Toit, and Bingham 2004). Wild dog populations were reduced by one-third as a result of rabies outbreaks in Tanzania and Kenya (Cleaveland 1998). Increased vaccination, especially along preserve boundaries, reduction of dog populations through birth control, and improvements in waste disposal would reduce transmission of canine rabies to wild animals (Butler, du Toit, and Bingham 2004).

**Predecessors to Capture, Neuter, and Return**

**Capture and Kill**

The capture and killing of stray dogs has been the dominant strategy to reduce dog populations and dog zoonoses. In the late 1980s, lethal dog-control programs were
challenged on both ethical and efficiency grounds. Mass removal strategies have been criticized because they fail to discriminate between owned and stray dogs and use cruel methods of removal. Dogs frequently are captured using nooses and chains, kept in vehicles without food and water for hours or days, then electrocuted, gassed, or drowned (Reece 2005).

For example, culls of dogs occurred in China 2003–2006 in response to increases in rabies deaths. China has the second highest rate of death and illness from rabies in the world. From 2001 to 2004, the number of rabies deaths more than tripled, from 854 to 2651 (Tang et al. 2005).

The upsurge in rabies deaths in China has been attributed to increases in dog populations, an extremely low rabies vaccination rate of only 3 percent, and inadequate postexposure treatment (Tang et al. 2005; Zhang et al. 2005). With a dog-human ratio of 1:9, the dog population in China has grown to between 80 and 200 million (Tang et al. 2005). In the four southwestern provinces with most of the recent rabies cases, 70 percent of households have one or more dogs (Zhang et al. 2005). In China dogs are the vectors in 85–95 percent of rabies cases.

In 2006 in southwestern China, government officials killed 50,000 dogs in five days in one province in an effort to end a rabies outbreak. Dogs who were not killed by their owners as ordered by the government were beaten to death. Both vaccinated and unvaccinated and owned and unowned dogs were killed.

Rather than reducing rabies risk, the culling of dogs in countries increases population turnover and movement, which, in turn, facilitates disease transmission. Following the elimination of dogs, new dogs repopulate the areas through compensatory breeding and migration (Bogel and Meslin 1990). Capture and kill programs remove vaccinated dogs from the population who are then replaced by unvaccinated dogs (Cleaveland et al. 2006). According to Cleaveland et al. (2006, 45),

Dog elimination programmes, may, in fact, be counter-productive and reduce the proportion of immunized individuals in a population, because some vaccinated dogs are killed and community response to dog elimination campaigns is generally to buy new puppies or adopt free-roaming (unvaccinated) dogs.

Capture and kill programs do little to reduce the size of dog populations. Lethal dog population control strategies require the elimination of 50–80 percent of dogs a year (WHO 1989), which is neither financially possible nor ethically acceptable in most countries (Rupprecht, Hanlon, and Hemachudha 2002). Most catch and kill programs remove only 3–5 percent of dogs per year (Bogel and Meslin 1990). While WHO initially supported the culling of stray dogs, it now concedes that removal of dogs does not significantly reduce dog populations or the spread of rabies (WHO 2001).

The culling of dogs also generates hostility toward dog-control officials, which undermines cooperation with rabies canine vaccination efforts (Cleaveland et al. 2006). In addition, killing of stray dogs negatively affects tourism (Leney and Remfry 2000).

**Postexposure Rabies Treatment**

The number of people receiving postexposure treatment has increased dramatically over the past decade. For example, the number of people who received postexposure treatment in Thailand climbed from 93,641 in 1991 to 350,535 in 2001 (Lumlertdacha et al. 2006). Improved public awareness of the need for treatment, reductions in vaccine costs, intradermal regimens, and administration of immunoglobulin at injection locations, all have resulted in some progress in rabies prevention in Asia (WHO 2001; Wilde, Khawplod, and Khamoltham 2005; and Lumlertdacha et al. 2006). The shift in most countries from the Semple vaccine (a vaccine, prepared in the brains of adult sheep, that induces severe and long-term side effects such as allergic encephalomyelitis) to cell culture vaccine also has improved treatment (WHO 2004). To further reduce rabies risks, preexposure vaccination is now recommended for at-risk groups such as young children and people who work with animals (WHO 2001; Wilde, Khawplod, and Khamoltham 2005; Dodet 2006).

However, progress in rabies prevention is at a standstill; no new Asian country has eradicated rabies in recent decades (Wilde, Khawplod, and Khamoltham 2005). Canine rabies remains endemic in India, Pakistan, Vietnam, Thailand, the Philippines, and most African countries.

**Canine Rabies Vaccination Campaigns**


Rabies control in dogs remains the only long-term, cost-effective means of eliminating or preventing most human cases. Human public health preventive measures should be paralleled by programmes for dog rabies control.
Based on epidemiological research, researchers estimate that 70 percent vaccination coverage will prevent rabies outbreaks (Coleman and Dye 1996; Coyne et al. 2001; WHO 2002; Cleaveland et al. 2003). In the field the level of coverage at which protection has been achieved has varied. For example, in Korea 30–40 percent coverage has eliminated rabies (Cleaveland et al. 2003). However, even with 56–80 percent coverage, rabies remains endemic in Mexico. Average dog-vaccination coverage is currently only 9.7 percent in Asia and 10.3 percent in Africa (Knobel et al. 2005). With community participation Bogel and Meslin (1990) believe that 70–75 percent of dogs populations are accessible to rabies vaccination campaigns.

WHO (2004) recommends that vaccination campaigns use only inactivated vaccine, that all staff involved receive preexposure vaccination, and that dogs be registered to provide permanent identification of those who have been vaccinated. Rabies surveillance and dog population surveys are urged to measure population size, turnover, growth, sources of ownerless dogs, degree of supervision of owned dogs, and distribution and accessibility of dogs to be vaccinated (Kitala et al. 2001). Dog density and frequency of immunization campaigns influence vaccination coverage success (Cleaveland et al. 2003).

WHO (2004) advocates campaigns that begin in one area and expand to cover larger areas, country-wide campaigns, or campaigns in geographically separate hot spots followed by expanded coverage (WHO 2001). WHO also supports free dog immunization. Dog-vaccination campaigns along national borders also are recommended to provide an “immunity belt” (WHO 2001).

Many Latin American countries have had success in controlling the spread of rabies through mass canine rabies vaccination campaigns and improved postexposure treatment (Organizacion Panamericana 2005). In 1983 the Pan American Health Organization (PAHO) and WHO set 2005 as the target date for elimination of canine rabies (PAHO and WHO 2005). Each year forty-four million dogs in the region are vaccinated (Organizacion Panamericana 2005). In many areas 80 percent coverage has been achieved quickly (WHO 2004). As a result of these efforts, human rabies cases dropped by 91 percent and dog rabies cases dropped by 93 percent between 1982 and 2003. Panama, Costa Rica, Chile, Uruguay, most of Argentina, and southern Brazil have been rabies free for more than ten years (Organizacion Panamericana 2005).

The Latin American experience also makes clear the need to sustain vaccination programs. After twenty-five years without rabies in Argentina, outbreaks occurred in two provinces in 2004 (PAHO and WHO 2005). Rabies outbreaks also occurred that year in Bolivia and in the state of Zulia in Venezuela. Political commitment, financial support for canine rabies-control programs, surveillance and dog population ecology data, and coordination are necessary to sustain rabies prevention in Latin America (WHO 2001). With canine rabies under some control, but transmission of rabies has become Latin America’s new challenge (Organizacion Panamericana 2005).

Targeted mass dog-vaccination campaigns in Africa have achieved some success as well. In rural northwestern Tanzania, the first campaign reduced rabies incidence by 70 percent (Cleaveland et al. 2003), and a second campaign reduced the disease by 97 percent. In Tanzania advertisements through primary schools and meetings with community leaders took place before the vaccination campaign. A central vaccination point was set up in each village, and all dogs brought to the vaccination points were registered and vaccinated for rabies, distemper, and parvovirus free of charge. Colored plastic collars were placed on treated dogs. Vaccination coverage was assessed at each of four phases through household surveys, observation of dogs, and number of rabies doses used in proportion to dog population. Researchers also collected data from hospitals on rabies and dog bite incidences at each stage. Vaccination coverage of 60–70 percent of dogs in this area of Tanzania has provided sufficient protection from canine rabies (Cleaveland et al. 2003).

Similar mass rabies vaccination campaigns have been held elsewhere in Africa and in Asia (Perry et al. 1995). In Nairobi central point vaccination sites were opened for five days and supplemented with door-to-door coverage during the last three days of the campaign. In Nepal vaccination campaigns achieved 75–80 percent coverage and involved public education, household surveys, central vaccination points for nineteen days, and teams that went door-to-door in areas where vaccination levels were insufficient (Bogel and Joshi 1990). Mass vaccination campaigns have improved attitudes toward animals and animal welfare (Cleaveland et al. 2006).

Although dog-vaccination campaigns are more cost-effective than postexposure treatment, countries may experience a decline in rabies without a concomitant decrease in demand for postexposure treatment (Cleaveland et al. 2003). For example, in Tunisia and Thailand rabies cases in dogs and humans declined significantly; however, postexposure treatments remained at the same level or increased. Dog rabies may need to be virtually eliminated before demand for postexposure treatment decreases (Cleaveland et al. 2003).

Oral vaccine as a supplement to current parenteral vaccination campaigns is viewed as an addi-
mass vaccination programs is another obstacle to rabies prevention. Despite the fact that young dogs are most involved in rabies transmission, puppies under three months are rarely vaccinated during campaigns. Perry (1995), Cleaveland (1998), WHO (2004), and Bauhloul et al. (2006) maintain that including puppies under three months will improve vaccination coverage. In Mexico puppies are vaccinated at one month as a part of rabies-control efforts (WHO 1998a).

While researchers identify mass canine rabies vaccination as the most effective and affordable rabies-control strategy, they acknowledge that vaccination campaigns often are not adequate to maintain a 70–75 percent vaccination coverage because of the high turnover of dogs (Kitala et al. 2001). However, many reports on mass rabies vaccination and dog population issues in Africa ignore Dodet (2006) or dismiss Kitala et al. (2001) sterilization, particularly of female dogs. According to Kitala et al. (2001, 228), “The spaying of bitches is a specialized feature and conceivably out of reach for most rural poor.” However, with the help of international animal protection organizations, sterilization combined with vaccination has been instituted in some communities with very interesting outcomes.

Capture, Neuter, and Return/Release

Public Health and Animal Welfare Benefits

Mass vaccination campaigns and improvements in postexposure treatment have significantly reduced dog and human rabies cases. Vaccination campaigns also have demonstrated community support for dog treatment programs, the accessibility of free-roaming dogs for vaccination and other treatments, and important techniques for reaching dogs. Capture, neuter, and return/release (CNR) programs directly confront the problem of high turnover of dog populations, which mitigates against extensive rabies vaccination coverage and dog population control.

CNR programs have as their goal the stabilization—not elimination—of street dog populations and...
the control of rabies transmission (Help in Suffering 2003). CNR for dogs in developing countries has been modeled on trap, neuter, and return (TNR) programs for feral cat colonies in the United States (HSI 2002). For TNR programs, people who put out food for stray and feral colonies trap cats and bring them to a veterinary facility, where the cats are sterilized and vaccinated for rabies and other diseases. The cats are ear-tipped to identify them as having been sterilized and then returned to the colony. Cats who test positive for feline leukemia virus (FeLV) or other diseases that are not treatable are euthanized humanely. Kittens more than seven weeks old are removed from the colonies, sterilized, socialized, and placed for adoption. The cats are usually returned to caretakers on the same day as surgery and then may be kept overnight before being returned to their colonies. In TNR treated feral cat colonies continue to be managed and monitored.

The TNR management of cats has been viewed as more effective than euthanasia because it allows cats to continue to "occupy environmental niches" that otherwise would be filled by unvaccinated and unsterilized cats (Hughes, Slater, and Haller 2002). In this way TNR colonies provide "a substantial barrier of vaccinated individuals against disease" (Slater and Shain 2005, 46). TNR also encourages colony feeders to participate in feral cat management and, if done properly, leads to a decline in the colony size. TNR has been endorsed by the American Veterinary Medical Association and most leading animal protection organizations. TNR also has won the support of caretakers of feral cat colonies who oppose euthanasia of healthy cats and are needed to implement TNR programs.

By controlling population growth and reducing dog mortality, CNR programs discourage migration and compensatory breeding of dogs to fill ecological niches left vacant by dog losses. Return of sterilized dogs to their home territories prevents a "vacuum effect" of attracting new dogs to unoccupied territories (Leney and Remfry 2000). Return of dogs to the territories from which they were captured also diminishes the stress and vulnerability of the returned dogs after surgery. These programs reduce the number of puppies in the population, who are at the greatest risk for transmission of rabies and other diseases. Similar to vaccination programs, a 70 percent sterilization rate is necessary to stabilize dog populations. Some argue that dog overpopulation will continue to be a problem until the proportion of breeding females is less than 20 percent (Fielding and Plumridge 2005). Like TNR programs, CNR programs have strong public support where catch and kill programs do not (Leney 2002).

CNR programs also have pressed for changes in waste disposal. As Help in Suffering (2003, n.p.) notes, “The overall, ultimate answer to street dog population control is to control the availability of edible wastes.” Waste disposal is a major factor in free-roaming dog populations and bite incidences. In New Providence 25 percent of garbage discarded each week was edible (Fielding, Mather, and Isaacs 2005). In Nepal stray dogs are able to feed at garbage dumps that line the streets and frequent the makeshift slaughter facilities in Katmandhu where offal is disposed of. In Japan, where there is no loose garbage, stray dog populations are lower (Kato et al. 2003).

Central to the success of CNR programs are improvements in the health, longevity, and behavior of free-roaming dogs in addition to reductions in population growth. For many years researchers have reported the health benefits of sterilization and contraception. Repeated pregnancies can physically stress animals, while the absence of pregnancy can improve animal health, making the animal less vulnerable to predation, reductions in food supply, bad weather, and other challenges. In addition, sterilization minimizes risks of some debilitating and fatal diseases.

TNR programs for feral cats highlight some of these benefits. Mean feral cat colony size decreased from 7 to 5.1 after Florida spay-and-neuter programs (Centonze and Levy 2002). Neutering of free-roaming cats improved body weight, body condition, and life span (Scott et al. 2002; Levy, Gale, and Gale 2003). Eighty-two percent of feral cat colony caretakers observe that spaying and neutering has improved the quality of cats' lives (Centonze and Levy 2002). Scott et al. (2002, 212) conclude, “in addition to halting reproduction, neutering may have other effects that, combined, improve the welfare of feral and free-roaming cats.”

Contraceptive trials involving wild animals further document improved body condition and reduced mortality as a result of temporary or permanent sterilization. Pregnancy prevention with the immunocoontraceptive porcine zona pellucide (PZP) enhanced the body condition of female deer (Kirkpatrick 1996, 2005; McShea et al. 1997; Rutberg 2005). The health of wild horses on Assateague Island, Virginia, also improved as a result of the PZP contraceptive program (Turner and Kirkpatrick 2002). Before PZP introduction, the mortality rate was greater than 10 percent for adult horses and 3 percent for foals. With the contraceptive program, adult mortality decreased to less than 4 percent and foal mortality to about 1 percent (Turner and Kirkpatrick 2002). The mean age at death of mares that have not been contracepted is 6.4 years, whereas it jumps to 19.9 years in mares who have been contracepted for three or more years (J. Kirk-
Dogs derive other health benefits from sterilization in addition to fewer pregnancies. Spayed and neutered dogs do not face the risk of ovarian, mammary, and prostate diseases and disorders (Kustritz 2002). Cancer is less likely in both female and male dogs after sterilization (Michell 1998, 1999). The cancer risk of female dogs who have been spayed declines even more significantly than it does for male dogs. Castration reduces the duration of chronic bacterial prostatitis infection in male dogs (Cowan et al. 1991). In addition, all CNR programs provide a range of treatments for parasites, nutritional deficiencies, and other health problems as well as vaccination and sterilization.

Several studies have examined the relative benefits of early gonadectomy. Comparing spay and neuter for shelter dogs at twelve weeks, twelve to twenty-three weeks, and more than twenty-four weeks of age, Howe (1997) found fewer minor complications for earlier procedures and no difference in major complications. Another study concluded that the benefits of early gonadectomy outweigh the risks (Spain, Scarlett, and Houpt 2004). While some researchers have suggested that urinary incontinence may result from ovariohysterectomy (Holt and Thrusfield 1993), other studies have revealed that urinary incontinence is less frequent in dogs who undergo the procedure before first estrus than those who do after first estrus (Kustritz 2002). Salmeri et al. (1991) saw little difference in health outcomes for spay and neuter at seven weeks versus seven months, although they found more growth plate closure delayed in early-neutered dogs that they did in intact dogs.

As a result of improved body condition and diminished susceptibility to disease, sterilized dogs enjoy longer life spans than do intact dogs. Spayed female dogs in one study gained an additional year over intact female dogs (Michell 1998). In this study, longevity differences between neutered and intact male dogs were insignificant. However, another study found removal of testis increases the life expectancy of male dogs (Waters, Shen, and Glickman 2000). Neutered dogs in New Providence, The Bahamas, were found to live longer than did intact dogs as a result of a reduction in sexually transmitted diseases, exposure to disease, and stress of mating and fighting (Fielding, Mather, and Isaacs 2005).

CNR programs also have the capacity to produce behavioral changes in dogs that limit bite and disease risk. In TNR programs caretakers report that feral cats were friendlier, less aggressive, and less likely to roam after they were sterilized (Scott et al. 2002). Sterilization also reduces roaming and aggressive behavior in male dogs (Lockwood 1995). Fewer escaping behaviors have been reported after gonadectomy (Spain, Scarlett, and Houpt 2004). Fewer females in heat also reduces fighting and pack formation (Help in Suffering 2003; Nolan 2006). For 60 percent of dogs in one study, castration reduced urine marking, roaming, and mounting, and one-third of dogs showed significant decreases in aggressive behavior (Neilson, Eckstein, and Hart 1997).

CNR Programs
Despite CNR's promise, it has been introduced only in India, Thailand, island areas, and a handful of other countries. In many of these countries, CNR programs were launched in direct response to threatened or actual mass killings of dogs by government officials in attempts to reduce populations and decrease rabies transmission. Some CNR programs operate from fixed clinics, others depend on mobile clinics. The programs vary in their duration, use of local and visiting veterinarians, target populations, and sterilization levels. Table 3 provides an overview of selected CNR programs.

India
With an estimated population of twenty-four million dogs, India has been the site of pioneering CNR programs. ABC (Animal Birth Control) programs were introduced following WHO and WSPA's publication of Guidelines for Dog Management, which addressed the ineffectiveness of capture and kill as a dog-control strategy. According to WHO (2004, 54), the goal of ABC programs is to “reduce dog population turnover as well as the number of dogs susceptible to rabies and limit aspects of male dog behavior (such as dispersal and fighting) that facilitate the spread of rabies.”

ABC programs in India were launched in response to the use of strychnine poisoning and electrocution as the dominant animal-control strategies (Help in Suffering 2003). In 1992 New Delhi’s court required that ABC programs replace cruel and ineffective methods of dog control (Help in Suffering 2003). A pilot program by Help in Suffering (HIS) in 1994 and 1995 demonstrated the effectiveness of CNR in several Jaipur districts. The program then expanded to all of Jaipur. ABC programs have begun in Bombay, Delhi, Calcutta, Madras, Bangalore, Hyderabad, Udaipur, and Jodhpur. The Jaipur program has developed new techniques for counting street dogs and for the capture and return of such dogs (Help in Suffering 2003). For the ABC program, HIS (2003) selects an area of the district, subdivides the district, and establishes a quota for the number of dogs to be captured in each area. Before working in the area, HIS informs people about the ABC program, what will be done to the dogs, and the benefits of the program. Staff then travel through the areas capturing as many female adult dogs and older
puppies of both sexes as possible. With the exception of puppies, male dogs are excluded from the program. Sterilization of female dogs is seen as more cost-effective, since one male dog can impregnate multiple females. In addition, there is a belief that intact male dogs are more territorial, which will prevent immigration of new dogs into territories (Nolan 2006). Puppies under three months also are not captured. Dogs are captured in the early mornings and early evenings by hand or with sacks and hoops. Staff receive incentives to encourage high catch rates and capture of sick dogs beyond their quotas. The dogs are then transported to the clinic.

At the clinics the dogs rest for twelve to twenty-four hours (Help in Suffering 2003), and food is withheld from them overnight. Anesthetized female dogs are spayed using the keyhole flank procedure, with the exception of heavily pregnant dogs on whom a midline spaying procedure is performed. Anesthetized male dogs are castrated. All dogs are vaccinated and identified with individualized tattoos and an earmark. After surgery a veterinarian determines which dogs are ready for release and which need to stay longer. The average release time is 3.79 days for females and 3.25 days for males. The dogs are then returned to the areas where they were captured. Two dogs are released at a time to minimize problems among the dogs and between the dogs and the public. Approximately 10 percent of the dogs brought into the shelter are euthanized because they are terminally ill, badly injured, too aggressive, or suspected of being rabid or having come in contact with another rabid dog.

HIS (2003) has sterilized and vaccinated 68 percent of the dogs in the population and has performed more than twenty-three thousand spay-and-neuter procedures. While there has been some opposition to the capture of dogs and to their return, the program generally enjoys widespread public support (Nolan 2006). In her evaluation of the Jaipur program, Nolan (2006, n.p.) observes, “Surgical spay and neutering of dogs appeared [to be] well accepted. Human population control and health care campaigns may have

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Selected Capture, Neuter, Return Program Locations, Duration, Sterilization Levels, and Components</th>
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<tbody>
<tr>
<td><strong>Place/Duration</strong></td>
<td><strong>Type of Clinic</strong></td>
</tr>
<tr>
<td>Abaco (February 2000–October 2000) 4–6 days per clinic 8 clinics</td>
<td>Fixed</td>
</tr>
<tr>
<td>Sri Lanka (January–May 2005) 13 sites 81 days in field</td>
<td>Mobile Visiting</td>
</tr>
</tbody>
</table>
WSPA also evaluated the Jaipur program recently. WSPA found that, while there was a relatively rapid increase in the proportion of females sterilized (10–60 percent over the first three years), the increase over the next six years (to about 75 percent sterilized) has been much slower. As a result of the ABC program, the dog density also declined by one third between 1997 and 2002. However, these decreases have not continued. The possible addition of dogs to the population from the reproduction of dogs whose owners have kept them on private property to avoid ABC capture, inadequate ABC coverage in some areas, and migration or acquisition of dogs from outside of the district may have prevented further population declines. Higher reproductive and pup survival rates among dogs in protected environments also may contribute to higher than expected population levels (E. Hiby, personal communication with A.N.R., n.d. 2006).

Among the challenges the Jaipur program has faced is difficulty in getting commitments from municipal authorities to refrain from capturing or killing dogs (Help in Suffering 2003). Municipal officials receive pressure from residents who see dogs as a nuisance and fear rabies. Officials also are concerned that CNR success will result in reductions in animal-control jobs.

The absence of information on street dog behavior and lack of trained resources, staff, equipment, and medical supplies also have been problematic. HIS had initial difficulties in identifying Indian veterinary surgeons to participate in the program because few local veterinarians have experience or training in small-animal medicine (Nolan 2006). In addition, problems with other non-governmental organizations inflating their sterilization numbers have undermined the reputation of ABC programs (Help in Suffering 2003). Nonetheless, other cities in India have also reported success with their ABC programs (Krishna 2005). Chennai has recorded a substantial decline in human rabies cases since it launched its ABC program in September 1996 (Figure 2), and the Jaipur rabies data are also impressive (Figure 3).

It is not immediately apparent why ABC programs should have this impact. If they are significantly reducing the number of young male dogs (the main rabies vectors) from the streets, it is conceivable that even a small reduction in teenage male dogs could break the infection cycle for rabies. The ABC program in Jodhpur has been set up to try to answer some of these questions. A desert city, Jodhpur is essentially an island consisting of
about 950,000 people and 46,000 dogs (or 4.9 dogs per hundred people) (K. Doyle, personal communication with A.N.R., n.d. 2006).

Thailand

In 1995 Thailand set the goal of being rabies free by 2000 (Wasi et al. 1997). Under Thailand’s 1992 Rabies Prevention Act, every owned dog must be vaccinated at two to four months of age and receive annual vaccinations (Wasi et al. 1997). Vaccination and sterilization campaigns focused on community dogs who live around temples and schools (Kamoltham, Singhsa, and Promsaranee 2003). Methods of sterilization included injections of medroxyprogesterone acetate, surgery, and use of natural plant hormones. Outreach to the medical community and local residents encouraged bite victims to seek treatment (Kamoltham, Singhsa, and Promsaranee 2003). Mass vaccination campaigns achieved 53 percent coverage (WHO 1996). Although rabies declined from two thousand cases in 1993 to fewer than twenty in 2003, vaccination levels of 40–70 percent in parts of the country are viewed as inadequate, particularly in view of the migration of infected dogs from suburban and rural areas (Denduangboripant et al. 2005). Moreover, stray dog populations tripled between 1992 and 1999 (Lumlertdacha et al. 2006).

With a population of six to ten million dogs, Thailand implemented a new program of capture, neuter, vaccination, and return in 2002. This program has been the target of criticism because it is limited to Bangkok and lacks adequate financial and staffing resources (Denduangboripant et al. 2005). Programs in Thailand faced difficulties in hiring veterinarians who are trained in small-animal surgery. When they could not hire enough veterinarians for surgery, Thailand officials built kennels to house captured dogs (Clifton 2002). This capture strategy has only served to facilitate migration of infected and intact dogs into new territories. Targeted CNR campaigns in isolated geographic areas such as southern Thailand are viewed as more viable (Denduangboripant et al. 2005).

Island Nations

CNR programs have operated successfully in island areas, including Abaco, Bali, the Galapagos, and Sri Lanka. In Abaco, an island in the Bahamas, a spay/neuter incentive program (SNIP) was launched in 1999 with support from HSI and the Pegasus Foundation. In 2000, after the success of the initial program, SNIP and Abaco Animals Require Friends (AARF) initiated “Project Potcake” as a CNR program (HSI 2001). Most “potcakes” (local dogs) are unowned, but these dogs are recognized and supported by specific neighborhoods.

For Project Potcake, two local veterinary clinics ran eight spay-and-neuter programs for four to six days each (HSI 2001). Volunteers canvassed neighborhoods and transported dogs to the clinics, where the animals were sterilized for free. The program focused on female dogs, but also included male dogs and cats. Project Potcake exceeded its target goals (HSI 2001). After the program had successfully reached both owned and socialized dogs, it attempted without success to use baited traps to capture less accessible dogs (HSI 2001). At the clinics dogs received additional medical treatment, including antibiotics, fluid replacement, and diagnosis of skin conditions (HSI 2001).

Initially, the program offered incentives of $10 for each male dog brought in and all cats and $15 for each female dog. Incentives were important in overcoming initial community suspicion, but could be decreased or eliminated as the program gained community support. Transportation for the dogs to and from clinics was viewed as more important than the financial incentive (HSI 2001).

The Abaco program was considered a success: the proportion of owners with sterilized dogs increased from 62 percent before the four clinics to 76 percent after the clinics (HSI 2001). With the popularity of the program, AARF was asked to run makeshift clinics in other neighborhoods (HSI 2001). Obstacles to the program have included the lack of owner participation and the numbers-driven program approach that on occasion has resulted in more captured dogs than could be sterilized (HSI 2001).

In Bali, an island with 3,151,000 people, there are an estimated 550,000–600,000 dogs (18–18.5 dogs per hundred people). Eighty-five percent of these animals are street dogs (Listriani 2002). Since its inception in 1998 by the Bali Street Dog Foundation (Yayasan Yudisthira Swarga [YYS]) the program has sterilized 13,790 dogs and provided veterinary care to an additional 31,718 (Peacock 2005a). YYS started with a “catch, treat, and release” program to treat skin diseases, parasites, and wounds. YYS now operates both mobile and fixed clinics; the former comprise two doctors, one dogcatcher, and a driver/field assistant. The “M.A.S.H.-style” surgery unit goes out four days a week, and the CNR program is directed at both female and male dogs. Before the mobile clinics began to visit villages, about 24 percent of the dogs were sterilized. After seven years of operation, an estimated 51 percent of dogs are now sterilized. Of the spay-and-neuter surgeries, 74 percent are performed by the mobile clinics (Peacock 2005a). It is evident that the increased proportion of sterilized dogs cannot be due solely to YYS activities. However, YYS has stimulated a change in community and veterinary behavior such that sterilization is now more common.
Veterinary education and training have been a major focus of YYS’s work. WSPA initially trained staff in spay procedures using a spay hook (Listriani 2002). Since then YYS’s fixed clinic has become a teaching facility for local veterinarians and veterinary students. Regular seminars are held in conjunction with the Indonesia Veterinary Association, and YYS offers internships for veterinary students and hosts visiting veterinarians from other countries. YYS also runs “kindness” classes for children and undertakes other public education efforts.

To stop the poisoning of dogs and cats by the Galápagos National Park Service (GNPS), Animal Balance introduced CNR to the Galápagos Islands (Animal Balance 2005, 2006). The local government provided clinic space, and municipal representatives did an initial door-to-door survey to inform residents about the upcoming spay-and-neuter program. A list of interested residents was given to Animal Balance, which then invited people to bring their dogs and cats to the clinic, and GNPS provided vehicles to transport the animals. Additional door-to-door canvassing covered every house on several of the islands to encourage participation. Radio commercials publicized the program and provided public education on dog care. Dog training and school-based humane education programs also supplemented the treatment of dogs and cats.

Before the Animal Balance program, no veterinary services were available on the islands for dogs and cats. Clinic equipment was brought to the Galápagos, and volunteer veterinarians from abroad were recruited to perform surgeries in the clinics. Animal Balance had run seven campaigns by 2006. In 2004 initial clinics were held on Isabela Island for six weeks and on Santa Cruz Island for two weeks. A four-week clinic was held on San Cristobal Island in 2005, along with another week-long clinic on Santa Cruz Island. In 2006 simultaneous campaigns were held on all three islands for nine days. Through these campaigns Animal Balance has sterilized 2,601 dogs and cats. After 2007 municipal administrators were to assume responsibility for the project.

The program has faced two recent challenges. Animal Balance (2006) is working with quarantine officials to contend with importation of purebred dogs to the islands, which could compromise vaccination and sterilization coverage. The organization also forged a compromise in response to the demand for puppies on San Cristobal Island. Previously hunters had refused to have their dogs sterilized. Animal Balance agreed to rescue and make available for adoption excess puppies that otherwise would be killed by hunters.

CNR programs also have been implemented in rapid response to natural disasters that precipitate fear of rabies. After the huge tsunami in 2004, the Sri Lankan military threatened to eradicate street dogs to prevent rabies outbreaks (HSI 2005a,b,c). The tsunami had displaced community dogs from familiar neighborhoods, making it difficult for them to locate food and shelter. Sri Lankan officials agreed to suspend plans for shooting and poisoning dogs after HSI made a commitment to launch a CNR program to vaccinate and sterilize free-roaming dogs. Working with a Sri Lankan animal hospital, veterinarians and other volunteers from HSI, YYS, and The Humane Society of the United States’ Rural Area Veterinary Services set up thirteen successive field clinics across the country. In addition to capturing, vaccinating, neutering, and returning community dogs, the field clinics encouraged owners to bring in their pets.

Field clinics sterilized and vaccinated an estimated 70–90 percent of the dog population at each site. In total, 1,430 dogs were treated between January and May 2005 (Peacock 2005b). The program developed strong community support, helped improve attitudes toward animal welfare, and increased appreciation of the need for veterinary services (HSI 2006).

The Success of CNR: Outcomes, Ingredients, and Constraints

CNR programs have been able to stabilize and, in some cases, reduce free-roaming dog populations. The ABC program in Jaipur achieved an initial population reduction of 28 percent (Help in Suffering 2003). In Abaco 50–75 percent fewer dogs were seen roaming the streets after Project Potcake than during the year before the program (Hargreaves 2002), and the number of dog roadkills declined significantly. Few litters of pups and pregnant or nursing potcakes were observed (HSI 2001; Hargreaves 2002). With the YYS program, the overall dog to human population ratio in Bali declined from 1:5.6 to 1:5.2 (Peacock 2005a). The population of dogs in targeted villages in Bali was reduced by over half when 75 percent of the village dogs were spayed or neutered. The population of puppies in these areas has decreased from 32 percent to 25 percent. In the Galápagos Islands, Animal Balance (2006) anticipated pet populations would be stabilized on Isabela, San Cristobal, and Santa Cruz islands by 2007.

Another measure of CNR success is reduction in canine rabies transmission. In Jaipur the ABC program has been associated with a significant decrease in rabies cases. In 2002 and 2003, no rabies...
cases were reported in Jaipur (Figure 2) in districts in which CNR programs have been implemented. In areas in which the program did not operate, the number of rabies cases increased or stayed the same. After declines in rabies deaths throughout the 1990s and no rabies deaths in 2002 in Thailand, three people died of rabies in Bangkok in 2003 (Lumlertdacha et al. 2006). The migration of people and dogs from affected areas, which, in turn, diminished rabies vaccination coverage, most likely contributed to this spike in the disease (Denduangboripant et al. 2005; Lumlertdacha et al. 2006). In Sri Lanka CNR possibly forestalled rabies outbreaks in the wake of the tsunami.

In many CNR program areas, recapture of treated dogs and field observations have demonstrated improved dog health. In Abaco dogs who had been sterilized showed weight gain, improved coat luster and quality, improved skin conditions, and fewer parasites and venereal tumors (HSI 2001). Following CNR implementation in Bali, the proportion of dogs classified as having poor welfare status decreased from 33 percent to 13 percent (Peacock 2005a). As of 2006 ABC dogs in Jaipur were in better condition than was the rest of the dog population (Help in Suffering 2003). HIS (2003) was in the process of developing more precise body condition scoring techniques to quantify improvements. These techniques were being applied elsewhere. In addition, fewer dogs were observed in emaciated condition after clinic-based sterilization programs in Abaco (HSI 2003). Little research on dog behavior has been carried out before and after CNR programs, although evidence from Bali suggests the proportion of aggressive dogs has decreased (from 8 percent to 3 percent [Peacock 2005a]), and other sites report that treated dogs are less likely to roam or fight (Help in Suffering 2003; Animal Balance 2005).

While documentation of CNR program outcomes is preliminary, CNR and vaccination campaign experiences, epidemiology, and dog ecology and behavior suggest several lessons for future programs. Dog population surveys are crucial to developing CNR and vaccination programs and monitoring their success (Matter and Daniels 2000; Wandeler and Bingham 2000; WHO 2004). Measurement of dog populations requires household surveys; collection of information on dog survival, fecundity, sex ratio, age structure, keeping practices and human population; use of capture-mark-recapture strategy to estimate owned and ownerless population; and field observation to ascertain reproduction, survival, habitat use, food sources, and social behavior (Matter and Daniels 2000).

CNR experiences in developing countries reveal important issues regarding the involvement of the veterinary community. Few veterinarians in developing countries have training or experience in small-animal medicine and surgery (WHO 2001). Most veterinary training is oriented toward agricultural use of animals. To be successful, CNR programs must incorporate a training component for local veterinarians. The Bali program, in which visiting veterinarians are provided with training capacity, has done this most successfully. In addition, the YYS veterinary teams have trained veterinarians in Sri Lanka and India.

CNR and sterilization programs also have identified some conflicts with local veterinarians. In Taiwan, for example, veterinarians have been reluctant to support spay-and-neuter programs because they “believe [the] resulting reduction in the dog population will be bad for business” (Hsu, Severinghaus, and Serpell 2003, 15). In Bali YYS also experienced initial resistance from local veterinarians that disappeared when YYS activities led to an increased demand for veterinary services.

Involvement of local veterinarians is imperative to meet legal requirements in some countries (Hargreaves 2002), to strengthen support for CNR programs, and to ensure long-term availability of spay-and-neuter services (HSI 2002). CNR programs increase local veterinarians’ interest in small-animal medicine. Following the same pattern in the United States, low or no-cost spay-and-neuter programs not only make services available and affordable, but they also spur local veterinarians to provide them (HSI 2002). At most locations CNR clinics were the first veterinary services provided to dogs and helped build public support for veterinary care.

Community involvement is essential to the success of CNR and vaccination programs. Residents play an important role at all sites in assisting program implementation through bringing dogs to sites and monitoring the animals. In many programs community leaders or “village mentors” provide entrée into local communities and facilitate public education and participation. Other programs enlist the involvement of “dog mommas,” who serve as caretakers for neighborhood groups of dogs (HSI 2002). At all sites programs gained strong community support and saw improved attitudes toward animal welfare.

Field experiences also demonstrate the importance of transportation of dogs to clinic sites and mobile clinics. Experiences in Abaco, Jaipur, and other settings suggest that people who are responsible for dogs are often unwilling or unable to bring their animals to a location that is any distance from their home. Rabies vaccination campaign surveys have found that the proportion of vaccinated dogs
diminishes as the distance from vaccination points increases (Matter et al. 2000). Owner inability to handle animals is another obstacle to participation in clinics that could be ameliorated through transportation of dogs (Matter et al. 2000). To reach the maximum number of dogs possible, dogs must be brought to clinics for spay-and-neuter procedures, or the clinics must be brought to the dogs.

Attitudinal surveys conducted around CNR and vaccination programs reveal some of the obstacles to convincing owners to seek care for their dogs. Overall, residents are supportive of spay-and-neuter programs because they want to avoid the animals’ having litters (HSI 2001). However, in Abaco, for example, some owners did not have their dogs neutered because of the young age of the dog, they had missed a previous clinic, or they did not want to spay male or purebred dogs (HSI 2001; Fielding, Samuels, and Mather 2002). Older owners are more likely than are younger ones to have their dogs spayed (Fielding, Samuels, and Mather 2002). Owners often let females have one litter before spaying (Fielding and Plumridge 2005). In Africa the desire for more guard dogs may outweigh concerns about overpopulation.

Owned dogs clearly play an important role in maintaining or increasing population levels of free-roaming dogs. Study after study has found that ownerless dogs who do not depend on humans have low reproductive rates and cannot maintain their population levels without new recruits. New recruit dogs come from the owned population whose members are allowed to roam freely and are not sterilized. Door-to-door canvassing and other strategies to incorporate owned dogs are central to the overall success of CNR.

CNR success in Abaco, Bali, Sri Lanka, and the Galapagos has been enhanced by their island locations. At these more isolated sites, risks of migration or introduction of infected or unsterilized dogs were minimal. In contrast, the size of Thailand and India and territorial borders make the integration of new dogs more likely to occur and harder to manage. The failure of recent CNR programs in Thailand makes clear the threat to maintaining both vaccination and sterilization thresholds. As Thailand studies of the distribution of different rabies virus strains confirm, dog populations move with human populations. CNR programs need to address these population shifts of humans and dogs to maintain stable dog populations and to achieve ongoing population reductions. “Immunization belts” and “sterilization belts” at borders of CNR program areas, as well as revaccination campaigns, are important to maintain population stabilization and vaccination coverage. Another threat to CNR progress in Thailand and elsewhere is the continued capturing and/or killing of dogs, which further encourages movement and increased breeding among the remaining intact animals.

Researchers have greeted sterilization programs in general and CNR programs in particular with some initial skepticism. While most experts agree that control of reproduction may help in rabies prevention and with other problems associated with free-roaming dogs, some do not believe these programs are sustainable, affordable, or sufficient (WHO 1989; Wilde, Khawplod, and Khamoltham 2005). Many of the concerns over the cost and ability of CNR to reach sufficient numbers of dogs could be addressed with the availability of an antifertility vaccine (Leney and Remfry 2000; Wheir, Dunbar, and Prasad 2005). Immunocontraceptive vaccines provide a possible fertility-control approach for many species of animals, although an immunosterilant would be much more useful. Immunocontraceptives need to be administered annually or every two years, which presents a major logistical problem in developing countries. Although some have suggested that the PZP immunocontraceptive could lead to sterilization of dogs (Fayer-Hosken, Dookwah, and Brandon 2000), the data are not strong, and no one has shown conclusively that PZP is effective in any canid even as an immunocontraceptive.

The difficulty of monitoring dogs after surgery in a field setting is yet another concern. WSPA traditionally only favors CNR as a short-term strategy when dogs can be monitored for health and welfare, the environment can support free-roaming dogs, and government and public support guarantees animal safety (Leney 2002; WSPA 2006). In her research on gonadectomy, Howe (1997) found greater risks after sterilization the shorter the postsurgical holding period in U.S. shelters. CNR programs vary in the amount of time they keep dogs before and after procedures. In Jaipur dogs usually spend the night at the clinic before surgery and are generally not released until three to five days after the operation (Nolan 2006). In Abaco, Bali, Sri Lanka, and the Galapagos, surgery was performed immediately, and the dogs were returned to their territories after relatively short (same-day) recovery times. In addition to logistical, resource, and medical concerns, postsurgical release time has competing animal welfare implications (Nolan 2006). On the one hand, keeping dogs longer can avoid postoperation complications. On the other hand, returning dogs sooner reduces stress to the animals and permits sterilization of more animals.

Another obstacle to CNR and dog-vaccination programs has been the lack of a single governmental department to claim responsibility and adequate resources for these programs (WHO
in most countries successful programs need the collaboration of veterinary, health, and sanitation departments as well as animal welfare nongovernmental organizations (NGOs) (WHO 2001; Help in Suffering 2003). Political commitment also must be sustained for effective and enduring rabies control (PAHO and WHO 2005). While government support has varied across CNR programs, Thailand is the only country in which CNR has been a government-run activity.

Puppies have the greatest risk of contracting and transmitting rabies. The mortality of puppies also contributes to high population turnover. Most vaccination and CNR programs, however, exclude puppies under three months of age. In Jaipur younger puppies are not included in CNR because of belief that they should not be separated from adults and that the capture and procedure would be too stressful (Nolan 2006). While scientific literature suggests that prepubertal gonadectomy is a safe procedure with no increased incidence of complications, health, or behavioral problems in developing countries (Howe et al. 2001), concern also has been expressed about neutering puppies under eight weeks of age outside a well-equipped clinic (Leney and Remfry 2000) and before their immune systems have matured (Cardwell 1993). Modification of CNR programs to include on-site vaccination of puppies could promote rabies prevention and dog health. Sterilization of puppies in field settings in which some supervision is available also might be a viable strategy. Because of differences in dog ownership patterns in developing countries, adoption of street puppies has not been a part of CNR (as is adoption of feral kittens in TNR programs).

CNR programs show great promise as a strategy to decrease public health risks and improve animal welfare. The ability of rabies vaccination campaigns to reach up to 90 percent of dogs, and their success in achieving sterilization rates of 51–85 percent with CNR, demonstrates the viability of the CNR approach. Because of different dog ownership patterns in developing countries, private, low-cost, and no-cost sterilization programs will never reach enough dogs to achieve population stabilization or reductions. CNR addresses the reluctance of owners to take dogs for treatment and the fact that community dogs are not affiliated with individuals who take responsibility for their veterinary care.

CNR also addresses the primary limitation of mass vaccination campaigns: high population turnover. The combination of vaccination, sterilization, and return of dogs to their territories appears to enhance the health, longevity, and stability of dog populations, reducing movement and breeding of unsterilized and unvaccinated dogs. Lower dog population levels decrease the risk of rabies, echinococcosis, and toxocariasis. In the case of free-roaming dogs, animal welfare and human health are closely linked. Ultimately, problems with free-roaming dogs cannot be separated from human population growth, urbanization, and increased waste.

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Caring attitudes and behaviors are rooted in a person’s capacity for empathy. Research (Kestenbaum, Farber, and Sroufe 1989; Brazelton and Greenspan 2000; Hoffman 2000) shows that quality of care and security of attachment affect children’s later capacity for cognitive development, emotional regulation, and behavioral control. Nurturing caregiving in a safe environment allows for continued development of neural pathways, which in turn, allows for mastery of increasingly sophisticated cognitive skills necessary for emotion regulation, and social perspective taking (Selman 1980), prerequisites to empathic behavior (Bryant 1985). True empathy requires that an individual possess the capacity to discriminate another person’s affect, see a situation from another person’s perspective, and respond with genuine emotion (Minuchin and Shapiro 1983). However, contextual factors such as extreme poverty, homelessness, chronic exposure to violence, and insufficient nurturing or childcare practices can interfere with cognitive and emotional development, obstructing the capacity to care about others and to behave empathically.

Americans live in a violent place. In fact, the United States is the most violent industrialized country in the world today (Thornton et al. 2002; Hamblen and Goguen 2005; Youcha 2005). Violence among children and teens is a more pressing problem in the United States than in any other country (U.S. Department of Health and Human Services 2003). A national survey of children ages ten to sixteen found that more than one-third were directly victimized by violence, including aggravated assault, attempted kidnapping, and sexual assault (Boney-McCoy and Finkelhor 1995). Marans and Schaefer (2001) reported on a study conducted at a Boston hospital showing that one of every ten children seen in the primary care center had witnessed a shooting or stabbing before the age of six (Taylor et al. 1992).

Children’s exposure to violence cuts across all socioeconomic, racial, and cultural strata, as demonstrated by Hill and Jones’s (1997) study of nine- through twelve-year-old children’s exposure to violence in low-risk versus high-risk neighborhoods. While children in both samples had witnessed assaults, stabbings, gang-related violence, robbery and rape, only 9 percent of those in the low-risk sample had witnessed a murder, compared to 32 percent of those in the high-risk sample (Hamblen and Goguen 2005).

Children are also exposed to violence through the media. Topics once considered only appropriate for the eleven o’clock television news are presented at all times of day, with little regard for the cognitive ability and psychosocial safety of the developing child. Film clips of beheadings; the torture of prisoners of war; war-zone hostages begging for their lives at gunpoint, and war-torn victims cradling the bloodied bodies of family members can be viewed from a computer desk chair or livingroom couch.

War and threats of terrorism on U.S. soil further complicate children’s psychosocial development, affecting their sense of personal safety as well as their understanding of what constitutes humane behavior. War may be an appropriate topic for teenagers to grapple with as they begin to think about their own developing values and beliefs. However, younger children lack the cognitive ability to view the ramifications of war from multiple perspectives while also mak-
ing appropriate choices about their own behavior.

The impact of violence exposure varies, depending on internal factors (e.g., age, temperament), degree of violence exposure, protective factors in the environment (e.g., a nurturing parent), and the availability of resources (Osofsky 1995). However, a growing body of research shows that consistent exposure to violence may have long-lasting consequences, affecting children’s cognitive and social development (Osofsky 2001; NYU Child Study Center 2006). For young children, repeatedly witnessing violence undermines a basic sense of trust (Youcha 2005) necessary for mastery of more advanced psychosocial tasks such as playing independently, interacting appropriately with peers, and developing a sense of agency. These children tend to develop a view of the world that is hostile (NYU Child Study Center 2006) rather than empathic and caring.

The Question
How does an elementary school teacher foster kind and compassionate behavior in children exposed to so much inhumane behavior? How does she teach them the importance of respect for the natural world when they live in environments characterized by so much disrespect? This question was not posed in the study described in this chapter. Rather, it emerged as a result of reading respondents’ hastily scribbled notes along the margins and on the back of surveys. In analyzing teachers’ responses to survey questions, it became clear that many intertwined, complex contextual factors affect whether and how teachers promote humane and environmental values and if and how students make sense of these lessons.

Findings discussed in this chapter were extrapolated from a comprehensive evaluation of KIND News, a humane and environmental education program of the National Association for Humane and Environmental Education (NAHSEE). Kind News (http://www.kindnews.org/about.asp) is a classroom newspaper for elementary school children. Published since 1983 by the youth education affiliate of The Humane Society of the United States, it is read by more than a million children nationwide. Its goal, according to its website, “is to encourage good character in children with an emphasis on kindness to animals, respect for natural habitats, good citizenship, and peaceful conflict resolution.” Content includes facts about animals, brainteasers, KIND Club Projects, inspirational celebrity profiles, an opinion forum, and original short stories. It is published at three reading levels: (grades K–2), (grades 3–4), and (grades 5–6). It is delivered in bulk to classrooms monthly from September through May accompanied by a teacher’s guide. It is available to teachers directly or as a gift through NAHSEE’s Adopt-a-Classroom program.

This chapter focuses on one of many themes in the data, challenges teachers face when striving to promote humane and environmental values and behaviors, and challenges students face in constructing knowledge and internalizing values. Only findings related to this theme are described. (For other evaluation data, contact NAHSEE: 67 Norwich-Essex Turnpike, E. Haddam, CT 06423-1736).

Methods
Sample
Respondents targeted were fifth- and sixth-grade teachers in a New England city with a population of 175,000. Home to several colleges and universities, hospitals, and numerous trade and service industries, it is racially, culturally, and socioeconomically diverse.

Data Collection
A survey was enclosed with each of the district’s fifth- and sixth-grade teachers’ packages of KIND News newspapers (see appendix A) (n = 270). Due to a low response rate, two shorter surveys were developed and distributed to those who had not returned the original survey. In all, 16 original surveys, 7 subset-one surveys, and 10 subset-two surveys were received (n = 33).

Instrument
Designed for this evaluation, the survey tapped into four areas: school and classroom demographics; teacher’s knowledge about humane and environmental topics; teacher’s motivation and personal commitment to teaching about humane and environmental topics; and teaching strategies used in the classroom.

Data Coding and Analysis
A correlation was run as a way of determining all possible connections among variables. Both simple and multivariate regressions were run, and statistically significant correlations were examined in light of teachers’ responses to open-ended questions and findings from an earlier tier of investigation. Open-ended questions were examined through use of Open, Axial, and Selective coding (Strauss and Corbin 1990). Throughout the process, coding categories were generated and refined. As themes emerged, coding paradigms were developed and examined.

Findings
Upper Grade Teachers Are Giving Up Their Subscriptions
1. Although subscriptions were originally distributed to fifth-
and sixth-grade classes only, teachers of lower grades have acquired subscriptions.

2. Not all students are reading the edition appropriate to their grade level (e.g., third graders reading an edition designed for fifth/sixth graders).

Stability of Basic Human Needs
1. At least 278 of the 628 students represented met eligibility requirements for free and reduced meals, a government program for families living near or below the federal poverty level.

2. Of twenty-three teachers queried, nine reported at least one student in their class living in transitional circumstances (sleeping in a shelter or car, on the street, temporarily with others, or in short-term foster care).

Campus Environment and Evidence of Disrespectful Behavior
1. Of the twenty-four teachers reporting bullying in their classroom, twenty reported that relational violence (ostracizing, shaming, name-calling, verbal threats) was either as evident as or more evident than physical violence (hitting, punching, spitting on, pushing, tearing/ removing clothing, use of weapons). There was no relationship between gender and type of violence.

2. Of the thirty-three teachers queried about problematic behaviors on campus, twenty-two reported littering and bullying; eight reported excessive relational aggression; four reported excessive physical aggression; six reported graffiti; six reported evidence of gang activity; and four reported incidences of students bringing weapons to school. Vandalism to cars, fights with weapons, threats to the safety of others (e.g., bomb threats), and destruction of the natural environment were each reported by three or fewer teachers. Only one teacher reported knowledge of cruelty to animals.

Teachers’ Commitment to Teaching Humane/Environmental Lessons
1. Eleven of twenty-six teachers surveyed said they feel personally committed to teaching humane/environmental lessons. However, there was no association between teachers’ personal commitment and whether they actually teach such lessons. Their commitment did not predict use of KIND News as a tool to promote those values, nor did it predict teacher-led discussions about KIND News articles.

2. Fourteen of twenty-six teachers queried stated they used supplemental materials in addition to KIND News to promote humane, environmental, and character values.

Students’ Academic Abilities
1. The proportion of students per classroom reading below grade level ranged from 8 percent to 100 percent. The mean percentage was 32.

2. Classrooms with high percentages of students reading below grade level also had high proportions of students reading above grade level (p = .025).

Students’ Peer Behavior
1. The higher the grade level, the less likely the teacher was to report improvement in children’s behavior toward one another (p = .049).

KIND News as a Useful Tool for Addressing Aggressive Behaviors
1. Fourteen of twenty-six teachers found KIND News helpful in addressing antisocial behaviors. Nearly as many respondents did not find it helpful.

2. The data revealed a highly significant correlation between grade level and teachers’ perception of KIND News as a useful tool for addressing bullying behavior (p = .005). The higher the grade level, the less useful it seemed to be.

3. Teachers who stated that KIND News was a useful tool for discussing bullying tended to see improvement in students’ behavior toward one another since the start of KIND News use (p = .049).

Discussion of Findings
Although this data was collected in one large New England city, the sample is representative of the larger population of the United States (see appendix B).

Who are KIND News readers? In the sample city, KIND News subscriptions are given to fifth- and sixth-grade teachers only, as a gift from a generous donor. However, children actually receiving KIND News range from grade one to grade six/seven (including one multi-grade special education class). Some fifth- and sixth-grade teachers are passing their subscriptions on to teachers of lower grades.

Because surveys were included in each teacher’s subscription packet, teachers who gave up their subscriptions did not have the opportunity to participate in the evaluation. Upper grade teachers...
may have more time-consuming curriculum demands, minimizing the time they have to spend on humane/environmental issues. As evidenced in the data, aggressive peer behavior seems to be a serious problem, especially in the upper grades; upper grade teachers may view peer aggression as a priority over kindness to animals and the natural world.

The passing of subscriptions has resulted in mismatches between some children’s cognitive and academic abilities and the edition of KIND News they currently use.

Classroom populations. A number of languages are spoken in the average classroom, including English, Swahili, Chinese, Japanese, Spanish, Creole, Korean, Portuguese, and Vietnamese. While not the majority, some children have little or no experience with nature or the natural world (e.g., have never walked in a forest, climbed a tree, peeked into a bird’s nest, or visited national/state park).

A significant number of children live in dire circumstances. The backgrounds in a single classroom ranged from high-income, highly educated families with access to numerous resources and opportunities to those living at or below the federal poverty level. Approximately one third of students and their families hover at this level.

A disturbing number of students live in transitional circumstances. Nine of twenty classrooms possessing the data reported at least one student living in transition. One teacher reported that nearly 30 percent of students in his class live in such circumstances. These figures may not reflect reality, however. Children living in transition tend to be embarrassed by their circumstances, often hiding the fact of their homelessness. Those living in battered women’s shelters or staying outside the school district may have been warned about the importance of keeping such information private.

Children’s attitudes and behaviors toward animals are generally positive but their attitudes and behaviors toward one another leave much to be desired. While some teachers reported improvement in children’s attitudes and behavior toward animals, few reported improvement in children’s behavior toward one another since the start of KIND News exposure. Only one teacher reported cruelty to animals, while more than half the sample reported bullying as a serious problem.

What to make of this finding? Few teachers are in positions to observe their students interacting with animals, making accurate response difficult. The publication may affect children’s attitudes toward animals more than their attitudes toward peers, due to its editorial focus on animals. Although students may construct knowledge and internalize respect for animals, they don’t seem to be transferring that knowledge to peer relationships.

KIND News appears to be a useful bullying-intervention tool for younger children, but not for older ones. Teachers of lower-grade students who use KIND News as a tool for discussing bullying tended to report improvement in students’ behavior toward one another since the start of KIND News use. Most fifth- and sixth-grade teachers did not find this to be the case, however. It’s impossible to discern how much of the credit belongs to KIND News and how much is related to extraneous variables (e.g., Sunday school lessons, values imparted by family members) and how much relates to the teacher who manages to find the time to discuss bullying with her students. Self-fulfilling prophecy and self-efficacy may also have affected findings. Teachers who believe KIND News is a useful tool for this purpose and who actually use it as such may be more likely to believe that it actually has improved peer behavior. It’s possible that teachers who believe they can improve children’s peer behavior, and try to do so, actually do improve their behavior. Only a carefully designed controlled experiment can tease out extraneous variables and provide more information.

Teachers lack the time necessary for integrating humane and environmental education consistently into their curriculum. Regardless of how committed they are to imparting humane and environmental values to their students, most respondents appeared to be barraged by increased curriculum demands and pressures related to standardized testing outcomes. Of those few teachers who practice humane and environmental education, such lessons tend to be scattered and “squeezed in” when time allows it or when they find “teachable moments.”

Respondents cited creative uses for KIND News, including using it for homework, to promote literacy skills, and as a vehicle to address bullying. Teachers enclosed thank you notes with their surveys expressing appreciation for the publication. Their gratitude and creativity may reflect satisfaction that by distributing KIND News, they are satisfying, to some degree, their need to impart humane and environmental values.

A large number of students are reading below grade level, especially those in the fourth grade and above, where the emphasis has shifted from learning to read to reading to learn (Chall 1983). In order for KIND News to be effective in classrooms where teachers do not have the time to review and discuss articles with their students, children must be independent enough readers to master the concepts on their own. Unfortunately, wide variations in reading abilities, however, may prevent
A study of homeless children in Worcester, Massachusetts, found significant decreases in developmental, interpersonal, and cognitive functioning, which the researchers attribute to the cumulative effects of the many risk factors of homelessness (Traveler’s Aid Family Services 2004). While lack of stable housing per se does not affect a child’s cognitive and intellectual abilities necessary for school success, the ramifications of these situations prevents him from achieving his full potential. Homeless children tend to miss significantly more school compared with housed children (Rubin et al. 1996); 12 percent are not even enrolled in school (U.S. Department of Education 1999). Approximately 22 percent of homeless children have been separated from their families at least once during the past year, and 25 percent have witnessed family violence (Weinreb 2004). Homeless children are four times more likely to score at or below the tenth percentile in receptive vocabulary and reading (Zima, Wells, and Freeman 1994) and twice as likely to repeat a grade as housed children (National Coalition for the Homeless 2005).

Forty-seven percent of children living in transition are afflicted with mental health problems (Weinreb 2004), including clinical depression and severe anxiety disorders (see Bassuk, Rubin, and Lauriat 1986; Bassuk and Rubin 1987; Zima, Wells, and Freeman 1994), behavior problems, and symptoms of social withdrawal (Weinreb 2004). Because families often can’t afford mental health services, don’t qualify for them, or move too frequently to take advantage of them, psychological and behavior problems tend to remain untreated (Hart-Shegos 1999).

Media Influences and the Changing Culture of Childhood
Marketing messages penetrate every area of children’s waking lives, often influencing minds that have not yet developed the cognitive capacity to make fully informed decisions. Unlike a number of other industrialized countries, where advertising toward children is closely regulated or banned, “in the United States, selling to children is simply ‘business as usual’” (American Academy of Pediatrics 2006, 2563). Some marketing strategists work with child psychologists who tell them how to create an ad that will not only appeal to children, but will also begin to shape their attitudes—a marketing goal termed “early brand loyalty” (Consumers Union 2006).

 Tweens (children between the ages of eight and twelve) are a fast growing consumer market. More than 40,000 television ads are directed at them yearly (Strasburger 2001); they are also exposed to marketing influences via the Internet, cell phones, and other electronic media, in magazines and in the schools.

Marketing to a Captive Audience
Many businesses promote their products (and brand loyalty) in the schools. ABC lettering charts and other learning materials may be decorated with slogans and icons from fast food, movie, cereal, and toy companies. They tend to be high quality, slick, and colorful, with lots of stickers, puzzles, or photos of popular celebrities, making them especially appealing to children. Such products are appealing to teachers and administrators, too; funding shortages make high-quality free supplemental materials hard to resist.

Messages conveyed through in-school promotions are not always
in children’s best interests. Some may even conflict with the values of the school, the child’s family, or of humane and environmental organizations. Unfortunately, children tend to assume messages conveyed through in-school promotions are credible, because they are introduced in the classroom.

Marketing Meanness: Condoning Mean-Spirited Behavior

The spirit of ads and messages to children has shifted drastically over the last decade. A study of food product ads on television marketed toward children between 1987 and 1998 reflects a disturbing shift away from pro-social and healthy themes in 1987 to antisocial and self-harming themes in 1998 (Howard 2003). Ads from the later years imply a kind of normalcy or social approval of aggressive and unkind or humiliating behavior.

K. Hymowitz (2000, 126) describes a popular jeans company depicting cool, confident pre-teen girls peering into the camera asking the viewer, “Have you ever seen your parents naked?” or stating, “I hate my mother.” A popular sneaker company recently ran an ad in an equally popular teen magazine depicting a group of apparently popular girls (wearing the sneakers) whispering about and ostracizing a less popular girl, also featured in the ad. Such an ad does more than foster children’s desire for the product; it promotes relationally aggressive behavior by playing on the reader’s worst fear—rejection.

Moreover, this ad appears to encourage readers to identify with and want to emulate the aggressor (and her henchwomen) rather than the peer-rejected girl who happens to be wearing the wrong shoes. Children know that adults create the ads; the covert message then, is that adults sanction this kind of behavior. Even well behaved and/or typically non-aggressive children come to believe that, although they don’t like being on the receiving end of it, aggressive and unkind or humiliating behavior toward one another is an acceptable social behavior.

Recent bullying research shows a disturbing shift taking place as children stand on the edge of adolescence; bullying behavior increases popularity and social acceptance among peers (Gillessen and Mayeux 2004a, b). The current generation of children appears to be learning that antisocial and destructive behaviors are not only acceptable; they’re also desirable (Howard 2003) and are likely to be rewarded with much-desired peer approval. Even children who don’t like behaving aggressively may find themselves emulating aggressive popular children as a way of moving up the social ladder.

Bullying in the Twenty-first Century

Until recently, bullying has been generally considered harmless schoolyard activity. Child development advocates, however, are beginning to recognize the ramifications of bullying behavior (NYU Child Study Center 2006). Easier access to weapons and weapon-making materials allow for increasingly dangerous acts. Relational violence, too, has become more serious as perpetrators, with the help of technology, spread rumors, photos, and images worldwide, in efforts to humiliate their victims before larger audiences. D. Alexander, director of the National Institute of Child Health and Development (NICHD) asserts, “Being bullied is not just an unpleasant rite of passage through childhood: it is a public health problem that merits attention” (NICHD 2001, 1).

A nation-wide study of bullying in schools indicated that 29 percent of school children are involved in bullying—13 percent perpetrate it, 10.6 percent are victimized by it, and 6.3 percent perpetrate and are victimized (Ericson 2001). These figures don’t include the unknown number of child witnesses who agonize over whether to intervene. Such children tend to experience significant distress including feeling helpless and ashamed. As they develop the capacity to care and empathize with others, so, too, do they experience guilt related to their conflicted feelings between needing to intervene and needing peer acceptance.

Teachers: Managers of the Twenty-first Century U.S. Classroom

Data from the KIND News evaluation reflect three areas obstructing teachers’ efforts to teaching humane and environmental lessons: (1) teachers’ job descriptions and the resources available to them; (2) social/political differences between KIND News and other systems in students’ lives (e.g., family, place of worship); and (3) students’ current behaviors regarding respectful practices. All three categories are inextricably intertwined, affecting not only whether educators teach humane and environmental lessons, but also why and how they use KIND News in the process.

Teachers’ Job Descriptions and Resources

Teachers’ individual roles within a particular system affect their perceived ability to present humane/environmental lessons. The departmentalized teacher’s subject specialty may play a role in whether he tackles humane and environmental education. Language arts, social studies, and science teachers may find features of KIND News useful for achieving learning goals and objectives, whereas math teachers may not. Departmentalized teachers tend not to spend the majority of their day with the same group of students, further limiting the possibility of squeezing in humane and environmental lessons.

Time—or lack of it—was the reason most often cited for not teaching humane and environmental les-
Some reassurance that she is pro-
wise barred from presenting.

Promoting the values she feels other-
ues, reflect not only students' con-
ing humane and environmental val-
the third area of obstacles to teach-
students' attitudes and behaviors,
attitudes and behaviors in children,
attitudes and behaviors in children,
mentally committed teacher, distrib-
result, some teachers may choose
they say it. They worry about doing
ful" about what they say and how
son. It is colorful, but not glossy;
illustrated characters are gen-
mental outcomes.

Teaching Children to be Kind in an Unkind World

Social-Political

Differences

The second obstacle to teaching humane and environmental lessons concerns social-political differ-
ences among teachers, families, and the educational institution. Not only must teachers walk a fine
between their own values and beliefs and those of their students' families (e.g., family's practices regard-
ing responsible pet ownership), they must also navigate the values of the school system, which
may or may not closely parallel the values of the teacher and/or families. Working with children and
families in a litigious society presents added challenges for educators. One teacher stated that he is
“not allowed” to let students know his personal beliefs about humane/environmental issues. Teachers
implicated occasionally commented on the fact that they “must be care-
about what they say and how
they say it. They worry about doing
or saying the wrong thing. As a
result, some teachers may choose
not to overtly teach about or pro-
mote humane values. To the per-
sonally committed teacher, distrib-
uting KIND News may provide
some reassurance that she is pro-
moting the values she feels other-
wise barred from presenting.

Attitudes and Behavior

Students’ attitudes and behaviors, the third area of obstacles to teach-
ing humane and environmental val-
ues, reflect not only students’ con-
textual backgrounds, including im-
licit and explicit values, but also
their social-emotional and cogni-
tive developmental abilities.

Nationwide, teachers cite large
numbers of students lacking age-
appropriate social skills (e.g., shar-
ing, waiting one’s turn). Increasing
numbers of elementary school chil-
dren are unprepared to function in
age-appropriate ways in the class-
room (Evans 2004). Teachers in this
position may believe that teaching
children to be kind to animals or to
respect nature falls farther down on
their list of priorities when, as one
respondent stated, “they don’t even
have basic manners.”

Conclusions

If basic human needs are met, ele-
mental school children tend to be
enthusiastic and motivated to learn.
Unfolding cognitive skills allow
increasing abilities to manage and
focus attention, especially regard-
ing topics they are motivated to
understand (Berger 2005). As they
peek around the corner of adoles-
cence, they discover strategies for
learning, accumulate constructed
knowledge, and begin applying that
logic to abstract topics such as
morality or humaneness.

NAH EE, in efforts to reach stu-
dents, publishes an award-winning
program designed to foster humane
and environmentally respectful atti-
tudes and behaviors in children,
especially in regard to animals and
the natural world. However, it must
compete on at least three levels
with powerful systems.

First, NAH EE must compete
with the corporate world in striv-
ing for children’s attention. Many
corporations have well-known (and
sometimes well-respected) icons,
celebrity endorsements, and slick,
well-crafted, well-placed marketing
strategies. In terms of appeal,
KIND News may pale in compari-
on. It is colorful, but not glossy;
the illustrated characters are gen-
erally unnamed, rounded and cute
rather than familiar, sharply angu-
lar, and coolly aloof.

Second, NAH EE faces the chal-
lenge of imparting values and
behaviors that conflict with mes-
gages children receive from numer-
ous resources throughout a single
day. For every article a child reads
in KIND News fostering compass-
ionate responsible behavior, he
may be bombarded with multiple
messages promoting just the oppo-
site. A well-written KIND News
article on the importance of kind-
ness to animals must compete with
the details of immoral, illegal, and
inhumane acts perpetrated by sen-
ators, congressmen, presidents,
priests, and other individuals in
positions of trust.

Last, NAH EE competes with pre-
viously developed attitudes and
beliefs of a fair number of children
with low self-efficacy and a poor
sense of agency. Children who are
exposed to chronic violence, live in
poverty, or are homeless tend to be
streetwise. They’re more likely to
be cynical about articles encourag-
ing kindness or respect. These
messages may pale in comparison
to the daily realities of their lives.
Such a child may be too busy fig-
oring out the safest route home to
pay attention to the fact that the
earth revolves around the sun; re-
specting the earth and atmosphere
when he hasn’t yet developed a
sense of safety in his own neighbor-
hood may seem irrelevant.

NAH EE provides informative,
age-appropriate, accurate, and up-
to-date information about humane
and environmental topics in the
form of a newspaper. However,
accurate information is only part
of the equation necessary for chil-
dren to develop humane and envi-
ronmentally respectful attitudes
and behaviors. The other half of
the equation includes, ideally,
trustworthy nurturing mentoring
relationships allowing children the
necessary room to develop the cog-
nitive and social skills necessary to
empathic development.
Empathy and care are intertwined with the ability to think about the feelings and needs of others and to regulate one’s emotions appropriately. While the most common pathway for developing caring behavior is via secure relationships with family members, alternative pathways are possible (Chase-Landsdale et al. 1995). Trustworthy mentors, using developmentally appropriate literature such as KIND News in the context of a high quality, multi-systemic program, may indeed foster the development of a kinder, more humane generation.

**Recommendations**

The success of intervention and prevention programs is determined by the soundness of the program, its acceptability to the intended recipients, and the quality of its implementation (Shonkoff and Phillips 2000). Effective programs support and are supported by multiple systems; focus on intervention in social context; maintain developmental appropriateness and target children over a long period of time; are implemented by qualified individuals in a safe environment; and are evaluated consistently and funded adequately.

*Use a multi-systems approach.* Successful prevention and intervention programs include in their design and implementation an understanding of and respect for children’s families, neighborhoods, cultures, schools, and other systems in which children’s lives are nested. Moreover, they work collaboratively with individuals in those systems to promote and achieve program objectives and goals. Lessons in program literature presented by the after-school program staff, for example, are ideally reinforced (or at least, not contradicted) by teachers, community center staff, and individuals in other systems.

*Focus intervention programs on social context.* School-based interventions targeting changes in the social context appear to be more effective than those attempting to change individual attitudes, skills, and risk behaviors (National Institute of Mental Health 2006). The same may be true for humane and environmental education programs. Focusing, for example, on taking pride in one’s school by promoting clean-up projects may be more effective than instructing children to refrain from littering. This is especially true if the valued behaviors conflict with those of children’s family or other systems. By overtly focusing on changes in context, adults allow children to come to their own conclusions and to internalize constructed knowledge and developing values as their own.

*Begin prevention and/or intervention programs early and keep programming developmentally appropriate.* Program literature and lessons are most effective when they appeal to a child’s desire to feel more grown-up. Literature or lessons that seem too “babyish” are likely to elicit scoffs. Role models and characters should be two or three years older than the target audience and appear respected by peers as well as adults.

*Early intervention, especially among disadvantaged children, leads to long-term positive results.* Younger children are interested in being “good” and take great pride in learning and doing good deeds. This is an ideal time to introduce and foster social skills development as well as age-appropriate humane and environmental topics.

*Slightly older children (third to fourth grade) think fairly concretely at some times and more abstractly at others.* They are eager learners and will, if the context allows, ask questions in efforts to make sense of complex issues, even though cognitive limitations may not allow them to fully comprehend abstract principles. They tend to be curious learners and care very much about issues of fairness. Short lessons integrated with hands-on tasks that use motor skills (e.g., building a birdhouse) and rapidly developing cognitive skills, are bound to result in knowledge construction.

Successful programming for preteens includes reasonably challenging cognitive tasks that allow them to test newly developing abstract thinking abilities. Although still dependent upon parents and other adults, preteens strive for a sense of autonomy and tend to resist messages that appear to tell them what to do or how to think. Lessons appealing to their developing ability to think more abstractly and to come to their own conclusions will be well received, albeit often with an air of pseudo-boredom. For example, an activity encouraging students to debate both sides of the question of spaying and neutering pets may be more likely to promote the construction of knowledge than the notion of spaying and neutering.

In the presence of authentic role models, preteens may develop the necessary comfort and trust to begin exploring their own beliefs and behaviors, asking profound questions as they struggle to make sense of the many contradictions encountered when exploring humane and environmental topics. This exploration and questioning is necessary for them to internalize humane and environmental values as their own.

*Use quality implementation strategies in safe environments.* The quality of implementation is as important to a program’s success as is the program itself. Programs are more likely to be successful if the mentors and other adults implementing them have a high degree of self-efficacy and earn the genuine respect of the program participants. A primary step in program design is the development of self-efficacy in adults implementing the program (Miller-Heyl, MacPhee,
and Fritz 2000). If program mentors believe they can design and implement a successful program, they are more likely to persevere, even in the face of opposition. They will persist when not entirely sure their results will be successful (Miller-Heyl, MacPhee, and Fritz 2000). When adults feel competent and confident, the children in their presence tend to believe that they, too, are capable (Miller-Heyl, MacPhee, and Fritz 2000).

Effective programs are implemented in safe environments. Safety needs must be met before mentors can focus on teaching and before children can focus on learning.

Ensure adequate, long-term funding and consistent evaluation. Building and grounds maintenance, transportation, salaries for competent staff, and money for supplies and various other expenses require adequate funding over a long period of time. Evaluation activities must be included in the budget and conducted over the course of the program. Ideally, adjustments in program implementation are considered as data are analyzed and explored.

Summary
Childhood has changed in a number of important ways over the last two decades, affecting not only children’s lived experiences, but also teachers’ practices, which in turn, affect if and how humane and environmental education programs are implemented. More children are living in poverty, are exposed directly and indirectly to violence, have reasonably easy access to weapons, and experience difficulty escaping negative peer influence and gang activity. They are bombarded with media-driven messages that may conflict with goals of humane organizations. In-school promotions are especially effective in gaining children’s attention; they tend to be colorful, glossy, and highly appealing. High quality writing and accurate reporting about humane and environmental topics in KIND News may pale in comparisons to glossy supplemental materials featuring licensed characters and other highly valued cultural icons.

Continuous cognitive, motor, and social changes in the developing child affect how he thinks about the world, interacts with others, and regulates his emotions and behavior. The likelihood of a child becoming a kind, caring, respectful citizen is much greater if certain protective factors (e.g., nurturing, safety needs) are in place. However, even children lacking such protective factors may develop into highly caring, empathic adults when certain resiliency factors (e.g., mentors who believe in the child’s goodness and capacity to be a kind, compassionate humane being) are in place.

Teachers face increasing curriculum demands, wider variations in students’ academic and social skills, and increasingly aggressive behavior among students. Although many teachers believe humane and environmental education is important, few teach these lessons consistently. They may rely instead on students’ ability to read KIND News and/or other supplemental materials related to humane and environmental topics. Findings from the KIND News evaluation reflect the fact that, while children’s attitudes and behaviors towards animals are not problematic, their behavior toward one another is aggressive, especially in the upper grades.

For humane education to be effective, programs must consider the shifting contexts of childhood; work collaboratively with multiple systems; be developmentally appropriate; be implemented over longer periods; foster self-efficacy among program staff and administrators; and be evaluated consistently and funded adequately.

With long-term participation in quality programs, children are more likely to think critically about conflicting messages related to ethical, moral, and humane practices, and as they move into adolescence, to struggle constructively with personal choices for their behavior and make informed decisions reflecting the values of the people and institutions they have come to genuinely respect.

(Editor’s note: in 2007 NAHEE was renamed Humane Society Youth.)

Literature Cited


## Appendix B
### Demographic Comparisons of City Sample and U.S. Population

(All figures are in percentages, unless otherwise indicated)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sample City</th>
<th>U.S. Population</th>
</tr>
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<tbody>
<tr>
<td><strong>Household and Family</strong></td>
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<tr>
<td>Average household size</td>
<td></td>
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<tr>
<td>(number of people in the household)</td>
<td>2.41</td>
<td>2.60</td>
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<tr>
<td>Average family size</td>
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<td>(number of people in the family)</td>
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<td>Percentage of Hispanic or Latino individuals of any race</td>
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<td>15.00</td>
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<td><strong>Age</strong></td>
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<td>Percentage of population over age 65</td>
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<td>Number of people age 65 and above living below the poverty level</td>
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<td>Families w/female head (no father present), children under age 5</td>
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Canada’s Commercial Seal Hunt

Rebecca Aldworth and Stephen Harris

Introduction

Like efforts to end the commercial hunting of whales, the campaign to stop the slaughter of seals in Canada has become a major focus for animal and environmental protection groups and governments the world over. For decades the face of the harp seal pup has been a symbol—to many, the symbol—of environment and animal advocacy.

But as much as the campaign to save the seals has become an icon for those who would protect wildlife, the campaign to continue the hunt has become a focus for those who would block the progress of the animal protection and environmental movements.

There is little middle ground between the two camps, with one calling for an immediate cessation of all commercial hunting of seals in Canada and the other lobbying for the highest seal hunt quotas in history. Canadian journalists often report with incredulity the vast gulf between the two sides of this debate. At the same time, those working to end the seal hunt note the campaign appears far harder to win than the economic and cultural importance of the industry would seem to warrant.

A review of the history of the seal campaign and the political environment in which it occurred can help account for some of these perceptions. It exposes the forces behind the rejuvenation of commercial sealing over the past decade and reveals that the price on the seals’ heads is far greater than that which could ever be attached to their skins. Moreover, it explains why the success—or failure—of the campaign to save the seals may play a significant role in shaping society’s view of the status of all animals.

Early Seal Hunting in Canada

Commercial hunting of seals and other pinniped populations has taken place off Canada’s east coast for hundreds of years. From its very beginnings, this commercial exploitation was conducted in an entirely unregulated and unsustainable fashion, leading to the extinction and severe depletion of several populations (Mowat 1984).

The overhunting of pinnipeds did not occur in isolation; the marine environment of the northwestern Atlantic has been systematically devastated by relentless commercial exploitation from the time of the first European settlers through today. In addition to pinnipeds, several species of whales, marine birds, and fish have also been driven to the brink of extinction through commercial slaughter over the past four centuries. Pilot whales, once the most common inshore whale species in Newfoundland, were killed en masse, in part to provide meat for mink and fox fur farms, until the population had become so depleted that hunters could no longer find enough to meet demand (Sanger, Dickinson, and Handcock 1998). The bowhead and right whales have become endangered species, the grey whale population of the North Atlantic no longer exists, and both the humpback and blue whale are now threatened species. Great auks, flightless aquatic birds once found throughout the North Atlantic, were hunted for their feathers, oil, and meat, and their populations began to decline rapidly in the late 1600s. Funk Island, off Newfoundland’s east coast, and the Magdalen Islands in the Gulf of St. Lawrence were once home to large colonies, but Funk Island’s last bird was killed between 1785 and 1800, and the species officially became

93
extinct in 1844 (Mersereau 2000). Industrial fishing has severely depleted numerous ground fish stocks, including northern cod, haddock, redfish, American plaice, and capelin.

Early European settlers’ first foray into commercial hunting of pinnipeds off the east coast of Canada was with the walrus. Throughout the sixteenth and seventeenth centuries, walruses were slaughtered relentlessly for their lucrative oil, leather, and tusks. By 1680 all walruses had been removed from the St. Lawrence River; those along the north shore of the Gulf of St. Lawrence were gone by 1704 (Lavigne and Kovač 1988).

As the walrus disappeared, grey seals quickly became a substitute source for marine oil. For a time, grey seals became one of the most exploited resources in the New World. As with the walruses, they were slaughtered by the thousands, and by the 1860s grey seals had been wiped out of much of their former range (Ronald and Lavigne n.d.).

With walruses and grey seal populations in severe declines, it was inevitable that hunters would soon set their sights on the larger populations of ice-breeding harp and hooded seals. These seals spent only part of the year in Canadian waters, breeding on inaccessible sea ice, and it is likely they initially escaped the attention of early hunters. But by the early eighteenth century, both French and English settlers had begun to hunt harp and hooded seals commercially; by the end of the century, British settlers in Newfoundland were killing more than a hundred thousand seals in some years (Lavigne and Kovač 1988).

Over the next hundred years, advances in technology and vessel construction dramatically increased the number of seals killed in the annual hunt. The year 1818 marks the beginning of the so-called Golden Age of Sealing, nearly half a century of historic high levels of killing. Between 1818 and 1862, Newfoundlanders killed more than eighteen million seals.

Annual catches of harp seals remained strong until the 1860s, when they finally began to decline as the unsustainable levels of hunting took their toll on the population. Despite technological advances such as steam-driven vessels and the use of aircraft to spot seal herds, kill levels would never again be as consistently high. Nonetheless, sealers continued to slaughter hundreds of thousands of seals annually, and by the turn of the century, another 12.8 million seals had been killed. This brought the total seal kill for the century to a staggering 33 million animals, most of them newborn harp seals (Ronald and Lavigne n.d.).

With the dawn of the twentieth century came the advent of steel-hulled ships, and annual catches averaged more than 200,000 per year until 1914. But the new ships were called into service during both world wars, and kill levels during these years dropped dramatically (Canadian Geographic 2000). Hunt numbers began to increase again at the end of World War II, with higher oil prices and the introduction of motorized vessels. On average, more than 200,000 seals were killed annually through 1949. That year the sealing industry began to restructure. Newfoundland became a province of Canada, and with that came social benefits that made sealing less necessary for economic survival (Canadian Broadcasting Company [CBC] 1958). As sealing firms in Newfoundland withdrew from the seal hunt, companies based in Norway sent their boats to the ice instead.

Despite the decrease in Newfoundland interest in the seal hunt, kill levels increased, achieving a 1950s average of 312,000 seals per year (Lavigne and Kovač 1988).

Scientists soon grew concerned about the high levels of killing. In 1960 D. Sergeant warned,

Under these conditions, and without imposition of effective controls, the stock of western Atlantic harp seals must be considered to be in grave danger of catastrophic decline in numbers within a very few years. (Lavigne and Kovač 1988, 131)

Sergeant and Fisher (1960) noted that the census figures indicated the population had been reduced by at least 50 percent between 1950 and 1960.

The Campaign to Save the Seals
The question the seal hunt posed was not just how seals were killed, but whether they should be killed at all.
—Brian Davies, founder, International Fund for Animal Welfare

As scientists grew increasingly concerned about unsustainable kill levels, Canadians were beginning to consider the animal welfare implications of the seal hunt. Human societies first sent observers to the seal hunt during the 1950s, and reports of cruelty slowly filtered out to the public. In 1958 Albert Perlin, editor of Newfoundland’s Daily News, was interviewed by CBC radio about the sealing industry. He commented,

The seal fishery was a wasteful industry. It was in many ways an unpleasant industry. I’ve heard many a sealer talk about the small whitecoats—two or three days old—almost looking up with tears in their eyes as they killed them... and frankly, if it’s an industry we could do without, I’m not at all sure—from the standpoint of humanitarianism alone—it’s probably a good industry to be without. (CBC 1958)

In 1964 the seal hunt achieved widespread notoriety, when a film including seal hunt footage was com-

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missioned and broadcast by Radio Canada (the French component of the CBC). For the first time, the stark images of the bloodied newborn pups on the white ice floes and scenes of seals appearing to be skinned alive allowed Canadians to see what they had occasionally read about in newspapers. The images were disturbing, and public reaction was understandably strong.

In 1966 the New Brunswick Society for the Prevention of Cruelty to Animals sent its officer, B. Davies, to observe the commercial seal hunt. Davies was profoundly moved by what he witnessed, and founded the International Fund for Animal Welfare (IFAW) just three years later, with the goal of ending Canada’s commercial seal hunt (Lavigne and Kovačs 1988). Impressed by its ability to generate media coverage, Davies also sought to involve the newly formed organization Greenpeace in the campaign to save seals. Over the coming years, innovative media events on the ice organized by IFAW, Greenpeace, and others, and the support of celebrities such as Brigitte Bardot, made the plight of the seal pups in Canada an international lead story. As the public outcry against the seal hunt echoed around the world, it was clear the global effort to save the seals had begun in earnest.

The messaging of the animal welfare groups working to stop the seal hunt largely focused on the objections to beating newborn pups to death in front of their mothers, along with observer testimony and veterinary evidence indicating a significant percentage of the pups were being skinned alive in the process (Simpson 1967; Jordan 1978). Images of newborn seals staring up at club-wielding sealers shocked people around the world, and, as the campaign progressed, the debate was changing from how many seals should be killed in the hunt to whether it was morally acceptable to kill them at all.

As the cruelty debate raged on, government scientists were continuing to warn that the consistently high kill levels threatened the very survival of the seal populations. In 1971 a quota system was introduced in an attempt to conserve the rapidly dwindling seal stocks. However, the situation continued to worsen, and by 1975 a senior Canadian government scientist was so concerned about the impact of high levels of hunting that he suggested the harp seal population could be lost in the absence of a ten-year moratorium on commercial sealing (Lavigne and Kovačs 1988).

With Canada showing little will to even reduce quotas to a more sustainable level—much less end the hunt for humanitarian reasons—Davies and his colleagues realized public opposition would not be enough to stop the seal hunt. At the time, Europe was Canada’s top seal skin market, importing fully three-quarters of the skins produced each year. Davies argued that Canada’s commercial seal hunt was in reality Europe’s responsibility, given that Europe was providing the economic incentive for the seal hunt to continue.

A tremendous lobby effort was waged by IFAW and European animal protection groups. An impressive five million signatures opposing the seal hunt were collected and submitted to the European Parliament and British government. By 1982 the public pressure was overwhelming, and the European Parliament voted to ban the import of skins from “whitecoats” (newborn harp seal pups under about two weeks of age) and “bluebacks” (hooded seal pups under about one year of age). The measure passed, 160 to 10, with 20 abstentions, and the issue then went to the European Commission for consideration. In October 1982 the commission recommended a temporary import ban based on a clause in the General Agreement on Tariffs and Trade (GATT) permitting trade restrictions to protect public morals. One month later the European Parliament effected a temporary ban to last until March 1983. Just before it expired, the European Economic Community (EEC), predecessor of the European Union, extended it for another six months. Talks on ending the ban took place among Canada, Norway, and the European Commission, but on October 1, 1983, the EEC implemented a two-year ban, then renewed it for another four years in 1985. Since Europe was the primary market for the Canadian sealing industry, kill levels in Canada declined dramatically (CBC 1982).

Still, Canada refused to prohibit a practice that was already ending through lack of markets. IFAW increased global pressure on the Canadian government and fishing industry by launching a boycott of Canadian seafood products in the United Kingdom in 1984. The boycott achieved significant corporate support, and the campaign convinced sealing groups to support a moratorium on the hunting of whitecoats. Still, the Canadian government refused to give in: it guaranteed to pay sealers 80 per cent of the value of the seal pelts that year (CBC 1984).

Clearly, the offer of subsidies was not enough. In 1984 and 1985, because of the European ban on the import of whitecoat and blueback seal skins and the successful British boycott of Canadian fish, there was no large vessel-based commercial seal hunt (CBC 1987). Animal protection groups, confident the seafood boycott had achieved its goals, suspended the tactic, believing the seal hunt was winding down and would soon be over for good.

In December 1986 the Royal Commission on Seals and Sealing, a panel that had been set up by the federal government two years earlier, introduced a report in the House of Commons. Among other things, the report recommended
an end to hunting whitecoats. In 1987 large vessel owners prepared once again to hunt seals. Animal protection groups reacted quickly, threatening to move the seafood boycott into the United States, the top market for Canadian seafood. The Canadian government responded by banning the use of larger vessels and the killing of newborn pups at the seal hunt in Canadian waters, effectively ending the large-scale commercial seal hunt for several years (CBC 1987).

Arguably, this could have been the end of commercial sealing in Canada if not for two important factors—the collapse of the northern cod stock and the rise of the “wise use” movement, whose strategies were embraced by those promoting commercial exploitation of marine mammals.

The Rise of the Wise Use Movement

Our goal is to destroy, to eradicate the environmental movement.... We’re mad as hell. We’re not going to take it anymore. We’re dead serious—we’re going to destroy them. We want to be able to exploit the environment for private gain, absolutely.

—Ron Arnold, executive vice president, Center for the Defense of Free Enterprise (Arnold 1995)

During the second half of the twentieth century, the environmental movement was fast changing from a fringe interest into a politically powerful entity. During this time leading environmental organizations such as Greenpeace were established, and, as public support for the movement grew, key environmental defense policies were successfully adopted. Three of the most important victories in the protection of marine mammals happened during this time: the 1972 U.S. Marine Mammal Protection Act, the 1982 moratorium on commercial whaling, and the 1983 EU ban on trade in products of whitecoat and blueback seal pups.

Even as the environmental movement was making headway, powerful opponents were surfacing in response. Those who stood to profit from resource exploitation struck back with an organized force that became known as the “wise use” movement. By creating industry front groups, using conservation language to describe resource extraction activities, advancing industry agendas through appropriation of native interests, and presenting environmentalists as selfish profiteers, the wise use movement set out to regain ground.

In 1988 a conference was organized by the Center for the Defense of Free Enterprise (CDFE), led by an active opponent of the environmental movement, R. Arnold. The conference drew industry leaders from the United States and Canada, and the outcome was a “wise use agenda” signed by all participants. But while the objectives of the wise use agenda (including clear-cutting of old growth forests and weakening of endangered species legislation) were controversial, it was the strategies laid out by the “wise users” to achieve their goals that were the most troubling to environmental groups.

One of the key tactics promoted by the wise use movement to counter environmental campaigns was the creation of “front” groups—industry advocacy organizations positioned as public interest groups. Arnold advised,

The public is completely convinced that when you speak as an industry you are speaking out of nothing but self-interest... The pro-industry citizen activist group is the answer to these problems. It can be an effective and convincing advocate for your industry. It can evoke powerful archetypes, such as the sanctity of the family, the virtue of the close-knit community, the natural wisdom of rural dwellers... and it can turn the public against your enemies.... I think you’ll find it one of your wisest investments over time. (Goldberg 2001, 15)

Soon, environmental and animal protection groups found themselves contending with industry-funded front groups in virtually every resource-extraction sector they attempted to influence. It was in this context that industry and government-funded sealing advocacy groups, including the North Atlantic Marine Mammal Commission (NAMMCO), the World Council of Whalers (WCW), the High North Alliance (HNA), and the IWMC World Conservation Trust were established. Notably, the Canadian government counseled, participated in, and funded these organizations (Goldberg 2001).

NAMMCO was created in 1992 by four pro-whaling nations (the Faroe Islands, Greenland, Iceland, and Norway) that were dissatisfied with the International Whaling Commission’s (IWC) global moratorium on commercial whaling. NAMMCO positions itself as a science-based and responsible alternative to the IWC and a recognized international management body. However, its membership is restricted to whaling and sealing interests, and experts view it as an organization working to promote a wise use agenda (Goldberg 2001). In 1997 Canada played host to a NAMMCO meeting, “Sealing the Future.” The conference, which included representatives of the Canadian government, resulted in a press release demanding the elimination of “WTO incompatible seal product trade barriers” (North Atlantic Marine Mammal Commission 1997, n.p).
While NAMMCO positions itself as an international management authority, other wise use groups define themselves as conservation bodies. On its website (www.nammco.org), the IWMC World Conservation Trust (formerly known as the International Wildlife Management Consortium, or IWMC) calls itself a “global coalition of experts and wildlife managers promoting the conservation of habitat and wildlife resources,” and asks people to “donate now to protect the world’s wildlife for future generations.” In light of this, the public would perhaps be surprised to learn that IWMC’s Canadian founder and president, E. Lapointe, is a paid lobbyist for countries seeking to reopen the trade in endangered species (Vidal 2004). Having previously worked with the Canadian government for fourteen years, Lapointe served as secretary general of the Convention on International Trade in Endangered Species (CITES) between 1982 and 1990, a position from which he was dismissed under controversial circumstances when he campaigned against a ban on the ivory trade. He later received a settlement after the UN found that his dismissal was “arbitrary and capricious,” and he now advises several nations, including Canada, on how to avoid animal trade legislation legally (Vidal 2004). Five of the nine officers in his organization are former CITES employees, and Lapointe states that his funding comes from Canada, China, Japan, Norway, and “two small European countries” (Russell 2002).

In addition to advocating trophy hunts for elephants, reopening the international ivory trade, and a return to commercial whaling, the IWMC strongly supports the Canadian seal hunt. In an open letter entitled “Seal War,” which was posted on the IWMC website in 2005, Lapointe urged organizations to join a “Sustainable Use Coalition to support the Canadian Sealers and Fishermen and the Canadian Government, in their struggle against the anti-sealing protest industry” (Lapointe 2005, n.p.). This, and the other seal content on the IWMC website, is a good example of wise use messaging, branding the campaign to defend the seal hunt as “sustainable” and the campaign to end it as “eco-terror.” The IWMC site defines groups working to end the seal hunt as “extreme,” “radical,” and “vicious,” and the individuals who oppose the seal hunt as misinformed, wealthy urbanites with little understanding of, or concern for, rural lifestyles.

Another common wise use strategy emerged in the 1980s: the use of public sympathy for traditional, subsistence aboriginal lifestyles to defend commercial trade in wildlife parts. An employee of the Canadian Department of Indian and Northern Affairs and senior Canadian government advisor, B. Roberts, explained the tactic at a whaling conference in Iceland as he outlined successful strategies used to counter anti-sealing groups. He said,

The first step was to neutralize the appeal of the animal protection lobby. To accomplish this it was necessary to mount an equally emotionally powerful counter-appeal. This counter-appeal was based on the survival needs of aboriginal communities which depended upon the continued taking of fur-bearing animals.

(Schmidt 1999, 7)

The Center for the Defense of Free Enterprise (2006), considered a leading wise use group, uses this tactic to support the seal hunt. The CDFE website includes a statement that, while providing any substantiating evidence, attempts to blame economic hardships and even suicide rates in native communities on the collapse of the commercial sealing industry in the 1980s:

The Canadian seal hunt was decimated by outside intruders...As a result, the resource-extracting culture withered and its suicide rate skyrocketed as helpless people felt the unreasoning hatred of well-fed constituencies in the dominant urban culture. http://www.eskimo.com/~rarnold/seal_hunt.htm

Notably, the commercial seal hunt in Canada is conducted almost entirely by non-aboriginal people from Canada’s east coast, and the traditional value of sealing to native communities has been in subsistence hunts, which by definition are not affected by global seal product trade. According to P. Hollingsworth, an Ojibwa and founder of the Native Animal Brotherhood, it is resource extraction industries that are leading to the demise of native culture.

He noted,

Indigenous survival is not synonymous with Canada’s fur trade. Quite the opposite is true. History has shown that the commercial fur trade industry actively promoted the disintegration of our culture, a process which continues to this day. (Global Action Network n.d.)

Regardless, the perception that ending the commercial seal hunt would have a devastating impact on native communities prevails, and hardships faced by Canadian aboriginals remain one of the most compelling arguments in support of the hunt. As CDFE’s founder Arnold stated in 1991, “Facts don’t matter. In politics, perception is reality” (Krakauer 1991, 70).

While these and other wise use tactics helped seal hunt proponents lay the foundation for a return to industrial-scale commercial sealing, it was the cod collapse off the east coast of Canada in the 1990s that provided the political impetus for the Canadian government to act.
The Collapse of Northern Cod

The collapse of the cod stocks was due to over-fishing. It had nothing to do with the environment and nothing to do with seals.

—Ransom Myers, former Canadian Department of Fisheries and Oceans scientist

Throughout the 1950s and 1960s, Canada’s fishing industry developed new technologies. With huge nets, industrial fishing vessels could haul up as much as two hundred tons of fish in one hour, twice the amount a typical sixteenth-century boat would have caught in an entire season. Cod catches increased steadily over the 1950s and 1960s, from a yearly average of 250,000 tons to a peak of 800,000 tons in 1968 (Brubaker 2000).

At the time, foreign fishing fleets were taking the lion’s share of the fish caught off the east coast of Canada. They took not only the cod, but the main food source for the cod, capelin, as well. It was no surprise that the northern cod stock was diminishing under the double threat of a decreasing food supply and overfishing (Tsao 1996).

By 1977 the decrease in ground fish stocks had become so evident that Canada imposed a two-hundred-mile limit off its coast as a means of stopping the foreign fishing fleets. Regrettably, instead of using the new protected zone to reduce fishing and allow fish stocks to rebuild, Canadian fishing companies saw a chance to increase their own take. In what many environmentalists see as a conservation betrayal, Canadian fishing fleets dramatically increased the size of their catches, and in Newfoundland the number of registered fishers increased by 41 percent (Blake n.d.). Fisheries biologist Richard Haedrich elaborated: “The idea was that the streets were paved with fish and that now that the Europeans were gone it would come to the Canadians” (McKibben 1998, 64).

Throughout the next decade, the Canadian government paid little heed to the concerns of inshore fishermen who were noticing a serious decrease in their catches and the size of the individual northern cod. They continued to set unsustainable quotas until it was evident the northern cod population could withstand no more (Harris 1998). By the 1990s, with northern cod stocks at only 1 percent of their historic levels, it was clear decades of overfishing had resulted in an ecological catastrophe. In 1992 a moratorium was declared on cod fishing; unfortunately, by then, many believe it was already too late (Woodard 2001).

The public demanded to know how Department of Fisheries and Oceans (DFO) scientists could have missed the obvious signs of a declining population, when inshore fishermen had been predicting the collapse for decades. As tens of thousands of Atlantic Canadians lost a primary source of income, the DFO offered up various explanations, from foreign fishing fleets to changing ocean temperatures. Despite a consensus among the scientific community to the contrary, seal predation was at the top of the DFO’s list (Lavigne 1995).

Given the residual resentment surrounding the EU sealskin ban and the boycott of Canadian seafood, the failure of the cod stocks to recover, and the prevalent myth that seals harm fish stocks, seals were a perfect scapegoat for dwindling fish stocks. Government and independent scientists argued that only 3 percent of a harp seal’s diet consists of northern cod, and that harp seals also consume many significant cod predators (Lavigne 1995). But their advice went unheard, and calls for a seal cull echoed loudly through eastern Canada and within the DFO bureaucracy itself.

A Lethal Combination

Mr. Speaker, I would like to see the 6 million seals, or whatever number is out there, killed and sold, or destroyed and burned. I do not care what happens to them...the more they kill the better I will love it.

—John Efford, Newfoundland Minister of Fisheries and Aquaculture, 1998

When the 1992 cod moratorium was announced, optimistic politicians predicted it would be over within a few years. But informed scientists were already stating it would take at least a decade before the cod could be expected to recover (Myers, Mertz, and Fowlow 1997). As the years went by, it was clear the cod were not coming back, and the Canadian government began to look at ways to appease the east coast fishing industry.

In October 1995 B. Tobin, then Canadian fisheries minister, along with the fisheries ministers from Iceland, Norway, Russia, and the Faroe Islands and a representative from Greenland, signed a statement declaring seals “a conservation problem” in parts of the North Atlantic Ocean (Department of Fisheries and Oceans 1995, n.p.). The statement concluded, “there is a need to reduce the sizes of the seal herds...through expanded commercial harvests where possible.” Only the EU dissented.

While informed cynics saw the move as an attempt to justify commercial sealing and placate fishermen in the wake of the cod collapse, Canadian media provided misleading legitimacy to the minister’s statement. The Canadian press falsely stated that “federal research has linked seals to a decline in cod stocks” (Lavigne 1996a, 57). The Department of Fisheries and Oceans scientist...
Oceans’ website homepage at the time stated, “Harp seals are one of the factors inhibiting groundfish recovery” (Lavigne 1995). In reality, the Canadian government’s own scientists had repeatedly concluded the depletion of fish stocks had nothing to do with seals (House of Commons Standing Committee on Fisheries and Oceans 1997). Regardless, a public relations foundation was clearly being laid for rejuvenation of the commercial seal hunt in Canada. It came as little surprise to animal protection groups when, in 1996, Tobin announced a massive federal subsidy for sealers (Lavigne 1996b). Hunt numbers exceeded 240,000 seals that year and have remained high ever since.

The Politics of Conservation

The following year some clarity was finally provided on the seals and cod question when two former DFO scientists, including J. Hutchings, published “Is Scientific Inquiry Incompatible with Government Information Control?” (Hutchings, Walters, and Haedrich 1997). It indicated a tradition of suppression of scientific information at DFO and cited numerous examples of DFO scientists warning that ground fish stocks were in a dangerous decline; these findings were either ignored or suppressed as high quotas continued to be allocated. The authors suggested, “The conservation of natural resources is not facilitated by science integrated within a political body” (Goldberg 2001, 3).

According to the authors, government interference was not restricted to reports on fish stocks. Just as evidence suggesting a pending collapse of cod stocks was suppressed, so, too, was information that did not support the government agenda to scapegoat seals; the authors pointed out that statements in the original draft of the 1995 Stock Status Report on Gulf of St. Lawrence ground fish, indicating seal predation was unlikely to be responsible for cod mortality trends, were allegedly removed from the published version, contrary to scientific advice.

A hearing was convened in the House of Commons Standing Committee on Fisheries and Oceans to hear testimony regarding the report. Witnesses described an established pattern at DFO of intimidating researchers, repressing scientific uncertainty about stock levels, censoring or rewriting reports, failing to collect or use relevant data, hiding data from researchers, barring scientists from speaking to the media or to colleagues about their findings, threatening to withhold research funding to universities whose staff criticize DFO, and threatening to sue DFO critics (Goldberg 2001, 3).

R. Myers, a former DFO fisheries scientist, was called to testify. He described being tasked by the DFO bureaucracy to conduct research “examining the mortality of cod relating to seals to counter arguments by animal rights people that one could never detect such an event.” Myers noted, “We found out we could not detect the effect of seals with the data we had. Because we did not show what was desired by Ottawa bureaucrats, that research was suppressed” (in House of Commons Standing Committee on Fisheries and Oceans 1997, n.p.).

Though Myers and other witnesses provided suggestions for improvements to DFO, the hearing in the House Standing Committee on Fisheries and Oceans resulted in little concrete change at DFO (Goldberg 2001). A decade later bottom trawling and other destructive technologies were still established practices in Canada’s fishing industry (Canadian Broadcasting Corporation News 2006b), and seals remained the focus of intensive studies that attempt to link their populations to declining fish stocks (Department of Fisheries and Oceans 2004).

Trading Quotas for Votes

In 1997, despite the information exposed in the House of Commons inquiry and media, the use of seals as a scapegoat for fisheries mismanagement continued. Newfoundland’s fisheries minister, J. Efford, crisscrossed the nation to convince Canadians of the need for an expanded seal hunt. “The problem is that seals eat fish. They do not eat Kentucky Fried Chicken. I don’t need to be a genius or a rocket scientist to figure that out,” he informed audiencees (Luksie 1998, n.p.).

It is perhaps ironic that Efford was blaming seals for the vanished cod just as the House of Commons inquiry was exposing what appeared to be a DFO agenda to scapegoat seals for the cod collapse. Around the same time, F. Mifflin, B. Tobin’s successor as Canadian fisheries minister, was telling the public that the cod stocks were recovering. In a 1996 press release, Mifflin stated, “Declines in stocks have stopped...there are indications that some stocks are rebuilding” (Department of Fisheries and Oceans 1996, n.p.). In a controversial move, just ten days before the 1997 federal election was called, Mifflin announced that six thousand tons of cod could be taken from the northern Gulf of St. Lawrence and off the west coast of Newfoundland, and ten thousand tons could be taken from the southern Newfoundland coast (Department of Fisheries and Oceans 1997).

Meanwhile, attempts by the DFO to prove seal predation was leading to increased cod mortality were falling far short of their goals (House of Commons Standing Committee on Fisheries and Oceans 1997). Nevertheless, a Par-
Biologists overestimated size of stocks. Managers proposed quotas that did not allow for natural large declines in populations, and they consistently set quotas that were higher than what the biologists proposed. Fishermen lobbied hard for greater access....

Berrill was referring to the collapse of northern cod in the Newfoundland fishery, but the words could apply equally to seals today.

Scientists argue the current Canadian seal hunt management plan poses a renewed threat to the survival of seal populations, particularly in light of the pending effects of climate change on the habitats of these ice-dependent animals. They suggest that DFO’s population modeling may be overestimating harp seal numbers (Harris, Sousbury, and Iossa 2005) and note that Canada and Greenland both hunt the same population of harp seals but do not cooperate in setting quotas.

Perhaps these factors would be less alarming, were it not for the pending effects of climate change on harp and hooded seals and other ice associated animals. In a 2005 report, Johnston et al. (2005) concluded that reduced ice cover in the Gulf of St. Lawrence and off Newfoundland and Labrador during the breeding season may represent a serious environmental challenge for harp and hooded seals, which require an ice platform for whelping and nursing. The report noted that, in six of the previous seven years (1996–2002), ice cover on the east coast of Canada was significantly below the seasonal average for the period 1983–2002, and in poor ice years, ice cover in some regions was up to 60 percent less than the yearly average observed between 1969 and 2002 (Johnston et al. 2005). In 1981 and 2002, both poor ice years, Canadian government scientists estimated that three-quarters of the pups born in the Gulf of St. Lawrence died as a consequence of bad ice conditions. In 1998 and 2000, they estimated that one-quarter of the pups died due to lack of ice before the hunt began (IFAW 2006a).

In 2005 S. Dion, Canada’s environment minister, spoke at the United Nations Climate Change Conference and warned, “Reductions in sea ice will drastically shrink marine habitat for polar bears, ice-inhabiting seals, and some seabirds, pushing some species toward extinction” (Dion 2005, n.p.). The same year, G. Regan, Canada’s minister of fisheries and oceans, allowed sealers to reach one of the highest quotas for ice-dependent harp seals in history.

Animal protection groups note that, in addition to its effects on marine mammal populations, Canada’s commercial seal hunt involves a well-documented and unacceptable level of cruelty. In 2001 an international team of veterinarians, including American, British, and Canadian experts, observed the commercial seal hunt. The team studied the seal hunt from the ice and from the air and performed postmortems on seal carcasses abandoned on the ice. Their report concluded the Canadian commercial seal hunt results in “considerable and unacceptable suffering” and noted in 42 percent of cases studied, the seals did not show enough evidence of cranial injury to even guarantee unconsciousness at the time of skinning (Burdon et al. 2001).

M. Richardson, a Canadian veterinary expert in humane slaughter and the former chairwoman of the Animal Care Review Board for the Solicitor General of Ontario, contends the seal hunt is inherently inhumane because of the environment in which it operates (offshore, on unstable ice floes, often in extreme weather conditions) and the speed at which it must be conducted to be commercially viable (hundreds of thousands of animals are killed over just a few days).
(Richardson 2005). In 2005 D. Broom of the University of Cambridge and S. Cheetham, chief veterinary officer of the British Royal Society for the Prevention of Cruelty to Animals (RSPCA), reported on footage of the Canadian seal hunt, noting the prolonged suffering of the animals and the inability of the sealers to provide an acceptably humane death to the pups (Broom 2005; Cheetham 2005).

Over six years (2001–2006), virtually all of the seals killed (97 percent) were less than three months old, and most were under one month (Figure 1). The pups in Canada were killed almost exclusively for their fur. Attempts have been made over the years to develop other products, with varying degrees of success. For a short time in the mid-1990s, seal organs brought in a significant percentage of total seal hunt revenues, though that market either closed down or was driven underground in the wake of negative publicity. The sealing industry has found some success in marketing seal oil, but most of it is sold as an industrial lubricant, and seal-processing plant price lists show sales of seal oil constitute a small amount of the total income generated by the seal hunt (Carino Company Limited 2005). Millions of dollars in direct subsidies were provided to the sealing industry through the late 1990s to try to develop markets for seal meat. However, this endeavor failed, with products such as seal pepperoni finding limited acceptance. Despite the millions of dollars in government subsidies for product development and marketing, seal carcasses are almost always left to rot on the ice floes, and Canadian government officials define the commercial seal hunt as “primarily a fur hunt” (Standing Committee on Fisheries and Oceans 2006). The skins are shipped, largely in a raw (unprocessed) state, directly to Europe, where they are tanned and resold in fashion markets.

Canadian sealers are commercial fishermen from Canada’s east coast who participate in several commercial fisheries throughout the year. Government data show they earn on average less than 5 percent of their total annual incomes from sealing. The rest is from commercial fisheries such as crab, shrimp, and lobster (Linsey 2006). This analysis is supported by quotes from sealers in media reports (Warne 2004).

Even in Newfoundland, where more than 90 percent of sealers live, sealing income accounts for less than .1 percent of the gross domestic product. Economists note the few million dollars the sealing industry brings in each year are offset by the high level of government support it receives. As a whole, the sealing industry received more than $20 million in government subsidies between 1995 and 2001, according to a report by the Canadian Institute for Business and the Environment (Gallon 2001).

In contrast to the relatively marginal economic contribution it makes, animal protection groups argue the commercial seal hunt causes significant damage to Canada’s international reputation and to Canadian businesses.

The Renewed Fight to Save Seals

We are absolutely committed to making sure this is the last slaughter of baby seals in Canada anyone will ever have to witness.

—Paul McCartney, March 2006

Throughout the mid- to late 1990s, animal protection groups around the world were slowly becoming aware of the steadily rising seal hunt quotas in Canada. One after another, organizations launched renewed campaigns—this time to put a “final end” to the Canadian seal hunt.
During those years it became evident that the animal protection community had in some ways become a victim of its own success in the seal campaign. Opinion polls showed the public was largely unaware the seal hunt was even going on (Angus Reid Group 1997), with many believing it had ended for good in the 1980s.

Environment and animal protection organizations argue incomplete and misleading information provided by the Canadian government only helped to confuse the matter. Though government kill reports clearly showed most of the seals killed in the hunt at the time were pups just days or weeks of age, the DFO asserted that hunting baby seals was illegal in Canada, restricting its definition of “baby seal” to the newborn (whitecoat) harp seals protected in Canada from commercial hunting as of 1987. In Facts about Seals, the DFO (2000, n.p.) stated, “Young harp seals are independent and completely self-reliant two or three weeks after birth.” Animal protection groups claimed the DFO position was misleading and inaccurate. They noted that seals can be legally hunted in Canada as young as twelve days old, when they begin to shed their white fur, and that most of the seals killed are less than three months of age. The groups argued that, at the young age they are slaughtered, the pups have poorly developed swimming skills and many have not yet eaten solid food, leaving them defenseless against the hunters. Organizations pointed out that public opinion polling in 1997 showed 85 percent of Canadians believed seal pups less than one year of age should be protected from hunting (Angus Reid Group 1997).

Animal protection groups maintained that DFO information regarding the size of the harp seal population was equally misleading. Department publications consistently referred to the harp seal population as being “triple” what it was in the 1970s, neglecting to mention that overhunting in the 1950s and 1960s had reduced the population by as much as two-thirds by the early 1970s. Animal protection groups argued that what was in reality a recovery from a dangerously low level was being misleadingly represented by the Canadian government as a population explosion.

Inflations of the economic value of the seal hunt were persistent in the DFO messaging. In its 2001 Facts about Seals, the DFO (2001) claimed, “The seal hunt provides valuable income to about 12,000 sealers and their families in eastern Canada.” However, in the same year, the executive director of the Canadian Sealers Association stated at a sealing conference,

In Newfoundland, we have 11,000+ licensed sealers with approximately 2,500 of them active in any given year. Sealing licenses are not expensive to buy—they cost $5.00 a year. The reason for the large number of licenses vis-à-vis the smaller number of active sealers is the fact that if they do not renew their license in any given year, they will not be eligible in the following year. (Greenland Home Rule 2001, 57)

In Six Facts about Canada’s Seal Hunt, the DFO (2005b) attributed a value of $40 million for the Canadian seal hunt, a figure several times greater than the amount government landings reports show was actually paid to sealers that year. The DFO claimed the $40 million figure was provided by the Canadian Sealers Association (CSA), but neither the DFO nor the CSA was able to provide any substantiating evidence. Regardless, the figure continued as of late 2006 to appear prominently on the DFO website.

As the years progressed, it became clear that animal and environment protection groups were opposing more than the sealing industry in their campaign to stop the seal hunt—they were up against the full force of the Canadian government. It was in this challenging environment that animal protection groups managed to bring the campaign to save the seals once again to the forefront of the public consciousness.

Throughout the 1990s organizations worked on a variety of fronts to end the seal hunt in Canada. Paid advertisements educated Canadians about the humane, conservation, and economic aspects of the commercial seal hunt. Grass-roots initiatives organized by animal protection groups resulted in protests across the country, and tens of thousands of Canadians contacted their political representatives to express their opposition to the seal hunt. Government relations campaigns put the commercial seal hunt onto the agendas of Canadian politicians. Scientific studies raised serious questions about the sustainability of the Canadian government seal hunt management plan.

During this time some advances were made in the campaign. The Canadian government reevaluated some of its estimates of the numbers of seals actually killed during the Canadian seal hunt, and the new calculations were incorporated into management plans. Canada began to relax its arguably unlawful restrictions on seal hunt observers, which had previously made it very difficult to obtain footage of the seal hunt. Possibly in response to opinion polls showing the majority of Canadians, including Newfoundlanders, opposed government subsidies to the seal hunt (Angus Reid Group 1997), direct subsidies to sealers were phased out before 2000.

However, the Canadian government continued to expand the sealing industry, and despite the best intentions of the animal protection groups, kill levels continued to increase...with one notable exception. In 2000, with the direct meat subsidy to sealers eliminated, the kill level dramatically declined, to under 100,000 animals. Animal protection groups hoped, perhaps naively, that the hunt was finally beginning to
wind down in favor of less controversial economic opportunities.

Unfortunately, the reprieve was brief. Some argue the subsidies were never really removed but rather driven underground by negative publicity. Seal hunt numbers began to climb again in the following year, and in 2002 more than 300,000 seals were killed, the highest kill level in thirty-five years.

April 2004 marked a turning point in the campaign, when The New York Times featured the seal hunt controversy on its front page (Krauss 2004). In the weeks that followed, major media outlets all over the globe, including those throughout Canada, the United States, Europe, Australia, South America, and Asia, covered the story. In the second year of the “million seal quota,” the world was finally becoming aware that Canada’s seal hunt was back and twice as large as when animal protection groups first campaigned to stop it.

However, rather than working to end the hunt in the wake of the negative publicity, the Canadian government stepped up its defense and promotion of the sealing industry, allocating the highest quotas for harp seals in history. Animal protection groups countered with a hard-hitting strategy to increase economic pressure on the Canadian fishing industry—a boycott of Canadian seafood products.

The Canadian Seafood Boycott

*The message is simple; it will be heard across the world. If you oppose Canada’s merciless slaughter of baby seals, don’t buy Canadian seafood products.*

—Wayne Pacelle, President and CEO of The Humane Society of the United States, press conference, 2005

In November 2004, in a meeting between Canada’s Department of Fisheries and Oceans and animal protection groups, government officials said that the only environment in which the seal hunt could end would be if Canada’s fishing industry demanded it. This was likely due to the close ties between the Canadian sealing and fishing industries; Canadian sealers are commercial fishermen who hunt seals in the off-season, and fisheries unions represent sealers (Fish, Food, and Allied Workers Union 2001).

Thus, following decades of unsuccessful negotiations with the Canadian government, a network of some of the world’s most influential animal protection groups created an economic incentive for the Canadian fishing industry to act. Noting the success of the 1980s seafood boycott in changing Canadian government policy on the seal hunt, the network, which represents tens of millions of people worldwide, declared a boycott of Canadian seafood products until the seal hunt is permanently ended (HSUS 2005). About two-thirds of Canadian seafood is exported every year to the United States, generating nearly $3 billion for the Canadian economy annually (Department of Fisheries and Oceans 2005a). This made the United States an obvious initial focus for the campaign to boycott Canadian seafood. With its millions of members and constituents across the United States, The Humane Society of the United States (HSUS) was in a natural position to lead the effort.

The HSUS launched the seafood boycott in the United States on March 29, 2005, the opening day of the 2005 commercial seal hunt. As of mid-2006, The HSUS reported more than 330,000 Americans and more than one thousand major restaurants, grocery stores, and seafood wholesalers in the United States pledged not to buy Canadian seafood until the seal hunt is ended for good. Since the boycott was launched, official government trade statistics through July 2006 showed the value of Canadian snow crab—a

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**Figure 2**
Decline in Value of Canadian Snow Crab Exports to the United States

Total value of Canadian snow crab exports to the United States down 34 percent (CDN$290 million) since the ProtectSeals seafood boycott began.

Source: Canadian international trade data from Statistics Canada through July 2006 (HS 03.06.14.10).
primary focus of the boycott—exports to the United States had declined by nearly $300 million (Figure 2). While animal protection groups have never claimed the boycott is the only reason for the decline, they viewed it as a significant factor (HSUS 2006).

The Canadian government denied the seafood boycott had had any impact, blaming the decrease in the value of Canadian snow crab exports to the United States on market conditions and competition from other countries. However, in July 2006 Greenland’s *Grønlandsposten* reported the boycott of Canadian seafood had directly affected Royal Greenland’s sales of Canadian seafood in the United States (AG/Grønlandsposten 2006). Royal Greenland, the world’s largest distributor of cold water shrimp, said its client restaurants that formerly bought Canadian shrimp are now asking for the more expensive Greenland variety because of the boycott.

While the seafood boycott puts economic pressure on the Canadian government and fishing industry to end the seal hunt, closing the global markets for seal products is starting to remove the primary incentive for sealers to hunt seals.

**Global Markets for Seal Products Begin to Close**

The Assembly undertakes to promote in every forum regulatory initiatives aimed at prohibiting the import and use of seals or seal parts....The Assembly also asks the Committee of Ministers and the parliaments of the Member States to exert pressure on the Canadian Government and Parliament to cease this cruel practice, which is unbecoming of a civilized nation. —2004 Motion for a Recommendation, submitted to the Council of Europe by Claudio Azzolini, Italian foreign minister

The 1980s European Union Directive prohibiting the trade in products derived from newborn (white-coat) harp seals and young (blueback) hooded seals brought Canada’s commercial seal hunt to a virtual standstill for a number of years (Figure 3). But while the intent of the legislation was to decrease demand for products of seal pups (and thus the incentive for sealers to hunt them), Canadian sealers simply began to kill the pups when they were just a few days older (Figure 1). Today, the skins of these young seals are legally traded in many parts of Europe (Figure 4).

**Figure 3**

Total Reported Kill of Harp Seals in the Northwest Atlantic, 1952–2006

Note: Includes Canadian commercial seal hunt and Arctic and Greenland harp seal catches. Catches for Greenland are estimated for 2005 and 2006. Canadian catch for 2006 is preliminary.

Sources: Graph courtesy of S. Fink; data updated from: Stenson (2005).
As Canada’s commercial seal hunt once again achieved international notoriety in 2004, international governments began to act on behalf of their citizens to put an end to their trade in all harp and hooded seal products. Belgium was the first country to take action, adopting a legislative proposal in May 2004 to ban the import/export and marketing of all seal products (Fink 2006). Soon other nations began to act as well; Croatia, Luxembourg, Mexico, and the Netherlands had all either ended their trade in seal products or had initiated campaigns to do so by 2006 (IFAW 2006b).

Initial Support from Greenland

On January 5, 2006, footage obtained by The HSUS of the 2005 commercial seal hunt was broadcast on Danish and Greenland national television stations. Public and government reaction was strong and swift, with Danish animal protection groups and parliamentarians publicly stating their opposition to Canada’s commercial seal hunt (Danish Broadcasting Corporation 2006a). Just twenty-three hours after the footage was aired, Greenland Prime Minister H. Enoksen announced to the Danish and Greenlandic media that his cabinet had decided to stop all of the Great Greenland Company’s trade in Canadian seal skins (Danish Broadcasting Corporation 2006b).

The decision removed an important market for Canada’s commercial seal hunt; in 2004 and 2005, Canadian government trade statistics revealed that Greenland had imported more than ninety thousand Canadian seal skins.

The Canadian government and fur industry reacted strongly. A. Herscovici of the Fur Council of Canada weighed in on the topic in Nunatsiaq News, sending a clear message to Greenland. According to Herscovici, the Greenland government would “only hurt themselves if they try to distance their seal hunting from images of clubbed baby seals in Atlantic Canada.” He continued, “[If they] animal protection groups] are successful in stopping the Atlantic Canada hunt, which they perceive as inhumane, their next target will be aboriginal hunters” (in Minogue 2006, n.p.).

On February 3, 2006, a leading Newfoundland newspaper reported that several high-level officials with the Inuit Circumpolar Conference and the government of Nunavut met with Greenland officials to present the “Canadian argument” on the matter (Baker 2006). On March 24 a high-level delegation from Canada went to Greenland to discuss trade opportunities between the two countries. The delegation included F. Gregory, Canada’s ambassador to Denmark; J. Anawak, Canada’s ambassador for Circumpolar Affairs; and G. Beaupré, director general of International Affairs, Fisheries, and Oceans Canada. While no specific mention of lobbying against the seal skin decision was made, the published trip itinerary shows meetings between the senior Canadian delegates and Greenland’s premier and minister of Fisheries and Hunting (Greenland Home Rule 2006a). Within weeks, the Greenland Home Rule government sent out a media advisory announcing it would once again allow Great Greenland to trade in Canadian seal skins (Greenland Home Rule 2006b).

Danish parliamentarians quickly urged Greenland to reconsider, noting any resumption in trade of Canadian seal skins could severely damage Greenland’s sealing industry (Greenland National Broadcasting Company 2006). Denmark’s foreign office then announced it would investigate the potential for a Danish ban on trade in Canadian seal skins. While the Greenland government had lifted its order for Great Greenland to stop trading in Canadian seal skins, as of mid-2006 it remained uncertain whether Great Greenland would actually resume the trade.

Such a move would likely be met with strong opposition from the animal protection community and the Danish public and government. The point, however, already may be moot. Many of the seal skins imported by

Figure 4
Canadian Exports of Seal skins to Europe, 2004

Exports of Raw and Unassembled Tanned Sealskins = 272,362 Pelts

Norway 53%
Greenland 16%
EU New 10
EU15 30%

Source: Eurostat and Statistics Canada.
Greenland from Canada are reexported into the EU, and the EU was as of 2006 taking action to stop its own trade in harp and hooded seal products.

The EU Resolves to Ban Seal Products
On September 6, 2006, the European Parliament adopted a written declaration instructing the European Commission to “immediately draft a regulation to ban the import, export, and sale of all harp and hooded seal products” (Lucas 2006). Four hundred twenty-five members of the European Parliament signed the Declaration, the highest level of support for any resolution in the history of the European Parliament. While the Canadian Minister of Fisheries and Oceans, L. Hearn, attempted to dismiss the resolution as “really nothing” (Canadian Press 2006a), others were not so convinced. In a September 7, 2006, press release, Canadian senator L. Milne, who also serves as president of the Canada Europe Parliamentary Association, stated of Hearn, “If he can’t understand how important this declaration is, he doesn’t understand his job” (Liberal Party of Canada 2006, n.p.). Milne’s sentiments are perhaps understandable. Canadian export statistics indicate the EU is a consistent and significant market for unprocessed (raw) sealskins and other seal products. Moreover, the implications of an EU prohibition on harp and hooded seal products are even greater, given the untracked exports of tanned sealskins from Canada to Europe (there is no distinct trade category for tanned sealskins in Canada); the powerful fashion markets in France and Italy; and the European retail trade of garments and other finished products made from sealskin and seal leather.

A Sealing License Retirement Plan
We are providing you with an alternative to what Paul McCartney called “a stain on the character of the Canadian people....” If this is really simply an economic problem, then take our offer.

—Cathy Kangas, founder and CEO of PRAI Beauty, letter to Canadian Prime Minister S. Harper, April 2006

In March 2006 animal protection groups escorted Paul and Heather McCartney to the ice floes in the Gulf of St. Lawrence to be photographed in the harp seal nursery. The McCartneys made an impassioned plea to Canadian Prime Minister S. Harper to end the seal hunt and for the Canadian government to consider investing in a license retirement plan for sealers. The unprecedented media coverage may have increased hostilities from the sealing community, with media reports of violence from sealers toward seal hunt observers occurring just weeks later (CBC News 2006a). However, the McCartneys’ proposed buyout plan did achieve some support from both seal hunt advocates and opponents.

License retirement programs have been implemented over the past few decades in Canada, the United States, Britain, Europe, Australia, and elsewhere in the wake of fishery closures and reductions (Nautilus Consultants 1997). The programs can take many forms, but they generally involve providing federal funds in exchange for fishing licenses. This kind of program has already been put into practice in Canada for marine mammal hunts; in the 1970s Canada declared a moratorium on commercial whaling and instituted a buyback program for whaling licenses (Williams and George n.d.).

In April 2006 BBC News reported that American businesswoman C. Kangas had made an offer of $16 million to the Canadian government to be used for a sealing license retirement program to end the commercial seal hunt. A Department of Fisheries and Oceans spokesperson turned down the offer quickly, stating, “The short answer is no. We’re not interested in the offer and would prefer she put the money in another worthwhile cause” (British Broadcasting Corporation 2006, n.p.).

The sealing industry was not as quick to turn away. On April 15, 2006, the Montreal Gazette reported that sealers from Prince Edward Island were open to the concept of a buyout (Canadian Press 2006b, 10). K. MacLeod, a local sealer said, “I talked to quite a few of the license holders here in P.E.I. and everyone is willing to give this a try.” He concluded that sealers would like to “explore the alternatives” and observed, “It’s the twenty-first century.”

Conclusions
P. Moore, a co-founder of Greenpeace, once said, “What the seal hunt represented was the paramount focus for public attention on the need to change our basic attitude and relationship to nature and to the species that make it up” (in Herscovici 1998, n.p.). In this he was correct; for the true cost of resumption of commercial sealing is far greater than the seals it claims each year, and those working both for and against it are well aware of what is at stake.

In the wake of the 1990s cod collapse, the Canadian government clearly felt secure in rejuvenating the commercial seal hunt, which had caused so much controversy in previous decades. Perhaps it believed that the animal protection movement had diminished over the years or that seal hunt proponents had laid a strong enough public relations foundation to weather any opposition. Instead, the Canadian government soon found itself to be the focus of strong domestic and
international criticism for rejuvenating the seal hunt.

Throughout the 1990s seal hunt proponents spent much of their efforts either discounting or scorning efforts by animal protection organizations to stop the commercial seal hunt. However, more recently, high-profile celebrities and hard-hitting campaign tactics by animal protection groups have brought the plight of seals in Canada to the forefront of public consciousness, creating a backlash of opposition to the hunt that has been impossible to ignore. In response the Canadian government launched a full-scale effort in defense of commercial sealing interests, committing the resources of several federal government departments. Senior Canadian government officials, including the prime minister, have spoken out regularly in defense of the sealing industry in Canada, and Canadian delegations have lobbied in Europe to prevent seal product trade restrictions.

Only time will reveal the fate of the harp and hooded seals of the northwest Atlantic, but to seal hunt opponents, the events of the past decade could perhaps be summarized by the oft-used words of Mahatma Gandhi: “First they ignore you, then they laugh at you, then they fight you...then you win.”

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Their Bugs Are Worse than Their Bite: Emerging Infectious Disease and the Human-Animal Interface

Michael Greger, M.D.

1981: Ronald Reagan takes the oath of office as president of the United States. MTV starts broadcasting. Raiders of the Lost Ark hits movie theaters, and Pac-Mania is all the rage. The Centers for Disease Control (CDC) issues a bulletin of just nine brief paragraphs: five men in Los Angeles with a strange cluster of symptoms are dying.

In the twenty-five years since that announcement, what we now know as AIDS has killed 20 million people (National AIDS Trust 2005). Where did the AIDS virus—and other emerging diseases, such as severe acute respiratory syndrome (SARS), Ebola, mad cow—come from?

The First Age of Disease
The Smithsonian Institution has identified three periods of disease since the beginning of human evolution (Armelagos, Barnes, and Lin 1996), and humankind’s relationship with animals has played a key role in each of these “epidemiological transitions.”

The first period started ten thousand years ago with the domestication of animals. When human beings confined animals to a barnyard, we corralled their diseases with them. They were not just any diseases. Species that have a herd instinct are the easiest to domesticate. Unfortunately such animals also evolved epidemic diseases that can exploit their large, dense numbers. Archeological evidence suggests that humans, on the other hand, evolved in tight hunter/gatherer bands too small to support epidemics and, as such, hardly suffered from contagious disease at all (Torrey and Yolken 2005a). Then human beings became herders, triggering what the director of Harvard University’s Center for Health and the Global Environment called the mass “spillover” of animal disease into human populations (Epstein, Chivian, and Frith 2003). The World Health Organization (WHO) defined the term “zoonoses” to describe this phenomenon (Mantovani 2001), from the Greek zoion for “animal” and nosos for “disease.”

Humanity’s biblical “dominion over the fish of the sea and over the birds of heaven; and every living thing that moved upon the earth” has unleashed a veritable Pandora’s ark full of humankind’s greatest killers. Human beings domesticated goats, and they, in turn, may have given human beings tuberculosis (Espinosa de los Monteros et al. 1998). This “captain of all these men of death” (Dubos and Dubos 1952, 8) in the last century alone killed about one hundred million people (Torrey and Yolken 2005b) and is today killing more people than ever (Reichman and Hopkins 2001). A disease that may have started out in goats now infects one-third of humanity (WHO 2000).

Tuberculosis is jumping species to this day. In a 2000 study, doctors tested children with tuberculosis in San Diego and found that one-third of the tuberculosis cases weren’t human tuberculosis. They were bovine tuberculosis, caught, the researchers suspect, from drinking inadequately pasteurized milk from an infected cow.

The investigators conclude, “These data demonstrate the dramatic impact of this underappreciated cause of zoonotic TB on U.S. children....” (Dankner and Davis 2000, E79).

When human beings first domesticated cattle, we also domesticated their rinderpest virus, which is thought to have turned into human measles (Daszak and Cunningham 2002). Now regarded as a relatively benign disease, measles...
has killed two hundred million people worldwide over the last 150 years (Torrey and Yolken 2005b). In a sense, all those deaths can ultimately be traced backed a few hundred generations to the taming of the first cow or bull (Diamond 1992).

Smallpox may also have been caused by a mutant cattle virus (McMichael 2001). Human beings domesticated pigs, and the result was whooping cough; we domesticated chickens and got typhoid fever; and we domesticated ducks and got influenza (Torrey and Yolken 2005b). Before then, it is likely that no one ever got the flu. Leprosy likely came from water buffalo, and the cold virus from horses (McMichael 2001). How often did wild horses have the opportunity to sneeze into humanity’s face until they were broken and bridled? Before then the common cold was presumably common only to them.

Diamond (1997) explains how barnyard diseases decimated 95 percent of Native Americans, who had never before been exposed to diseases like tuberculosis, measles, and smallpox. Before Europeans arrived, bringing their goats with them, tuberculosis didn’t exist in the Americas. There were no domesticated buffalo, so there was no measles or smallpox. There were no pigs, so no pertussis; no chickens, so no Typhoid Marys. While people in Europe and Asia died by the millions of killer scourges, none was dying in the New World because there were no farm animals to domesticate (Diamond 1997).

Such events aren’t confined to centuries past. New diseases from domesticated farm animals continue to be discovered. H. pylori, a bacteria living in the human stomach, causes stomach cancer and the vast majority of peptic ulcers worldwide (De Groote, Ducatelle, and Haesebrouck 2000). Roughly half of the world’s population is now infected with it (Suerbaum and Michetti 2002). This ulcer-causing bacterium is thought to have originated in sheep’s milk, but is now spread person-to-person. What is now probably the most common chronic infection afflicting humanity (Centers for Disease Control and Prevention 2005) came about because we decided thousands of years ago to start drinking the milk of another species (Dore et al. 2001).

H. pylori is not an isolated find. H. pullorum, a cousin of H. pylori, is a bacterium found in chicken meat. Hepatitis E, a new hepatitis virus that can kill pregnant women, has been found to be rampant in North American pork operations (Yoo et al. 2001). Unlike a disease like trichinosis, which only affects those who actually consume undercooked pork, once hepatitis E crosses the species line, it can be spread person-to-person. One may not have eaten infected pork, but the person from whom one got a blood transfusion may have.

## The Second Age of Disease

The second great era of human disease started with the Industrial Revolution of the eighteenth and nineteenth centuries, when an epidemic of the so-called diseases of civilization, such as cancer, heart disease, stroke, and diabetes, began. These chronic diseases, considered largely preventable through changes in diet and lifestyle, now account for seven of ten deaths in the United States and the majority of deaths worldwide (Centers for Disease Control and Prevention 2006a). Interestingly, our domestication of animals also plays a role.

In 2004 WHO published its long-awaited Global Strategy on Diet, Physical Activity, and Health, unanimously endorsed by the United Nations’ 192 member countries. WHO is considered one of the world’s most reputable sources of nutrition information because it is seen as less beholden to the multitrillion-dollar food industry than government agencies can be. (For example, U.S. government recommendations, allegedly at the sugar industry’s behest, have long allowed added refined sugar to make up an astounding 25 percent of our daily calorie intake [Doyle 2003]).

WHO blames the growing epidemic of global chronic disease in part on “greater saturated fat intake (mostly from animal sources), reduced intakes of complex carbohydrates and dietary fiber, and reduced fruit and vegetable intakes.” As such, it is calling for limiting the consumption of saturated animal fat and “increasing the consumption of fruits, vegetables, legumes [beans, peas, and lentils], whole grains, and nuts” (World Health Organization 2003, n.p.).

Barnard, Nicholson, and Howard (1995) estimate that meat consumption may account for up to one-quarter of the cases of heart disease in the United States, one-third of the diabetes, maybe four out of ten common cancers, half of the obesity, two-thirds of the nation’s high blood pressure, and as many as three-fourths of all gallbladder operations.

M. Nestle, one of the world’s most highly respected nutrition experts, former director of nutrition policy at the U.S. Department of Health and Human Services, and longtime chairwoman of the nutrition department at New York University, has said, “The evidence is so strong and overwhelming and produced over such a long period of time that it is no longer debatable…. There is no question that largely vegetarian diets are as healthy as you can get” (in Liebman 1996, n.p.). The fewer animals in the human diet and the more healthy plant foods—the WHO’s “fruits,
vegetables, beans, whole grains, and nuts” — the lower the risk of developing many chronic diseases (WHO 2003, n.p.).

The Third Age of Disease

By the mid-twentieth century, humankind had developed penicillin, conquered polio, and eradicated smallpox. The age of infectious disease was thought to be over. Indeed, in 1948 the U.S. secretary of state pronounced that the conquest of all infectious diseases was imminent (Najera 1989). Twenty years later the U.S. surgeon general declared victory: “The war against diseases has been won” (Crawford 2000). Even Nobel laureates were seduced into the heady optimism. To write about infectious disease, one Nobel-winning virologist wrote in the 1962 text Natural History of Infectious Disease, “is almost to write of something that has passed into history.” “[T]he most likely forecast about the future of infectious disease,” he pronounced, “is that it will be very dull” (Burnet and White 1962).

Then something changed. After years of declining infectious disease mortality in the United States, the last three decades have seen a reversal in that trend (Gill, Rechtschaffen, and Rubenstein 2000): the number of Americans dying from infectious diseases has started going back up (Cohen and Larson 1996). Beginning in approximately 1975 (National Agricultural Research, Extension, Education, and Economics 2004), new diseases started to surface at a pace unheard of in the annals of medicine (Epstein, Chivian, and Frith 2003) — more than thirty new diseases in thirty years, most of them newly discovered viruses (Woolhouse 2002). The concept of “emerging infectious diseases” has now changed from a mere curiosity in the field of medicine to an entire discipline that has moved to center stage (Brown 2000). We may soon be facing, according to the Institute of Medicine, a “catastrophic storm of microbial threats” (Weinhold 2004).

We are currently living in the third era of human disease, described by medical historians as the age of “the emerging plagues” (Glasser 2004). Never in medical history have so many new diseases appeared in so short a time — and almost all of them have entered the human population from animals. Animals were domesticated ten thousand years ago: what has changed in recent decades to bring this sobering reality upon us?

Human beings have been changing the way animals live. One example: during World War II, when leading cattle-producing nations were at war, Argentina took advantage of the situation by dramatically expanding its beef industry at the expense of its forests. There human beings discovered the deadly Junin virus (or, more accurately, it discovered human beings), which is now known as the cause of Argentine hemorrhagic fever. This “hamburgerization” of the rainforests subsequently played a role in uncovering the Machupo virus in Bolivia, the Sabia virus in Brazil, and the Venezuelan hemorrhagic fever virus in Venezuela (Hoff and Smith 2000).

Deforestation also contributes to global warming. The millions of cattle and other farm animals, and the billions of tons of their manure, are primary global contributors of the greenhouse gas methane (Mossa, Jouanyb, and Newbold 2000), which also plays a significant role in climate change (Ramanujan 2005). The warming trend could dramatically expand the reach of insect-borne diseases like the West Nile virus. According to an international panel of experts, if the average world temperature were to increase by three degrees, the zone in which malaria is spread would expand from 45 percent of the world’s population to 60 percent (Nolen 2005), causing fifty to eighty million new cases of malaria (Stapp 2004).

Inroads into Africa’s rainforests have blazed trails on which other hemorrhagic fever viruses escaped — the Lassa virus, Rift Valley Fever, and Ebola. “These zoonotic viruses seem to adhere to the philosophy that says, ‘I won’t bother you if you don’t bother me,’” (Culliton 1990, 279). But as people began “pushing back forests, or engaging in agricultural practices that are ecologically congenial to viruses, the viruses could make their way into the human population and multiply and spread” (Culliton 1990, 279).

Radical alterations of forest ecosystems can be — indeed, are — hazardous, whether in the Amazon Basin or the woods of Connecticut. Lyme disease was first recognized in New England’s forests in 1975 and has since moved across all fifty states (Dryden’s Grant Information 2005), affecting an estimated hundred thousand Americans (National Institute of Allergy and Infectious Diseases 2000). Lyme disease is spread by bacteria-infested ticks who live on deer and mice, animals with whom people have always shared wooded areas. Suburban sprawl in recent decades has chopped America’s woods into subdivisions, scaring away the foxes and bobcats who had previously kept mouse populations in check.

Cookie-cutter subdivisions weren’t the reason Africa’s rainforests were cut down. Rather, transnational timber corporations, hacking logging roads deep into the remotest regions of the continent, paved the way for a mass human migration into the rainforests to set up concessions to support the commercial logging operations. One of the main sources of food for these migrant workers is bushmeat—wild animals killed for food (Walters 2003), including upwards of twenty-six different species of primates (Avasthi 2004). Thousands
of endangered great apes—gorillas and chimpanzees—are shot, butchered, smoked, and sold for human consumption (Rose 1996). To support the logging industry’s infrastructure (Rose 1998), a veritable army of commercial bushmeat hunters is bringing the great apes to the brink of extinction (Walsh et al. 2003). “These logging companies have been promoting the bushmeat trade themselves,” says Fox (2000, n.p.). “It is easier to hand out shotgun shells than to truck in beef” (Fox 2000).

By cannibalizing fellow primates, human beings are exposing themselves to pathogens particularly fine-tuned to human primate physiology. Recent human outbreaks of Ebola, for example, have been traced to exposure to the dead bodies of infected great apes hunted for food (Karesh et al. 2005). Ebola, one of humanity’s deadliest infections, is not efficiently spread, though, compared to a virus like human immunodeficiency virus (HIV).

The leading theory about the emergence of HIV is “direct exposure to animal blood and secretions as a result of hunting, butchering, or other activities (such as consumption of uncooked contaminated meat)” (Hahn et al. 2000). Experts believe the most likely scenario is that HIV arose from humans seeing their way into the forests of west equatorial Africa on logging expeditions, butchering chimpanzees for their flesh along the way (Laurance 2004).

In some countries the prevalence of HIV now exceeds 25 percent of the adult population (Davis and Lederberg 2001), leaving millions of orphaned children in its wake (United Nations 2004). Five people die from AIDS every minute (Lamptey et al. 2002). The most current thinking leads one to believe that, because someone butchered a chimp a few decades ago, twenty million people are now dead (National AIDS Trust 2005).

Wild animals have been hunted for a hundred thousand years, but at nothing like the current rate. Growing human populations and increasing demand for wildlife meat exceed local populations of affected species (Karesh et al. 2005). This has resulted in an enormous (and largely illegal) transboundary trade of wildlife and the setting up of intensive captive production farms in which wild animals are raised, often subjected to poor sanitation, in unnatural stocking densities before being packed together into markets for sale. These factors favor the spread and emergence of mutant strains of pathogens capable of infecting hunters, farmers, and grocery shoppers (Gilbert, Wint, and Slingenbergh 2004). Live-animal markets have been described by the director of the Wildlife Conservation Society as veritable human and animal “disease factories” (Lawrie 2004). These viral swap meets are blamed for the transformation of a class of viruses previously known for causing the common cold into a killer named SARS (Lee and Krilov 2005).

The intensive commercial bushmeat trade started in the live-animal markets of Asia (Bell, Robertson, and Hunter 2004), particularly in Guangdong, the southern province surrounding Hong Kong from which the deadly avian influenza strain H5N1 arose (Chen et al. 2004). Literature from the Southern Song Dynasty (1127–1279) describes the residents of Guangdong eating “whatever food, be it birds, animals, worms, or snakes” (Jun 2004). Today, live-animal markets cater to the unique tastes of the people of Guangdong, where shoppers can savor “Dragon-Tiger-Phoenix Soup,” a brew made of snake, cat, and chicken (Bray 2005) or delicacies like san jiao, or “three screams”—the wriggling baby rat is said to scream first when hefted with chopsticks, a second time when dipped into vinegar, and a third time as she or he is bitten into (Lynch 2003).

In China animals are eaten for enjoyment, sustenance, and their purported medicinal qualities. There are reports of dogs being “savagely beaten before death to increase their aphrodisiac properties” (Lawrie 2004). Cats are killed and boiled down into “cat juice,” used to treat arthritis. Many of the cats are captured ferals in ill health, so “consuming such diseased cats is a time bomb waiting to explode,” claimed the chief veterinarian of the Australian RSPCA.

The cat-like masked palm civet has been a popular commodity in Chinese animal markets (Brummitt 2004). Civets are raised for their flesh, and the civet cat penis is soaked in rice wine for use as an aphrodisiac (Bell, Roberton, and Hunter 2004). These animals also produce the most expensive coffee in the world (Kasper n.d.). So-called fox-dung coffee is produced by feeding coffee beans to captive civets and then recovering the partially digested beans from the feces (Marshall 1999). A musk-like substance of buttery consistency secreted by the anal glands gives the coffee its characteristic flavor and smell (William 2003).

The masked palm civet has been blamed for the SARS epidemic (Lee and Krilov 2005). “A culinary choice in south China,” one commentator summed up in Lancet, “led to a fatal infection in Hong Kong, and subsequently to 8,000 cases of severe acute respiratory syndrome (SARS), and nearly 1,000 deaths in thirty countries on six continents” (Mack 2005). Ironically, one reason civets are eaten is for protection from respiratory infections (Davis 2005c). As noted in The China Daily, “We kill them. We eat them. And, then, we blame them” (Ming 2004, n.p.).

Viruses can escape the rain forests in animals living or dead, as pets or as meat. The international trade in exotic pets is a multibillion-dollar
industry, and exotic pets can harbor exotic germs (Avasthi 2004). Wildlife trafficking—the illegal trade in wildlife and wildlife parts—is a soaring black market worth $10 billion a year in the United States alone (U.S. Department of State 2005). The United States imports an unbelievable 350,000 different species of live animals. The deputy director of the U.S. Fish and Wildlife Service testified before a Senate committee in 2003 that the United States imports more than 200 million fish, 49 million amphibians, 2 million reptiles, 365,000 birds, and 38,000 mammals in a single year (Weinhold 2004).

Whether for exotic pets or exotic cuisine, imported animals transported together under cramped conditions end up in holding areas in dealer warehouses, where they—and their viruses—can mingle further. The 2003 monkeypox outbreak across half a dozen states in the Midwest was traced to monkeypox-infected Gambian giant rats shipped to a Texas animal distributor, along with eight hundred other small mammals snared from the African rain forest. The rodents were housed in a warehouse or a garage around and ultimately juxtaposing them in a warehouse or a garage somewhere,” said Wisconsin’s chief epidemiologist (Marchione 2003). As one expert quipped, “It was probably easy for a Gambian rat to get into the United States than [it was for] a Gambian” (Marchione 2003).

Bird smuggling may actually have been what brought the West Nile virus to the Western hemisphere (Johnson 2003). West Nile hit New York in 1999 and has since spread across forty-eight states and Canada (Stapp 2004), with thousands of cases in 2005 and more than a hundred deaths (Centers for Disease Control and Prevention 2006b). Its continued expansion suggests that the virus has become permanently established in the United States, all, perhaps, because of a single, illegally imported pet bird (Ludwig et al. 2003).

This movement of disease agents can also threaten wildlife. The greatest animal plague ever recorded was the “Great Rinderpest Pandemic” at the end of the nineteenth century. The use of cattle by the Italian army to pull gun carriages into sub-Saharan Africa is thought to have triggered the outbreak of rinderpest, a measles-like disease of cloven-hoofed animals that wiped out not only up to 95 percent of cattle in some countries (Waltner-Toews 2002), but also up to 90 percent of other large ungulate species such as African buffalo and giraffe (Alfonso 1999). Societies based on the cattle economy were devastated. As one Masai man described, the corpses of cattle and people were “so many and so close together that the vultures had forgotten how to fly” (Plowright 1982). No longer can natural barriers like the Saharan desert protect populations against the spread of epidemic disease.

A contemporary example is an emerging fungal disease discovered in 1998 (Williams et al. 2002) that causes massive die-offs and even extinctions of amphibian wildlife across five continents (Williams et al. 2002). Ecologists now suspect the international restaurant trade in the North American bullfrog (for its fleshy legs) may have played a key role in global dissemination of this disease (Ginsburg 2004).

According to WHO’s coordinator for zoonoses control, “The chief risk factor for emerging zoonotic diseases is environmental degrada-

tion by humans.” This includes degradation wrought by global climate change, deforestation, and, as described by WHO, “industrialization and intensification of the animal production sector” (WHO and Office International des Epizooties 1999, n.p.).

In 2005 China, the world’s largest producer of pork (RaboBank International 2003), suffered an unprecedented outbreak in scope and lethality of Streptococcus suis, a newly emerging zoonotic pig pathogen (Gosline 2005). Strep. suis is a common cause of meningitis in intensively farmed pigs worldwide (Merek Veterinary Manual, n.p.) and presents most often as meningitis in people as well (Huang et al. 2005), particularly those who butcher infected pigs or handle infected pork products (Gosline 2005). Due to involvement of the auditory nerves connecting the inner ears to the brain, half of the disease’s human survivors are rendered deaf (Altman 2005).

WHO reported that it had never seen so virulent a strain (Nolan 2005) and blamed intensive confinement conditions as a predisposing factor in its sudden emergence, given the stress-induced suppression of the pigs’ immune systems (WHO 2005). The U.S. Department of Agriculture (USDA) explains that these bacteria can exist as a harmless component of a pig’s normal bacterial flora, but stress due to factors like crowding and poor ventilation can drop the animal’s defenses long enough for the bacteria to become invasive and cause disease (USDA 2005b). China’s assistant minister of commerce admitted that the disease was “found to have direct links with the foul environment for raising pigs” (China View 2005, n.p.). The disease can spread through respiratory droplets or directly via contact with contaminated castration scalpels, tooth-cutting pliers, or tail-docking knives (Du 2005).
Germany, has the densest population in the United States, but in Europe. The reason for this is the intensification of pig production, especially in intensive confinement settings (Du 2005). According to The Journal of Swine Health and Production, human cases of meningitis in North America are likely underdiagnosed and misidentified (Gottschalk 2004) due to the lack of adequate surveillance (Cole, Todd, and Wing 2000). WHO encourages careful pork preparation (WHO 2005), and North American agriculture officials urge Streptococcus suis disease awareness for people “who work in pig barns, processing plants, as well as in the home kitchen” (Du 2005, n.p.).

The first human case of Streptococcus suis was not in Asia or in the United States, but in Europe. The Dutch pig belt, extending into parts of neighboring Belgium and Germany, has the densest population of pigs in the world, more than twenty thousand per square mile. This region has been hit in recent years with major epidemics of hog cholera and foot and mouth disease, leading to the destruction of millions of animals. “With more and more pigs being raised intensively to satisfy Europe’s lust for cheap pork, epidemics are inevitable,” wrote MacKenzie (1998, n.p.). “And the hogs may not be the only ones to get sick.”

This Streptococcus suis outbreak followed years after the emergence of the Nipah virus on an intensive industrial pig farm in Malaysia. Nipah turned out to be one of the deadliest of human pathogens, killing 40 percent of those infected, a toll that propelled it onto the U.S. list of potential bioterrorism agents (Fritsch 2003). This virus is also noted for its “intriguing ability” to cause relapsing brain infections in some survivors (Wong et al. 2002) months after initial exposure (Wong et al. 2001). Even more concerning, a 2004 resurgence of Nipah virus in Bangladesh showed a case fatality rate on a par with Ebola—75 percent—and showed evidence of human-to-human transmission (Harcourt et al. 2004). The Nipah virus, like all contagious respiratory diseases, is a density-dependent pathogen (U.S. Central Intelligence Agency 2006). “Without these large, intensively managed pig farms in Malaysia,” the director of the Consortium for Conservation Medicine said, “it would have been extremely difficult for the virus to emerge” (Nierenberg 2005, 44).

Even industry groups like the American Association of Swine Veterinarians cite “[e]merging livestock production systems, particularly where they involve increased intensification” as a main reason why zoonotic diseases are of increasing concern. These intensive systems, in addition to their high population density, “may also generate pathogen build-ups or impair the capacity of animals to withstand infectious agents” (Meredith 2004, n.p.). Increasing consumer demand for animal products worldwide over the past few decades has led to a global explosion in massive agricultural operations that have come to play a key role in the third age of emerging human disease (McMichael 2004).

Whether it be from Escherichia coli O157:H7 in hamburgers, antibiotic-resistant Salmonella in eggs, Listeria in hot dogs, “flesh-eating” bacteria in oysters, or Campylobacter in chickens and Thanksgiving turkeys, the CDC estimates that seventy-six million Americans come down with foodborne illness every year (Mead et al. 1999). In the twenty years between 1975 (around the time when the dean of Yale’s School of Medicine famously told students that there were “no new diseases to be discovered”) and 1995, seventeen foodborne pathogens emerged, almost one each year (Liang 2002). According to the executive editor of Meat Processing magazine, “Nearly every food consumers buy in supermarkets and order in restaurants can be eaten with certainty for its safety—except for meat and poultry products” (Bjerklie 1999).

Animals were domesticated ten thousand years ago. With billions of feathered and curly-tailed test-tubes for viruses to incubate and mutate within, a WHO official described the last few decades as “the most ambitious short-term experiment in evolution in the history of the world” (Cookson 1993, n.p.).

Global public health experts have identified specific “dubious practices used in modern animal husbandry” beyond the inherent overstocking, stress, and unhygienic conditions that have directly or indirectly launched deadly new diseases (Phua and Lee 2005). One such “misguided” brave new farm practice is the continued feeding of livestock slaughterhouse waste, blood, and excrement to save on feed costs (Stapp 2004).

Feed expenditures remain the single largest industry expense (Lawrence and Otto 2006). The livestock industry has experimented with feeding newspaper, cardboard, cement dust, and sewer sludge to farm animals (Rampton and Stauber 1997). Satchell and Hedges (1997, n.p.) report: “Cattle feed now contains things like manure and dead cats.” The Animal Industry Association (1989) defends these practices, arguing that the average U.S. farm animal “eats better than the average U.S. citizen.” Forcing natural herbivores like cows, sheep, and other animals to be carnivores and even cannibals has turned out to have serious public health implications.
A leading theory on the origin of bovine spongiform encephalopathy (or “mad cow disease”) is that cows got it by eating diseased sheep (Kimberlin 1992). In modern corporate agribusiness, protein concentrates (or “meat and bone meal,” euphemistic descriptions of “trimmings that originate on the killing floor, inedible parts and organs, cleaned entrails, fetuses” [Ensminger 1990]) are fed to dairy cows to increase milk production (Flaherty 1993) as well as to most other livestock (The Economist 1990). Nearly ten million metric tons of slaughterhouse waste is fed to livestock every year (WHO and Office International des Epizooties 1999). Reecycling the remains of infected cattle into cattle feed was probably what led to the British mad cow epidemic’s explosive spread (Collee 1993) to nearly two dozen countries around the world in the subsequent twenty years (USDA 2005a). Dairy producers can use corn or soybeans as a protein feed supplement, but slaughterhouse by-products can be cheaper (Albert 2000).

The meat industry has long known that cannibalistic feeding practices could have human health consequences, as Salmonella epidemics in poultry linked to the recycling of animal remains back into animal feed had been described well before the mad cow disease epidemic (Waltner-Toews 2002). Despite the known potential hazards to humans, the meat industry remains opposed to a total ban on feeding slaughterhouse waste, blood, and excrement to farm animals (Murphy 2003).

In 2004 the Worldwatch Institute (2004) published Meat: Now, It’s Not Personal, whose title alludes to intensive methods of production that have placed all human beings at risk, regardless of what they eat. In the age of antibiotic resistance, which has been fueled by the industrial feeding of antibiotics to farm animals to promote growth, a simple scrape can turn into a mortal wound, and a simple surgical procedure can be anything but simple. At least these “superbugs” are not effectively spread from person to person. Given the propensity of industrial animal agriculture to churn out novel lethal pathogens, what if they produced a virus capable of a global pandemic?

**Last Great Plague**

The dozens of emerging zoonotic disease threats that have characterized this third era of human disease must be put into context. Strep. suis infected scores of human beings and killed dozens. Nipah infected hundreds and killed scores. SARS infected thousands and killed hundreds. AIDS has infected millions. Only one virus we know of can infect billions—influenza.

Influenza, the “last great plague of man” (Kaplan and Webster 1977), is the only known pathogen capable of truly global catastrophe (Silverstein 1981). Unlike other devastating infections like malaria, which is confined equatorially, or HIV, which is only fluid-borne, influenza is considered by the CDC’s K. Fukuda to be the only pathogen carrying the potential to “infect a huge percentage of the world’s population inside the space of a year” (in Davies 1999, n.p.).

Because of its extreme mutation rate, influenza is a perpetually emerging disease. A. Fauci, NIH’s pandemic planning czar, calls it “the mother of all emerging infections” (Davis 2005b, n.p.). In its 4,500 years of infecting humans since the first domestication of wild birds, influenza has always been one of the most contagious pathogens (Taylor 2005). Only since 1997 has it also emerged as one of the deadliest.

H5N1, the new killer strain of avian influenza spreading out of Asia, had only killed about a hundred people by mid-2006 (WHO 2006). In a world in which millions die of diseases like malaria, tuberculosis, and AIDS, why is there so much concern about bird flu? The answer is, because the flu has killed before. An influenza pandemic in 1918 became the deadliest plague in human history, killing up to a hundred million people around the world (Johnson and Mueller 2002). The 1918 flu virus was likely a bird flu virus (Belshe 2005); that virus made more than a quarter of all Americans ill and killed more people in twenty-five weeks than AIDS has killed in twenty-five years (Barry 2004). In 1918 the case mortality rate was less than 5 percent (Frist 2005). H5N1 has so far officially killed half of its human victims (WHO 2006).

H5N1 took its first human life in Hong Kong in 1997 (Davies 1999) and has since rampaged west to Russia, the Middle East, Africa, and Europe (Lancet Infectious Diseases 2006). It remains almost exclusively a disease of birds, but as the virus has spread, it has continued to mutate. It has become more lethal and more environmentally stable and has begun taking more species under its wing (Stöhr 2005). Influenza viruses don’t typically kill mammals like rodents, but experiments have shown that the latest H5N1 mutants can kill 100 percent of infected mice, practically dissolving their lungs (Garrett 2005). “This is the most pathogenic virus that we know of,” declared one lead investigator. “One infectious particle—one single infectious virion—kills mice. Amazing virus” (Drexler 2002, 180).

The virus also started killing cats, both pets (WHO 2004) and tigers and leopards in zoos (Keawcharoen et al. 2004). Before H5N1 no influenza virus was known even to make felines sick (Kuiken et al. 2004). According to WHO (2004, n.p.), “The reported infection of domestic cats with H5N1 is an unusual event in what is an historically unprecedented situation.”

Currently in humans H5N1 is good at killing, but not at spread-
ing. Three essential conditions are necessary to produce a pandemic.

- A new virus must arise from an animal reservoir, such that humans have no natural immunity to it.
- The virus must evolve to be capable of killing human beings efficiently. (H5N1 has met these first two conditions.)
- The virus must succeed in jumping efficiently from one human to the next. (For H5N1 it’s one small step to man, but one giant leap to mankind!)

If the bird flu virus triggers a human pandemic, it will not be peasant farmers in Vietnam dying after handling dead birds or raw poultry—it may be New Yorkers, Parisians, Londoners, and people in every city, township, and village in the world dying after shaking someone’s hand, touching a doorknob, or simply inhaling in the wrong place at the wrong time.

Mathematical models suggest that it might be possible to snuff out an emerging flu pandemic at the source if caught early enough (Ferguson et al. 2005; Longini et al. 2005), but practical considerations may render this an impossibility (Center for Infectious Disease and Policy Research 2005). Even if we were able to stamp it out, as long as the same underlying conditions remain, the virus would presumably soon pop back up again as it has in the past (Heiberg 2005).

The current dialogue surrounding avian influenza speaks of a terrifying emergence of H5N1, but people have kept chickens in their backyards for thousands of years, and birds have been migrating for millions. What has changed in recent years that led us to this current crisis? At a November 2005 Council on Foreign Relations Conference on the Global Threat of Pandemic Influenza, the senior correspondent of the PBS television program The NewsHour with Jim Lehrer, R. Suarez, asked such a question of the “godfather of flu research” (Council on Foreign Relations 2005), R. Webster.

SUAREZ: Was there something qualitatively different about this last decade that made it possible for this disease to do something that it either hasn’t done before...a change in conditions that suddenly lit a match to the tinder?

WEBSTER: [F]arming practices have changed. Previously, we had backyard poultry...Now we put millions of chickens into a chicken factory next door to a pig factory, and this virus has the opportunity to get into one of these chicken factories and make billions and billions of these mutations continuously. And so what we’ve changed is the way we raise animals and our interaction with those animals. And so the virus is changing in those animals and now finding its way back out of those animals into the wild birds. That’s what’s changed. (Council on Foreign Relations 2005, n.p.)

The big change in the ecology of avian influenza has been the industrialization of the global poultry sector. Over the last few decades, meat and egg consumption has exploded in the developing world (Kazmin 2004), leading to industrial-scale commercial chicken farming, the perfect environment for the emergence and spread of new superstrains of influenza. When tens of thousands of animals are crammed into filthy, football-field-size sheds to stand beak-to-beak in their own manure, human beings are asking for trouble.

WHO in part blames the emergence of deadly Asian viruses—such as H5N1, SARS, and Nipah—on the “over-consumption of animal products” and intensive animal agriculture (Oshitani, n.d.). The World Organization for Animal Health blames in part the shorter production cycles and greater animal densities of modern poultry production, which result in “greater number of susceptible animals reared per given unit of time” (Capua and Maramon 2003, n.p.).

The Food and Agriculture Organization of the United Nations (FAO) notes that

[T]here seems to be an acceleration of the human influenza...
problems over the last few decades, involving an increasing number of species, and this is expected to largely relate to intensification of the poultry (and possibly pig) production. (Gilbert, Wint, and Slingenbergh 2004, n.p.)

The FAO elaborates in an internal document:

[Ch]icken-to-chicken spread, particularly where assisted by intensive husbandry conditions, promotes the virus to shift (adaptation) to a more severe type (highly pathogenic type) of infection.... Intensive production conditions favor rapid spread of infection within units and “hotting-up” of virus from low pathogenicity to a highly pathogenic types. (FAO 2004, n.p.)

The United Nations specifically calls on governments to fight what it calls factory farming:

Governments, local authorities, and international agencies need to take a greatly increased role in combating the role of factory farming [which combined with live bird markets] provide[s] ideal conditions for the virus to spread and mutate into a more dangerous form. (United Nations 2005, n.p.)

All bird flu viruses seem to start out harmless to both birds and people. In its natural state, the influenza virus has existed for millions of years as an innocuous, intestinal, waterborne infection of aquatic birds such as ducks (Webster et al. 1992). How does a duck’s intestinal bug end up in a human cough?

In the viruses’ natural aquatic bird reservoir, the duck doesn’t get sick, because the virus doesn’t need to make the duck sick to spread. In fact, it’s in the virus’s best interest for the bird not to get sick so as to spread farther. After all, dead ducks don’t fly. The virus silently multiplies in the duck’s intestinal lining to be excreted into the pond water and then swallowed by another duck who alights for a drink; the cycle continues as it has for millions of years, and no one gets hurt.

If, for example, an infected duck is dragged to a live poultry market, though, and crammed into a cage stacked high enough to splatter virus-laden droppings over many different species of land-based birds, the virus then has a problem. No longer can the virus rely on the ease of pond water spread: it must mutate or die (Shortridge 1992). Thankfully for the virus, mutating is what influenza viruses do best (Suarez 2000). In aquatic birds the virus is perfectly adapted in total evolutionary stasis (Webster 1998), but, when thrown into a new environment—land-based birds like chickens—it quickly starts mutating to adapt to the new host (Suarez et al. 1998). In the open air, it must resist dehydration (Dronamraju 2004), for example, and may spread to other organs to find a new way to travel. Sometimes it finds the lungs.

The more virulent the virus becomes, the quicker it may be able to overwhelm the immune system of its new victims (Van Blerkom 2003), but it must take care not to become too deadly. In an outdoor setting, if the virus kills the host too quickly, the animal may be dead before it has a chance to infect another. So there’s a limit to how virulent these viruses can get (Dimmock, Easton, and Leppard 2001)—or at least there was until now.

Enter intensive poultry production. When the next beak is inches away, there may be fewer limits to how nasty the virus can get. Evolutionary biologists believe that this is the key to the emergence of so-called predator-like (McGirk, Adiga, and Glacier 2005) viruses like H5N1—disease transmission from immobilized hosts (Ewald 1994). When you have a situation where the healthy animals can’t escape the diseased, then there may be no stopping rapidly mutating viruses from becoming truly ferocious (Rennie 2005).

This may have been what occurred in the crowded trenches, troop transports, and army camps of World War I leading up to the 1918 pandemic. Boxcar capacity was labeled “eight horses or forty men” (Byerly 2005, 94). Millions of people were forced into close quarters where there was no escaping a sick comrade. This may have been where the flu virus of 1918 gained its virulence (Byerly 2005).

From the virus’s point of view, these same trench warfare conditions exist today in every industrial chicken shed. Birds are intensively confined, crowded, and stressed, not just by the millions but by the billions. Mabbett (2005, 34) offers a concise explanation of the role of large-scale poultry production:

The AI virus lives harmlessly in the ducks popular in Asia to control insect pests and snails in rice paddies. If this duck ‘flu passes to chickens kept nearby, it can mutate into a deadly and highly contagious strain that speeds rapidly with accompanying high mortality. The larger the flocks and the more intensive the production level, the more scope there is for the disease to spread for genetic changes to the virus. The industry admits to

[T]he growing realization that viruses previously innocuous to natural host species have in all probability become more virulent by passage through large commercial populations. (Shane 2005, 22)

Unfortunately for us, through some quirk of evolution, the respiratory tract of a chicken seems to bear a striking resemblance (on a virus receptor level) to our own respiratory tract (Gambaryan, Webster, and Matrosovich 2002). So as the virus gets better at infecting and killing chickens, it may be getting better at infecting and killing us.

Their Bugs Are Worse than Their Bite: Emerging Infectious Disease and the Human-Animal Interface
Virologist E. Brown is a specialist in the evolution of influenza viruses: “You have to say that high intensity chicken rearing is a perfect environment for generating virulent avian flu virus” (in Beekman 2004, 6). To lower the risk of generating increasingly dangerous bird flu viruses, the global poultry industry must reverse course away from greater intensification.

Might not human beings want birds confined indoors away from waterfowl, though? Does it matter from a public health standpoint if the environment inside poultry sheds can transform harmless viruses into deadly viruses if the harmless virus can’t get inside in the first place? Unfortunately, studies have uncovered widespread disregard for this so-called biosecurity (Schmit 2005)—even in the United States, where the industry claims to have the best biosecurity in the world (Canning 2005, n.p.).

According to Vaillancourt (2002, 12): “High biosecurity and proper monitoring are still wishful thinking in many areas of intensive poultry production.” A 2002 bird flu outbreak in Virginia led to the deaths of millions of birds and found its way inside two hundred farms (Senne, Holt, and Akey 2003), highlighting just how wishful is the thinking that industrial poultry populations are biosecure. Based on the rapid spread of bird flu in the United States in 2002, leading USDA poultry researchers concluded the obvious: “[B]iosecurity on many farms is inadequate” (Suarez, Spackman, and Senne 2003, 896).

University of Maryland researchers surveyed commercial chicken facilities throughout the Delmarva Peninsula, perhaps the densest concentration of chickens in the world, and concluded that U.S. flocks “are constantly at risk of infection triggered by poor biosecurity practices” (Tablante et al. 2002, 896).

The intensive global poultry industry is not only playing with fire with no way to put it out, but it is also fanning the flames, and firewalls to contain the virus do not exist. “Unfortunately,” leading USDA poultry virologist D. Senne told an international gathering of bird flu scientists, “that level of biosecurity does not exist in U.S. poultry production and I doubt that it exists in other parts of the world” (in Stegeman 2003, n.p.). S.M. Shane (2003, 22) notes a “decline in the standards of biosecurity in an attempt to reduce costs in competitive markets.” The decline is a contributing factor, Shane concludes, in the frequency and severity of disease outbreaks.

Biosecurity measures as currently practiced are better than nothing but may not be something on which to stake millions of human lives for the sake of cheaper chicken. A pandemic of H5N1, or a comparable future bird flu virus, has the capacity to spark the greatest medical catastrophe of all time. It may be wiser to move away from intensive poultry production altogether or, at the very least, stop encouraging its movement into the developing world.

Avian health expert K. Rudd, drawing on thirty-seven years’ experience within the industry, warns: Now is the time to decide. We can go on with business as usual, hoping for the best as we charge headlong toward lower costs. Or we can begin making the prudent moves needed to restore a balance between economics and long-range avian health. We can pay now or we can pay later. But it should be known and it must be said, one way or another we will pay. (Rudd 1995, 20)

As the United Nations has urged, combating factory farming may prevent the emergence of future viruses, but there seems little hope of eradicating H5N1. M. Osterholm, the director of the U.S. Center for Infectious Disease Research and Policy and an associate director within the U.S. Department of Homeland Security, has tried to describe what an H5N1 pandemic could look like. He suggests policymakers consider the devastation of the 2004 tsunami in South Asia: “Duplicate it in every major urban centre and rural community around the planet simultaneously, add in the paralyzing fear and panic of contagion, and we begin to get some sense of the potential of pandemic influenza” (in Kennedy 2005, A1).

“An influenza pandemic of even moderate impact,” Osterholm writes, “will result in the biggest single human disaster ever—far greater than AIDS, 9/11, all wars in the twentieth century and the recent tsunami combined. It has the potential to redirect world history as the Black Death redirected European history in the fourteenth century. (In Kennedy 2005, A1)

One hopes the direction world history will take is away from raising birds by the billions under intensive confinement to potentially lower the risk of our ever being in this same precarious situation in the future.

Will We Survive?

Former U.S. Senate Majority Leader B. Frist described the recent slew of emerging diseases in almost biblical terms: “All of these [new diseases] were advance patrols of a great army that is preparing way out of sight” (in Dennehy 2005, n.p.). J. Lederberg, who won the Nobel Prize in medicine for his discoveries in bacterial evolution, has said, Some people think I am being hysterical [referring to pandemic influenza], but there are catastrophes ahead. We live in evolutionary competition with microbes—bacteria and viruses. There is no guarantee that we will be the survivors. (In Culli-
In host-parasite evolutionary dynamics, the so-called Red Queen hypothesis attempts to describe the unremitting struggle between immune systems and the pathogens against which they fight, each constantly evolving to try to outsmart the other (Lythgoe and Read 1998). Its name is taken from L. Carroll’s *Through the Looking Glass*, in which the Red Queen instructs Alice, “Now, here, you see, it takes all the running you can do to keep in the same place” (Carroll 1872, n.p.). Because the pathogens keep evolving, human immune systems have to keep adapting as well just to keep up. According to the theory, animals who “stop running” go extinct.

So far our immune systems have largely retained the upper hand, but the fear is that, given the current rate of disease emergence, the human race is losing the race (Culliton 1990). Mitchison (1993, 136) writes:

> Has the immune system, then, reached its apogee after the few hundred million years it had taken to develop? Can it respond in time to the new evolutionary challenges? These perfectly proper questions lack sure answers because we are in an utterly unprecedented situation [given the number of newly emerging infections].

According to Torrey and Yolken (2005a), “Considering that bacteria, viruses, and protozoa had a more than two-billion-year head start in this war, a victory by recently arrived Homo sapiens would be remarkable.”

J. Lederberg ardently believes that emerging viruses may imperil human society itself (in Drexler 2002). D. Morens says:

> When you look at the relationship between bugs and humans, the more important thing to look at is the bug. When an enterovirus like polio goes through the human gastrointestinal tract in three days, its genome mutates about two percent. That level of mutation—two percent of the genome—has taken the human species eight million years to accomplish. So who’s going to adapt to whom? (In Drexler 2002, 8)

Pitted against that kind of competition, Lederberg concludes that the human evolutionary capacity to keep up “may be dismissed as almost totally inconsequential” (Drexler 2002, 180). To help prevent the evolution of viruses as threatening as H5N1, the least we can do is take away a few billion feathered test-tubes in which viruses can experiment, a few billion fewer spins at pandemic roulette.

The human species has existed in something like our present form for approximately 200,000 years. “Such a long run should itself give us confidence that our species will continue to survive, at least insofar as the microbial world is concerned. Yet such optimism,” wrote A. Mitchison (1993, n.p.), the Ehrlich prize-winning former chairman of zoology at the University College of London, “might easily transmute into a tune whistled whilst passing a graveyard.”

According to a WHO spokesperson:

> The bottom line is that humans have to think about how they treat their animals, how they farm them, and how they market them—basically, the whole relationship between the animal kingdom and the human kingdom is coming under stress. (Torrey and Yolken 2005a)

Along with human culpability, though, comes hope. If changes in human behavior can cause new plagues, changes in human behavior may prevent them in the future.

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In one month’s time, ten countries would be joining the European Union (EU) and become part of a unique European market, increasing the already large number of animals traveling on European roads. With the impending expansion of the EU, the passage of such a regulation was paramount.

Intense negotiations to find a proper compromise between animal protection and the economic interests of the sectors involved had been going on for months. Member states fought from opposite extremes: no changes to the status quo because of negative economic impacts on one side, and no transport of animals for slaughter on the other. Indeed, that particular night, the European ministers felt great pressure from both the general public, worried about the possibility of increasing the suffering of animals traveling thousands of kilometers primarily just to be slaughtered, and the economic operators, who were ready to develop an even larger transport network to cope with the new demands of an enlarged European market.

The debate concluded in December 2004 with an agreement by the EU ministers on a new European regulation for the protection of animals during transport (European Commission 2005a). The regulation did not mandate more appropriate traveling times and loading densities for the transported animals, but, as a compromise, it did introduce for the first time the use of satellite navigation systems to trace the transport of animals in the EU.

The months of negotiations, argument, and political strategizing reveal the climate of debate on animal protection in Europe in 2004. They clearly indicated that a new approach—one not based only on adopting new legislation—was needed to advance the demands of a society in the process of changing its relationship with animals while at the same time associating respect for an animal’s welfare with the concept of a higher-quality product. These demands are found not only in the EU, but increasingly, in the United States as well.

A Global Perspective

According to the Food and Agriculture Organization of the United Nations, globally, approximately 56 billion land animals—including nearly 48 billion broiler chickens—are slaughtered for human consumption in a single year (Food and Agriculture Organization of the United Nations 2004), in addition to an untold number of aquatic animals. The numbers of individual animals raised and killed by the meat, egg, and dairy industries far surpass the number of animals with whom human beings have any other relationship—whether they be those seen as fabric, target practice, test tubes, companions, or sideshow spectacles.

By continent, Asia raises approximately 23 billion farm animals, Africa nearly 4 billion animals, and Australia an estimated 500 million, while Europe, North America, and South and Central America (combined) each raise approximately 10 billion animals. With the exception of Africa, chickens (broiler chickens and laying hens) account for 90 percent of all nonaquatic farm animals used in agriculture on each continent. Globally, broiler chickens
Agricultural ethicist B.E. Rollin (n.d., n.p.) asserts, “[I]n industrial agriculture, this link between productivity and well-being is severed. When productivity as an economic metric is applied to the whole operation, the welfare of the individual animal is ignored.” A recent review concluded that:

Apart from a favorable increase in production, animals in a population that have been selected for high production efficiency seem to be more at risk for behavioral, physiological, and immunological problems. (Rauw et al. 1998)

Looking to the most prominent Western country, the United States, and its poultry industry, as a case study, it is clear that productivity has caused serious concern about the consequences for the animals’ health and welfare. The overwhelming majority of the nearly 10 billion birds raised for egg production or human consumption each year in the United States, as reported by the U.S. Department of Agriculture (USDA), are members of breeds bred selectively for high rates of lay or to achieve slaughter weight in the shortest time. During 2004 approximately 300 million hens produced 76.2 billion table eggs, with each hen laying an annual average of 260 eggs (U.S. Department of Agriculture [USDA], National Agricultural Statistics Service 2005a). This is a more than tenfold increase over the approximately 25 eggs their ancestors, Red Junglefowl (Arshad 1999), laid each year and more than double the average 100 eggs laid annually by hens in the 1940s (United Egg Producers 2004). In just the last five decades, the rearing time for broiler chickens has decreased by nearly half, from 84 to 45 days (Duncan 2001; personal correspondence, G. Matheny with S. Pretanik, director of Science and Technology, National Chicken Council, January 14, 2004), and 2006’s turkeys reached thirty-five pounds in weight in 132 days, rather than the 220 days it took forty years ago (Ferket 2004). Emphasizing productivity can often be at odds with animal welfare and, as a result, has severely reduced the health and well-being of farmed birds. Data show that up to nine of ten egg-laying hens now suffer from osteoporosis, a disorder largely genetic in origin and exacerbated by the battery-cage system customary in the U.S. egg industry (Webster 2004). Forced rapid growth has caused many broiler chickens and turkeys acute and chronic pain, leg abnormalities and disorders, skeletal and cardiovascular disease, and other disabilities (Scientific Committee on Animal Health and Welfare 2000; Duncan 2004a; Mench 2004; The Humane Society of the United States 2006).

Human-Animal Relationship

As countries urbanize and farm animal production intensifies, consumers become increasingly removed from animals raised by the meat, egg, and dairy industries. This detachment could explain the prevalence of intensive animal agriculture in the United States as well as Americans’ minimal understanding of farm animal welfare concerns when compared with, for example, the practices and knowledge of EU citizens. According to a 2002 U.S. census of agriculture, approximately 1 million Americans (compared with a total population of nearly 300 million) are animal farm operators, and numerous sources point to the growing population numbers in urban or suburban areas, compared to rural, farming communities. In contrast, according to a European Commission’s (EC) (2005b) Eurobarometer report, 68 percent of EU citizens (in twenty-two out of twenty-five countries) had visited animal production farms, and nearly 40 percent of them had
done so more than three times. These and other findings led the authors to conclude that “[v]isits to farms seem to increase the awareness of and concern for animal welfare” (European Commission 2005b).

Consumer Concern for the Treatment of Farm Animals

“[C]onsumers are increasingly concerned by the quality of food they buy, where it comes from and how it was produced,” reported Scotland’s The Herald (Buglass 2006). Said T. Fowler, senior economist with the U.K. Meat and Livestock Commission and author of the study “Ethical Consumerism in the U.K.,”

Fair trade, organic, free range, or cruelty free are the most widely accepted understandings (of ethical consumerism).... There is a surprisingly high proportion of consumers—52 percent—whose buying patterns are determined by perceptions of what is ethical. (In Buglass 2006, n.p.)

Indeed, whether they have direct experience with animal production or have never visited a facility, when asked, a majority of citizens of the United States and the EU share concerns about the welfare of farm animals.

In the United States, a number of surveys show that the majority of Americans favor the humane treatment of farm animals: 81 percent of Americans polled agreed that birds should be included in the federal Humane Methods of Slaughter Act, which would require them to be rendered insensible to pain before shackling and slaughtering (Penn, Schoen, and Berland 2005); 82 percent agreed that effective laws should protect farm animals against cruelty and abuse (Zogby International 2003); 72 percent believed farms should be inspected by government officials to ensure laws protecting animals from cruelty are being followed (Zogby International 2003); 66 percent found farm animal exemption from state cruelty laws to be unacceptable (Zogby International 2003); and 62 percent supported passing strict laws concerning the treatment of farm animals (Moore 2003).

In Europe, in responding to specific surveys, citizens say they no longer view farming animals simply as a means of food production. Instead, they see it as relevant to other key social goals, such as food safety and quality, environmental protection, sustainability, and the humane treatment of animals. In 2001 the results of an EU-funded study on consumer concerns about animal welfare and their impact on food choice showed that although consumers are concerned about farm animal welfare, this concern is not a priority in food choice...consumers use animal welfare as an indicator of other, usually more important product attributes, such as food safety, quality and healthiness.... Although the majority of consumers report high level of concerns about farm animal welfare, such concerns are not translated into behavior, the research identified a series of barriers to purchasing animal friendly products. (Harper and Henson 2001)

In 2005 and 2006, Eurobarometer surveys and Internet consultations conducted on behalf of the European Commission highlighted the importance of animal protection to European consumers: 60 percent of respondents said they were worried about farm animal welfare, which scored higher than concerns over BSE (bovine spongiform encephalopathy, or mad cow disease) or gaining weight, and previously 82 percent felt they had a duty to protect animals, whatever the cost (Harper and Henson 2001).

Willingness to Pay

As improvements in animal welfare are demanded at the farm level, the issue of consumers’ willingness to absorb higher costs for products becomes increasingly important—and controversial. The question of who will bear any extra costs derived from higher animal welfare standards is commonly raised in both the EU and the United States. Increasing data show that investments in good standards for animal welfare are economically advantageous.

Consumers in the EU and the United States report a willingness to pay higher prices for products sourced from more animal welfare-friendly production systems. In the EU 57 percent of survey respondents in the Eurobarometer stated they would pay a premium for more animal welfare-friendly eggs, for example. In the United States, sim-
ilar findings have been reported. In a 2004 Golin/Harris poll for the United Egg Producers, 54 percent of consumers said they were willing to pay 5–10 percent more for eggs labeled “Animal Care Certified,” without any information about what the label actually meant; 10 percent reported they were willing to pay 15–20 percent more; and 77 percent reported they would consider switching to a brand with such a label (Golin/Harris International 2004). Research suggests consumers are willing to pay an average of 17–60 percent more for eggs from non-cage systems (Bennett and Larson 1996; Bennett 1997a; Animals Australia 1998; Rolfe 1999; Bennett and Blaney 2003).

Although survey data indicate a clear willingness to pay for higher-welfare products, the problem lies in putting these stated claims into practice. Nevertheless, the concerns of the majority of consumers regarding the treatment of farm animals have not yet been taken seriously.

The public good benefits of measures to improve animal welfare also deserve assessment. A study on moral intensity and willingness to pay with regard to farm animal welfare issues and the implications for agricultural policy revealed that the value to society of measures to improve animal welfare must be considered in a cost-benefit framework—for example, the value of benefits to an individual could be assessed in terms of her willingness to pay for animal welfare improvements. Using such models, various studies have shown that the benefits of animal welfare measures greatly outweigh the costs of better farming practices over customary intensive systems that deprive animals of many behavioral and physiological needs. In addition to those consumers who demand and purchase animal welfare-friendly products, others can derive significant satisfaction derived from the knowledge that such animals are afforded protections denied to those reared in industrial systems. Therefore, private consumption and public good aspects need to be taken into account. Some have postulated that providing that consumers are fully informed about the animal welfare implications of their purchasing decisions, the market will ensure that consumers purchase animal products which will maximize their individual net benefits from consumption. (Bennett 1997b, 243) and that “society is placing an implicit (money) value on animal suffering” (Bennett 1997b, 241).

Consumers have identified a series of barriers to purchasing animal-friendly products—chiefly lack of education and information about production methods, lack of transparency, lack of availability of products, lack of belief in the ability of individual consumers to make a difference in animal welfare standards, disassociating the product from the animal of origin, and the increased cost of animal-friendly products. Consumers expressed a preference for a combined strategy of setting minimum animal welfare standards and adapting present agricultural policy to provide farmers with incentives to change over to more humane systems.

Responses to Growing Interest in Farm Animal Welfare

Given increasing consumer concern over the treatment of animals raised for meat, eggs, and milk, it follows that animal welfare is increasingly on the agendas of government agencies, academic institutions, corporations, nongovernmental organizations (NGOs), investment banks, and leading public health and animal health organizations. As a result a number of recommendations, standards, directives, laws, and initiatives have emerged at national and international levels, providing guidelines or minimum standards to improve the well-being of animals in agriculture. These movements indicate an increasing awareness that human beings’ relationship with and treatment of farm animals are issues worthy of attention.

In recent years such diverse entities as the Austin, Texas-based grocer and Fortune 500 company, Whole Foods Market, the International Finance Corporation of the World Bank, the World Organization for Animal Health (OIE), and Google have helped to move farm animal welfare to the foreground of public discourse with their respective policies or recommendations. For example, Whole Foods Market as of 2007 had not only made a commitment to offer welfare-friendly products, but it had also taken a leadership role in moving animal agribusiness toward more extensive production systems (those with non-intensive production practices) with its development of Animal Compassionate Standards (http://www.wholefoodsmarket.com/issues/animalwelfare/index.html). In October 2006 the International Finance Corporation (http://www.ifc.org/ifcext/environ.nsf/AttachmentsByTitle/p_AnimalWelfare_GPN/SPFILE/AnimalWelfare_GPN.pdf) issued its Animal Welfare in Livestock Operations Good Practice Note, which begins:

Animal welfare is gaining increased recognition as an important element of commercial livestock operations around the world. Animal welfare is just as important to humans for reasons of food security and nutrition. Higher animal welfare standards are also increasingly seen to be a prerequisite to enhancing business efficiency.
and profitability, satisfying international markets, and meeting consumer expectations.

The OIE, a worldwide organization with 167 member countries, adopted a complete set of guidelines in 2005 to protect animals during transport by land and by sea, at slaughterhouses, and at killing for disease eradication. And in May 2006 Internet giant Google adopted a corporate policy to discontinue the use of eggs from caged laying hens in all of its employee cafés.

**Legislative Efforts: A European Perspective**

In the United States, animals reared by the meat, egg, or dairy industries are afforded no legal protections while on the farm and only minimal protection during transport. USDA does not require the overwhelming majority of them (specifically birds, who account for nine of ten farm animals) to be rendered insensible to pain before shackling and slaughter. In contrast, the EU has adopted a specific legislative approach for the welfare of animals from the farm to the slaughter plant.

The first EU legislation on animal welfare, adopted in 1974, concerned the stunning of animals before slaughter (European Economic Community 1974). While this initiative indicated the importance the European Economic Community (EEC) already attached to animal welfare and the prevention of unnecessary suffering, its purpose was strictly to reduce the impact on the internal market of different measures in EEC member states that could create additional costs. Despite the pure economic aim, the Directive of 1974 (n.p.) posited:

> Whereas the Community should also take action to avoid in general all forms of cruelty to animals; whereas it appears desirable, as a first step, that this action should consist in laying down conditions such as to avoid all unnecessary suffering on the part of animals when being slaughtered....

Following the humane charge outlined in the directive on protecting animals at slaughterhouses, many other legislative steps have been taken. As of 2006 in the EU, calves older than eight weeks had to be kept in groups without tethering and muzzling, pregnant sows could no longer be kept in individual crates, and cages for laying hens without materials for enrichment—animal production practices that remain customary in the United States—were to be phased out. During transport, animals in the EU could be trucked for a maximum of eight hours; if they must travel for longer, the animals must do so in vehicles specially equipped for long-distance journeys with water and food in sufficient quantity. Since 1993 specific welfare requirements detail protections for handling, managing, and stunning or killing animals in slaughterhouses.

Directive 98/58/EC on the protection of animals kept for farming purposes underlines the principles forming the basis of EU animal welfare legislation and highlights the need to treat animals according to their physiological and ethological needs. Respecting the basic five freedoms—freedom from discomfort; from hunger and thirst; from fear and distress; from pain, injury and disease; and freedom to express natural behavior—is a fundamental principle, and the EU has already taken various practical steps to secure real improvements in animal welfare.

Also underpinning the EU’s animal welfare policy is a specific protocol on the Protection and Welfare of Animals introduced via the Treaty of Amsterdam in 1999. This protocol recognizes that animals are “sentient beings” and obliges the European institutions and member states to pay full regard to the welfare requirements of animals when formulating and implementing community legislation in agriculture, transport, internal market, and research.

**The Socio-Economic Costs of Animal Welfare**

It has been demonstrated that any requirement implying investments and changes to existing production systems may have an impact on production costs.

In recent years, the European Commission has taken important steps in developing specific studies and impact assessments on the socio-economic implications of animal welfare measures. These efforts have been undertaken by several public and private organizations. In particular, important university institutes in Europe have studied the impact of animal welfare on the trade of animal products and on the European market, and the economic impact of animal welfare measures on products that are globally competitive, such as eggs, pork, and poultry (see as examples Agra CEAS Consulting 2004; DEFRA, U.K. 2005; van Hoorne 2005).

In the United States, The Humane Society of the United States has prepared a series of analyses comparing intensive production methods with more welfare-friendly systems (see http://www.farmanimalwelfare.org). The findings indicate that practices that improve animal well-being are economically viable.

As the EU and U.S. poultry industries are very similar and integrated, analysis of broiler production may be of interest, particularly since poultry meat has become a global commodity.
Stocking Density

In studies concerning a 2005 European Commission proposal on the welfare of chickens kept for meat production, it has been shown that the price of a chicken would rise by either 8 or 2.5 Euro cents to maintain farmers’ earnings at the maximum stocking densities of 30 or 38 kg/m², respectively, foreseen in the European Commission’s recent legislative proposal on this issue. Nevertheless, while this may seem negligible, the margins at which modern farms operate and international trade competes also need to be considered. A U.K. study on broiler production calculated an average overall net margin of 3.0 pence per bird for the 600 million birds produced in England in 2002.

Growth

Virtually all chickens reared for meat are members of fast-growing breeds selectively bred to reach market weight as efficiently as possible—that is, in a shorter time with less feed. Eighty-five to 90 percent of these significant reductions in time and feed intake is due to genetics, and 10 percent to 15 percent to nutritional changes (Havenstein, Ferket, and Qureshi 2003). Such rapid growth has contributed to serious welfare challenges for birds, including skeletal and cardiovascular disease as well as chronic hunger in breeding stock (Scientific Committee on Animal Health and Animal Welfare (SCAHAW) 2000; Mench 2004a; Mench 2004b). “Without a doubt, the biggest [animal] welfare problems for meat birds are those associated with fast growth,” concludes poultry welfare science expert I. Duncan (2004a, 310).

It used to be thought that all farm animal welfare problems could be solved by correct environmental design. Experience with modern broilers and their parent stock, broiler breeders, has cast doubt on this assumption....[T]o a large extent, the welfare problems [of broiler chickens]...will not be solved by environmental manipulations. It is the bird that must be changed, and the long-term solution is in the hands of the primary breeding companies. (Duncan 2004b, xii)

The costs of poultry breeding programs are negligible—around 0.5 percent of live production value (Arthur and Albers 2003). However, adopting slower-growing breeds does involve increased running costs. The EU’s Scientific Committee on Animal Health and Animal Welfare (SCAHAW) modeled the additional production costs involved in adopting slower-growing poultry breeds (Scientific Committee on Animal Health and Animal Welfare [SCAHAW] 2000), and found that slower growth would increase running costs primarily by delaying the slaughter age from forty one to fifty one days (in the European case). These costs would be partly offset by a 65 percent reduction in weekly mortality rates, a 10 percent increase in feed conversion ratios, and a lower chick price because of improved breeder fertility and egg hatchability in slower-growing breeds. SCAHAW concluded that running production costs of slower-growing breeds would be about 5 percent higher than those of conventional breeds (SCAHAW 2000).

In its model, SCAHAW did not include quality price premiums made possible through slower growth, for example, color and water-holding capacity are frequently reported to be poorer in faster-growing flocks (Remignon and Le Bihan-Duval 2003). The SCAHAW model also did not include the decrease in condemnations and downgrades due to better bone health in slower-growing breeds, which could represent significant savings. A 1994 survey in the United States estimated that losses to producers due to leg problems were $80 million to $120 million for broilers and $32 million to $40 million for turkeys (Sullivan 1994). Adjusting for the increase in the value of poultry production and assuming no change in the percentage of birds with leg problems, annual losses could now run $144 million to $216 million for broilers and $37 million to $46 million for turkeys (USDA/National Agricultural Statistics Service 1998, 2005b).

Catching of Poultry

Customary catching and crating of broiler chickens for transport to slaughter involves manual efforts. Birds generally are caught by hand and carried inverted by a single leg, three or four birds per hand. During an average shift, a single catcher will lift between five and ten tons of birds at a rate of 1,000 to 1,500 animals an hour (Nijdam et al. 2004; Ramasamy, Benson, and Van Wickle 2004). In the United States, catching crews typically are paid by the shed (unit of housing) or by weight, so there is little incentive to be gentle in handling (Grandin 2003). Nijdam et al. (2004) report that “[f]or a member of a catching team, it could be difficult to maintain concentration and exercise care throughout a longer catching time.” Rough handling, which causes birds to experience fear (Jones 1992), can increase as crews become fatigued. Lacy and Czarick (1998) concluded that [A]s fatigue sets in, one’s primary motivation becomes just getting the job over with. Catching and crating the birds as quickly as possible with the minimum effort possible becomes the major focus. Careful handling becomes secondary.

Birds raised for meat are typically unaccustomed to being touched by humans. When handled, their plasma corticosterone levels elevate, a physiological indicator of stress (Duncan 1989; Elrom 2000). The method of handling can also
affect stress. Kannan and Mench (1996) report that both being carried with other birds and being inverted elevate plasma corticosterone levels compared to the levels of birds carried singly and upright.

In addition to stress and fear, birds suffer a number of injuries during catching, including bruises, broken bones, torn skin, and dislocations. Injuries associated with manual catching are well documented:

- Kettlewell and Turner (1985) found that as many as 20 percent of birds experienced injuries during catching that led to carcass downgrade.
- The Wall Street Journal reported that “up to 25 percent of broilers on some farms are hurt in the [catching] process” (Kilman 2003).
- Five percent to 25 percent of poultry carcasses at processing plants exhibit bruising of the breast, thighs, or wings (Farsaie, Carr, and Wabeek 1983; McGuire 2003).
- Griffiths (1985) estimated that 40 percent of bruises recorded at processing plants are caused by catching and crating, while McGuire (2003) estimated 90 percent.
- Grandin (2003) recounted one operation in which 5 percent of birds had broken wings caused by rough catching.
- Nijdam et al. (2006) reported that 29.5 percent of dead-on-arrival (DOA) broiler chickens at slaughterhouses exhibited trauma that the authors attributed to catching and crating.
- Bayliss and Hinton (1990) reported that 35 percent of DOA broiler mortality was due to catching and transport injuries.

In a review of poultry welfare problems caused during catching and transport, Knowles and Broom (1990) concluded, “[T]he most traumatic stages of the process and the stages most likely to give rise to physical damage, are the times when the birds are manually handled.”

In contrast, birds harvested mechanically with machinery that “catches” them via a ramp or rubber-fingered rotors and pulls them upright on a conveyer belt to transport crates, had significantly lower rates of bruises, fractures, and dislocations than did conventionally manually caught birds (Knierim and Goeke 2003). Leg, wing, and rump injuries were 50 percent, 22 percent, and 27 percent lower, respectively, and the number of birds with one or more injuries was 30 percent lower. Lacy and Czarick (1998) found that rates of leg bruising were 58 percent lower with mechanical harvesting, while Elrom (2000) reviewed studies finding that mechanically harvested birds had injury rates 25 percent to 87 percent lower than manually caught birds.

The principal cost associated with adoption of mechanical harvesting is the capital investment in a harvester—between $150,000 and $200,000 (Lacy and Czarik 1998; Bellett 2003). These systems reduce labor costs by employing crews half the size of those used in conventional manual catching, while maintaining similar catch rates. Knierim and Goeke (2003) found that three-person mechanical harvesting teams loaded 8,000 birds in an average of 55 to 60 minutes, while six-person manual catching teams loaded 8,000 birds in 40 to 50 minutes. Thus, the catch rate per person-hour for the mechanical harvester was 2,667 to 2,909 birds per person-hour—33 percent to 82 percent higher than that for the conventional manual catching team. Nijdam et al. (2005) found that the catch rate for mechanical harvesting was 114 percent higher per person-hour than the rate for conventional manual catching.

Accounting for the different wage scales of manual and mechanical catching workers, American Calan (a company that designs and builds agricultural equipment used in the feeding and data collection of large animals at research facilities throughout the world) estimated that mechanical harvesting reduces labor costs by 67 percent (Thornton 1994), or around $183,000 a year in current dollars. Thus, the payback period for a $200,000 harvester with $76,000 in annual running costs would be twenty-two months, with net savings thereafter. Similarly, Lacy and Czarick (1998) estimated a payback time of fifteen months. The estimated payback period would be even shorter if savings from reduced bruising were considered, in addition to savings from reduced health care costs and compensation claims due to improved catcher safety (Ramasamy, Benson, and Van Wicklen 2004).

**Poultry Slaughter**

Typically, poultry are shackled and electrically stunned in a water bath before slaughter. Raj et al. (1997) found that most broiler chickens sustained at least one bone fracture and one hemorrhage during shackling and electrical stunning. During electrical stunning, chickens can defecate and inhale water, contaminating carcasses (Gregory and Whittington 1992). These factors lead to carcass downgrades and condemnations, thereby decreasing processors’ revenue.

In contrast, many European processors are adopting controlled atmosphere stunning (CAS) slaughter of meat, egg, and breeding birds. In CAS live birds are kept in their transport crates after reaching the slaughterhouse. While still crated, they are passed through a chamber containing gas—typically either 90 percent argon in air or 30 percent CO₂/60 percent argon in air. These mixtures are not poisonous; rather, they cause the birds to die from anoxia. The dead birds are then hung on shackles for processing. According to Raj (1998), CAS reduces stress and trauma associated with removing conscious birds from their transport containers, in particular, under the bird
handling systems which require tipping or dumping of live poultry on conveyors; the inevitable stress, pain, and trauma associated with shackling the conscious birds, i.e. compression of birds’ hock bones by metal shackles; the stress and pain associated with conveying conscious birds hanging up side down on a shackle line which is a physiologically abnormal posture for birds; the pain experienced by some conscious birds that receive an electric shock before being stunned (pre-stun shocks)…. The pain and distress experienced by some conscious birds which miss being stunned adequately (due to wing flapping at the entrance to the water bath stunners) and then pass through the neck cutting procedure; [and] the pain and distress associated with the recovery of consciousness during bleeding due to inadequate stunning and/or inappropriate neck cutting procedure.

To that list should be added the pain and distress of some birds who are still conscious when they enter the scalding tanks for feather removal and then die by scalding or drowning (Duncan 1997). Duncan (1997) concludes that,

[CAS] is the most stress-free, humane method of killing poultry ever developed. The birds are quiet throughout the operation. They remain in the transport crate until dead and the killing procedure itself is fast, painless, and efficient. There is no risk of recovery from unconsciousness.

Adoption of CAS involves large capital costs to purchase gas-stunning equipment. A system in the United States that processes around 1 million birds a week (150 to 200 birds a minute) costs less than $1 million and is compatible with existing crates and loading equipment. According to the European Integrated Pollution Prevention and Control Bureau (EIPPCB), the running costs of gas, using an 80 percent nitrogen/20 percent argon mixture, are between 51 and 84 cents (in 2005 U.S. dollars) per 100 birds (European Integrated Pollution Prevention and Control Bureau [EIPPCB] 2003). CAS also results in cost savings and increased revenues by decreasing carcass downgrades, contamination, and refrigeration costs; increasing meat yields, quality, and shelf life; and improving worker conditions. Without live shackling and electrical stunning, CAS results in fewer broken bones and less bruising and hemorrhaging (Raj et al. 1990; Raj and Gregory 1991; Raj et al. 1997; Hoen and Lankhaar 1999; Canadian Food Inspection Agency 1999; EIPPCB 2003). The reduction in carcass defects increases boning yield and deboned meat quality (Raj et al. 1990; Raj et al. 1997; Hoen and Lankhaar 1999; O’Keefe 2003). In addition, CAS has been shown to reduce bruising by as much as 94 percent and bone fractures by as much as 80 percent (Raj et al. 1990; Raj et al. 1997). Conservatively assuming that CAS increases yield by only 1 percent, a plant processing 1 million broilers a week, with an average dressed carcass weight of 4.5 pounds and a wholesale price of $0.80 per pound, would increase annual revenue by $1.87 million after adopting CAS. And as CAS increases the rate of rigor development, it results in faster carcass-maturation times and reduces handling, floor space, and refrigeration costs (Raj et al. 1997; SCAHAW 1998; EIPPCB 2003; O’Keefe 2003). Because gas-stunned chickens do not inhale contaminated water as they do during electrical stunning, CAS also decreases contamination costs (Gregory and Whittington 1992).

CAS can improve worker conditions and safety and decrease labor costs due to production line inefficiencies, injuries, and turnover from handling conscious birds. The Canadian Food Inspection Agency concluded that “[t]he environment for the [personnel] working in the poultry stunning area is also very much improved with the use of controlled atmosphere stunning” (Canadian Food Inspection Agency 1999). O’Keefe reports that for one CAS plant, annual labor savings due to easier handling in post-stun shackling more than offset increased operating costs (O’Keefe 2003).

Based on the estimates above, a plant that installs a CAS line at a cost of $1 million, with a capacity to slaughter 1 million birds a week, would incur annual operating costs of between $265,200 and $436,800, along with increased revenue of $1.87 million from increased meat yield. Payback would be achieved in less than one year, with increased profits thereafter. Similarly, Shane found that U.K. producers adopting CAS were able to recoup their capital investment in one year (Shane 2005).

**The Global Dimension**

It is clear that animal welfare has extended far beyond European borders; indeed, it is being accorded a growing level of importance in civil society around the world. The guiding principles agreed upon by all of the 167 member countries of the OIE in 2004 and part of the introduction to the guidelines for animal welfare recognize “that the use of animals in agriculture and science, and for companionship, recreation, and entertainment, makes a major contribution to the well being of people” and “that the use of animals carries with it an ethical responsibility to ensure the welfare of such animals to the greatest extent practicable” (OIE Terrestrial Animal Health Code 2006, Sec. 3.7, App. 3.7.1.).

Internationally there is a great challenge to balance competition, productivity, and animal welfare in
The Future: A Global Perspective

Clearly the EU has taken the global initiative in improving farm animal welfare—not only within its own member states, but abroad as well. Complementing the OIE’s initiative, the European Commission has started to negotiate animal welfare standards to be incorporated into bilateral agreements between the EU and Third World country suppliers of animals and animal products. One of the OIE guiding principles stating that “[i]mprovements in farm animal welfare can often improve productivity and food safety, and hence lead to economic benefits” is encouraging the adoption of animal welfare standards worldwide.

Achieving international awareness about animal protection and contributing actively to the development of international standards while respecting the ethical and cultural dimension of the issue is one of the five main actions included in the Community Action Plan on Animal Welfare.

Other initiatives are planned in knowledge/training activities and development of future strategies in veterinary education, including e-learning initiatives. Taking the EU-Chile Agreement as an example, one objective is to reach a common understanding concerning animal welfare standards based on developments in the competent international standards organizations. The agreement already covers standards concerning the stunning and slaughter of animals and will be extended to include their land and sea transport. Efforts have been undertaken to exchange information and promote cooperation and exchange of expertise. The importance of training has been highlighted to promote awareness of animal welfare and application of relevant animal welfare guidelines.

In trade and external relations, the European Commission has been active in promoting the EU perspective on the importance of animal welfare, including, among other things, a specific submission to the World Trade Organization (WTO) on animal welfare and agricultural trade (WTO, Annex to COM 2002, 626 Final) stating, “[T]he objective of the EC [European Community] in raising animal welfare issues in the context of the WTO negotiations is not to provide a basis for the introduction of new types of tariff barriers” but “to promote high animal welfare standards, to provide clear information to consumers, while at the same time maintaining the competitiveness of the EC farming sector and food industry.” The EU also made a submission to the WTO Special Committee on Agriculture in December 2001 on mandatory labeling for agricultural products, whose aim should be

[T]o ensure that members can pursue their legitimate policy objectives, including relevant agriculture non-trade concerns, through labeling requirements for food and agricultural products, thereby supporting market led, least trade restrictive approaches to international trade. (WTO, Annex to COM 2002, 626 Final)

In the European Commission’s communication (2002), imports from countries outside the EU that do not necessarily apply animal welfare rules equivalent to those enforced in the EU have already been addressed.

A recent seminar organized by non-governmental observers (NGOs) as part of the European Commission’s Civil Society dialogue initiative (to consult stakeholders in order to develop policies on several trade-related issues: http://trade-info.cec.eu.int/civilsoc/meetdetails.cfm?meet-11116) had as its topic “Sustainable Agricultural Production and Good Animal Welfare Practice: Trade Opportunities for Developing Countries.”
Conclusions and Future Directions

Increasingly throughout Europe and the United States, the farming of animals is no longer viewed simply as a means of food production. Instead it is seen as fundamental to other key social goals, such as food safety and quality, safeguarding environmental protection, sustainability, enhancing the quality of life in rural areas and the preservation of the countryside, and ensuring that animals are treated properly.

Public authorities are obliged to take these demands into account when formulating and implementing relevant policy to ensure that animals are treated humanely. In response to this situation, a Community Action Plan on the Protection and Welfare of Animals covering 2006 to 2010 has now been developed in Europe. This plan seeks to define more clearly the direction of EU policies for the coming years, to continue to promote high animal welfare standards in the EU and at the international level, and to provide greater coordination of existing resources while identifying future needs.

A more consistent and coordinated approach to animal protection and welfare needs to be ensured across several policy areas to respond to clear public concerns.

National authorities and major global players in the food chain have a duty and a responsibility to respond to citizens’ demands concerning and the shifting in attitudes toward farming production. As evidenced by polling consumers on both sides of the Atlantic, the majority of citizens are concerned about the humane treatment of animals, and as the United States and the EU share common players in the food market and country borders blur due to globalization, the development of strategic, international collaborations is critical in achieving improved farm animal welfare (European Commission 2006). Thus far, the differing approaches—primarily, legislation in the EU and voluntary codes in the United States—have not been favorable in establishing cooperation nor in achieving rapid progress in improving the welfare of farmed animals.

Opportunities to cooperate in the development of a common, science-based approach should be explored, taking advantage of the new framework offered by multilateral organizations such as the OIE and taking into consideration all stakeholders who demand these improvements.

The views expressed herein are purely those of the authors and may not in any circumstance be regarded as an official position of the European Commission.

Note

1Defined in 1979 by the U.K. agricultural ministry’s advisory body, the Farm Animal Welfare Council.

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Habitat Destruction and Wild Animal Suffering

When we think about the inhumane treatment of wild animals, what typically comes to mind is the trapping of a wolf, the clubbing of a seal, or some other iconic scenario from the annals of animal welfare activism. Invariably these scenarios involve direct, physical, even brutal actions that cause fear, pain, and usually death. We often overlook an extremely important source of wild animal suffering: habitat destruction. Habitat includes food, water, cover, and space. When any of these components is eliminated or degraded, wild animals suffer and many die, often in more insidious, protracted, and torturous ways than if killed or crippled by a hunter or natural predator.

Many wild animals survive an initial onslaught of habitat destruction only to be stranded in a foreign, inhospitable environment. When a food or water source is eliminated or degraded, wild animals suffer and many die, often in more insidious, protracted, and torturous ways than if killed or crippled by a hunter or natural predator.

When thermal cover is destroyed, wild animals must expend precious time and energy to regulate body temperatures, decreasing or eliminating other activities such as feeding, playing, or reproducing. When hiding cover is lost, wild animals enter a constant state of fear and stress, instinctively seeking cover, in vain, from predators who may or may not be present. When an area of wild animal habitat contracts, overcrowding and inhumane side effects ensue, culminating in cannibalism, in some cases.

Wild animals who are able to escape to nearby suitable habitats (assuming such habitats exist) face the difficulty of competing with already-established individuals of their own species. The problems faced by these animals are very similar to the problems faced by those who remain in an area where habitat has contracted. In general, populations within an ecosystem tend to fluctuate near carrying capacity, so the immigration of displaced animals results in a stressful attempt for survival by all animals, including the original inhabitants and the immigrating refugees. In other words, the stress, suffering, and mortality of animals resulting from habitat destruction reverberates outward from the center of habitat destruction.

Habitat destruction, meanwhile, occurs in the normal course of human affairs, and we often hear of “human activity” being identified as the cause of many environmental problems. However, it behooves the environmental and animal protection communities to specify what type of human activity is problematic. For example, habitat destruction is not typically a matter of spiritual, intellectual, or political activity, at least not directly. Rather, the habitat destruction human beings cause is virtually always a result of economic activity. The process of economic growth simply entails more economic activity and, therefore, more habitat destruction and more inhumane treatment of wild animals.

Economic growth is not intended to kill, torture, or harass animals, and in that respect is not as detestable as various other forms of inhumanity. Yet economic growth is surely the greatest of all forms of inhumanity in terms of the gross amount of wild animal suffering that results. Therefore, for those concerned with the humane treatment of wild animals, perhaps nothing is so important to address as the policy and process of economic growth.
Economic Growth and Habitat Destruction

Economic growth is an increase in the production and consumption of goods and services. It entails increasing human populations, per capita consumption, or both. The size of an economy is generally indicated by gross domestic product (GDP) or gross national product (GNP). (GDP and GNP are referred to collectively as GDP throughout this chapter.) The strengths and weaknesses, uses and misuses of GDP as an economic indicator are assessed in a later section. For now, suffice it to say that GDP is a very good indicator of the size, not the health, of an economy.

The relationship between economic growth and habitat destruction is readily apparent when we consider the causes of species endangerment (Table 1). For example, in the United States these causes include agriculture, domestic livestock production, mining, logging, and other extractive sectors (Czech, Krausman, and Devers 2000). These economic activities imperil species because they remove or degrade the food, water, cover, and space required to sustain wild animals. To put the scale of the problem into perspective, consider how many individual animals suffer when an entire species is imperiled by these economic activities. Yet this is precisely what has occurred when a species is listed as threatened or endangered pursuant to the Endangered Species Act. As of March 1, 2006, 1,272 species were listed in the United States, including 527 animal species and 745 plant species (U.S. Fish and Wildlife Service 2006), with an additional 935 vertebrate species designated as “candidates” for listing. Now imagine all the individual animal suffering that has led to all this endangerment.

Another primary cause of species endangerment is urbanization. “Urbanization,” used here in the simplest sense of expanding urban area, reflects the growth of the national labor force and the consumer population as well as a variety of industrial and service sectors. Few types of habitat destruction are as thorough and permanent as urbanization. While the logging of a forest, for example, is a traumatic experience for its wild denizens, some of them are able to carve a niche out of what is left after the harvest. When a city expands, it usually does so by adding pavement, buildings, and infrastructure, all of which are absolutely inhospitable to most of the area’s original species.

Economic infrastructure extends far into the countryside, too, providing the matrix of a national economy. Roads, reservoirs, pipelines, power lines, telecommunications facilities, and wind farms are examples and constitute another major

<table>
<thead>
<tr>
<th>Cause of Endangerment</th>
<th>Number of Species Endangered, by Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactions with non-native species</td>
<td>305</td>
</tr>
<tr>
<td>Urbanization</td>
<td>275</td>
</tr>
<tr>
<td>Agriculture</td>
<td>224</td>
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<tr>
<td>Outdoor recreation and tourism development</td>
<td>186</td>
</tr>
<tr>
<td>Domestic livestock and ranching activities</td>
<td>182</td>
</tr>
<tr>
<td>Reservoirs and other running water diversions</td>
<td>161</td>
</tr>
<tr>
<td>Modified fire regimes and silviculture</td>
<td>144</td>
</tr>
<tr>
<td>Pollution of water, air, or soil</td>
<td>144</td>
</tr>
<tr>
<td>Mineral, gas, oil, and geothermal extraction or exploration</td>
<td>140</td>
</tr>
<tr>
<td>Industrial, institutional, and military activities</td>
<td>131</td>
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<tr>
<td>Harvest, intentional and incidental</td>
<td>120</td>
</tr>
<tr>
<td>Logging</td>
<td>109</td>
</tr>
<tr>
<td>Road presence, construction, and maintenance</td>
<td>94</td>
</tr>
<tr>
<td>Genetic problems</td>
<td>92</td>
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<tr>
<td>Aquifer depletion, wetland draining or filling</td>
<td>77</td>
</tr>
<tr>
<td>Native species interactions, plant succession</td>
<td>77</td>
</tr>
<tr>
<td>Disease</td>
<td>19</td>
</tr>
<tr>
<td>Vandalism (destruction without harvest)</td>
<td>12</td>
</tr>
</tbody>
</table>

Source: Modified from Czech, Krausman, and Devers (2000).
It is hard to imagine a more omnipresent danger than roads, upon which countless animals are mangled and left, during their final hours, to be slowly, opportunistically picked apart by vultures and scavengers. As The Humane Society of the United States (2006, n.p.) noted, millions upon millions of wild animals are killed on our nation’s highways every year. Some scientists estimate that humans kill more wild animals with their cars than with any other instrument, including guns....The damage that highways inflict on wildlife is not limited to direct mortality. It starts with the destruction of habitat and continues with the construction of the road itself, which causes more wildlife mortality. Chemical and physical alteration of the surrounding environment and introduction of potentially invasive species accompany construction and use of roads....Perhaps the most serious of all the negative effects on wildlife is the highway’s fragmentation of habitat. Fragmentation confines wild populations to areas too small for their needs or forces animals to attempt road crossings to locate food, cover, nesting sites, and mates.

Power lines present the menace of electrocution, the outcome of which may be death or permanent crippling. Harness and Wilson (2001) documented the electrocutions of 1,450 raptors representing sixteen species between 1986 and 1996. Golden eagles accounted for the largest percentage of fatalities. Data on power line electrocution are not easy to acquire, and it is logical to assume that a large number of birds, especially, are electrocuted each year on power lines, electric fences, and other electric infrastructure.

Power line collisions are also a significant source of bird crippling and death. As with electrocution, most instances of power line collision go undocumented, and often documentation occurs only for the most studied species. For example, power line collisions have been documented as a significant source of mortality for waterfowl species in many areas (Erickson, Johnson, and Young 2005).

This is an opportune time to mention an inevitable trade-off that occurs any time a habitat is transformed, lest we be charged with bias. Power lines and power poles, as anyone who has driven a country road can testify, do not only electrocute birds. They also provide perching habitats, as do grain elevators, skyscrapers, and even nuclear plants. All is relative, however, and what concerns us here is the net effect for wild animal welfare. To understand net effects, we must keep in mind what our economic infrastructure has replaced. When a forest, for example, is cleared of its trees, plowed, and fragmented by roads and power lines to feed the local economy, it is inane to conclude that economic growth was good for birds because power lines provide perches. The effects of economic growth on wild animal welfare must be considered in the aggregate and not by looking at isolated, incidental, minor examples.

Wind farms, seen as a great hope for “green” economic growth, are the newest gauntlet in the routes of migratory birds. Wind farms are often situated in areas where winds are favorable not only to harvesting for energy, but also to birds for migrating. Substantial bird death and injury is inevitable. For example, wind turbines at Altamont Pass, California, kill approximately one thousand birds of prey per year, including hundreds of red-tailed hawks, burrowing owls, American kestrels, great horned owls, ferruginous hawks, and barn owls. Birds of more than forty species have been killed at this single wind farm (Center for Biological Diversity 2006).

Outdoor recreation is another threat to species and may be classified as a distinct economic sector with many subsectors, including hunting, fishing, hiking, biking, four-wheeling, boating, and birdwatching. Americans spent $810 billion in 2001 on wildlife-related outdoor recreation (U.S. Fish and Wildlife Service 2002). Clearly these various forms of outdoor recreation vary dramatically in their impact on wild animals, but most typically, the direct threat of outdoor recreation to wild animals is trampling, killing, or disturbance. Certain forms and high levels of outdoor recreation have substantial effects on habitats in some areas, for example, with off-road vehicle recreation in the Desert Southwest. Outdoor recreation constitutes the fourth most prominent cause of species endangerment in the United States (Czech, Krausman, and Devers 2000).

When we think of human economic activity, we often forget about the “other side of the coin.” Pollution is nothing but an inevitable by-product of economic production. Along with the goods and services produced in an economy, pollution may be classified in economic terms as “co-production.” Pollution is an insidious, ubiquitous, and constant threat to wild animals, who are mostly helpless to understand when a pollutant has permeated their environment, what the pollutant may do to them, and how to avoid the pollutant, if indeed avoidance is possible. Whether it be respiratory failure stemming from pesticides, bone loss from lead poisoning, or ataxia (loss of coordination) from organic chemicals, or any symptom from a long, harrowing list, pollutants ensure some of the
most torturous deaths in the animal kingdom (Table 2). All else being equal, or ceteris paribus, as the economist would say, economic growth means more such torture, more such death.

Non-native invasive species, which disperse largely as a function of international trade and interstate commerce (Erickson, Johnson, and Young 2005), constitute one of the biggest and most rapidly growing threats to ecological integrity and animal welfare. Most wild animals, including native species in pristine environments, live lives of frequent or even constant danger. However, adaptation and evolution have equipped them to deal with other species in their natural ecosystems, and the very existence of a species is an indication of evolutionary success. However, when a totally foreign species is introduced via ship ballast, cargo plane, or railway car, native species may suddenly find themselves in a nightmarish ecosystem, occupied by one or more species before whom they are defenseless. Sea lampreys slowly sucking the life out of lake trout, mice eating seabird chicks alive, and, most recently, giant pythons in Florida, constricting unsuspecting, slow-reacting animals...the fisherman’s hook and the hunter’s bullet are merciful in comparison. With our focus on habitat destruction, however, we should especially note the wholesale ecosystem transformations resulting in some areas of the United States from the introduction of kudzu, salt cedar, Asian carp, water hyacinth, rats, Old World climbing fern, zebra mussels, wild pigs, and a host of other invasive keystone species. The transformations resulting from the invasion of such species are as life-changing and inhumane for wild animals, as are other transformative activities such as agriculture, logging, and ranching.

Global warming is becoming recognized as another threat to species (Malcolm et al. 2006), although its mechanisms are less direct. Temperature is a key variable in ecological functioning and species composition. Global warming is “pushing” polar species (such as polar bears) off the ends of the earth and creating unprecedented niches near the equator that will only be filled through the slow process of evolution. It has also been implicated in increased incidences of human and wildlife diseases (Harvell et al. 2002). Global warming is largely a function of greenhouse gas emissions from the burning of fossil fuels. The large, industrialized economies are primarily fossil-fueled; therefore, global warming is also a function of economic growth. This is the real “inconvenient truth” that even Al Gore skirts around—the eight hundred-pound gorilla in the room where climate change is discussed. The threats to wild animals are essentially a who’s who of the human economy. This is readily explained using basic principles of ecology. The principle of “competitive exclusion,” for example, states that no species succeeds except at the expense of other species with overlapping niches (Pianka 1974). Due to the tremendous breadth of the human niche, which expands via new technology, the human economy grows at the competitive exclusion of wild animals in the aggregate. To put it less technically, those skyscrapers we alluded to earlier provide some habitat, especially for pigeons, but not for the forest’s worth of species they displaced.

Another relevant aspect of ecology is trophic theory. The entire “economy of nature” (the production and consumption activities of

### Table 2

**Overview of Maladies Experienced by Wild Animals Exposed to Environmental Contaminants**


| Ataxia (Loss of coordination) | Anemia |
| Muscular weakness | Skin lesions |
| Tremors | Immunotoxic response |
| Convulsions | Behavioral effects |
| Lethargy | Altered behavior |
| Hypoactivity | Unkempt appearance |
| Reproductive effects | Hypothermia |
| Developmental abnormalities | Coma |
| Reduced fertility | Paralysis |
| Spontaneous abortions | Internal bleeding |
| Excretory effects | Dyspnea (Laboried breathing) |
| Excess defecation | Tachypnea (Rapid breathing) |
| Bloody feces | Eye/Vision problems |
| Diarrhea | Blindness |
| Spasmodic contraction of anal sphincter | Contraction of pupils |
| Emesis (Vomiting) | Dilatation of pupils |
| Anorexia (Weight loss/Emanation) | Ptosis (Drooping of eyelids) |
| Excessive thirst | Protrusion of eyes |
| Nasal secretions | Lacrimation (Excessive tears) |
| Epistaxis (Bleeding from nares) | Head and limbs arched back |
| Salivation | Piloerection (Erection of contour feathers) |
| Edema | |
nonhuman species) is founded upon the producers, or plants, that produce their own food via photosynthesis (Figure 1). Primary consumers, or animals that eat plants, constitute the next trophic level. Secondary consumers prey on primary consumers, and so forth. In some ecosystems there may be six or seven trophic levels and, in all ecosystems the top trophic level is called the “supercarnivores.” Mixed throughout this trophic system are “service providers” that are not readily categorized in trophic levels. These include decomposers, scavengers, and parasites. In addition, many species that do fit neatly into a particular trophic level also provide incidental services such as pollination, soil aeration, and nutrient cycling.

For our purposes, perhaps the most important thing to be gleaned from trophic theory is that the size of the entire enterprise, the whole economy of nature, depends on the size of the producer trophic level. Growth in the economy of nature requires growth of the producer trophic level. It requires an increase in primary production (i.e., photosynthesis). There is a limit to the size of the economy of nature imposed by primary production, which in turn is limited by solar energy and the availability of resources such as soils, minerals, and water.
The human economy is not immune to the basic principles of ecology. It, too, has a trophic structure, with the entire enterprise founded on agricultural and extractive surplus (Figure 2). As Adam Smith pointed out in *The Wealth of Nations*, the origins of money are in agricultural surplus. “No food, no stock market,” we might say, along with no video games, no outdoor recreation, no sports, etc. The economy is an integrated whole consisting of many and diverse sectors, but none of them grows without concomitant growth in some or all of the others. Most important, more agricultural and extractive surplus is required for the growth of the economy at large.

Philosophically, some prefer to classify humans as part of the economy of nature, in which case they clearly constitute the very highest trophic level (Figure 3). They are the supercarnivore of the super carnivorous (Figure 3). As Adam Smith pointed out in *The Wealth of Nations*, the origins of money are in agricultural surplus. “No food, no stock market,” we might say, along with no video games, no outdoor recreation, no sports, etc. The economy is an integrated whole consisting of many and diverse sectors, but none of them grows without concomitant growth in some or all of the others. Most important, more agricultural and extractive surplus is required for the growth of the economy at large.

Philosophically, some prefer to classify humans as part of the economy of nature, in which case they clearly constitute the very highest trophic level (Figure 3). They are the supercarnivore of the super carnivores. They can acquire for consumption virtually anything edible to them and are rarely threatened themselves by predators, especially in developed nations. As the trophic level comprising humans expands in biomass, it exerts “trophic compression” on the lower trophic levels that comprise the rest of the economy of nature (Figure 4). In other words, the growing human economy puts the squeeze on the very trophic levels that support it, like a building that undergoes continual expansion with no additional foundation. This is another way of illustrating the principle of competitive exclusion that makes it even clearer that there is a limit to human economic growth imposed by the other, underlying trophic levels and, ultimately, by primary production.

**Economic Growth as National Policy**

Economic growth is a high priority in the domestic policy arena of virtually every nation, indeed the highest priority in many. In the United States, economic growth has been an explicit bipartisan goal since the Great Depression. The diplomatically dark decades of the Cold War featured an epic struggle in which the score was kept in GDP. For the United States, the logic was stark and brutal. Staying ahead of the Soviets militarily required economic growth to finance the accumulation of weaponry.

When the Soviet Union collapsed in 1988, the drive for economic growth in the United States continued, based on greedier goals with a sheen of nobler aspirations. There is still a significant populace in the United States living in poverty, and instead of instituting progressive reforms for redistributing wealth, the American government has adopted supply-side economics and the logic that “a rising tide lifts all boats.” Supply-siders fail to recognize a limit to the supply of “water” or the number of “boats” in the “tide.”

American economic philosophy, theory, and policy are especially important for several reasons. The American government and society remain the standards of capitalist democracy in many parts of the world, although America’s image has been tarnished in recent years as the capitalist aspect has greatly outpaced the democratic aspect. More important, from the standpoint of humane treatment of wild animals, the United States is by far the largest consumer in the world. The United States accounts for one-fourth of the world’s marketed production and consumption, with GDP over $12 trillion and per capita GDP at $41,500 in 2005.

The economic might of the United States gives it tremendous political power and influence over international affairs and economic agreements. For example, the United States controls the big levers in the World Bank, International Monetary Fund, and World Trade Organization (Sardar and Davies 2003). These levers are set for rapid economic growth of the American and global economies.

There are many scholars who believe there is no limit to economic growth, and those who believe there is no limit to economic growth will naturally believe there is no conflict between economic growth and the environment, including the habitats that provide for the humane treatment of wild animals.

**Conventional Economics and Economic Growth Theory**

Economics has a long history of being corrupted by vested interests (Beder 2002). For example, in the United States, economics departments were in their formative stages during a period when land barons were fighting the populist movement, which was based largely on Henry George’s proposal for major land tax reform (George 1929). Mason Gaffney of the University of California-Riverside documented how land barons established or patronized leading economics departments and hired economists to undermine George and the populists (Gaffney and Harrison 1994). Led by J.B. Clark at Columbia University and, eventually, by F. Knight at the University of Chicago, economists denied the importance of land as a distinct factor of production, pointing instead to labor and espe-
cially capital as the key productive forces. The old “land, labor, and capital” of the classical economists rapidly became “labor and capital,” where land was either ignored or considered the lowest form of capital. The result was that land was paid little attention to as the U.S. tax code was being developed.

This episode in the corruption of economics also had a profound effect on the economic “production function,” a core concept in macroeconomics. Today, when we open a typical macroeconomics textbook, we find that “\( Y = f(K,L) \)”—production is a function of capital and labor. With land out of the equation, the corrupted production function constitutes a theory of economic growth that fails to recognize any limits to economic growth.

Economic growth theory went through several major stages after the anti-George backlash. John Maynard Keynes and Sir Roy Harrod laid the foundation for modern economic growth theory, and subsequent stages are associated with the work of R. Solow (1950s), R. Lucas (1980s), and D. Romer (1990s). Modern theories of economic growth tend to be centered on the Romer model.

The most important aspect of the Romer model, for our purposes, is Romer’s treatment of technological progress (Romer 1990). In economic terms technological progress refers to increasing output of goods and services per unit of material and energy input. Romer correctly pointed out that labor—the “L” in the production function—includes a portion of the labor force that conducts research and development (“R&D”), which gives rise to technological progress. Research and development, and the resulting technological progress, is required for increasing per capita GDP growth and, therefore (as economists generally assume), increasing human welfare.

It doesn’t take long to identify a startling implication of the Romer model: the only sure way to get more R&D is to have more people conducting it. Therefore, a common interpretation of the Romer model is that population growth is required for per capita GDP growth (Jones 1998). This hypothesis is essentially the same argument made by J.L. Simon for a decade preceding Romer’s work (Simon 1981). Simon, erroneously called an “economist” by fans and foes alike, had an academic background in business. He famously claimed there was no limit to population growth because, as population growth caused environmental problems, more human brains were available to solve those problems. In fact, Simon said, the standard of living would forever continue to increase, along with the population. The Romer model is much more sophisticated, but is just as ecologically unsound as Simon’s “pop economies.” At its core is the corrupted production function and the assumption of unlimited economic growth.

To say there is no limit to economic growth on a finite land mass is mathematically equivalent to saying we can have a stable, steady state economy on a perpetually diminishing land mass. For example, with technological progress, we could have the $40 trillion global economy contained first on a continent, then in a city, and ultimately in a corner saloon. This is precisely as “ludicrous” as saying there is no limit to economic growth on Earth. Yet, we continually hear, “There is no conflict between economic growth and environmental protection.” It is easy to understand why this is the case when we consider the political economy of growth.

The Iron Triangle of Economic Growth

After President Dwight D. Eisenhower warned Americans of the “military-industrial complex” in his famous 1960 farewell address (Eisenhower 1961), political scientists developed a concept called the “iron triangle.” An iron triangle consists of a special interest group, a political faction, and a...
professional or professional society that is well represented in one or more government agencies. Iron triangles dominate policy arenas and fend off all comers. They materialize when interest groups, politicians, and professionals have similar perspectives and mutual interests, especially economic and political interests. They are not necessarily conspiratorial, and probably seldom are, but they are extremely effective in charting the course of public policy.

In the United States, the iron triangle most relevant to the conflict between economic growth and the humane treatment of wild animals is a virtual juggernaut in the policy arena. The “special interest” is the corporate community at large, and the political “faction” is the political community at large. The corporate community is concerned primarily with profits and is served by a national policy of aggressive economic growth, while the campaign-financing system ensures political fealty to the corporate community (Korten 2001). Most Americans have a vague suspicion about this corrupting influence in American politics. That suspicion motivates the occasional movements toward campaign finance reform.

The third side of the iron triangle of economic growth policy comprises conventional or “neoclassical” economics, which feeds the politicians the expedient theory of unlimited economic growth and the corollary that there is no conflict between economic growth and environmental protection. The neoclassical theory of unlimited growth also helps maintain “consumer confidence,” so necessary for hefty corporate profits and good days on Wall Street. The influence of neoclassical economic growth theory has dire implications for the humane treatment of wild animals. In response to growing discontent with neoclassical economics, various academic reform movements, societies, and schools of thought have arisen, most notably the International Society for Ecological Economics.

Those concerned with the humane treatment of wild animals, however, should use discretion in their critiques of neoclassical economics. Neoclassical economics has produced some valuable approaches to habitat conservation, especially in the realm of microeconomics. Cost-benefit analysis, for example, coupled with studies that demonstrate the economic value of wildlife, has helped wildlife managers make better decisions and illustrate the importance of wild animals to American society. From the perspective of the humane treatment of wild animals, the critique should be targeted primarily toward conventional macroeconomics, especially the theory of unlimited economic growth. To make a substantial contribution to the humane treatment of wild animals, we must have a seat at the economic policy table, or at least influence what occurs at that table, but the iron triangle is a formidable barrier.

For accessing the macroeconomic policy arena, a major ally is the ecological economics movement, represented by the International Society for Ecological Economics and its various national chapters. Professional natural resource societies are also beginning to scrutinize neoclassical economics and the implications of economic growth for conservation. The Wildlife Society (2003, 2) published a technical review on economic growth that described a “fundamental conflict between economic growth and wildlife conservation” and adopted a position on economic growth. The U.S. Society for Ecological Economics and the North America Section of the Society for Conservation Biology have taken strong positions on economic growth. The American Fisheries Society, Ecological Society of America, and American Society of Mammalogists were all considering related positions as of late 2006.

The Center for the Advancement of the Steady State Economy (CASSE), a nonprofit organization based in Arlington, Virginia, has been instrumental in these efforts, and its own position on economic growth is often used as a template from which economic growth positions are developed. The CASSE position on economic growth has also been endorsed by several scientific and environmental organizations.

GDP: A Baby and Its Bathwater

A common critique of GDP is that it is not a good indicator of economic welfare, much less of overall human welfare. GDP does not account for the vast collection of health and happiness parameters that cannot be bought. Yet many economists and most politicians commonly assume that GDP is a primary indicator of welfare. In no way does GDP account for the humane treatment of wild animals.

Despite the weakness of GDP as an indicator of welfare, GDP is a very good indicator of the size of an economy. It reflects the amount of economic activity taking place and, given the trophic structure of the human economy, it also reflects the amount of natural resources reallocated from the “economy of nature” and its wild animals to the human economy. That explains the tight connection of GDP growth with energy and material use (Daly and Farley 2003; Nørgård 2006) and with environmental impacts such as biodiversity decline (The Wildlife Society 2003; Czech et al. 2005).

Accounting for the economy of nature in the process of economic growth allows us to view the circular flow of money in its ecological context (Figure 6). This in turn helps to clarify the impacts of economic growth on the environment and wild animal welfare (Figure 7).
It is not in the interest of the humane treatment of wild animals to advocate abolishing GDP as a federal government calculation. Rather, GDP is a valuable tool and a widely recognized model of consistency that allows scholars and policy makers to develop time series data for monitoring trends in the size of the economy. It is akin to a scale for measuring the weight of a person. The obese person needs to lose weight, not throw away the scale! However, it does behoove us to consistently and vocally note that a bigger economy is not necessarily a better one and, for the humane treatment of wild animals, is almost invariably worse. In other words, GDP is a negative indicator of the humane treatment of wild animals.

A good doctor uses not only the scale but also the stethoscope, the blood pressure cuff, and other instruments to monitor health. Likewise, in recent years a number of alternative economic indicators, or indicators of broader social welfare, have been developed and advocated, some of which are highly relevant to the humane treatment of wild animals.

Alternative indicators generally fall under two categories. One category includes those indicators for which the “score” or the indication is expressed in monetary units. These are economic indicators per se. The other category includes indices that are not expressed in monetary terms, but rather involve a nonmonetary “scoring” of variables. These indicators vary widely in their foci but are not generally referred to as economic indicators.

A notable example of an alternative to GDP is the Index of Sustainable Economic Welfare (ISEW), developed by Daly and Cobb (1989). The ISEW incorporates GDP but also accounts for various aspects of economic welfare not represented by GDP, such as the estimated costs of pollution to society and the value of natural resources depleted in the process of economic production. The ISEW is not an indicator of economic growth, but rather an indicator of economic sustainability. As such, it is not so much an “alternative” to...
GDP, which measures the size of the economy, but a complement to GDP that measures sustainability.

An equally notable example of an economic indicator of social welfare is the Genuine Progress Indicator (GPI). The GPI considers the monetary value of nonmarketed services such as housework, caring for children and the elderly, and volunteerism. Such activities can be viewed as good for society, despite their having no associated market transactions. As with the ISEW, the GPI is not intended to be an indicator of economic growth and is not so much an alternative to GDP, which measures purely the size of the economy, but a complement to GDP that measures social welfare, or the quality of the economy.

Tracking of indicators such as the ISEW and GPI suggests that, while the economy has continued growing over the past few decades, economic welfare has not, and ecological and economic sustainability has been declining (Daly and Farley 2003; Venetoulis and Cobb 2004). (This is precisely to be expected when we consider the principles of ecology most relevant to economic growth, including competitive exclusion and trophic levels.) Alternative economic indicators such as these should be advocated, as long as care is taken not to conflate trends in such indicators with trends in economic growth.

An example of a nonmonetary indicator of social welfare is the Human Development Index (HDI). The HDI incorporates poverty, literacy, education, life expectancy, childbirth, and other factors. It is a standard means of measuring social well-being, with a focus on child welfare. (There is nothing preventing the development of an HDI-derived indicator that would also incorporate considerations of the humane treatment of wild animals.) Since 1993 the United Nations Development Programme has used the HDI in its annual report. The HDI and other nonmonetary indicators of welfare should be advocated as better representing the status of nations with regard to overall well-being. As with alternative monetary indicators such as the ISEW and the GPI, these nonmonetary indicators of welfare are not indicators of economic growth.

The Steady State Economy as an Alternative to Economic Growth

With economic growth as a primary policy goal—and perhaps the mother of all threats to wild animal welfare—it behooves us to consider the alternatives to economic growth. This is not as complicated as it may seem when we keep in mind that economic growth is nothing but increasing production and consumption of goods and services. In fact, there are but two alternatives: decreasing production and consumption and stabilized production and consumption. Decreasing production and consumption is also known as “recession,” while stabilized production and consumption goes by the less well-known “steady state economy.”

Recession, anathema in social, political, and policy circles, may be referred to collectively as the “political economy.” We consider recession here for two reasons, however, in addition to simply identifying it as an alternative to economic growth. First, given the principles of ecological economies addressed above, recession would generally result in more humane treatment of wild animals. “Generally” means there would be exceptions, for example, if a nation responded to recession by weakening its environmental regulations. However, even this hypothetical response would not necessarily result in a net loss of humane treatment, because we do not know what would be worse for wild animals, a “cleaner” but larger economy or a “dirtier” but smaller economy. Furthermore, a nation would respond in such a fashion largely because of its goal of economic growth. It is not logical to judge the effects of a recession when the underlying goal is yet more economic growth. In any event, the negative effects of recession on wild animal welfare must be viewed logically as exceptional and short term when there is a fundamental conflict between economic growth and the humane treatment of wild animals. All else being equal, recession would leave more habitat devoted to the humane treatment of wild animals.

The second reason for dwelling a bit on the alternative of recession is that national and global recessions—deep and protracted recessions—may be inevitable. By definition, recession is inevitable for any economy that has exceeded its carrying capacity. Many scholars believe this is the case with the $40 trillion global economy because of its dependence on petroleum supplies, which appear to be near or at their peak in per capita terms. This is the central issue of the burgeoning literature on “peak oil” (for example, Defeyts 2001). To the extent that recession comes to be viewed as inevitable, a dramatic transformation of the American and global political economy is certain. Those concerned with the humane treatment of wild animals would do well to participate in this transformation and to work toward political solutions that do not entail, for example, scrapping environmental regulations. There are no such solutions in the offing, however, if economic growth remains the higher priority.

At this moment in American political economy, it is unacceptable to advocate a recession for virtually any reason, much less for the humane treatment of wild animals.
This reality brings us to the other alternative to economic growth, the steady state economy.

The phrase “steady state economy” merits some linguistic clarification before discussing policy tools. What is meant by “steady,” “state,” and the combination of the two words with “economy”? The phrase “steady state economy” can be parsed in two ways. Neither is household language yet.

The steady-state economy (usually hyphenated), used by neoclassical economists, especially growth theorists, refers to a steady or stable ratio of economic variables, most notably capital and labor. Recall, however, that in neoclassical economics no limit to economic growth is acknowledged, so that the steady ratio of capital to labor exists in a condition or “state” of growth. Therefore, “steady-state economy” refers to a growing economy with a stable ratio of capital to labor, or “steady-state growth,” a phrase we might consider exceptionally oxymoronic in the long run. This term is highly technical and will presumably remain an obscure bit of economics jargon, similar to “steady-state approximation” in physics.

“Steady state economy” (without the hyphen), more relevant to the humane treatment of wild animals, has great potential for entering into the American and global vernacular, by nature of its broad sweep of political and economic implications. “Steady” refers most directly to population and per capita consumption. All else being equal, then, it refers to a steady rate of the production and consumption of goods and services and is indicated by steady, or stabilized, GDP. Given the principles of ecology outlined above, it should be abundantly clear that a steady state economy provides for a stable, secure, nondeclining base of habitats that are required for the humane treatment of wild animals. This is the only meaning of steady state economy to be used hereafter.

The noun, “state,” is not clearly defined in the ecological economics literature, but by implication it is clear enough. It refers primarily to the political unit, or state, in which production and consumption are steady. Often, “steady state economy” is shortened to “steady state” once the context has been established; we can refer, for example, to an “American steady state” or a “global steady state.”

When the meaning of “steady state economy” is clear, it naturally evokes a number of skeptical, even cynical questions, especially among those with a particular view of “the American way.” Some think that capitalism requires a growing economy for its very existence. The American Constitution establishes a capitalist democracy for the United States, so any policy goal alternative to economic growth is cynically viewed as anti-American. This is a most unfortunate misunderstanding.

Who says a capitalist economic system requires economic growth? One camp comprises corporate interests that want economic growth to be a national goal and, therefore, that portray any other goal as anti-American. The other camp comprises what we might call “green Marxists,” who seek any critique of capitalism. Their argument is that, if economic growth is bad for human welfare, and capitalism requires economic growth, then capitalism is bad for human welfare. Both capitalist and Marxist ideologues claim that economic growth is a prerequisite for a capitalist system, but for very different political reasons.

Czech and Daly (2004) point out that the supposed choice between capitalism and a steady state economy is a false one. All that capitalism truly requires is private ownership of capital, which may be the case in a growing, receding, or steady state economy. The American constitution calls for a capitalist democracy, and if the majority in a democracy come to recognize the dangers of economic growth, it may guide the state to stabilize the production and consumption of goods and services, even with private ownership of capital. A stock market will still exist and will be neither “bullish” nor “bearish”; winners and losers will cancel out in the net. Players’ prospects in the stock market will be better than those in a casino (which has the house advantage), but they will be by no means guaranteed. People will still have bank accounts and other assets. Corporations and other businesses will still make profits. The difference between a steady state economy and a growing economy is that, in a steady state economy, profits will not perpetually increase. Instead, profits in the aggregate will stabilize at a level that is within the regenerative capacity of the ecosystem. This maintenance of profits is most easily understood by considering a renewable natural resource such as timber. Profitable timber harvesting may occur, but profits can only be maintained in the long run if the timber harvest stays within maximum sustainable yield.

In a capitalist system, firms will compete for such profits whether or not the economy is growing. Some will win and enjoy the profits, while others will lose and move on to other ventures. The same principle applies to all other renewable resources, such as fisheries, livestock forage, and agriculture crops. Production in these agricultural and extractive sectors, which constitute the trophic foundation of the human economy, ultimately determines the size of the economy.

Still, skeptics ask, doesn’t the establishment of a steady state economy require some type of socialist government? Yes, in the sense that virtually any check on unbridled, laissez faire capitalism is to some extent “socialist.” In the United States, for example, there is social ownership of lands such as national parks, forests, and wildlife refuges. No, in the sense that pri-
private ownership of land, labor, and capital may still predominate in a nation that sets its macroeconomic policy levers for a steady state economy.

The rhetoric about capitalism versus socialism in macroeconomic affairs has been overblown by ideologues. Such rhetoric is an aftermath of Cold War propaganda, in which the United States portrayed its economy as nearly pure “capitalism,” and the Soviet Union portrayed its economy as nearly pure “socialism.” In fact, both economies had capitalist and socialist elements, as do all modern economies. The so-called socialist democracies of Europe are probably labeled most accurately, as both private and state entities control the factors of production—land, labor, and capital—in a way that adheres to majority support.

Now that we have excised the biggest bugbears beleaguering the steady state economy, let’s consider four of the most frequently asked questions, drawing on the observations of Czech and Daly (2004).

How Is Quality of Life Affected by a Steady State Economy?

A steady state economy is similar to a stable, secure population of wild animals. It stabilizes at or below the capacity of the environment to sustain it, and it avoids the fate of species that often exceed carrying capacity and crash, damaging the environment in the process and compromising the prospects of its progeny.

Wildlife biologists know that a wide variety of social structures may produce stable wildlife populations. The same holds true for a steady state economy. For example, a steady state economy with long human life spans entails low birth and death rates. Most of us would view this as preferable, within reason, to a steady state economy with short life spans, high birth rates, and high death rates. The same concept applies to capital and durable goods such as automobiles. Most of us would probably prefer an economy with a relatively slow flow of high-quality, long-lasting goods to an economy with a fast flow of low-quality, short-lived goods.

Nothing about a steady state economy precludes economic development, where development is defined as a qualitative process. Various sectors may come and go in the development of a steady state economy. For example, organic farms may supplant factory farms, the proportion of bicycles to Humvees may increase, and professional soccer may attract more fans as NASCAR attracts fewer. As long as the physical size of the economy remains constant in the long run, a developing economy is a steady state economy.

Nor would any type of cultural stagnation result from a steady state economy. John Stuart Mill (1806–1873), one of the greatest economists and political philosophers in history, emphasized that an economy in which physical growth was no longer the goal would be more conducive to political, ethical, and spiritual improvements (Mill 1900).

What Happens to Jobs in a Steady State Economy?

In economic discussions, a common qualifier is ceteris paribus, or all else being equal. Ceteris paribus, a steady state economy means a constant rate of employment. The “all else” remaining equal includes such factors as salary and retirement age. For example, a steady state economy may have higher rates of employment when salary and retirement ages are lower.

Ceteris paribus does not mean, however, that each particular job is retained in perpetuity. Economic development continues in a steady state economy so that, in the extractive sector, oilfield roughnecks may decrease in number while wind-power facility attendants may increase. In the arts, guitar playing may wax while flute playing wanes. In the sciences industrial chemists may be replaced by wildlife biologists, etc.

Will We Lose Our Retirement Accounts?

For that matter, what will happen to bank accounts in general? Answering this question requires a brief consideration of the origins of monetary income. Income reflects the use of natural resources and, therefore, the loss or conversion of wildlife habitats. This relationship of income to natural resource use is observed most readily in agricultural and extractive industries. However, as pointed out by the physiocrats (predecessors of the classical economists), the origins of all monetary income are in agricultural surplus (Heilbroner 1992). Without agricultural surplus, everyone is too busy acquiring food (hunting, gathering, or subsistence farming) to specialize in the production of other goods (much less “higher” services such as entertainment) for wages. In other words, everyone’s income and expenditure, no matter the sector he or she works in, ultimately depends on the use of natural resources and, therefore, wildlife habitat loss (Czech 2002).

Practitioners of ecological economics often elaborate on this by introducing the term “natural capital” (Daly and Farley 2003, 17). Natural capital is the stock of natural resources (for example, a forest) that yields a renewable flow of goods (for example, perehes for birds, timber for humans). The cardinal sin of accounting is to count the liquidation of capital as income, yet our national income accounting (the process of calculating GDP and GNP) routinely adds the money...
derived from the liquidation of natural capital. That component of GDP is more representative of reduced wild animal welfare than it is of increased income!

In a steady state economy, the average amount of money in real dollars earned by workers from the current generation to the next remains constant. “Real dollars” means that inflation has been accounted for. Because income reflects the use of natural resources, stabilized income reflects a stabilized “ecological footprint,” which is the area of land required to support a human being (Wackernagel and Rees 1996). The ecological footprint is another way of measuring the inhumane treatment of wild animals.

If the steady state economy is established at a relatively low human population level, the potential exists for each worker, and his or her replacement in the next generation, to earn a high income. This scenario is similar to that of a low-density deer population with plenty of forage per deer. If, on the other hand, the steady state economy is established at a high population level, less income is available for the average worker, as with a high-density deer population with little forage per deer.

Certainly for the humane treatment of wild animals, it is important that a steady state economy be established at a relatively low population level. This scenario is conducive to incomes high enough to allow retirement savings and social security (in the generic sense), while providing for the habitat needs of wild animals. If the steady state economy is established within ecological carrying capacity, each new generation may expect its workers to accumulate retirement savings of the same magnitude as those of the previous generation, without continual erosion of wild animal welfare. This points to the importance of establishing a steady state economy as soon as possible.

**How Big Should a Steady State Economy Be?**

This question always generates discussion about the ultimate economic carrying capacity of the global ecosystem. Global capacity, indeed, is an important question and a focus of ecological economics. However, for our purposes, we can ask a different question: how much wild animal welfare should we maintain? Presumably many animal protection advocates would answer, “As much as possible of what is left.” This gives us the answer to the original question, because maintaining as much wild animal welfare as possible requires the establishment of a steady state economy as soon as possible and as close to the current size as possible. In GDP terms this is an economy of approximately $11 trillion for the United States.

Some may assume that public conservation lands will be sufficient for wild animal welfare and that the ongoing protection of these lands will result in the establishment of a steady state economy of the appropriate size. This is an unlikely outcome, however, as long as economic growth is a primary, perennial, and bipartisan goal. In the context of a public and polity that prioritizes economic growth, the political boundaries and protective mandates of our public lands are continually contested (Czech 2002). For example, the drive for economic growth has resulted in an ongoing effort to open more portions of Arctic National Wildlife Refuge land to oil exploration and extraction, jeopardizing the welfare of caribou calves and other denizens of the Arctic.

*Ceteris paribus*, then, there is an optimum size of the economy for society as a whole. There is also an optimal size, and certainly a smaller size, from the perspective of the humane treatment of wild animals. Humane treatment has not typically been a pressing concern in primitive economies emerging from the wilderness. As an economy grows, however, natural capital is liquidated, wildlife habitats are lost, and wild animal welfare declines. Society begins devoting fiscal resources to conserving wildlife habitats and tending to wild animal welfare, and humane societies thrive. As vast areas become devoid of wildlife, however, there is less wild animal welfare to protect. For those concerned with the humane treatment of wild animals, the time for advocating a steady state economy is upon us.

**Economic Growth and Animal Protection**

Readers are now familiar with a sequence of logic pertaining to the humane treatment of wild animals. (1) Wild animal welfare requires wildlife habitats. (2) Economic growth occurs at the expense of wildlife habitats. (3) Stabilization of wildlife habitats, and, therefore, the humane treatment of wild animals, requires the establishment of a steady state economy. It remains only to consider some of the means available to animal protection advocates for pursuing the establishment of a steady state economy.

Fortunately, animal protection advocates do not have to start from ground zero in this effort. Wildlife ecologists, conservation biologists, and ecological economists have been developing solidarity on this issue, informally for many years, and formally in more recent years. For example, The Wildlife Society has described “a fundamental conflict between economic growth and wildlife conservation”; the Society for Conservation Biology’s North America Section has taken a policy position, “The Steady State Economy as a Sustainable Alternative to
Economic Growth”; and the United States Society for Ecological Economics (www.ussee.org) has a policy position that identifies “an economy with a relatively stable, mildly fluctuating product of population and per capita consumption” (i.e., a steady state economy) as “a viable alternative to a growing economy and...a more appropriate goal for the U.S. and other large, wealthy economies.”

In other words, animal protection advocates have a foundation of professional, scientific findings and positions to stand on in educating the public and policy makers on the threat of economic growth to wild animal welfare. This is a crucial distinction from, for example, the efforts of Friends of the Earth in the 1970s. Friends of the Earth did a remarkable job of raising Americans’ awareness of the perils of economic growth to the environment and wildlife, garnering coverage in such mainstream media as U.S. News and World Report, yet the effort seemed not to resonate in the American psyche and certainly made even less of an impact in the public policy arena. Why?

One major reason is that Friends of the Earth had no backing from the professional, scientific organizations that have established credibility over the decades with the public and politicians. That situation has changed, and we can hope that Friends of the Earth retrenches and once again confronts the eight hundred-pound gorilla of economic growth, along with other key conservation organizations such as the National Wildlife Federation, Defenders of Wildlife, and the World Wildlife Fund.

Yet none of those organizations will bring to the table in prominent, urgent fashion the plight of individual, innocent wild animals who are crushed under the plow, poisoned by pollution, or summarily displaced by the roads, factories, and commercial metropolises that comprise our economies. It is left to animal welfare organizations such as The Humane Society of the United States and The Fund for Animals, the International Fund for Animal Welfare, and the Animal Welfare Institute to occupy this unique niche. There are many reasons beyond animal welfare for developed nations, beginning with the United States, to adopt steady state economies, but there are just as many commercial and political barriers. It will take solidarity on the part of those advocating a steady state economy, and the animal welfare community’s involvement is paramount in developing public support. Aside from the prospects of their own children and grandchildren (prospects that are likewise threatened in the long run by economic growth), many Americans genuinely care about the humane treatment of wild animals. They just need to see how this concern conflicts with the goal and process of economic growth.

One may ask, “But what, specifically, can animal protection advocates do to help in the establishment of a steady state economy?” A thorough answer requires a book of its own, but a short answer is easy and in order. First, animal protection organizations can educate their members on the conflict between economic growth and the humane treatment of wild animals. Once their members are sufficiently conversant with the subject, animal protection advocates can begin to educate the general public, beginning with the civic groups and organizations with which they already partner on other issues. A slightly more advanced step is to develop educational campaigns in cooperation with other animal welfare groups and conservation organizations.

We can expect the public to “get it” because, when we really think about it, this is an issue of common sense. Nothing grows forever. We can’t have our cake and eat it, too. We can’t kill the goose that lays the golden eggs. The American lexicon is laden with pithy proverbs and apt anecdotes about the fallacies of perpetual economic growth and the perils of pursuing it. The iron triangle of economic growth will defend itself, primarily with a plethora of propaganda, but one dollar’s worth of solid common sense can defeat thousands of dollars of propaganda.

When we have engaged the public’s common sense, there will remain a whole world of political work toward the establishment of a steady state economy through public policy. This will entail macroeconomic policy reform. Fiscal and monetary policy levers will have to be ratcheted down gradually, from the current expansionary settings to the steady state economy.

Macroeconomic policy reform is off in the future, and we can’t get there without the requisite public education and outreach. Yet that future is something to cherish, strive for, and unite us. It’s the only future that is wholly conducive to the humane treatment of wild animals.

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The Role of Economics in Achieving Welfare Gains for Animals

Jennifer Fearing and Gaverick Matheny

Introduction

The demand for animal products and services is a powerful economic force in society, and multibillion-dollar industries are organized around this demand. These industries often face increased costs by improving animal welfare and are quick to use economic arguments against proposed welfare reforms (see sidebar on page 169). These arguments, while often specious, can influence consumers, voters, and policy makers. Citizens are less likely to support animal welfare reforms they’ve been told will double their shopping bill or impoverish family farmers.

Animal welfare advocates cannot respond to these economic arguments with moral rhetoric alone. Instead, non-governmental observers (NGOs) must challenge the economic assumptions, calculations, and conclusions of animal industries and produce reliable economic arguments of their own. To do so they should understand some basic economic principles, which we review below, and, when possible, enlist the help of economists.

The Economy

People often refer to “the economy” without much understanding of its fundamentals. There are two schools of economic study, macroeconomics and microeconomics. Most often references to “the economy” are related to macroeconomic concerns: interest rates, employment figures, trade balances, inflation levels, commodities prices, and other aggregate measures of market behavior. Macroeconomic figures are helpful for making broad comparisons between today’s “economy” and that of earlier periods or the economies of other countries/regions/states. Those who study microeconomics focus on the behavior of, and interactions among, individual consumers, producers, and industries.

Changes in the welfare of animals—whether the animals are the products themselves (e.g., meat, hunting trophies, fur coats) or whether animals are used in process or production (e.g., eggs, dairy products, cosmetics testing, circus entertainment)—are made at the firm level in response to changes in costs (supply side) or consumer preferences (demand side). As such, we focus here on microeconomic principles.

In Figure 1, the economy is illustrated as two concentric circles. In a market economy, there are two markets: the factor market and the product market. In the factor market, households (or firms) that own the factors of production sell their labor, land, and capital to firms that produce products in exchange for wages, rent, and interest. In the factor market, households are the sellers, and the companies are the buyers.

In the product market, companies sell the products they have produced to households that pay money to purchase them. The money flows in the opposite direction this time: people buy products from firms that produce them. In this way, money flows circularly—creating an economic marketplace where money goes from the producers to the workers in the form of wages and back to the producers in the form of payment for products.

Consider the market for eggs. In the factor market, an egg farmer needs factors of production, including land on which to build structures and pens to house his hens; the hens themselves; equipment to collect, sort, clean, and package the eggs; feed and medicines to keep the hens alive; cartons and packaging; trucks to ship the cartons; and employees to assist with all aspects of production. Having invested in these factors, the farmer produces eggs for...
sale to the public. In the product market, when the eggs are sold, the payments received by the egg farmer go to pay for the costs associated with producing the eggs. The farmer pays wages to his employees, rent to a property owner (or bank, if there’s a mortgage), and interest on any loans taken to purchase the equipment or otherwise manage cash flow.

The government’s role in these markets is pervasive. Taxes are taken or expressly relieved at almost every juncture. The farmer may be exempted from sales taxes that would otherwise be levied on his equipment purchases and also may deduct business expenses from annual income taxes, but he pays taxes on wages paid to employees and any profits earned from the business. Households, which pay taxes on other nonfood goods, are expressly exempt from sales taxes on eggs because of government policy. The farmer’s workers pay taxes on their income earned, and the banks, landlords, and equipment makers also pay taxes on any profits earned from their business dealings with the egg farmer. Finally, beyond the tax effect, the farmer may be eligible for various government programs and subsidies that may further alter his cost structure. We discuss the role of government in creating or eliminating distortions in markets through use of the tax system, subsidies, or other policies later.

Supply and Demand

The relative volume of products and money that flows between households and firms in the economy is driven by supply (availability of specific goods) and demand (desire for those goods). Each product has its own market and supply and demand characteristics. Each firm in a given product market has its own supply curve driven by its cost structure—that is, the firm can calculate for any given price what quantity of goods it can produce and still earn a reasonable profit margin. Each consumer in a given product market has an individual demand curve: each of us has a personal schedule of prices we’re willing to pay for various quantities of that good.

In today’s complex product economy, few buyers and sellers meet to negotiate specific terms. Instead, most products are sold in stores alongside thousands of other products, each with its own unique market at play. As such, firms cannot “price discriminate,” that is, set a different price for every consumer’s unique willingness to pay. Even though you might be willing to pay $2 for a bag of peanuts, and one of the authors is only willing to pay $1, the selling firm must select a single price—one it hopes will maximize its profits given our different preferences.

What becomes relevant then is the overall supply and demand schedules. Supply is measured as the sum of individual firm supply schedules, and demand is the sum of individual household demand schedules. The “market clearing” price and quantity for the good are set by the intersection of the willingness of suppliers to supply and consumers demand for the product.

This relationship is illustrated in Figure 2. At any given price, the firms in this product market are willing to supply some quantity of a good that is demanded by consumers. The higher the price people are willing to pay, the higher quantity a firm will be willing to supply. The converse is also true: if the willingness to pay for a given product is lower, firms will supply a lesser quantity. The demand curve declines because consumers are allocating among scarce resources. At higher prices for any given goods, fewer consumers are willing or able to purchase them. Conversely, as goods become widely available at lower prices, more people are willing or able to purchase them.

The market is said to “clear” at equilibrium: supply and demand intersect where the amount demanded equals the amount supplied, at what’s called the “market clearing” price. In Figure 2, given Demand_1, this happens at a quantity of Q_1 and a price of P_1, the product of which determines the total revenue received by the firms.

The slope of the two curves is determined by the degree of
“elasticity” in the market. Elasticity indicates the degree of flexibility in buying or selling an item at higher prices. On the demand side, consumers may have relatively inelastic demand for staples like milk, flour, or eggs and for items like gas for their car, prescription medications, or cigarettes (if one is a smoker). Because consumers of these products tend to “need” them, they are less sensitive to prices—as prices go up, they may purchase somewhat fewer goods, but they will likely continue to purchase them. A person has more elastic demand for less necessary (to them) goods. Luxury items or “splurge” products may quickly become off-limits if the price increases. If the price of freshly baked bread from the bakery rose somewhat, for example, many consumers would decide to switch to processed bread from the bread aisle.

On the supply side, firms have varying flexibility to respond to price changes with contraction or expansion of the number of goods supplied. For some products they may be able to expand supply rapidly to take advantage of higher prices in a market; for others, they might have more limited ability to react. Short- and long-term scenarios can adjust the price elasticity of both supply and demand over time, but measuring elasticity plays a key role in evaluating consumer and firm responses to changes in the market environment, including changing information, cost structures, and preferences relating to improving animal welfare.

The characteristics and observations that drive supply and demand curves can and do change in reaction to endogenous (within the market) and exogenous (beyond the market) factors. Endogenous factors might be new versions of products or marketing campaigns that alter supply or demand or both. Exogenous factors can include new information (e.g., independent research showing ill health effects associated with a given product), disasters (natural, disease outbreaks, terrorist attacks), or the introduction of competing products with different (better) characteristics. When changes like this occur, supply and demand can shift in or out, causing a new equilibrium to manifest. In Figure 2 demand is shown to be shifting out; for every given price of the good, a higher quantity is demanded. Suppliers, whose schedules did not change, react by shifting their production to the quantity $Q_2$ and charging $P_2$, and the total money involved increases.
Applying Economics to Animal Welfare

Economics in its application may seem a cold and hard science; in fact, it was famously deemed the “dismal science” by Thomas Carlyle in the mid-1800s. But at its most basic level, economics is fundamentally a study of what people value or prefer, thus it has its roots in moral philosophy. Whereas moral philosophy concerns itself with what preferences people ought to have, economics concerns itself with what preferences people actually have, and how they can best be satisfied.

People do not always express their preferences, making measurement difficult. Modern economics has sought to measure the preferences revealed by individuals’ behaviors in markets, where goods and services are exchanged using money. For example, if one is willing to spend $2 for a bag of peanuts but only $1 for some popcorn, one is said to reveal a stronger preference for peanuts than for popcorn. More controversially, money may also be used as a common currency to compare the preferences belonging to different people. If one is willing to spend $2 on peanuts, but another is willing to spend only $1 on peanuts, then the first is considered to have a stronger preference for peanuts than the second has. (This is imprecise, since $1 may have more value for the second person than it does for the first, if, for instance, the second has a lower income. But economists argue about how such imprecision can be corrected.) A market is considered to be economically efficient when, on the whole, society is able to maximize the satisfaction of its members’ preferences.

Because nonhuman animals do not participate in markets, within an economic framework, their preferences can be measured only indirectly by the extent to which human consumers value animal welfare when making their economic decisions. For instance, a hen’s preference not to be caged has market value only when a consumer recognizes this preference, feels some obligation to respect it, and chooses not to buy eggs laid by caged hens.

Animal Production and Welfare

A production process transforms inputs into outputs. In the case of animal production, inputs such as animals, feed, housing, human labor, and veterinary services are transformed into outputs such as meat, eggs, milk, fur, zoo amusements, and product testing assurances. To maximize profits, animal producers may attempt to maximize the efficiency of this transformation. The implications for animal welfare are illustrated in Figure 3 (McInerney 2004). The vertical axis indicates animal welfare, while the horizontal axis indicates the efficiency of animal production in terms of some product for human consumption, such as eggs per unit of production cost. Point A represents a completely unmanaged, wild existence for animals. Arguably, there is some level of management that increases welfare above this level; for instance, providing food, shelter, and protection from predators to otherwise free-roaming animals. From the animals’ perspective, the ideal level of welfare is B.

Beyond B, producers sacrifice animal welfare for the sake of increased productivity. This may involve intensive confinement, to decrease housing costs, and intensive breeding, to increase productivity per animal. As more of an animal’s metabolism is dedicated to production, less is available to support central determinants of animal welfare, such as immune function or cardiovascular and skeletal health. Animal mortality caused by intensification is economically acceptable to producers, so long as the gains in efficiency outpace the increase in mortality. If unregulated, producers motivated solely by efficiency will operate at D. Beyond this point, animals begin to fall sick or die in sufficiently large numbers that total efficiency declines.

Presumably to the left of D is a point C, where the welfare of animals is socially optimal from humans’ point of view. For reasons discussed below, C is likely to be much closer to B than it is to the existing level of welfare provided by producers in a free market.

Problems in the Market for Animal Welfare

A society’s attitudes toward animal welfare could be revealed by consumer demand for animal-welfare-friendly products. However, the socially optimal level of animal welfare may not be achieved through the market because the market suffers from a number of failures: aspects of animal use and production create “negative externalities”; the “opportunity costs” of animal use are rarely, if ever, factored in; the failure to consider “substitution effects” for competing or alternative products; the high and increasing market concentration of many animal-using industries; animal welfare, which has both public good and merit good characteristics; and consumers who are not well-informed about animal welfare.

Negative Externalities

A negative externality is a cost that a product causes to society that is not reflected in the product’s price. For instance, a producer that causes pollution in manufacturing a product may cause a negative
externality if neither the producer nor the consumer is taxed to offset the pollution abatement costs. Externalities can be corrected by some form of government action. For instance, a government can restrict or tax pollution or the sale of polluting products. Left uncorrected, negative externalities push adverse impacts onto people who are not party to the production or consumption of the product.

Poor animal welfare causes several negative externalities. A number of consumers feel discomfort about other people's mistreatment of animals. People who live or work near concentrated animal-feeding operations (or CAFOs, where animals are raised indoors in large numbers at high densities), often are adversely affected by the air and water pollution generated. Not only is their health compromised, but often they find their property values are depressed, owing to the pollution caused by their CAFO neighbors. Both the discomfort and the pollution are negative externalities, genuine social costs that are not reflected in the market prices of the animal products.

**Opportunity Costs**

Justifications for animal use or reduced animal welfare rarely take “opportunity costs” into account. The opportunity cost of any decision is what was forgone in favor of what was selected. For example, state government agencies with purview over natural resources often claim that providing new hunting opportunities (e.g., new species, new seasons, lower age requirements, or increased bag limits) provides economic benefits to states. But these officials do not factor in the reduced opportunities for wildlife enjoyment that necessarily result from more hunting. According to the latest U.S. Fish and Wildlife Service national survey, wildlife watchers outnumber hunters by a factor of five to one and generate $38.4 billion per year relative to hunters’ impact of $20.6 billion (U.S. Fish and Wildlife Service 2002). The opportunity costs of increased hunting, then, may be reduced wildlife watching, which brings with it an offsetting, unfactored economic impact.

**Substitution Effects**

In characterizing the economic impact of a proposed increase in animal welfare, firms, trade associations, or government officials often overlook the existence of “substitution effects.” Consumer demand for a given good can and does change in response to changes in prices, laws, social mores, and the availability of alternative products. When the market contracts due to lower consumer demand, the reduced revenue in that product market does not show the whole picture. Consumers likely have shifted their purchases to another substitute product that is more desirable. To measure the true impact of an increase in animal welfare, these purchases must be included.

For example, local officials have defended continuing circus shows with exploitative animal acts in publicly owned arenas because such shows generate revenue for the city and for proximate restaurants, parking garages, and the like. But local officials rarely factor in the economic impact that might be generated by animal-free circuses or other children’s entertainment that would substitute for the animal events. In some cases the substitution effect might be so great that it might more than offset the loss of revenue from the circuses, especially in light of the decreasing popularity of such shows with the public. In the absence of a traveling animal show, more families might opt to take advantage of local attractions that hire residents as employees, in contrast to the circus employees who reboard the train or bus and spend their incomes in other parts of the country. What’s clear is that failing to account for substitution effects distorts the market and potentially reduces opportunities for increasing animal welfare.

**Increasing Market Concentration**

A truly competitive market is possible only when enough buyers and sellers participate. When many firms vie for the same consumers, competition doesn’t just put downward pressure on prices—which is usually a good thing—but it also creates pressure for individual firms to react more quickly to changing consumer preferences. People are generally familiar with the notion of monopoly: a single firm produces a product, and no other firms find it profitable to enter the market (owing to patent protection, scale economies, first-mover advantages, or other factors). A monopoly allows a firm to control the entire supply curve, puts upward pressure on prices, and tends to be slower at innovation or product improvement (hence, the characterization of the “lazy monopolist”).

But a market doesn’t have to be strictly monopolized by a single firm to show signs of these failures. Markets with high levels of seller concentration (that is, with very few sellers) can significantly reduce their competitiveness and be slow to respond to changing consumer demands.

Livestock markets are particularly concentrated and increasingly vertically integrated along the supply chain (i.e., where once farmers sold to slaughterhouses, who sold to packers, now one company owns all three levels). Rapid expansion of industrial farming has dramatically reduced the number of meat, dairy, and egg producers, turning the family farm into a novelty. A March 2005 USDA study of market structure in the meat, poultry, dairy, and grain-processing industries concluded that

[T]he drop in the number of plants, sharp rise in plant size,

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**The Role of Economics in Achieving Welfare Gains for Animals**
and a leveling or decline in the per capita consumption of red meat, fluid milk, and flour products led to a 50 percent increase in average four-firm concentration levels—to about 46 percent for all nine industries. (Ollinger et al. 2005, iv)

On average, four companies accounted for about half of the total production in each of these industries. Perhaps the most notable example of market concentration is the hog industry. Between 1975 and 2005, the number of hog farmers in America fell from 660,000 to 67,300—nearly 90 percent (U.S. Department of Agriculture, National Agricultural Statistics Service [USDA/NASS] 2005). This is not due to a decline in demand for pork products. The number of pigs raised on U.S. farms actually increased over that same period—from 69 million pigs per year to 104 million pigs per year (USDA/NASS 2006). Four major companies control more than 64.1 percent of the hog slaughter and packing industry in the United States (U.S. Congressional Research Service 2006).

Even the National Pork Producers Council, the trade association representing pork packers and producers, told Congress that this level of concentration raises issues:

> While not a guarantee of conduct that increases consumer prices and/or reduces producer prices, these levels and their trends increase the possibility of such conduct and provide ample incentive for heightened vigilance. (Caspers 2000, n.p.)

As of mid-2006, federal antitrust officials were reviewing Smithfield’s proposed acquisition of its biggest rival, Premium Standard Farms, which followed on Smithfield’s acquisition of ConAgra’s refrigerated meats subsidiaries earlier in the year (Associated Press 2006).

### Public and Merit Goods

Animal welfare has characteristics of both public goods and merit goods. A public good is a good valued by everyone in society, whose benefit is nonexcludable (it can be enjoyed by anyone) and non-rival (one person enjoying it has no effect on another enjoying it). Clean air is an example of a public good. When the air is clean, everyone can enjoy it: one person’s enjoyment has no effect on another’s. Wildlife is another example of a public good. One person admiring the neighborhood mourning doves does not diminish a neighbor’s enjoyment from watching the same birds. In a free market, producers have no incentive to supply public goods in sufficient quantities, since they cannot capture full payment. As a result, public goods often must be provided—or protected—by governments or other collective bodies with the power to regulate their use. Using the mourning dove example, society must decide whether or how to balance the interests of those who favor watching or feeding the birds with the interests of those who enjoy shooting them.

A merit good is a good that is not valued by everyone in society but has broad social benefits. Public schools and vaccinations are examples of merit goods. All members of society indirectly benefit from provision of these goods, even if they are not a direct consumer of them. A merit good may be provided or subsidized by governments if there is sufficient public support for such action. Alternatively, governments may spend money increasing demand for merit goods by educating society about the good’s merits.

Animal welfare has aspects of both public and merit goods. Some level of animal welfare is a public good: nearly everyone in society believes animals should not be starved or beaten, for instance. But some level of animal welfare is a merit good. While not everyone believes that CAFOs are inhumane, for example, those who do may believe it so strongly that aggregate social welfare, as a whole, might be increased by banning CAFOs.

### Imperfect Information

The market for animal welfare also suffers from imperfect information. Producers and retailers do not have complete information about the degree of consumer demand for animal welfare; producers often lack full information about the costs associated with improving animal welfare; and consumers are not given (and often cannot obtain) accurate information about the animal welfare aspects of products they purchase.

Most consumers value animal welfare but may know little about how their purchases affect animals. For instance, a recent poll found that 71 percent of respondents believe “in general, farm animals are fairly treated in the United States” (Zogby International 2003). But when asked about standard farming practices in the United States, most of these same people deemed them objectionable. A 2000 Zogby poll found that 86 percent of adults feel the crowding of hens in commercial egg production is “unacceptable” (Yahoo News 2000). A 1995 poll by Opinion Research Corporation found that 90 percent of respondents disproved of the standard practices of confining veal calves, pigs, and hens (Swanson and Mench 2000). The majority of Americans object to standard agricultural practices—but only after they’re told what those practices are. This suggests that Americans are largely ignorant about factory farming, so their purchases do not accurately reflect their stated preferences.

The problem is exacerbated by the lack of transparency in animal products. Animal welfare is a quality characteristic of a product, an aspect that consumers value and use to differentiate competing products. (Ollinger et al. 2006, iv)
products. However, unlike some characteristics—like taste, smell, or touch—it can rarely be observed in the final product. Consumers cannot determine from an unlabeled product how animals were treated during production. As a result animal products are considered “credence goods,” goods whose characteristics (in this case, animal welfare) cannot be discerned by a consumer before or after purchase.

Credence goods cause market inefficiency, since consumers may inadvertently buy lower-quality (in terms of animal welfare) goods and, therefore, drive higher-quality (in terms of welfare) goods from the market. The market failure surrounding credence goods is justification for government intervention, typically in the form of standards and labeling requirements. Some labeling programs have sought to provide information about animal welfare, though these are often found to be inadequate (at best) or deceptive (at worst). More complete and accurate labeling improves economic efficiency by helping consumers to target expenditures toward products they most want.

The use of animals in cosmetics testing provides a good example of improved labeling that has resulted in a more efficient market where consumers’ purchases can accurately reflect their preferences. There are a number of different labels, each providing different levels of assurances about the use of animals (as testers or ingredients). Some labels indicate that animals were not tested for the finished product (meaning the individual ingredients themselves may have been tested on animals), while others assure not only no testing of the finished product or ingredients but also the absence of animals as an ingredient. These labels give consumers additional information about cosmetics products, which allows them to consider their preferences when they shop.

Last, it is worth noting a fundamental market failure: the largest group of stakeholders in decisions affecting animal welfare—the animals, themselves—do not participate in the market. Their preferences, and their suffering, are of no direct account.

Willingness to Pay
A fundamental proposition in economics is that the extent to which society values a good is indicated by the level of consumers’ willingness to pay (WTP) for it. Some consumers are not willing to pay much for animal welfare, while others are willing to pay a considerable amount. From the perspective of society, the optimal level of animal welfare is that which corresponds to society’s aggregate WTP.

Many consumers willing to pay considerable amounts for animal welfare have no opportunity to do so in the market. This includes consumers who choose not to participate in a market (for instance, vegans); consumers who cannot participate in the market because the products they want to buy are unavailable; and consumers who participate, and are willing to pay some amount for welfare improvements, but not as much as what is currently charged.

Society’s revealed WTP for animal welfare, as embodied in market behavior, may thus be significantly lower than its actual WTP. To capture the residual WTP, economists try to measure society’s declared WTP by asking people what they would be willing to pay to see a specific improvement take place, for instance, “How much would you be willing to pay to see a ban on whaling?” WTP research typically involves the use of surveys of a large sample to represent the attitudes of society.

Society’s aggregate WTP can be derived from estimates of average WTP multiplied by the total population size. This number represents the total benefit society receives from an improvement in animal welfare. If this number is greater than the total cost of the improvement, then the improvement is a net benefit to society and should be instituted.

Consumers report a willingness to pay more for products labeled with animal welfare assurances. In a 2004 poll, three-quarters of respondents said they were willing to spend two cents more for a fried-chicken meal with welfare assurances (Zogby International 2004). In fact, the KFC Corporation (parent of Kentucky Fried Chicken) has estimated that meeting NGOs’ (nongovernmental observers) demands for welfare improvements would increase costs by less than this amount (Blum 2004).

Other research suggests that consumers are willing to pay an average 17–60 percent more for eggs from cage-free systems (HSUS 2006). One study found that consumers were willing to pay average taxes of $8 per person per year to fund practices they believed would improve conditions for hens (Bennett and Larson 1996). This WTP exceeds the additional cost of cage-free production, as discussed in the sidebar on page 170.

Consumers’ statements do not always translate into actual purchases, as revealed by the low market shares of non-CAFO products. The misfit between consumers’ intentions and their behavior might owe to the unavailability of non-CAFO products in many supermarkets and restaurants; absent or poor labeling; or perceptions that the responsibility for animal welfare lies with government, producers, or retailers (Blandford et al. 2000). There are also concerns about the accuracy of declared WTP. People who feel strongly about an issue could declare a WTP that is unrealistically high. Therefore, a number of research methods have been devised to improve the accuracy of declarations.
Taking Account of Free Trade

Animal welfare legislation in Europe and the states of Florida and Arizona outlawed the use of particular animal production systems within their national or state boundaries. However, both sets of legislation may have a limited effect on animal welfare as long as consumers continue to demand, and are supplied with, products imported from other nations or states that use the outlawed systems. Trade thus represents a special problem for animal welfare legislation. As the European Commission noted, “Animal welfare standards, notably those concerning farm animal welfare, could be undermined if there is no way of ensuring that agricultural and food products produced to domestic animal welfare standards are not simply replaced by imports produced to lower standards.” (European Commission 2000, 1)

This concern applies just as readily to interstate trade within the United States.

As an example, the United Kingdom maintains higher animal welfare standards for sows than do most European Union (EU) countries. Since the country’s ban on sow gestation crates and tethers went into effect in 1999, U.K. pork costs increased and production volume declined by 40 percent. In 2005 more than half of all pork products in British supermarkets were imported, and more than two-thirds of these imports were produced using systems illegal in the United Kingdom (Meat News 2005).

In one survey, 92 percent of British respondents believed imported meat should be produced to U.K. minimum standards (Meat News 2005). Similarly, 95 percent of respondents in an EU-wide survey said that imported products should be produced under animal welfare regulations at least as demanding as those applied in their own countries (Poultry World 2006). Trade restrictions are one way to solve the problem, but international trade rules limit the kinds of restrictions that are possible.

Rather than modify trade rules, the most practical means of protecting animal welfare may be to educate consumers and to convince retailers to carry only acceptable products. While trade agreements can force nations to allow imports, they can’t force supermarkets or restaurants to sell them:

Retailers are becoming the most potent force in setting animal welfare standards and will be the major engine for influencing animal welfare change. They can move faster than governments, can cut off a supplier’s livelihoods by stopping contracts, and can ignore international trade agreements. While Europe as a whole has to adhere to the World Trade Organization and cannot bar imports on animal welfare grounds, retailers are free to do so. (Bayvel 2005)

In Switzerland compliance with animal welfare standards was limited until the major retailers selling eggs, following pressure from consumers and NGOs, announced they would sell only eggs from cage-free operations (Studer 2001). Sweden’s ban on battery cages has also been helped by retailers’ refusal to stock battery eggs (Agra CEAS Consulting 2004). Major Austrian supermarkets have volunteered to end the sale of cage eggs by 2007 (M. Balluch, personal communication with G.M., April 14, 2006). And in the United Kingdom, Germany, Austria, and Switzerland, McDonald’s, Europe’s largest food service operator, uses only free-range eggs (Pickett 2006).

The visibility and name recognition of retailers make them sensitive targets of animal welfare campaigns. As retailers compete with each other over public perception, successfully negotiating welfare gains with a major retailer can lead to a “race to the top” and to a push for harmonizing regulation so that costs are shared.

How Animal Welfare Campaigns Affect the Economics of Animal Production

NGOs can work to affect both the demand for and supply of animal welfare. On the demand side, NGOs can educate consumers about animal welfare. On the supply side, NGOs can educate producers and retailers about animal welfare; encourage voluntary production and retail standards; promote research on alternative production methods; promote subsidies for animal welfare improvements and challenge subsidies for animal welfare abuses; and help advance and enforce regulations governing the treatment of animals and the sale of animal products. These strategies vary in the level of distortion they introduce to the market.

The least distorting strategy is to allow producers to treat animals however they wish and allow consumers to purchase any level of animal welfare they demand. Such an approach is likely to create a variety of welfare levels, catering to consumers who care strongly about animal welfare, those who care moderately, and those who care weakly. Such an approach is supported by farm assurance schemes that meet strictly enforced welfare standards and by government regulation of labeling. At the same time, NGOs and governments can work to educate consumers about the value of animal welfare, increasing demand for higher-welfare products.

Market distortions that now favor abusive industries can also be dismantled. For instance, feed grain subsidies disproportionately benefit...
CAFOs that do not grow their own feed; research and extension services at land grant universities disproportionately study and encourage CAFO production; and CAFOs are offered tax breaks to purchase cages and pens. Similarly, state fish and game commissions subsidize hunting activities, including in many cases the purchase and provision of “stocked” animals (e.g., fish, pheasants) to provide recreational animal use activities that are in no way connected to conservation efforts. And in the United States, the U.S. Food and Drug Administration continues to require the institutional use of animals in repetitive, uninformative, or unnecessary testing of cleaning products, cosmetics, or medicines—where viable nonanimal alternatives or earlier research exists.

Because of the negative externalities of animal abuse, and the public good and merit good aspects of animal welfare, some level of market distortion is justified. Producers and consumers could be taxed (subsidized) at an amount equal to the negative (positive) externality they create. The aim of this tax (subsidy) is to compensate society (the producer or consumer) for the full value of the externality. In parallel to the “polluter pays” principle used in environmental policy, producers who abuse animals could be expected to compensate society in some way—for instance, through taxes on less humane producers. In parallel, humane producers could receive a subsidy for the benefit they provide society.

Last, governments can impose regulations that set minimum standards of care and/or limit the production or sale of certain products. Throughout the world, this has been the favored strategy for protecting the welfare of pets. In Europe this has also been the favored strategy for protecting the welfare of farm animals (supplemented by subsidies). To a limited extent, this is also true in the United States, where there are humane regulations concerning the slaughter and transport of some farm animals.

**Cost-Benefit Analysis**

Individuals, organizations, and societies have an unlimited number of preferences but have only limited resources to invest in satisfying these preferences. To satisfy the greatest number of preferences, people must choose the most efficient investments. Cost-benefit analysis (CBA) is an economic tool used to measure efficiency. Here we discuss how CBA can help organizations prioritize projects.

With CBA the marginal costs and benefits of a project are measured and discounted. Marginal costs are typically measured in dollars and include any additional expenses an organization incurs by funding a project. Future costs are often multiplied by a discount rate, as costs incurred in the present represent a greater loss for organizations, which could otherwise invest the funds.

A project’s marginal benefit can also be measured in dollars saved or gained (for instance, from increased donations); and in noneconomic measures, such as the number of animal lives or life-years saved or some quality-adjusted measure of animal welfare. Like costs, future benefits are often multiplied by a discount rate, as benefits realized in the present can be reinvested.

Net marginal cost is the difference between discounted economic costs and discounted economic benefits. A cost-benefit ratio is calculated as the net marginal cost divided by the noneconomic marginal benefit. Projects with a lower cost-benefit ratio are more efficient than are projects with a higher cost-benefit ratio and, all other things being equal, ought to be prioritized.

For example, suppose an NGO has two projects, each of which lasts one year. Project A costs $100,000, brings in $80,000 in donations, and saves an estimated two thousand animals. Project B costs $200,000, brings in $50,000 in donations, and saves an estimated five thousand animals. The cost-benefit ratios for the projects are:

Project A:

\[
\frac{($100,000-80,000)}{2,000} = $10
\]

per animal saved

Project B:

\[
\frac{($200,000-50,000)}{5,000} = $30
\]

per animal saved

Project A has a lower cost-benefit ratio and is thus more efficient. All else being equal, the organization should invest its funds in Project A rather than Project B to save the greater number of animals.

**Moving Forward**

If the objective is to do the greatest good for the greatest number, then animal protection NGOs (and the donors who support them) should invest their scarce resources in projects that reduce misery most cost-effectively. Because farm animals represent 99 percent of all animals raised and killed in the United States each year, and because there is broad public ignorance about standard farming practices, efforts to improve farm animal welfare may be especially cost-effective. Economists and policy makers generally prefer pull strategies over push strategies because they are less market-distorting. A pull strategy educates, informs, and promotes changes in consumer or producer behavior. A push strategy regulates, forces, and demands such changes. A note of caution: campaigns against individual producers, or groups of producers in individual regions, can be ineffective. If one producer is forced out of business, another may simply take its place, as long as the
demand for goods remains unchanged.

Targeted public education campaigns revealing standard animal abuse could make substantial progress toward improving animal welfare. Most Americans care deeply about animal welfare but know little about animal abuse. Most would be appalled to see how animals are treated in agriculture, research, entertainment, and other industries. NGOs can ask consumers to consume fewer of those products and services that cause animals the most misery. This advice is consistent with the “Three Rs” approach used in other animal welfare campaigns: refine, reduce, and replace (Russell and Burch 1959).

The low market share of welfare-friendly products probably has more to do with consumers’ unawareness of these products and less to do with their limited availability at retail outlets. If retailers thought there was sufficient demand for welfare-friendly products, they would sell them out of self-interest. However, retailers can be encouraged to market actively welfare-friendly products to consumers, even in advance of significant consumer demand. They may be encouraged to do so to develop a brand image as a responsible retailer or to protect themselves against future animal welfare campaigns. Retailers—especially large ones—have considerable influence over production methods, are most vulnerable to consumer pressure, and are immune to trade agreements. As more retailers require audits of their suppliers, the need for independent third-party auditing and for harmonized standards with simple, transparent labeling will increase (Thiermann and Babcock 2005).

**Research Needs**

**Costs and Benefits of Animal Welfare**

To argue that animal welfare improvements are not economically disastrous to producers, retailers, or consumers, better data are needed regarding the net economic effects of such improvements at each level of the market. Scant data exist on the production costs of welfare improvements in the United States. Better data are also needed on the producer share of retail prices for animal products to estimate the effect of production costs on these prices. There have been few studies evaluating consumers’ WTP for animal welfare improvements, and even fewer studies have measured the actual behavior of such consumers in price experiments. There are no publicly available price elasticity data on welfare-friendly products, so it is difficult to estimate the profitability of welfare improvements for producers and retailers and the additional costs faced by consumers. Unfortunately, few economists are studying these problems.

**Subsidies**

To our knowledge there has been no research on the extent to which public subsidies for CAFOs and other animal industries distort the market for animal products and decrease animal welfare.

**Externalities**

Animal industries involve hidden costs to society. There has been no full accounting of these costs.

**Market Concentration**

More research on the impact of market consolidation in the agricultural sector would aid federal regulators considering antitrust and other merger concerns.

**Trade**

Only recently has there been some discussion of how international trade and trade agreements will affect animal welfare. The problem of substitution needs to be studied to assess the effectiveness of state and national legislation.

**Evaluation Research**

Few animal welfare NGOs have sought to evaluate the effectiveness of their projects. Cost-benefit studies can help NGOs focus their scarce resources on those projects that are most cost-effective in preventing misery.

**Social Marketing**

NGOs are likely to increase the cost-effectiveness of their programs by using tools already employed in market research. Increasing consumers’ demand for animal welfare can be seen as a marketing problem similar to that faced by any company that wants to increase demand for its products. NGOs need to acquire better data about the lowest-hanging fruit in society—those consumers who can be persuaded with the least amount of effort to adopt more humane purchases, and better data on how best to educate these consumers about animal welfare. One approach would be to measure how WTP varies with the amount of information consumers are given about animal products.

**Resources**

The reports and research tools related to the economics of animal welfare listed below are available online, although they often require users to be university affiliates or purchase subscriptions and/or pay per-article fees. The descriptions below are taken from the producing organizations.

EconLit: According to the American Economic Association, EconLit indexes more than thirty years of economics literature from around the world. Compiled and abstracted in a searchable format, EconLit, a comprehensive index of journal arti-
Common Economic Fallacies

It's in producers' economic interests to protect animal welfare.

As suggested by Figure 3, producers have an incentive to maintain welfare only at point D, the point of maximum production efficiency. In cases where improvements in animal welfare decrease efficiency, efficiency usually wins. Animal morbidity and mortality are costly to producers but can be less costly than the improvements in breeding and management needed to reduce morbidity and mortality. As two poultry scientists asked,

Is it more profitable to grow the biggest bird and have increased mortality due to heart attacks, ascites [another illness caused by fast growth], and leg problems, or should birds be grown slower so that birds are smaller, but have fewer heart, lung, and skeletal problems? (Tabler and Mendenhall 2003)

The researchers conclude that it takes only “simple calculations” to find “it is better to get the weight and ignore the mortality” (Tabler and Mendenhall 2003).

Rollin notes that it is:
more economically efficient to put a greater number of birds into each cage, accepting lower productivity per bird but greater productivity per cage....[I]ndividual animals may “produce,” for example gain weight, in part because they are immobile, yet suffer because of the inability to move....Chickens are cheap, cages are expensive. (Rollin 1995, 119)

And Mench (1992) states:
It is now generally agreed that good productivity and health are not necessarily indicators of good welfare....Productivity...is often measured at the level of the unit (e.g., number of eggs or egg mass per hen-housed), and individual animals may be in a comparatively poor state of welfare even though productivity within the unit may be high.

Moreover, when animals are no longer productive—as is the case with sick, injured, or “spent” animals —there is no economic incentive for producers to care for them. It’s typically cheaper to let these animals die than it is to treat them. For instance, 99 percent of farm animals receive no individual veterinary attention during their lives. In the whole United States, just 220 veterinarians are responsible for the care of ten billion farm animals (National Institute for Animal Agriculture 2005).

Increasing production costs will hurt consumers.

While consumers may have to pay more for animal-friendly products and services, this does not “hurt” consumers any more than consumers are “hurt” by paying more for safer automobiles. As McInerney (1991, 18) says,

Good economic sense simply means ending up with the pattern of consumption goods and services that is preferred. It is very little to do with spending less money—if it were we would all die cold, naked, and unhappy surrounded by our cash!

Consumers value animal welfare. An efficient market is one in which the aggregate WTP of consumers equals the aggregate value of the animal welfare provided. WTP research tells us that such a market is likely to be one where consumers pay more for goods and services than they presently do.

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**Figure 4**

**Supply Chain Flowchart**

- Supply/Equipment Sellers
- Farmers
- Slaughterhouses/Manufacturers
- Retailers
- Consumers

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*The Role of Economics in Achieving Welfare Gains for Animals*
The Economics of Farm Animal Production

Free-range meat and eggs are often sold at two to three times the price of conventional cage eggs. This has more to do with niche marketing and economies of scale in distribution than with production costs. In well-developed markets with significant competition, prices decrease significantly. For instance, in the United Kingdom, where free-range eggs enjoy a high market share, free-range eggs often cost less than cage eggs (Farming UK 2006). Production costs associated with many farm animal welfare improvements are modest and can be offset by marginally increased prices to consumers. As long as the playing field is leveled by regulation or adoption by producer or retailer associations, the effect on producers can be minimal.

Several welfare improvements increase production costs at the farm level (Table 1). But even significant increases in production costs may not significantly increase retail prices, as farm costs typically represent less than half of the retail price of meat or eggs. Wholesalers and retailers add their own margins to each product (USDA Economic Research Service 2002).

For instance, given the 48 percent farm value share of retail price for poultry meat (USDA Economic Research Service 2002), a 5 percent increase in production costs would translate into a 2.4 percent increase in the retail price to the consumer—a few pennies more per pound of chicken to alleviate the “the single most severe, systematic example of man’s inhumanity to another sentient animal” (Webster 1994, 156). Assuming substitutable products were not available, increases in price would not be expected to decrease producers’ profits. Demand for meat, eggs, and dairy products is said to be “price inelastic,” meaning consumers are relatively unresponsive to price changes. Producers as a group can pass increased costs on to consumers without a loss in profits, as the decrease in demand is more than compensated for by the increase in unit price (Huang and Lin 2000). It is ultimately consumers who bear the costs of improved animal welfare.

Assuming constant percentage marketing margins at the farm level and fixed marketing margins at the retail level, by purchasing slow-growth chicken meat, barn eggs, and pork from group-housed sows, an American’s average annual food spending would increase by only $5 (HSUS 2006). Assuming free-range meat, eggs, and milk would increase production costs on average by 50 percent (an overestimate), purchasing only free-range animal products would increase average per capita food spending by only $3 per week (Blisard 2001).

Table 1
Costs of Welfare Improvements

<table>
<thead>
<tr>
<th>Housing System</th>
<th>Cost Increase over Standard Practice (by percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group housing (sows)</td>
<td>0</td>
</tr>
<tr>
<td>Group housing (calves)</td>
<td>1–2</td>
</tr>
<tr>
<td>Slow-growth (broilers)</td>
<td>5</td>
</tr>
<tr>
<td>Free-range (turkeys)</td>
<td>30</td>
</tr>
<tr>
<td>Free-range (hogs)</td>
<td>8–47</td>
</tr>
<tr>
<td>Furnished cages (layers)</td>
<td>8–28</td>
</tr>
<tr>
<td>Barn (layers)</td>
<td>8–24</td>
</tr>
<tr>
<td>Free-range (layers)</td>
<td>26–59</td>
</tr>
</tbody>
</table>

Sources: Theuvsen, Essmann, and Brand-Sassen (2005); Eurogroup for Animal Welfare (2005); Andreasan, Spickler, and Jones (2005); The HSUS (2006).
articles, books, book reviews, collective volume articles, working papers, and dissertations, is available at libraries and on university websites throughout the world. It is licensed from information service providers, which provide search engines, links to libraries’ full-text subscriptions, and other enhancements to assist users in document retrieval. More information: www.econlit.org.

AgEcon Search: A website developed and maintained at the University of Minnesota by Magrath Library and the Department of Applied Economics, AgEcon Search collects, indexes, and electronically distributes full-text copies of scholarly research in the broadly defined field of agricultural economics, including subdisciplines such as agribusiness, food supply, natural resource economics, environmental economics, policy issues, agricultural trade, and economic development. More information: http://agecon.lib.umn.edu.

CAB Abstracts: Available primarily through university libraries, CAB Abstracts is described as the most comprehensive source of international research information in agriculture and related applied life science. Updated monthly, CAB Abstracts provides current, in-depth coverage of global journal articles, academic books, abstracts, published theses, conference proceedings, bulletins, monographs, and technical reports. More information: www.cabdirect.org.

Hoovers Online: Hoovers provides qualitative company profiles that contain company overviews and histories (private company and international company coverage), product/brand-name listings, competitors, officers’ names and salaries, product segmentation data, subsidiaries, and financial data, including access to annual reports and Securities and Exchange Commission (SEC) filings. Hoovers also profiles industries and has an IPO watch calendar. Financial data are available for public companies only. More information: www.hoovers.com.

USDA Economic Research Service (ERS): The ERS is a primary source of economic information and research in the U.S. Department of Agriculture. ERS conducts a research program to inform public and private decision making on economic and policy issues involving food, farming, natural resources, and rural development. ERS’s economists and social scientists conduct research, analyze food and commodity markets, produce policy studies, and develop economic and statistical indicators. The agency’s research program is directed at the information needs of USDA, other public policy officials, and the research community. ERS information and analysis is also used by the media, trade associations, public interest groups, and the general public. Many datasets, reports, and analyses are available online in real time and updates are available via email through free subscriptions. More information: www.ers.usda.gov.

U.S. Fish and Wildlife Service (USFWS): The USFWS has a Hunting Statistics and Economics section, which sponsors a National Survey of Fishing, Hunting, and Wildlife-Associated Recreation every five years. The questions are developed in concert with technical committee members from every state and with representatives of nongovernmental organizations. The latest survey was conducted in 2006. More information: www.fws.gov/hunting/huntstat.html.

The Humane Society of the United States: The Economic

Dollars and Nonsense

“Officials say Denver could lose $8 million if Ringling Bros. isn’t allowed to visit the city.”

—ABC 7 News, “Opponents to ‘Circus Ban’ Bill Rally in Denver Initiative 100 up for Vote in August Primary,” July 14, 2004

“Voter Kim Douglas said the predicted economic impact affected her vote. ‘The state has lost so much business and revenue, and I was convinced that this would be yet another blow,’ she said.”


Fiscal effects include: “[P]otential sales tax revenue loss, to the extent this bill results in fewer dog shows in California. For example, if 10 percent fewer dogs are shown in California, there is a potential for state and local sales tax revenue losses of more than $1 million annually.”

—California State Assembly, Committee on Appropriations, Analysis of AB 418 (Koretz), April 13, 2005

“This year’s dove season will bring an additional $87 million to Michigan’s economy.”

—National Rifle Association news release, “Michigan Dove Hunting Legislation Headed to Governor,” June 8, 2004

“Pigs are their bread and butter and they must be treated humanely to be profitable for the company.”

—Snowflake, Arizona, Councilwoman Sharon Tate, quoted in “Snowflake Council Opposes Initiative Concerning Treatment of Female Pigs,” AZJournal.com, July 19, 2006

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Research Department maintains a searchable database of more than a thousand collected articles and reports focused on animal welfare and economics issues. Since the department’s inception in mid-2006, two relevant reports have been issued (one dealing with the economic impact issues related to circuses in Massachusetts, the other with mourning dove hunting in Michigan). The Farm Animal Welfare Department research library contains a number of current analyses of economic alternatives to specific factory farming practices. More information: www.hsus.org.

See also the resources described in Chapter 1 of this volume.

Notes
1 While “cruelty-free” labels clearly provide consumers with more information on which to base their purchasing decisions, many consumers do not fully appreciate the key distinctions among these labels and may inadvertently purchase less welfare-friendly cosmetics products. The experience of the cosmetics-labeling efforts suggests standardization of definitions and regulation of terms like “cruelty-free” would result in even more efficient outcomes.

2 Ethical questions about animal welfare depend on both the quality and duration of animals’ lives. Borrowing a measure used in the health sciences, duration can be expressed in terms of “life-years,” equal to the number of animal lives affected times the average life span in years. A life-year can also be weighted by a perceived level of welfare. While highly subjective, as some welfare problems are more serious than others, estimating “quality-adjusted life-years” can help to prioritize projects that relieve the most animal suffering.

3 In economic terms large retailers exercise what is called monopsony power. Their large purchasing share from the wholesale or manufacturing sector makes their preferences or requirements worth responding to. McDonald’s Corporation, for example, used its monopsony power as the number one purchaser of beef in the United States to exact animal welfare improvements at cattle slaughterhouses owned or contracted by companies wanting to continue selling beef to the fast food giant (see, for example, McDonald’s Corporation 2003).

4 The price elasticity of demand is defined as the percentage change in the quantity of a good purchased by consumers, in response to a 1 percent change in that good’s price. When a good’s price elasticity is between 0 and −1, demand is said to be inelastic with respect to price. An increase in price of, for example, 10 percent will decrease demand less than 10 percent. This means that, in principle, the total revenue for the seller of that good will not decrease, as the decrease in demand is more than compensated by the increase in unit price.

Literature Cited


The Demographics of the U.S. Equine Population

Emily R. Kilby

Introduction

In this demographic examination of America’s equine population, the numbers clearly show upward trends in all things equestrian over the past fifty years. Will that trajectory continue, adding year after year to the current ten million population, or will loss of open spaces turn the tide as it limits horse housing and riding room? Will ownership patterns undergo fundamental changes when population density, land costs, and escalating environmental controls eliminate the “backyard”-keeping concept and make suburban boarding stables untenable? Will horse production expenses rise in the face of land pressures to the point that equestrian involvement, now a highly egalitarian pursuit in this country, truly becomes a rich person’s game?

Horse people started fretting over these sorts of questions not long after horses stopped being beasts of burden in this country and became mostly recreational partners and companions. So far, the equine species has flourished in its nonutilitarian role, but there’s no end run around the fact that horses are and always will be large animals in a shrinking natural world.

How Many U.S. Horses Are There?

This most basic question of demographic research is yet to be answered with satisfactory accuracy for the U.S. equine population. Horses and other equidae are no longer sufficiently critical to national well-being to warrant the close government oversight afforded food-producing animals, nor are they so much a part of the average American experience as to inspire close scrutiny of their numbers and condition. Instead, available demographic data for horses and their kin have arisen from special interests or within restricted populations, resulting in seemingly conflicting figures.

The American Veterinary Medical Association (AVMA) put the 2001 horse population at 5.1 million (AVMA 2002), a 28 percent increase over the 4 million calculated for 1996, which had represented an 18 percent decrease from the 4.9 million estimated five years before that.

Equine Census Taking

The American horse population is not nearly so volatile as these conflicting figures seem to indicate. Indeed, vast changes have occurred in equine numbers over the past century, with as many as six million horses and mules disappearing in a single decade, but those losses were in response to the mechanization of farming and transportation (Table 1). (The lack of data from 1960 to the present is regrettable. USDA surveys ceased to be an accu-
rate assessment because they did not take into account recreational horses, and the horse industry has attempted only occasionally to undertake a national horse population assessment in the past thirty-six years.) However, it appears to be fairly safe to conclude that the 1950s marked the low point of American equine numbers, with horses and mules largely phased out of agricultural production and transportation but not yet filling significant recreational roles. Since then, the trend in equine numbers has been steadily upward.

The surveys’ purposes, designs, and sampling methodology account for the three divergent assessments of the American equine population cited above and most likely for the relatively large shifts reportedly occurring within short intervals as well.

**American Horse Council**

The AHC has surveyed the economic activity associated with horses and horse uses every decade since the mid-1980s. The data are collected primarily for political purposes. By specifying dollars-and-cents figures for a specialized and relatively small recreational and business entity, the AHC, a lobbying organization, can better influence national and state legislatures in matters affecting horse breeders, owners, trainers, dealers, and recreational, sporting, and business users. The larger the numbers shown, the more impact equestrian interests appear to have.

The AHC’s population figures were shaped by the following study characteristics, as explained in the study’s technical appendix (AHCF 2005):

- The commerce of horse involvement was the survey focus. Respondents in the owner group had to be at least eighteen years old and owner or part-owner of a horse(s). Data for youth involvement and for non-owning equestrians may be underreported or excluded.
- The survey posed questions in terms of horses only. No input is explicitly solicited for other equidae, which include ponies, miniature horses, donkeys/burros, and mules. It is not uncommon for recreational horse owners to maintain a mix of breeds and types, and if respondents answered the questions quite literally, the lesser but still significant population of ponies and asses is not included in the 9.2 million figure. Finally, it appears that owners and producers specializing in miniature horses might have been excluded entirely.
- The survey sample was derived from equestrian membership lists and business databases. The 18,648 usable owner/industry supplier responses from which the report data were subsequently derived (along with different surveys of horse show and racing management) represent a valid pool for studying economic matters, but the sample would have excluded owners who maintain horses with little or no organizational contact or commercial involvement. Horse population figures and activity profiles may have been skewed by this selection process.
- The primary response mechanism was through an Internet website, with a small proportion of mailed questionnaires for those without computer access. Again, the methodology selected against owners outside mainstream culture, which would not have much effect on an economic impact study but probably underrepresents “invisible” own-

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**Table 1**

**U.S. Equine Population During Mechanization of Agriculture and Transportation**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Horses and Mules</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>21,531,635</td>
</tr>
<tr>
<td>1905</td>
<td>22,077,000</td>
</tr>
<tr>
<td>1910</td>
<td>24,042,882</td>
</tr>
<tr>
<td>1915</td>
<td>26,493,000</td>
</tr>
<tr>
<td>1920</td>
<td>25,199,552</td>
</tr>
<tr>
<td>1925</td>
<td>22,081,520</td>
</tr>
<tr>
<td>1930</td>
<td>18,885,856</td>
</tr>
<tr>
<td>1935</td>
<td>16,676,000</td>
</tr>
<tr>
<td>1940</td>
<td>13,931,531</td>
</tr>
<tr>
<td>1945</td>
<td>11,629,000</td>
</tr>
<tr>
<td>1950</td>
<td>7,604,000</td>
</tr>
<tr>
<td>1955</td>
<td>4,309,000</td>
</tr>
<tr>
<td>1960</td>
<td>3,089,000</td>
</tr>
</tbody>
</table>

Source: Adapted from Ensminger (1969).
ers in providing raw equine population figures.

The AHC report’s very precise tally of U.S. horses in 2003—9,222,847—is actually the center point of a statistically determined range defining a 95 percent confidence interval. According to these calculations, if the same methodology were applied a hundred times, ninety-five of the surveys would produce a U.S. horse population figure somewhere between 8,869,858 and 9,575,837. Given the methodology’s exclusion of certain types of horse owners and some equine classes, the actual equine population seems likely to be at the higher end of the range or possibly exceeding that 9.6 million (rounded) maximum figure.

**U.S. Department of Agriculture**

USDA has kept tabs on agricultural production through periodic censuses, starting in 1840. Every five years, NASS attempts to survey all U.S. agricultural producers with a shorter form and chooses a sizable sampling of them for a more detailed assessment of agricultural practices and expenses. For the most recent enumeration, approximately 2.8 million census packets were mailed in December 2002, and follow-up contacts continued until each county had at least a 75 percent response rate. Such blanket coverage assures a very accurate count of most food- and fiber-producing units in the country, but horses and their kin are special case animals.

USDA’s equine population figures are significantly limited by the primary criterion for inclusion in the enumeration: censuses are sent to all agricultural operations that produce or sell $1,000 or more of agricultural products annually or would do so in normal years. The large block of “backyard” owners who maintain horses on a few acres or nonagricultural “farmettes” would not be surveyed. It is also unclear if suburban boarding, training, and lesson stables would be captured during the list-building process.

The most recent USDA enumeration lists 3.64 million horses and ponies and 105,358 mules, burros, and donkeys in the “other animal production category,” along with the likes of bison, goats, rabbits, and bees. Horse/pony numbers on income-producing farms increased by one million between 1992 and 1997 and by another half-million by 2002, a 78 percent increase overall. During the same decade, ass numbers nearly doubled between 1992 and 1997, rising from 67,692 to 123,211, then fell back to 105,358 in 2002. While the progression in horse/pony numbers reflects the population trend reported by other observers, the rather precipitous rise and retreat of ass numbers in a single decade begs the question of a sampling or reporting anomaly in one of the years.

Recognizing the shortcomings of the purely agricultural enumeration model for gathering equine data, USDA conducted additional surveys following the 1997 census to estimate the number of all equidae in the country and their sales, not just those on qualifying agricultural establishments. By including equine data estimated from enumerations of sixteen thousand randomly selected square-mile areas across the country and surveys of twenty thousand larger farms and commercial operations, along with the basic findings from the standard census, NASS calculated the total number of equidae at the start of 1998 to be 5,250,400 and a year later to be 5,317,400 (USDA 1999). If that 1.3 percent annual increase continued until 2003, there would be 5.6 million equidae by this survey model, still millions shy of the AHC count for that year.

**American Veterinary Medical Association**

The professional association for U.S. veterinarians conducts animal ownership surveys at half-decade intervals and produces a demographics sourcebook to aid its members in making business and marketing decisions. The data for these reports come from a statistically representative sample chosen from an established panel of U.S. households that have agreed to participate in surveys of this nature (Clancy and Rowan 2003). The most recent survey, performed in 2001, found 1.7 percent of responding households reporting horse ownership, with an average of 2.9 horses per owning household. Using data of this sort for the various species, the AVMA can offer population-estimating formulas for veterinarians to use in calculating potential client pools in their communities. The AVMA’s equine formula is therefore: divide the community population by 2.69 to get the number of households, then multiply the number of households by 0.05. The national proportion of horses to households was determined by this study.

Though it does provide a useful business tool, the AVMA’s enumeration method is too many steps removed from an actual hooves-on-the-ground count to generate reliable population figures. 

- The survey goal was to characterize ownership patterns, not perform a true count of pet species in the United States.
- The survey focused on companion/recreational owners and may have underrepresented or excluded horses used for breeding, work, and competition.
- The respondent pool was initially skewed by the self-selection of participants, then narrowed further by selecting a sample representative of the entire U.S. population, not one representative of U.S. horse owners. Horse ownership is a phenomenon associated with rural areas and smaller communities whose populations may not have been sufficiently represented in the AVMA sample for accurate equine data collection.
The total of these two estimated populations is 9,096,319, very close to AHC's count of 9,222,847 for 2003. The AHC's broader-ranging sampling method appears to have captured both companion/recreational and production owners for the most accurate and complete numeric snapshot of today's equid population.

Wild Horses and Burros

None of the censuses cited above includes equidae roaming on federal lands or maintained in government holding facilities. This unowned population originated from domesticated horses and burros who escaped or were freed onto range lands, starting in the sixteenth century with the first Spanish explorers. The Atlantic barrier islands, from coastal Maryland down through the Georgia coast, have also harbored feral herds since the colonial era. Even under seemingly harsh conditions, these feral equidae reproduce quite successfully; with modern-day herds capable of doubling in size every five years, given the absence of natural predators in most of today's ranges (BLM 2006). Until the 1960s free-ranging horses and burros were considered wildlife of sorts, fair game for public taking for taming, selling for pet food or slaughter, or killing to reduce grazing competition for domestic stock. Since passage of the Wild and Free-Roaming Horse and Burro Act of 1971 and its implementation in 1973, the Department of the Interior's Bureau of Land Management (BLM) has been responsible for overseeing herds on federal lands in ten Western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming). The agency is charged with multipurpose management of vast federal holdings for recreation, logging, mining, grazing, and wildlife management, in addition to the equine oversight, and at the same time sustaining the health and productivity of public lands (BLM 2006).

Wild horse and burro populations are now held to population limits that will prevent overgrazing or other destruction of their range lands while still leaving adequate herd numbers for a healthy gene pool. Each management area has an upper population limit determined by available resources, and herds are subject to periodic culling to maintain optimum populations. Additionally, birth control measures are now being applied to wild horses to lower their reproduction rates and reduce the number of excess animals needing removal. The BLM (2006) disposes of excess horses and burros from federal lands as follows:

- “adopting” them out to private citizens with restrictions to assure adequate care and prevent their being sold to slaughter;
- maintaining them in holding facilities until adoption or in long-range pasture if they are not adopted; and
- since December 2004 disposing of the unadoptable population through unrestricted sale, meaning that buyers can deal with the animals as they would after a private transaction, although challenges were subsequently made to this management change.

As of March 2006 the BLM (2006) population included:

- approximately thirty-two thousand horses and burros on public range lands, exceeding the optimum total population of twenty-eight thousand by four thousand and
- twenty-six thousand in short- and long-term holding facilities.

In fiscal year 2005, ending in September, 11,023 animals were removed from the Western ranges. By early 2006, 5,701 of them had been adopted out, continuing the stream of 208,000 BLM horses and burros that have been placed with private owners since 1973. The remainder left in BLM holding facilities were to be offered for adoption three times before being deemed unadoptable and made available for unrestricted sale. Until the December 2004 legislation, unadoptable horses were kept as government property for the remainder of their lives. The BLM's 2005 budget for the Wild Horse and Burro Program was $39.6 million, with $20.1 million used to maintain gathered animals in short- and long-term holding facilities. The legislation allowing unrestricted sale was intended to eliminate the expense of lifetime care for the unadoptables.

Where it has jurisdiction over national seashores, the National Park Service (NPS) either removes feral horses there as non-native species or attempts to maintain barrier island horse populations at levels that do not harm the ecological balance. On Assateague Island, for instance, the NPS now uses contraceptive injections to reduce the Maryland herd's reproduction rate to maintain a population of 150 adults (Kirkpatrick 2005). On the Virginia portion of Assateague, the Chincoteague Volunteer Fire Company conducts an annual July “pony penning” to cull that herd to the same target number (NPS 2003).

Horse herds on barrier islands farther down the coast have met with a patchwork of population-control measures as coastal development...
has overrun their ranges, and awareness of their damage to the fragile barrier-island ecology has grown. Over the years some herds have been removed entirely from the islands, others have been fenced away from the new communities built on their former ranges (with only marginal success), and others still are managed by the NPS or private entities to maintain a viable presence on their historic ranges (Hause 2006). If the various target populations have been met and maintained, the current horse population on barrier islands along the Atlantic coast appears to number around a thousand, a far cry from the National Geographic Society’s 1926 estimate of six thousand wild horses roaming the Outer Banks just from Currituck to Shackleford (Hause 2006).

Government agencies now manage most unowned horses roaming free on public lands. The BLM’s 2005 fiscal year count of wild horses in ten Western states was 27,369; the number of wild burros ranging in five of those states totaled 4,391 (BLM 2005). With the East Coast barrier horses added in, approximately 33,000 free-roaming equidae are currently in the United States. Another 27,000 are living as wards of the state, so to speak, in holding facilities, for a total feral/once-feral population of 60,000.

“Invisible” Populations

As large as horses are, they do go undetected by government and association enumerators alike. An untold number of equidae live as pets or pensioners in places, such as semisuburban smallholdings, not normally associated with livestock keeping, and many urban centers have an equestrian presence, such as police horses, riding stables, and carriage operators, that exists outside the norm. Other equidae “hide” amid a menagerie of critters on hobby farms or as work animals on secluded properties. Not all horse owners compete, register, join up, subscribe, or shop for horsey things and thus reveal their whereabouts for enumerators. If these “below the radar” animals equal just 1 percent of the known equine population of the country, that’s another hundred thousand added to the true total.

Two more definable equine populations are most likely underreported because they are legally and/or culturally outside the American mainstream.

Horses on Indian Reservations

These horses throughout the country actually live in sovereign lands and thus are not directly subject to state or national regulation or oversight. Many Western tribes maintain large numbers of horses for stock work on their range lands and also because of deep cultural and ceremonial significance attached to the species. For the 2002 agricultural census, which did survey reservations, NASS performed a special enumeration of Native American farms/ranches and merged those results with full reservation data to produce “Appendix B,” detailing the agricultural characteristics of American Indian and Eskimo farm operations.

According to NASS, Native Americans on 12,174 properties producing $1,000 or more in agricultural goods owned 115,464 horses in 2002 (USDA 2002). Yet because reservation horses are often handled as communal property rather than individually owned and because large herds on Plains and Western reservations are often managed as range animals, that enumeration may be very approximate. For instance, the NASS count given for horses on Indian-operated ranches in Washington State in 2002 was 4,018, yet that statewide figure is less than the 5,000 reported by a newspaper writer in 2004 for the Yakima Indian Reservation alone (Palmer 2004). By BLM standards Washington State has no “wild” horses because they are not on BLM-managed federal lands, but the herds kept on the vast reservation acreages there and throughout the West and the Plains are certainly less clearly defined and probably more numerous than the NASS count suggests.

Amish Horses, Mules and Donkeys

These are canvassed for NASS enumerations, as long as they are on properties that meet the $1,000 production standard. While the majority of the Amish in communities now spread across twenty-five states do remain in agricultural production to some degree, members are increasingly turning to carpentry, manufacturing, and other nonfarm work for their livelihoods (Milicia 2004), thus removing them from the NASS survey pool. With church tenants holding them separate from the “English” (non-Amish) world, Amish horse owners may not respond readily to agricultural censuses and are unlikely to have any presence at all in other forms of polling.

In lieu of reliable enumeration, the current number of Amish horses and mules can be estimated by applying the horse-to-human ratio that existed in premotorized America. In 1910, two years after the first Model T rolled onto the roads, there were 24,042,882 horses/mules and 92,228,496 people for a 1:3.8 ratio. Today’s Amish population, 70 percent of which lives in Ohio, Pennsylvania, and Indiana, is estimated to number around 180,000 and is rapidly growing (Milicia 2004). If this statistical time travel has validity, there are at least 47,000 Amish horses and mules in the United States.
How Many U.S. Horses Are There?
Although current equine enumerations can be faulted for limitations in their focus, methodology, and results, their data, considered cumulatively, point to the accuracy of the American Horse Council estimate. Projecting the AHCF horse population figure for 2003 two years into the future (1.3 percent growth in '04 and '05 = 9,464,200), and adding overlooked ponies and asses (200,000), the country’s feral equidae (60,000) and the “invisible” populations (200,000) produce a figure of 9,924,000 for the 2006 U.S. equine population.

The Future
With institution of a National Animal Identification System by 2010, all uncertainty should be removed from the equine-counting business. In the planning stages as of 2006, this USDA initiative will permit tracking of all U.S. livestock from first breath to last for the sake of disease control and bioterrorism protection. Each animal will be identified through a standard coding system indicating place of origin, along with an individual identifier. Microchipping is the likely technology that will be applied to equidae, reporting all horses, ponies, and asses to a single database where population figures will be actual hooves-on-the-ground numbers, not statistical extrapolations.

What Does the U.S. Equine Population Look Like?
In a random encounter with a member of the equine species in the United States, this is the most likely sighting throughout much of the country: a riding horse, standing about fifteen hands (sixty inches measured at the shoulders), either female (a mare) or neutered male (a gelding)—but certainly not a stallion—probably sorrel, tending toward a stocky build and ranging in age between five and twenty. The random animal’s breeding, usually discernible to experienced horsepeople by its physical characteristics, or conformation, would most likely be quarter horse, the country’s preponderant type by all measures. The second most likely encounter would be with a somewhat more streamlined-looking horse in a “plain brown wrapper”—a sixteen-hand bay or dark brown Thoroughbred type, with perhaps a touch of white on face and foot.

But in the United States, diversity rules the equine as well as the human population, so that random sighting might instead be of a four-foot-tall critter with a white and brown coat, very long ears, a bray, not a neigh, and registration papers from an organization called the American Council of Spotted Asses. Or the sighting could be of a large, high-headed black horse with feathery legs and flowing mane hitched to a cart: a Friesian, one of many imported sorts increasingly brought into the country by horsepeople seeking something more exotic than the prevailing breeds for activities outside the norm. The United States unquestionably has the most variegated collection of equidae on earth. The American Horse Council’s Horse Industry Directory listed 106 registries for horses, ponies, or asses (AHCF 2003). Some are multiples drawing registrations from the same pool of animals, but an equal number of smaller organizations probably missed out on inclusion in the directory.

Breed Registries
Of the hundred or so U.S. registries, most record bloodlines to maintain a “pure” genetic pool by requiring that newly registered animals be the offspring of two parents who are already in the studbook. The original purpose of recording livestock bloodlines and maintaining them generation after generation was to give breeders information with which they could make mating decisions that would improve their animals’ production and performance. Today DNA testing is required by the more rigorous organizations to assure authenticity of parentage. The Thoroughbred studbook (The Jockey Club), started in England in the early seventeenth century, is the oldest and most carefully maintained of any, closely guarding the bloodlines and racing data of the breed. Other studbooks are “open,” meaning that occasional outcrossing is allowed with a few other specified breeds. The quarter horse studbook, for instance, has permitted matings with Thoroughbreds, among others, particularly in producing racing stock. Crossbred registries either specify one type of mating pattern (for instance, Andalusian + quarter horse = Azteca horse, a registrable “breed”) or register any type of offspring from the specified purebred parent (for example, the half-Arabian registry).

In addition to or in lieu of recording by bloodline, breeds are now defined by other parameters. Almost a quarter of the registries listed in the AHCF directory accept horses on the basis of physical appearance, usually coloration, such as palomino and buckskin, or marking patterns, such as Appaloosas and pintos, but there’s even a registry for curly-haired horses. Pony and miniature registries restrict entry by height as well as parentage. Gaited horses who move in a variety of less common footfall patterns, with names like walker, paso, singlefoot, mangalarga, and foxtrotter, belong to a subset of registries that have increased in popularity along with recreational horse use because they produce a bounce-free ride. Sports and activities, such as flat and harness racing and performance/sport horses bred for eventing and jumping, are the organizing principle for some of the oldest and some of the newest registries. Finally, historically significant and geographically distinc-
tive horses get their own associations, including Spanish mustangs, Icelandic horses, and a recreated medieval charger going under the name Spanish-Norman horse. In the modern proliferation of equine registries, record-keeping more often has to do with membership services and show-ring results than with actual breed improvement.

**Registry Tallies**

Tracking the tallies of annual registrations entered into the nine major U.S. registries is one way of profiling the national equine population. Viewing registration trends over time provides insights into the waxing and waning of particular horse types and equestrian interests. In both 2006 and throughout the past decades, American Quarter Horse Association (AQHA) reg-

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**Table 2**

**Annual New Registrations for the Nine Largest U.S. Horse Breed Registries**

<table>
<thead>
<tr>
<th>Year</th>
<th>Quarter Horse</th>
<th>Paint</th>
<th>Thoroughbred</th>
<th>Arabian</th>
<th>Appaloosa</th>
<th>Standardbred</th>
<th>Tennessee Walking Horse</th>
<th>Saddlebred</th>
<th>Morgan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>94,445</td>
<td>5,655</td>
<td>27,551</td>
<td>18,797</td>
<td>19,316</td>
<td>13,929</td>
<td>6,212</td>
<td>3,855</td>
<td>3,700</td>
</tr>
<tr>
<td>1983</td>
<td>168,346</td>
<td>14,626</td>
<td>43,787</td>
<td>18,391</td>
<td>22,184</td>
<td>20,298</td>
<td>7,561</td>
<td>2,787</td>
<td>5,317</td>
</tr>
<tr>
<td>1985</td>
<td>157,360</td>
<td>12,692</td>
<td>46,635</td>
<td>30,004</td>
<td>16,189</td>
<td>18,384</td>
<td>7,812</td>
<td>4,351</td>
<td>4,538</td>
</tr>
<tr>
<td>1988</td>
<td>128,352</td>
<td>14,929</td>
<td>45,256</td>
<td>24,578</td>
<td>12,317</td>
<td>17,393</td>
<td>8,400</td>
<td>3,811</td>
<td>3,526</td>
</tr>
<tr>
<td>1989</td>
<td>NA</td>
<td>14,930</td>
<td>44,250</td>
<td>21,723</td>
<td>10,746</td>
<td>16,896</td>
<td>8,850</td>
<td>3,708</td>
<td>3,732</td>
</tr>
<tr>
<td>1990*</td>
<td>115,000</td>
<td>15,000</td>
<td>40,333</td>
<td>13,000</td>
<td>10,000</td>
<td>15,000</td>
<td>8,000</td>
<td>3,700</td>
<td>3,400</td>
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<tr>
<td>1991</td>
<td>101,390</td>
<td>18,648</td>
<td>38,149</td>
<td>12,993</td>
<td>9,902</td>
<td>13,617</td>
<td>8,092</td>
<td>3,570</td>
<td>3,392</td>
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<tr>
<td>1992</td>
<td>102,843</td>
<td>22,396</td>
<td>35,050</td>
<td>12,544</td>
<td>10,033</td>
<td>13,029</td>
<td>8,123</td>
<td>3,048</td>
<td>2,408</td>
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<tr>
<td>1993</td>
<td>104,876</td>
<td>24,220</td>
<td>33,820</td>
<td>12,349</td>
<td>9,079</td>
<td>12,086</td>
<td>7,510</td>
<td>3,353</td>
<td>3,120</td>
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<tr>
<td>1994</td>
<td>106,017</td>
<td>27,549</td>
<td>32,117</td>
<td>12,962</td>
<td>10,104</td>
<td>12,204</td>
<td>7,856</td>
<td>3,192</td>
<td>3,038</td>
</tr>
<tr>
<td>1995</td>
<td>107,332</td>
<td>34,846</td>
<td>31,882</td>
<td>12,398</td>
<td>10,903</td>
<td>10,918</td>
<td>9,450</td>
<td>2,300</td>
<td>3,063</td>
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<td>1996</td>
<td>108,604</td>
<td>41,491</td>
<td>32,242</td>
<td>11,645</td>
<td>10,067</td>
<td>11,589</td>
<td>10,991</td>
<td>2,142</td>
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<td>1997</td>
<td>110,714</td>
<td>50,440</td>
<td>32,115</td>
<td>11,594</td>
<td>11,030</td>
<td>11,336</td>
<td>12,256</td>
<td>2,193</td>
<td>3,415</td>
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<td>1998</td>
<td>125,308</td>
<td>55,356</td>
<td>32,944</td>
<td>11,320</td>
<td>9,100</td>
<td>10,881</td>
<td>13,250</td>
<td>2,952</td>
<td>3,100</td>
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<tr>
<td>1999</td>
<td>135,528</td>
<td>62,186</td>
<td>33,838</td>
<td>11,501</td>
<td>10,099</td>
<td>11,183</td>
<td>13,375</td>
<td>2,705</td>
<td>3,220</td>
</tr>
<tr>
<td>2000</td>
<td>145,936</td>
<td>62,511</td>
<td>34,719</td>
<td>9,660</td>
<td>10,906</td>
<td>11,281</td>
<td>14,387</td>
<td>2,908</td>
<td>3,654</td>
</tr>
<tr>
<td>2001</td>
<td>150,956</td>
<td>56,869</td>
<td>34,705</td>
<td>9,266</td>
<td>9,322</td>
<td>11,261</td>
<td>14,479</td>
<td>3,050</td>
<td>3,475</td>
</tr>
<tr>
<td>2002</td>
<td>156,199</td>
<td>60,000</td>
<td>32,941</td>
<td>9,394</td>
<td>9,092</td>
<td>11,699</td>
<td>14,865</td>
<td>2,931</td>
<td>3,976</td>
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<tr>
<td>2003</td>
<td>160,980</td>
<td>51,000</td>
<td>33,671</td>
<td>9,400</td>
<td>9,200</td>
<td>11,050</td>
<td>14,978</td>
<td>2,578</td>
<td>2,938</td>
</tr>
<tr>
<td>2004**</td>
<td>162,590</td>
<td>52,000</td>
<td>34,070</td>
<td>9,000</td>
<td>9,200</td>
<td>11,500</td>
<td>15,000</td>
<td>3,200</td>
<td>3,500</td>
</tr>
<tr>
<td>2005**</td>
<td>165,000</td>
<td>44,000</td>
<td>34,070</td>
<td>8,000</td>
<td>7,000</td>
<td>11,000</td>
<td>13,500</td>
<td>3,000</td>
<td>3,400</td>
</tr>
</tbody>
</table>

*Approximate, except for Thoroughbred.

**Registry estimates.

registrations exceeded all others by
tens of thousands (Tables 2 and 3).

The American Paint Horse Associ-
ation (APHA), formed in 1965 to
register quarter horse types with
more white coat markings than are
permitted for AQHA registration, is
now the second-largest breed reg-
istry. During the past fifteen years,
registered quarter horses and paints
combined made up almost three-
quarters of all registrations in that
nine-breed cohort. It is safe to say
that the multipurpose, American-
made breed derived from bloodlines
that excelled in sprint racing during
colonial days (hence the “quarter
mile” designation), then seasoned
as stock horses on the Western
ranges represents the preferred
using type for today’s American
owner. Quarter horses are just what
the recreational market wants:
medium in size, comparatively easy-
going and low maintenance, and
capable of performing a variety of
activities, particularly as the registry
has allowed outcrossing to create
the more streamlined physiques
favored in the “English” disciplines
(an equestrian style based on a flat
saddle that includes hunters,
jumpers, dressage, and polo, and
“saddlesseat” style riding) to the
original, stockier cattle-horse type.

Breed Numbers
Quarter horse/paint dominance is
indisputable, but the diverse U.S.
equine population cannot be char-
acterized by registration numbers
alone. Despite the opportunities to
“paper” just about any variety of
equid, a portion of the population—
probably a significant one—was
never registered, or its registrations
have gotten lost with changes of
ownership. Membership and regis-
tration fees are expensive, and the
majority of Americans are involved
in horse activities that don’t require
registry/association affiliation, thus
papers are not a compelling need
throughout the horse-owning popu-
lation. The AHC economic impact
study, supported largely by the
Thoroughbred and quarter horse
associations, characterized the
makeup of the 2003 U.S. horse pop-
ulation using only three broad pro-
nodes: Thoroughbred, quarter horse,
and “other,” which included other
registered and nonregistered horses. The survey respondents
reported ownership for 2003 in the
following proportions (AHC 2005):

- Thoroughbred—14 percent,
or 1,291,807
- Quarter horse—35.6 percent,
or 3,288,302
- Other horses—50.3 percent,
or 4,642,739

Identical 50–50 proportions for
the combined Thoroughbred-quarter
horse cohort and the other-horse
group were also found by the only
scientific survey yet done of the U.S.
equine population and its manag-
ment, conducted in 1998 for the
USDA’s National Animal Health Mon-
itoring System (NAHMS) (USDA
1998). However, the 1998 sample of
owners, selected from twenty-eight
states accounting for 78 percent of
the national equine population enu-
merated by NASS for 1992, reported
an even greater concentration of
quarter horses—40 percent—than
the more recent AHC study. The
NAHMS survey included all equidae
found on U.S. properties and de-
tailed the “other horses” that were
lumped together in the AHC study.

Table 4 shows the NAHMS-deter-
mined composition of the U.S.
equine population by type and breed
as percentages of the total and as
current head counts, based on a
2005 population of ten million.

Comparison of Tables 3 and 4
shows little agreement between

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fifteen-Year Total Registrations for Nine Major U.S. Registries, 1991–2005</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Association Registry</th>
<th>Total</th>
<th>Percentage of Nine-Breed Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Quarter Horse Association</td>
<td>2,844,273</td>
<td>59.6</td>
</tr>
<tr>
<td>American Paint Horse Association</td>
<td>663,512</td>
<td>13.9</td>
</tr>
<tr>
<td>The Jockey Club (Thoroughbreds)</td>
<td>506,333</td>
<td>10.6</td>
</tr>
<tr>
<td>U.S. Trotting Association (Standardbreds)</td>
<td>174,634</td>
<td>3.7</td>
</tr>
<tr>
<td>Tenn. Walking Horse Breeders’ and Exhibitors’ Association</td>
<td>178,112</td>
<td>3.7</td>
</tr>
<tr>
<td>Arabian Horse Registry of America</td>
<td>164,026</td>
<td>3.4</td>
</tr>
<tr>
<td>Appaloosa Horse Club</td>
<td>145,037</td>
<td>3.0</td>
</tr>
<tr>
<td>American Morgan Horse Association</td>
<td>48,752</td>
<td>1.0</td>
</tr>
<tr>
<td>American Saddlebred Horse Association</td>
<td>44,142</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,768,821</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Calculations from Table 2.
the population percentages in the two lists, but they diverge most strikingly for quarter horses and paints. The NAHMS quarter horse percentage derived from owner data was 20 percentage points lower than the registry’s share of the nine-breed total; for paints the farm count was 5.4 percent, while the registry proportion equaled 13.4. Only the Standardbred was close to the same percentage on both lists, while the remaining specified breeds were a little to a lot higher on the farm than the registry numbers would indicate.

One explanation for this disparity is the methodologies. Registries attempt to keep an exact count of each year’s new entries; the NAHMS percentages derived from a sample consisting of fewer than three thousand respondents taken from little more than half the states. Yet a more significant reason for the differences is probably timing. Since the 1998 survey was conducted, AQHA and APHA have experienced strong growth, while most of the remaining registries have nudged upward very little, remained steady, or declined.

The three windows onto U.S. breed numbers seem impossibly contradictory when actual population figures are compared. Taken at face value, the breed populations produced by NAHMS percentages and the two breed counts specified in the AHC study cannot be reconciled with reality. Even if every single quarter horse and Thoroughbred registered in the past fifteen years were alive today, there would still have to be an additional 643,577 surviving older registered quarter horses and another 394,327 aged Thoroughbreds to fulfill the NAHMS percentage allotments. The overages are flipped using AHC calculations: 444,000 for quarter horses and 785,400 for Thoroughbreds. All of the other breed counts derived from NAHMS percentages exceed the cumulative registry figures as well.

Horses do not really have to be immortal to make these numbers work. The more realistic explanation for the breed population inflation reflected in survey results is recreational horse owners’ disregard for the formal papering process. When questioned, as they were on both surveys, about how many of each breed they own, they usually respond with the animals’ known or suspected origins, not strictly with their registration status. Given this tendency to report by type, not registry affiliation, the U.S. horse population probably has a much greater proportion of unregistered horses than the 9 percent designated “other, not registered” in the NAHMS results. That particular group probably includes primarily horses, often called “grade,” who are of unknown origin and no discernible type. All others are probably enumerated in whatever standard breed category they most closely resemble.

**Special Populations**

The NAHMS study was uncommonly inclusive and provides a useful glimpse of less visible equidae found on U.S. equestrian properties. The nonhorse group, including ponies, miniature horses, and asses, represented little over 10

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**Table 4**


<table>
<thead>
<tr>
<th>Type/Breed</th>
<th>Percentage of Population</th>
<th>Approximate Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donkeys/burros</td>
<td>2.7</td>
<td>270,000</td>
</tr>
<tr>
<td>Mules</td>
<td>2.0</td>
<td>200,000</td>
</tr>
<tr>
<td>Miniature horses</td>
<td>1.6</td>
<td>160,000</td>
</tr>
<tr>
<td>Ponies</td>
<td>5.4</td>
<td>540,000</td>
</tr>
<tr>
<td>Horses</td>
<td>88.3</td>
<td>8,830,000</td>
</tr>
<tr>
<td>Quarter horse</td>
<td>39.5</td>
<td>3,487,850</td>
</tr>
<tr>
<td>Thoroughbred</td>
<td>10.2</td>
<td>900,600</td>
</tr>
<tr>
<td>Other, registered</td>
<td>9.1</td>
<td>803,530</td>
</tr>
<tr>
<td>Other, not registered</td>
<td>9.0</td>
<td>794,700</td>
</tr>
<tr>
<td>Arabian</td>
<td>7.8</td>
<td>688,740</td>
</tr>
<tr>
<td>Appaloosa</td>
<td>5.9</td>
<td>520,970</td>
</tr>
<tr>
<td>Paint</td>
<td>5.4</td>
<td>476,820</td>
</tr>
<tr>
<td>Draft</td>
<td>4.8</td>
<td>423,840</td>
</tr>
<tr>
<td>Tenn. Walking Horse</td>
<td>4.8</td>
<td>423,840</td>
</tr>
<tr>
<td>Standardbred</td>
<td>3.5</td>
<td>309,050</td>
</tr>
</tbody>
</table>

*Based on a current total equine population of ten million.

Source: USDA (1998)
percent of the equine population on the surveyed properties in 1998. Miniature horses, which constituted the smallest fraction at 1.6 percent, are clearly the growth group in this niche. Between 1992 and 2001, the American Miniature Horse Association recorded 83,361 new registrations, with the trajectory being upward throughout the decade (AHC 2003). Even though they were the smallest population recorded by NAHMS in 1998, annual registrations of these pet equidae now exceed those for Arabians, Appaloosas, saddlebreds, and Morgans.

**Age Characteristics**

Equidae are quite long-lived compared to livestock and small-pet species. They commonly live into their twenties, even into their forties and beyond. According to the Guinness Book of World Records, the oldest documented horse was sixty-two, the oldest pony, fifty-five (Equine World Records 2006). Health-care advances and ownership attitudes have combined to extend the average life span of recreational/companion equidae. In a 2000 special report on the aged equine population, EQUUS magazine reported that, according to their registries, 52 percent of Arabians and 57 percent of Morgans were over fifteen years of age, compared to 30 percent of quarter horses, 25 percent of saddlesbreds, and 15 percent of paint horses and Standardbreds (EQUUS 2000). In general, breeds registering an increasing number of animals in the last five to ten years would have a younger population than would those with declining registrations in the most recent decade.

The Standardbred youthfulness does not reflect recent breed growth, however. Instead, it is the consequence of the relatively short productive life of racehorses. Standardbreds tend to race longer than Thoroughbreds, but even then a trotter or pacer still competing at age twelve is considered an old-timer. Unless the retired Standardbred is used for breeding—not an option for geldings—he or she must be converted to pleasure or carriage use or disposed of. As riding animals, retired Thoroughbred runners may have more opportunities for second careers as performers in other sports or as recreational animals, but temperamentally they are not always suitable for pleasure mounts.

The NAHMS survey excluded race-track populations from its analysis of age patterns in 1998. At that time the survey group fell into the following age ranges (USDA 1998):

- 58.8 percent were five to twenty years of age, the horse’s average working life;
- 23 percent were eighteen months to five years, the maturing and training period;
- 8.9 percent were six to eighteen months, horse adolescence, so to speak;
- 7.8 percent were twenty or more years old, generally retirement time;
- 1.3 percent were under six months, the period foals are normally at their mothers’ side; and
- 0.5 percent were of unknown age. When applied to a current equine population of ten million, these percentages would produce the following age profile:
  - 8,180,000 of training and using age;
  - 1,020,000 under using age; and
  - 780,000 over age twenty and likely in retirement.

The different equid types in the 1998 sample had some quite distinctive age patterns. Horses, making up nearly 90 percent of the sample, were right on the norm in all age groups. Ponies were the most aged, with twice the percentage (15.2) of over-twenties and half the percentage (0.6) of sucklings in their numbers, though they were close to the average in the five-to-twenty age group. Mules also lacked an up-and-coming population, with only 13.8 percent under age five, compared to the 33.2 percent of the total sample and an exceptionally high percentage—81.7—in the five-to-twenty group and only 4.3 percent over age twenty. Miniature horses and donkeys were well outside the age norms in the opposite direction (though the small sample sizes leave room for larger standard errors): nearly half of each group was in the eighteen-month to five-year group, and they exceeded the norms for the two younger groups as well; their percentages in the over-20 group were markedly less than the norm (2.7 for minis; 0.9 for donkeys).

Today’s equine age profile no doubt follows the same basic bell curve, but the percentages are likely to have undergone some adjustments. Except for quarter horses and paints, production in the larger American breeds has been pretty flat or in decline for the past decade or longer. That would indicate an overall aging of the population. Yet the loss of business in established breeds may simply mean that American tastes/interests have splintered off in many new directions, where smaller breeds registering a few hundred horses annually and importation of “exotics” from other countries are taking up the production slack. Another possibility in the slowing of established registries is an increase in “backyard” cross-breeding. Pleasure owners have a propensity to grow one or two of their own from a favorite companion mare. The motive usually has more to do with sentiment than producing to a breed standard, and registrations would not be sought across the board.

**The Future**

As of mid-2006, NAHMS was in the process of preparing to publish a 2005 version of its horse management and health survey. It will be interesting to see how the current from-the-farm population profiles differ from the 1998 findings in
light of changing production patterns of registered stock during the intervening years, shifts in minor populations, particularly of miniature horses, and the aging—or not—of U.S. equidae.

**Where Do U.S. Horses Live?**

Ranking states by the numbers of horses residing within their boundaries is the usual way of examining equine population patterns and their significance. Both the AHC’s national economic impact study and numerous state-generated economic valuations use raw horse numbers as primary data on which all other calculations are based. It makes sense that the more horses who are maintained within a state, the more economic activity will take place around them. Reclined by head count only (AHCF 2005), the top ten horsiest places in the country are

1. Texas 978,822 horses
2. California 698,345
3. Florida 500,124
4. Oklahoma 326,134
5. Kentucky 320,173
6. Ohio 306,898
7. Missouri 281,255
8. North Carolina 256,269
9. Pennsylvania 255,763
10. Colorado 255,503

The USDAs equine-specific census of 1998 and 1999 arrived at a rather different state ranking based on its population estimates (USDA 1999). None of the state figures below is in any way comparable to the AHC’s numbers (see the earlier discussion concerning methodologies):

1. Texas 600,000
2. California 240,000
3. Tennessee 190,000
4. Florida 170,000
5. Pennsylvania 170,000
6. Oklahoma 170,000
7. Ohio 160,000
8. Minnesota 155,000
9. New York 155,000
10. Washington 155,000

The NAHMS study, another USDA effort but concerned not so much with enumeration as with surveying horse management practices for health-monitoring purposes, reported 1998 population patterns by region (USDA 1998):

- Ten southern states, including Texas, Florida, Oklahoma, and Kentucky, accounted for 40 percent of the surveyed equine population.
- Seven Western states, including California and Colorado, accounted for 26 percent.
- Seven North-Central states, including Missouri, accounted for 20 percent.
- Four Northeastern states, including Ohio and Pennsylvania, accounted for 13 percent.

Any useful assessment of location’s effects on the lives horses lead has to take into account more than raw population numbers. The very largest states in terms of land area are going to hold more horses than the medium to small states, but are horses also a large presence to the human population in the very large state and of little significance in the small state? The state tallies by themselves don’t say. A more meaningful approach is to add two more factors to the analysis: how many horses and how many people are on how much land? Viewed through this multifocal lens, the U.S. horse population looks quite different (Table 5).

The top ten horsiest states in terms of number of horses per square mile of land area are

1. Maryland 15.6 per square mile of land
2. New Jersey 11.2
3. Connecticut 10.7
4. Florida 9.3
5. Kentucky 8.0
6. Ohio 7.5
7. Virginia 6.0
8. Indiana 5.7
9. Pennsylvania 5.7
10. North Carolina 5.3

Someone driving through Maryland would be twice as likely to encounter horses as would someone traveling through Kentucky, and New Jersey and Connecticut residents live with readier geographical access to horses than do residents of Texas and California.

The human-to-horse ratio defines the states’ horsiness in yet another way. The ten locales with the fewest number of people for every horse are

1. Wyoming 5.1 people per horse
2. South Dakota 6.4
3. Montana 7.1
4. Idaho 8.8
5. North Dakota 10.7
6. Oklahoma 10.8
7. Nebraska 11.6
8. New Mexico 12.9
9. Kentucky 12.9
10. Iowa 14.8

Residents in these ten states are far more likely to have direct contact with horses than are people in more populous areas. Kentucky is the anomaly in the listing for not being a wide-open-spaces Plains or Western state. Human-to-horse ratio is better proof than the head count alone that a state is truly a horsey area. In all the other low-ratio states, both the human and equine populations are sparse. Even then, the two species knocking around in an expansive land area have closer associations than do tiny Rhode Island’s 308 people for every one horse.

New England, home of less than 2 percent of the national horse population is, far and away, the least horsey area in the forty-eight contiguous states. Expanding the region to coincide with the U.S. Census Bureau’s Northeast designation by including much horser New York and Pennsylvania and the little-bit-horser New Jersey improves the horse presence to 8 percent of the national total. At the same time, this region contains 19 percent of the human population (USCB 2000) and includes the nation’s
Table 5
State Horse Population Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Horse Population*</th>
<th>Horses/ Square Mile</th>
<th>Number of People/Horse***</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>9,222,847</td>
<td>2.7**</td>
<td>31.8</td>
</tr>
<tr>
<td><strong>Northeast</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maine</td>
<td>37,854</td>
<td>1.2</td>
<td>34.8</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>37,529</td>
<td>4.8</td>
<td>171.0</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>3,509</td>
<td>3.4</td>
<td>308.0</td>
</tr>
<tr>
<td>Vermont</td>
<td>24,540</td>
<td>2.7</td>
<td>25.3</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>14,651</td>
<td>1.6</td>
<td>88.5</td>
</tr>
<tr>
<td>Connecticut</td>
<td>51,968</td>
<td>10.7</td>
<td>67.4</td>
</tr>
<tr>
<td>New York</td>
<td>201,906</td>
<td>4.3</td>
<td>95.2</td>
</tr>
<tr>
<td>New Jersey</td>
<td>82,982</td>
<td>11.2</td>
<td>104.8</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>255,763</td>
<td>5.7</td>
<td>48.5</td>
</tr>
<tr>
<td><strong>Southern Region</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delaware</td>
<td>11,083</td>
<td>5.7</td>
<td>74.9</td>
</tr>
<tr>
<td>Maryland</td>
<td>152,930</td>
<td>15.6</td>
<td>36.3</td>
</tr>
<tr>
<td>West Virginia</td>
<td>89,880</td>
<td>3.7</td>
<td>20.2</td>
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<tr>
<td>Virginia</td>
<td>239,102</td>
<td>6.0</td>
<td>31.2</td>
</tr>
<tr>
<td>North Carolina</td>
<td>256,269</td>
<td>5.3</td>
<td>33.3</td>
</tr>
<tr>
<td>South Carolina</td>
<td>94,733</td>
<td>3.1</td>
<td>44.3</td>
</tr>
<tr>
<td>Georgia</td>
<td>179,512</td>
<td>3.1</td>
<td>49.2</td>
</tr>
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<td>Florida</td>
<td>500,124</td>
<td>9.3</td>
<td>34.8</td>
</tr>
<tr>
<td>Kentucky</td>
<td>320,173</td>
<td>8.0</td>
<td>12.9</td>
</tr>
<tr>
<td>Tennessee</td>
<td>206,668</td>
<td>5.0</td>
<td>28.6</td>
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<td>Alabama</td>
<td>148,152</td>
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<td>Mississippi</td>
<td>113,063</td>
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<td>Louisiana</td>
<td>164,305</td>
<td>3.8</td>
<td>27.5</td>
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<tr>
<td>Texas</td>
<td>978,822</td>
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<td>23.0</td>
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<td>Arkansas</td>
<td>168,014</td>
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<td>16.4</td>
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<td>Oklahoma</td>
<td>326,134</td>
<td>4.7</td>
<td>10.8</td>
</tr>
<tr>
<td><strong>Midwest Region</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Ohio</td>
<td>306,898</td>
<td>7.5</td>
<td>37.3</td>
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<tr>
<td>Michigan</td>
<td>234,477</td>
<td>4.1</td>
<td>43.1</td>
</tr>
<tr>
<td>Indiana</td>
<td>202,986</td>
<td>5.7</td>
<td>30.7</td>
</tr>
<tr>
<td>Illinois</td>
<td>192,524</td>
<td>5.7</td>
<td>66.0</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>176,636</td>
<td>3.3</td>
<td>30.8</td>
</tr>
<tr>
<td>Minnesota</td>
<td>182,229</td>
<td>2.3</td>
<td>28.0</td>
</tr>
<tr>
<td>Missouri</td>
<td>251,255</td>
<td>4.1</td>
<td>20.5</td>
</tr>
<tr>
<td>North Dakota</td>
<td>59,391</td>
<td>0.9</td>
<td>10.7</td>
</tr>
<tr>
<td>South Dakota</td>
<td>120,878</td>
<td>1.6</td>
<td>6.4</td>
</tr>
<tr>
<td>Iowa</td>
<td>199,220</td>
<td>3.6</td>
<td>14.8</td>
</tr>
<tr>
<td>Nebraska</td>
<td>150,891</td>
<td>2.0</td>
<td>11.6</td>
</tr>
<tr>
<td>Kansas</td>
<td>178,651</td>
<td>2.2</td>
<td>15.3</td>
</tr>
<tr>
<td><strong>Western Region</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Mexico</td>
<td>147,181</td>
<td>1.2</td>
<td>12.9</td>
</tr>
<tr>
<td>Arizona</td>
<td>177,124</td>
<td>1.6</td>
<td>32.4</td>
</tr>
<tr>
<td>Nevada</td>
<td>51,619</td>
<td>0.5</td>
<td>42.1</td>
</tr>
<tr>
<td>Colorado</td>
<td>255,503</td>
<td>2.5</td>
<td>18.0</td>
</tr>
<tr>
<td>Utah</td>
<td>120,183</td>
<td>1.5</td>
<td>19.9</td>
</tr>
<tr>
<td>Idaho</td>
<td>158,458</td>
<td>1.9</td>
<td>8.8</td>
</tr>
<tr>
<td>Montana</td>
<td>129,997</td>
<td>0.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Wyoming</td>
<td>99,257</td>
<td>1.0</td>
<td>5.1</td>
</tr>
<tr>
<td>California</td>
<td>698,345</td>
<td>4.5</td>
<td>51.4</td>
</tr>
<tr>
<td>Oregon</td>
<td>167,928</td>
<td>1.7</td>
<td>21.4</td>
</tr>
<tr>
<td>Washington</td>
<td>249,964</td>
<td>3.8</td>
<td>24.8</td>
</tr>
<tr>
<td>Alaska</td>
<td>11,449</td>
<td>0.0****</td>
<td>57.2</td>
</tr>
<tr>
<td>Hawaii</td>
<td>8,037</td>
<td>1.3</td>
<td>157.0</td>
</tr>
</tbody>
</table>

*AHCF (2005).
**Land area for forty-eight contiguous states.
***USCB (2004).
****Fewer than 0.1 percent.
**Culture and Climate**

Physical space in a state or region is a major equine population determinant, but human demand decides the density rate. Maine, with its smallholdings of poor agricultural land and New England rectitude, has a comparatively short history with horses as work animals and as recreational presences. Its climate does not invite year-round horse enjoyment or make horse keeping an easy, inexpensive venture. Mainers would apparently rather be sailing or snowshoeing than horseback riding. Vermont’s distinction as the birthplace of the Morgan breed and continued home of its registry probably contributes to that state’s greater equestrian involvement. Marylanders have no demographic reasons for their higher-than-average horse interest. They live in the most densely populated state outside the Northeast, ranking fifth in the country, with 541.9 people per square mile. With less than a third the land area of Maine, Maryland has four times its horse population and the nation’s highest horse density. The small state’s more congenial climate and better soil are factors, but its historical associations with horse sports back to the colonial era have encouraged commercial horse production and professional operations, and well-paid workers in two major metropolitan areas have the disposable income to spend on horse enjoyment.

A warm climate apparently has greater appeal to horse owners overall than do large incomes. Horses themselves adapt quite well to cold climates and are probably healthier in the north, where there’s less opportunity for biting insects to spread several serious equine diseases and where heat-associated conditions, infections, and skin disorders are less common. But horses cluster where people want to use/enjoy them, primarily in outdoor activities, and the greatest concentration of the U.S. equine population—41 percent—is in the Southern region (AHCF 2005), where only 36 percent of the U.S. population lives (USCB 2000). In twelve of the sixteen Southern states, the median household income in 1999 was a little—or a lot—lower than the national median (USCB 2000). Along with its warmth, the Southern region is historically horse country from its long and, in some areas, continuing dependence on live horsepower in agricultural and ranch work and its horse-sport-and-socializing legacy.

The eleven Pacific Coast and Mountain states in the Western region and the twelve states in the Midwest region (as defined by USCB, not by the NAHMS study) are closely matched in horse numbers, with 25 and 26 percent, respectively, as well as human population, with 22 and 23 percent, respectively. In the northern tier of states, weather may put a damper on horse enjoyment, but both regions offer boundless space for equestrian activities, and horses have always been an essential element in Western and Midwestern work and culture. In the states in these two regions with the lowest human-horse ratios, the median household incomes in 1999 were also below the national average (USCB 2000). As long as an area has lots of open space, horses are not the luxury items that they are often perceived to be. In fact, a state’s median income appears to be a poor predictor of horseiness, given the fact that New Jersey, Connecticut, Massachusetts, and New Hampshire had among the highest median household incomes in the country in 1999 (USCB 2000) and only a small fraction of its horses.

**Breeds by Region**

Regional breed differences reported in the NAHMS study (USDA 1998) reflect the use patterns and equestrian preferences characteristic of each area:

- Quarter horses were the dominant breed everywhere except the Northeast, where they represented 24 percent of the population, 16 percent less than the norm. If the survey had not included Ohio in this region, the proportion would have been even less.
- Draft breeds made up only 1 and 2 percent of the populations in the Southern and Western regions, respectively, but accounted for 11 percent in the Northeast and 12 percent in the Central region.
- Standardbreds had a negligible presence in the West (0.9 percent) and the South (2.1 percent), but approached 10 percent in the Northeast and 6 percent in the Central region. The inclusion of Ohio as a Northeastern state has distorted the results, as the Standardbred registry is located in Columbus, and the breed has more of a following in the Midwest.
- Thoroughbreds comprised more of the Southern horse population than elsewhere (14.2 percent) and had the smallest presence in the Central states (4.3 percent).
- As could be expected, Tennessee Walking Horses were found in greatest concentration in the Southern region (8.2 percent of the population there), but their second strongest showing was in the Northeast, accounting for 4.3 percent of that area’s population.
- Arabians made up about 10 percent of the horse population in the Northeast, Western, and Central regions, but only 4.5 percent in the South.
- Appaloosas were consistent throughout, ranging from 5 to 7 percent.
- Paints had their greatest concentration in the Northeast, at 8.8 percent, while they accounted for around 5 percent of the rest of the regions.

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As for the nonhorse populations, there were fewer ponies but more miniature horses in the Southern region than there were elsewhere in the country. Mules had the smallest presence in the Northeast and the largest in the West, and donkeys/burros made up 4 percent of Southern equidae but only 1.4 percent of the Western population.

Wild horses and the “invisible” populations are particularly tied to their locales. Table 6 shows the top locations for BLM, reservation, and Amish horses, with population figures where available. In their geographical niches, they are protected from mainstream assimilation and influence.

Where Do U.S. Horses Originate?

Despite economic- and tax-related slumps—and downright slides in some of the major breed registrations starting about twenty years ago—the U.S. horse population has expanded steadily overall since the mid-twentieth century. As some big bubbles burst, particularly for Arabians and Appaloosas, and as racehorse production reversed, particularly for Standardbreds (Table 2), the small and medium breeds just kept on registering babies at the usual rate and sometimes at a little better than that. There was still that host of recreational owners and its every-now-and-then production pattern. The U.S. market has had plenty of horses to go around since the 1960s. Of that number, importation from other countries accounts for only a tiny fraction.

In the past decade, only 19,541 live horses classified as purebred breeding animals, divided about equally between mares and stallions, have come into the country (USDA 2006a). (The remaining 300,000 or so live horses imported during that same period appear to have been brought into the country to go directly to slaughter, although the “nonpurebred” division could include performance horses not intended for breeding [USDA 2006a; FAO 2006].) Instead of shopping elsewhere, the nation’s horsemen grow their own, comparatively few of them on massive farms or ranches producing sometimes more than a hundred foals annually, many more on moderate-size operations with a dozen or two broodmares, and, as discussed earlier, a great many on hobby properties producing occasional foals for personal satisfaction.

Amateur Involvement

Size factors into the high level of amateur involvement in U.S. horse production. In European countries breeding is generally left to the professionals, often with a national standard and performance evaluation to ensure a quality product for specific uses. In the United States, the national tendency toward independence/self-reliance, combined with plenty of rural and semirural land, allows practically anyone with the urge to do so to become a horse breeder. Perusal of reader profiles for four of the country’s largest general interest, all-breeds horse publications supports that assertion:

- 39 percent of EQUUS’s 149,647 subscribers own one or more broodmares (EquiSearch.com 2006).
- Almost half of Horse & Rider’s 169,077 subscribers report owning at least one broodmare (EquiSearch.com 2006).
- One-quarter of Practical Horseman’s 78,224 readers own one or more broodmares (EquiSearch.com 2006).
- One-quarter of Western Horseman’s 181,764 horse-owning readers uses horses for breeding, whether professionally or as a hobby not specified (Western Horseman 2006).

Commercial Producers

The AHC Economic Impact Study examined breeding in only the racing and showing sectors, and then only for its financial implications. Of the country’s approximately eight hundred fifty thousand Thoroughbreds in the racing industry, about half were in training/competition and the other half in the breeding sector, including mature producers, their immature offspring, and horses and stallions returning from the track to become breeding stock. In show horse production, the division between competitors and breeders was not at all even: more than two million were competing, while a third that many were producing new show stock (AHC 2005). Horses bred to race have a much shorter competitive life than do most show and competition horses, so production turnover has to be quicker to keep up a stream of starter horses. Speed over short distances is not enhanced by age, so successful runners are usually at their peak before age five. In other competitive disciplines requiring schooling in behaviors more “sophisticated” than all-out running, age four or five is often the earliest starting point in show careers.

The NAHMS horse management study assessed the prevalence of professional or semiprofessional horse breeders among all equine operations, but the percentage may well have changed in the intervening years. Of all sectors of the horse industry, larger-scale breeders not backed by financial reserves from other sources are most susceptible to economic downturns and financial setbacks. Breeders’ production decisions take place at least two years, and usually longer, before sales can bring in enough cash to cover production costs. Equine gestation lasts eleven months, and the foal is usually four to six months old at weaning. Occasional weanling sales are made, but in the racehorse...
In the response to both oversupply and undersupply. In the former situation, the horses are likely to be caught in the squeeze when they cannot be sold, and bills for their care continue to mount.

**Production Trends**

At the time of the NAHMS survey, almost ten years ago, horse production was beginning to regain some momentum after the 1980s bust, which resulted from a combination of unfavorable tax changes, recession in the oil industry and the U.S. economy, and deflation of hyped markets for some fancy show stock (Kilby 1989). The survey identified 5.2 percent of the sampled operations with breeding as their primary function, the second-smallest sector after boarding/training stables (USDA 1998). At the same time, the horses on these operations made up 14.8 percent of the total, for a higher-than-average per-farm count. As an indicator of U.S. breeding activity, the age profile for U.S. equidae produced by NAHMS raises some questions when examined in light of breed registry figures. Using eight million as a generous estimated national equine population for 1998, the under-six-months group (1.3 percent of the total) would include 104,000 foals on the ground during the polling. Yet the total new registrations (264,211) recorded by just nine registries for that year was more than 2.5 times the number suggested by the NAHMS results.

One explanation for the disparity in foal production figures is the survey procedure, which gathered data through phone interviews between March 16 and April 10, 1998. Although many commercial breeders aim to produce foals in the first quarter of the year for competitive advantage in juvenile races and futurity competitions, May is the peak month for U.S. horse births, which then trail off in June and continue at a low rate into early fall. But even doubling the percentage as compensation still does not add up to the registration indicators of breeding activity in this country. Taking the major breeds’ 1998 total and adding a conservative hundred thousand more for small-breed registrations and the unregistered foals produced in 1998 indicates a 4.6 percent reproduction rate for that year. When applied to the 2003 population (9.2 million), that rate would indicate a foal crop of 423,200. The known registrations

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**Table 6**

Primary Locations of Three Special Equine Populations and Population Numbers, Where Available

<table>
<thead>
<tr>
<th>Bureau of Land Management Horses</th>
<th>Reservation Horses</th>
<th>Amish Horses (top county)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nevada 13,251</td>
<td>Oklahoma 17,826</td>
<td>Ohio (Holmes)</td>
</tr>
<tr>
<td>Wyoming 3,991</td>
<td>Arizona 1,542</td>
<td>Indiana (LaGrange)</td>
</tr>
<tr>
<td>California 3,079</td>
<td>Nevada 1,464</td>
<td>Pennsylvania (Lancaster)</td>
</tr>
<tr>
<td>Oregon 2,670</td>
<td>California 1,228</td>
<td>Maryland (St. Mary’s)</td>
</tr>
<tr>
<td>Utah 2,420</td>
<td>Utah 142</td>
<td>Communities in 20+/- other states</td>
</tr>
<tr>
<td>Oregon 2,670</td>
<td>Montana 8,230</td>
<td></td>
</tr>
<tr>
<td>Utah 2,420</td>
<td>Texas 6,938</td>
<td></td>
</tr>
<tr>
<td>Nevada 13,251</td>
<td>Oregon 15</td>
<td></td>
</tr>
</tbody>
</table>

Sources: BLM (2005); USDA (2002); Milicia (2004).
with the nine major breeds was 265,795, leaving a remainder of 157,405, which would have to be accounted for through unregistered offspring and those entered into smaller studbooks. That remainder may be an inflated version of the production reality for the year, but, clearly, the U.S. foal crop has been closer to 4 percent annually than to 1.3 percent of the total population.

The gender makeup on NAHMS-surveyed equine operations for 1998 (Table 7) shows some interesting differences among the several populations and again raises questions about its portrayal of U.S. horse-reproduction activity.

First, the questions. If 10.6 percent of the surveyed population were pregnant mares (754,720 of an estimated horse population of 7.12 million that year), the outcome would be a virtual population explosion that year. The live foal rate in bred domesticated mares is not 100 percent by any means, but it is no longer the dismal 50 percent posited in the prereproductive technology era (Loch and Massey 2006), so there is no way that many pregnant mares could have produced the likely number of foals born, starting with the 264,000 registered in the nine breeds. That late in their gestations, more than 755,000 pregnant mares would be expected to have at least 650,000 foals running at their sides by season’s end, which, of course, they did not. Two explanations could account for the survey’s divergence from reality: either respondents cited the number of mares on their operations considered to be breeding stock but not all of them were pregnant at that time, or the sample of respondents overrepresented the active breeding sector in the country as a whole. Ten percent of the U.S. horse population may be thought of as broodmares, but they are not cranking out foals every year.

Other than that unlikely percentage of pregnant mares, the most striking feature in the NAHMS gender profile is the reproductive implications for miniature horses. The fact that more than one-quarter of the males remain intact into breeding age is mirrored in the high percentage of pregnant females, a rate that, in this special population, presumably could be true, especially coupled with the upward trend in annual registrations cited earlier. Horse and even pony stallions, with their large size and testosterone-driven behaviors, can range from difficult to dangerous to handle and manage, requiring special housing and separate turnout in most domesticated situations. Apparently minis, weighing much the same as their handlers and standing considerably shorter, do not inspire the same urgency to eliminate the hormone-driven behavior with castration.

Interesting, too, is the above normal number of entire asses (jacks) in the gender profile but without a corresponding rise in pregnant jennies (female asses). It may well be that donkeys/burros are maintained as one-of-a-kinds on most horse properties, whereas miniatures live in pairs or herds. Both of these small populations of small animals are the purest examples of what can be categorized as “pet” equidae, with little use as typically defined. Their diminutive size reduces the danger/difficulty of maintaining the males intact, saves on castration costs, and results in especially cute and not very expensive mini babies. The reproductive picture of these pet horses begins to resemble that of pet dogs and cats.

Reproduction Technologies

The physical risks and management difficulties of dealing with the male half of the reproductive effort has pretty much disappeared through-

<table>
<thead>
<tr>
<th>Table 7</th>
<th>Gender Makeup of a Sample Equine Population, Eighteen Months of Age and Older, 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
</tr>
<tr>
<td></td>
<td>Intact (Stallions)</td>
</tr>
<tr>
<td>Horses</td>
<td>7.4</td>
</tr>
<tr>
<td>Ponies</td>
<td>7.1</td>
</tr>
<tr>
<td>Miniature horses</td>
<td>27.0</td>
</tr>
<tr>
<td>Donkeys/burros</td>
<td>17.8</td>
</tr>
</tbody>
</table>

Note: Remaining percentages in each category “unknown.”

out the equine industry. Horse breeders still produce foals the old-fashioned way by what is called “live cover” (during which both animals are typically under human restraint during the mating to lessen the risk of injury), and some remain even more old-fashioned and “pasture breed,” running a band of ten or so mares with a stallion and letting nature take its course. These two more or less natural methodologies usually result in higher conception rates, but there are more risks of injury—kicks, bites, falls, internal tears—to the animals in the process than some owners care to take. For safety’s sake, many breeders collect semen from stallions and inject it in the mares even when the two mating animals are on the same property. But the real incentives for horse breeders’ interest in manipulated matings is in widening breeding choices that previously were limited by geography and extending reproductive possibilities once limited by biology.

Today any mare owner anywhere who has sufficient funds, a capable veterinarian, and moderate distance to an airport can breed to the best (though stallion owners can insist on a certain quality of mare) by using cooled, live transported semen or, with somewhat less success, thawed frozen semen. Embryo transplantation into surrogate dams allows competition mares to produce a foal or more each year without having to miss any shows or allows good mares with faulty/damaged organs to reproduce. Finally, the births in 2006 of the first commercially cloned horses take equine reproduction to the point where owners can produce exactly the individual they want by making an identical genetic copy of an existing horse.

Regardless of the technology, the goal has been to make a better—or even perfect—racehorse, show horse, polo pony, draft horse, or miniature. Like unplanned matings, planned matings inevitably produce some “worse” along with the “betters,” creating a population of reject animals and spurring another try for the next “better” if not “perfect” horse. The accessibility of modern reproductive technology in U.S. horse breeding, not to mention the expense and management demands on owners who choose to use it, would seem to be strong influences in reducing the wastage of “unwanted” horses produced in this country. If every equine pregnancy is planned so painstakingly and paid for so dearly, each offspring would be all the more valuable than the foals mass-produced each year from mediocre stock in hopes that there will be a standout or two in each crop.

Currently, all breed registries, except for The Jockey Club for Thoroughbreds, allow some form of reproductive manipulation in the matings of their registered stock, if only the use of artificial insemination involving a mare and stallion on the same property. Most studbooks accept foals produced by any of the modern means up to cloning, which is too recent and too uncommon for rule book action. After all, the more foals registered, the better for the association. DNA tests can now assure the parentage of foals no matter how the egg was fertilized or whose uterus nourished the foal. That’s the fundamental concern of all bloodline registries.

How Are U.S. Horses Managed?
When horses manage themselves in free-range situations, their maintenance plan is simple:

- Drink at least five gallons of fresh, unpolluted water daily, more when sweating.
- Take a lick or two of salt every once in a while to sustain mineral levels.
- Graze sufficient forage to keep a light layer of fat over the ribs and backbone.

- Do all this in the company of a half-dozen or so congenial herd mates.
- Roam over topography sufficiently varied and vegetated to provide protection and comfort zones throughout the seasons.

The open-air wanderings hold contagion and parasitism at bay, while all the unshod footwork keeps the hooves in trim, and the endless grazing of coarse roughage wears continuously erupting teeth evenly for trouble-free nipping and grinding. It’s a simple, healthy plan not often available in domestication due to lack of space, conflicting work schedules for the horses, and owners’ fear of injury and blemishing.

Horses across the country can be found living entirely antithetical existences—tethered without sustenance amid junk and clutter; shut away perpetually in dark barns; swaddled in blankets inside opulent, heated stables; striving all day in harness, then standing in narrow tie stalls. But these are the extremes in an equine population that usually gets at least a taste of the natural way for part of each day. The NAHMS survey found 85 percent of its sample population living under their owners’ care either at nonagricultural residences or on farms/ranches involved in other agricultural pursuits. Northeastern horse owners were 12 percent less likely than other regions’ owners to reside with their horses on farms/ranches, producing related bumps in the percentage of horses at residences and boarding/training stables in the region. Horses in the Central region were the least likely to be under commercial care, and Western horses were the least likely to be at breeding farms. Overall, the distribution of U.S. horses according to their residences looked like Table 8 in 1998.

The agricultural bent of this survey’s sampling technique, plus the escalation of suburban ownership in more recent years, probably
means that a greater proportion of U.S. horses is kept in commercial boarding establishments today. The respondents in this survey may also have been more experienced in horse management than were the full gamut of owners, as only 9 percent of the reporting operations were newer than three years old, and the largest group had owned horses for twenty years or longer.

Keeping in mind, then, that the NAHMS management findings probably are not as suburbanized as they should be and do not represent the naive, negligent, and unenlightened sector of ownership, the horse’s natural maintenance plan in U.S. domestication has been adjusted as follows (USDA 1998):

- Water for horses on at least 60 percent of operations came out of wells, except for those in the Southern region, where surface water (streams and ponds) was used more frequently than it was in other areas of the country.
- Along with essentially universal salt-block availability, close to 40 percent of horses receive supplemental vitamin-mineral mixes.
- Feed is generally provided, as opposed to expecting the animals to maintain themselves by foraging alone. In fact, pasturage is more often thought of as exercise space than as a source of nourishment. On 87 percent of operations that fed hay at least three months of the year, the preferred variety was grass hay but by only narrow margins over alfalfa, a protein-rich legume, and a grass-alfalfa mix. Nutritionally, grass hay matches the horse’s digestive needs most closely. Hay is usually distributed twice daily, if not more frequently, or continually, matching the natural plan most closely. Minus the physical effort needed in ranging to find the food, domesticated horses tend to overindulge and be overweight. The feeding of grain, particularly in winter, also is commonplace in U.S. horse keeping plans, but with no real parallel in the natural model, other than occasional snacks on the mature seed heads of grassy plants. These concentrated energy sources, primarily doled out from commercial bagged rations formulated to nutritional standards for different classes of horses, may be necessary to fuel hardworking horses. At least as often and for recreational owners particularly, the addition of grain is more of a bonding mechanism than it is a nutritional necessity. Only 5.6 of operations reported feeding no grain, while 7.6 percent of the large majority fed concentrates specially formulated for ease of chewing and better digestibility for geriatric horses.
- Socialization, a very important aspect of herd-living equidae, was guaranteed on at least half of the reporting operations and probably to some degree on the majority where three to twenty or more horses lived and thus offered ample intraspecies awareness, if not direct contact. Management on more than a third of operations did divide up the acreage into smaller lots specifically to permit segregation of different groups of residents, but even visual contact satisfies the equine need for company. Almost half of the noncommercial respondents reported keeping just one or two equidae on their residential or farm properties. In these small populations, horses at least paired are often more content than horses kept solo, but socialization outside their own species, including with owners, can make up for lone horses’ isolation.
- The freedom to range and the responsibility to seek one’s own comforts were not year-round options for many U.S. horses. Instead, their cut of the exercise areas (number of acres divided by the number of animals grazing/roaming there equals the stocking rate) on operations in all of the regions equaled about 1.25 acres. In most areas of the country, they were confined inside buildings for some part of their days as protection against the weather, more so in some areas than others. During Northeastern winters, 40 percent of operations kept their animals confined more than half the time, and another 40 percent stabled them fairly often but less than half the time. In contrast, Western horses got the most freedom.

<table>
<thead>
<tr>
<th>Table 8</th>
<th>U.S. Horse Residence Patterns, 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Percentage of Equine Population</td>
</tr>
<tr>
<td>Residence with equidae for personal use</td>
<td>55.0</td>
</tr>
<tr>
<td>Farm or ranch</td>
<td>31.0</td>
</tr>
<tr>
<td>Breeding farm</td>
<td>5.2</td>
</tr>
<tr>
<td>Boarding/training stable</td>
<td>3.9</td>
</tr>
</tbody>
</table>

year-round, rarely or never being confined in summer in 86 percent of management situations and remaining unstabled during winter in 76 percent of the operations. Central and Southern horses were about midway between the two regional extremes in their confinement patterns—unconfined in summer on about 60 percent of operations, with only a 5 percent increase in confinement during winter.

- Management practices on commercial operations reflected awareness of the health implications of unnatural confinement of a large population of equidae in relatively small areas. Residential and farm owners with just one or two animals did the least to protect their animals against infectious diseases through vaccinations and potentially serious effects of parasitism through routine deworming. Less than half of that group’s caretakers had at least one animal vaccinated in the previous year, while 90 percent of operations with more than twenty residents had met the same criterion. Deworming was performed more universally (86.7 of all operations), most likely because owners can perform the treatment themselves at small expense. Fecal testing found that 83 percent of the sampled horse populations were shedding only a low level of parasite eggs or none at all, suggesting the management programs were effective. The Western region, where confinement was lowest, also had the lowest levels detected of parasite eggs or none at all, suggesting the management programs were effective. The Western region, where confinement was lowest, also had the lowest levels detected of parasite eggs or none at all, suggesting the management programs were effective.

How Are U.S. Horses Used?

Horses and their kin are the champs of multitasking among all the domesticated animals. They are partners in work, partners in play, professional athletes, amateur athletes, beauty contestants, cultural icons, beasts of burden, marathon runners, service animals, baby makers, boon companions, basic transportation, schoolmasters, financial investments, animated lawn ornaments, and more. The AHCF economic impact study boils their many roles down to four categories, folding breeding animals into the activity for which they’re producing, and calculates their financial contribution to the gross domestic product. It adds up to billions nationally. Tables 9, 10, and 11 show the division of all U.S. horses and those in selected states by their uses. The numbers given were not head counts but were calculated statistically, with extrapolation due to poor response to the show management survey, which may have produced some data flukes not reflected in the tables in states where quarter horses do not rule.

Table 9
National Equine Use Patterns, 2003

<table>
<thead>
<tr>
<th>Use</th>
<th>Percentage of Total</th>
<th>Number of Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreation</td>
<td>42</td>
<td>3,906,923</td>
</tr>
<tr>
<td>Showing/Competition</td>
<td>29</td>
<td>2,718,954</td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
<td>1,752,439</td>
</tr>
<tr>
<td>Racing</td>
<td>9</td>
<td>844,531</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>9,222,847</td>
</tr>
</tbody>
</table>

but on barns and fields. The NAHMS vision sees the world the majority of U.S. horses inhabit—out of the limelight and out on the trails or out to pasture.

**Recreational Horses**

One woman’s recreational horse is in the trailer and on the go to a trail ride here, an overnight camping adventure there, and a special training clinic way out there, week in and week out. Another woman’s recreational horse is one of a half dozen at her home, and she might get a saddle on and ride over to the neighbor’s place a couple of times a month, if she is lucky enough to squeeze in some time for it. With horses, recreation can be just about anything you please, from primping and pampering to roughing it in the outback; from a zen-like search for the perfect circle or half pass (a lateral movement in dressage) to the discovery of inner peace as a volunteer in a therapeutic-riding program. The joiners have plenty of equestrian organizations, local to national, to add some socializing to the picture. The reclusive types can ride off into the sunset on solitary trails. That is a major appeal of horse involvement—something for everyone. And for a surprising number, the something is tending to their horses at least twice daily, forking manure and heaving hay bales; worrying over ailments, injuries, and feeds bills 365 days of the year; and having little time left over to actually use the animals. They do this year after year, and, when asked what they do with their horses, the answer is “just for pleasure.”

Horses in the recreational/pleasure category may do everything the pros do, though rarely so well and usually not quite so seriously. They may be kept in top working trim and put on as many miles as human commuters being trailered to various events or riding venues. The NAHMS study reported that the second most common reason for trailering horses was attending shows/competitions (21 percent), with transportation to work being the first, and though practically all commercial operations had transported at least one horse during the previous year, 46 percent of the purely pleasure group had done so as well, the greatest portion of which was for recreation (USDA 1998). That was almost ten years ago; the rate of trailering by recreational owners has increased

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### Table 10

**Horse Involvement by Activity in Selected States, by Region**

<table>
<thead>
<tr>
<th>State</th>
<th>Racing</th>
<th>Showing</th>
<th>Recreation</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York</td>
<td>23,216</td>
<td>60,746</td>
<td>89,223</td>
<td>28,721</td>
<td>201,906</td>
</tr>
<tr>
<td>New Jersey</td>
<td>7,271</td>
<td>27,061</td>
<td>39,581</td>
<td>9,070</td>
<td>82,982</td>
</tr>
<tr>
<td>Maryland</td>
<td>41,805</td>
<td>29,032</td>
<td>47,337</td>
<td>34,756</td>
<td>152,930</td>
</tr>
<tr>
<td>Florida</td>
<td>134,406</td>
<td>158,641</td>
<td>160,696</td>
<td>46,381</td>
<td>500,124</td>
</tr>
<tr>
<td>Kentucky</td>
<td>58,755</td>
<td>88,176</td>
<td>100,185</td>
<td>73,057</td>
<td>320,173</td>
</tr>
<tr>
<td>Louisiana</td>
<td>20,815</td>
<td>59,669</td>
<td>58,793</td>
<td>25,027</td>
<td>164,305</td>
</tr>
<tr>
<td>Texas</td>
<td>104,836</td>
<td>310,988</td>
<td>340,383</td>
<td>222,615</td>
<td>978,822</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>22,225</td>
<td>118,513</td>
<td>113,776</td>
<td>71,620</td>
<td>326,134</td>
</tr>
<tr>
<td>Ohio</td>
<td>33,477</td>
<td>98,660</td>
<td>119,102</td>
<td>55,659</td>
<td>306,898</td>
</tr>
<tr>
<td>Indiana</td>
<td>14,339</td>
<td>61,024</td>
<td>105,695</td>
<td>21,929</td>
<td>202,986</td>
</tr>
<tr>
<td>Missouri</td>
<td>9,742</td>
<td>65,345</td>
<td>145,674</td>
<td>60,461</td>
<td>281,255</td>
</tr>
<tr>
<td>New Mexico</td>
<td>10,076</td>
<td>36,746</td>
<td>63,955</td>
<td>36,405</td>
<td>147,181</td>
</tr>
<tr>
<td>Colorado</td>
<td>10,113</td>
<td>76,979</td>
<td>106,624</td>
<td>61,787</td>
<td>255,503</td>
</tr>
<tr>
<td>California</td>
<td>82,236</td>
<td>191,945</td>
<td>315,261</td>
<td>108,903</td>
<td>698,345</td>
</tr>
</tbody>
</table>

Source: AHCF (2005), state breakouts.
steady since, as they avail themselves of public trails, educational clinics, and riding vacations along with showing. Recreational horses in the United States are often the center of a nonstop lifestyle.

On the other hand, recreational horses may do nothing at all except be the object of someone’s deepest affections, naïve neglect, or irrational cruelty. Not a single criterion exists for being a recreational/pleasure horse in the United States. Any breed, age, size, capability, or appearance that catches a potential buyer’s interest or appears to match the requirements for the dreamed-of activity, and the buyer is a recreational/horseperson after hundreds—or hundreds of thousands—of dollars change hands. Horses do not need to be well trained or sound of limb, wind, or even mind for a recreational match to be made with a willing owner.

Too often the first-time buyer, particularly, sees the kind eye but not the puffy ankle and slight limp that go with it, or the golden palomino coat but not the head-flinging response to a hand approaching the lovely face. Perhaps he sees the retired harness racer’s “snap” that will take the carriage down the road with style but not the trench worn along the paddock fence, indicative of a compulsive pacing that will make the horse a hard animal to keep weight on and/or live with in general. Worst of all, a well-meaning parent may think a young, untrained horse will make an ideal mount for a young, inexperienced child so “they can grow up and learn together.”

Somehow, a lot of rank beginners and their inappropriate horses make it through the steep learning curve of first-time ownership, and a lifetime hobby/need is established. Of the nearly two million horse owners in this country (children under eighteen were not included in the survey), as calculated by the AHCF study, 83 percent were over thirty, with the

---

**Table 11**

<table>
<thead>
<tr>
<th>State</th>
<th>Recreation</th>
<th>Showing</th>
<th>Other</th>
<th>Racing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>44</td>
<td>30</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>New Jersey</td>
<td>48</td>
<td>33</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>South</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maryland</td>
<td>31</td>
<td>19</td>
<td>23</td>
<td>27</td>
</tr>
<tr>
<td>Florida</td>
<td>32</td>
<td>32</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Kentucky</td>
<td>31</td>
<td>28</td>
<td>23</td>
<td>18</td>
</tr>
<tr>
<td>Louisiana</td>
<td>36</td>
<td>36</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Texas</td>
<td>35</td>
<td>32</td>
<td>23</td>
<td>11</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>35</td>
<td>36</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>Midwest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio</td>
<td>39</td>
<td>32</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>Indiana</td>
<td>52</td>
<td>30</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Missouri</td>
<td>52</td>
<td>23</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>West</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Mexico</td>
<td>43</td>
<td>25</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>Colorado</td>
<td>42</td>
<td>30</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>California</td>
<td>45</td>
<td>27</td>
<td>16</td>
<td>12</td>
</tr>
</tbody>
</table>

*Calculated from Table 9.
Note: Rounding responsible for over/underages in percent totals.

**Table 12**

<table>
<thead>
<tr>
<th>Primary Use of Resident Horses</th>
<th>Percentage of Surveyed Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasure</td>
<td>66.0</td>
</tr>
<tr>
<td>Farm/ranch</td>
<td>15.2</td>
</tr>
<tr>
<td>Showing/competition</td>
<td>6.5</td>
</tr>
<tr>
<td>Breeding</td>
<td>6.0</td>
</tr>
<tr>
<td>Other</td>
<td>3.6</td>
</tr>
<tr>
<td>Racing</td>
<td>1.9</td>
</tr>
</tbody>
</table>

largest block (41 percent) between the ages of forty-five and fifty-nine (AHCF 2005). The elastic boundaries of recreational horsemanship have room for even truly elderly people if they wish to go there. It’s the place for older horses, too. The recreational sector takes in past-their-prime pros from racing and upper-level sports and recycles their talents to compete at lower levels of the same sport or retrain them for other activities.

Recreational riders and their horses make up the broad base of Olympic sports, such as dressage, eventing, and reining, taking on progressively more difficult tests and courses as they improve. Few rise to the international level, but equestrian sports such as these that are physically and mentally challenging and based on a long working relationship with one horse appeal to many in the recreational world. The past twenty years have seen large increases in most equestrian activities, but sports that test brains—training, skill, and strategy—not just beauty have seen some of the steepest rises (Table 13).

**Show Horses**

Every horse is potentially a show horse if whoever happens to use the animal pays the fees to enter a competition, even if it is only an egg-and-spoon race with twelve-year-old competitors. On any given weekend, spring through fall, and maybe throughout the winter, too, hundreds of thousands of horses and their handlers/riders/drivers are going round and round in dusty rings, being judged, getting pinned or shown the gate. Others are testing their limits on challenging cross-country jumping courses or in polo arenas; cutting cattle, roping calves, racing cloverleaf patterns around three barrels; or having their endurance tested in all-day judged.

---

**Table 13**

**Selected Competitive-Sport Association Memberships over Two Decades**

<table>
<thead>
<tr>
<th>Association</th>
<th>1985</th>
<th>1995</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Equestrian Federation* (multidiscipline oversight)</td>
<td>45,238</td>
<td>62,000</td>
<td>87,050</td>
</tr>
<tr>
<td>U.S. Pony Clubs (youth horsemanship education)</td>
<td>8,999</td>
<td>13,000</td>
<td>11,800</td>
</tr>
<tr>
<td>American Driving Society (international discipline)</td>
<td>850</td>
<td>2,500</td>
<td>3,016</td>
</tr>
<tr>
<td>U.S. Trotting Association (harness racing)</td>
<td>55,075</td>
<td>35,196</td>
<td>24,650</td>
</tr>
<tr>
<td>U.S. Dressage Federation (international discipline—English)</td>
<td>18,543</td>
<td>40,000</td>
<td>33,044</td>
</tr>
<tr>
<td>U.S. Eventing Association** (international discipline—English)</td>
<td>8,346</td>
<td>10,900</td>
<td>13,800</td>
</tr>
<tr>
<td>National Cutting Horse Assoc. (competitive cattle work)</td>
<td>14,363</td>
<td>11,500</td>
<td>16,000</td>
</tr>
<tr>
<td>National Reining Horse Association (international discipline—Western)</td>
<td>2,050</td>
<td>7,000</td>
<td>13,000</td>
</tr>
<tr>
<td>American Endurance Ride Conference (international discipline—100-mile contests)</td>
<td>2,000</td>
<td>5,050</td>
<td>6,570</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>155,463</td>
<td>178,146</td>
<td>208,930</td>
</tr>
</tbody>
</table>

* Formerly American Horse Shows Association.
** Formerly U.S. Combined Training Association.

Note: Members of all international disciplines who compete in their sports must also be members of the USEF; therefore, yearly totals include duplicate counts for those sports.

trail rides. The AHC 2003 directory listed forty horse association and event organizers that sponsored more than 10,500 competitions attracting in excess of ten million class entries.

Not all of these organizations provided their counts (AHC 2003). And countless tiny shows are put on by riding stables as a goal/reward for the students or to bring in outside participants and make some money from entry fees. Many organizations mount elaborate multiday shows each year, with income that sometimes goes to charities. Most sport-specific groups and larger breed registries/associations encourage participation and ownership by sanctioning restricted shows; recording results; and creating point systems, futurities, jackpots, and the like to heighten competition and motivate continued participation, often culminating in days-long national championship events.

The cost for a local riding-school show might hit $50 a day: the big-time competitors can spend tens of thousands for a show season, and that’s not counting the horse. Traditionally, showing in the English disciplines has been done for the sole tangible reward of a ribbon, if one was lucky enough to get pinned, and the pride in one’s superior horsemanship. Western competitions and some jumping events sweeten the pot with cash winnings, usually derived from futurity money collected from breeders early in their prospective competitors’ lives, then two or three years’ worth is paid out in big bucks to the top finishers in the event. The AQHA, a huge corporate operation sponsoring, among other things, 2,500-plus approved shows and events annually attracting close to ten thousand entries, oversees the collection, investment, and disbursement of an incentive fund, based on points earned during recognized competitions. Between 1986 and 2003 the fund distributed $43,690,096.14, and many millions more are currently invested for the 2006–2011 funds (AQHA 2004).

Only a small fraction of U.S. horses are full-time show horses, but they, in particular, are at risk because of all that cash. The outlay of huge sums of money to participate and/or the prospect of winning immense payoffs puts a must-win cast on a competition originally intended to improve the breed through comparative evaluation. As showing was conceived, the stallion who got the blue ribbon or whose offspring won the trophies had more mares brought to him, and the quality of the stock improved to everyone’s benefit. But competition for cash and acclaim rarely improves human nature, and the horses involved can bear the brunt. In the 1990s, for instance, hunter-jumper trainers were killing horses for insurance money (Chronicle of the Horse 1998), and for decades, despite laws specifically banning the practice, Tennessee Walking Horses’ trainers have “sored” the horses’ forefeet and legs to cause them to move in an extreme fashion that wins the big prize.

Shows can have a wider-reaching negative effect on all horses produced for a particular competitive style even if they don’t ever enter a show ring. Judging standards originated to define the ideal type for that breed’s conformation and way of moving, all based on a particular job the horse would be expected to carry out in real life. Yet as the blue ribbon, rather than the functional performance, came to be the ultimate concern, breeders produce what judges will pin, and when judges select for extremes, such as the Tennessee Walking Horse’s exaggerated “big lick” gait, the quarter horse’s bulging muscles atop trim, tiny feet, or the Arabian’s wild-eyed “animation,” the nonfunctional or antifunctional winning characteristics spread through the breed. Drugs, devices, and abusive training techniques are used when the characteristic, such as the “big lick” and the quarter horse’s automaton-like show-ring movement, proved impossible to develop through genetics.

Racehorses

Although six registries conduct some sort of racing program for their breeds, Thoroughbreds, Standardbreds, and Quarter Horses are historically the pari-mutuel contenders. Appaloosas, Paints, and Arabians do most of their running at small venues, such as county fairs in the West. Internationally and in this country, Thoroughbreds, originating four hundred years ago in England, are the prestige runners, whose Triple Crown races—at the least, the Kentucky Derby—most Americans would recognize. Harness racing (Standardbreds were so named because they had to trot or pace to a certain time standard to be entered into the registry regardless of their parentage) grew out of this country’s democratic, agricultural heritage, which continues strongest in the Midwest, and Quarter Horse racing, though originally contested on East Coast main streets in Colonial times, evolved in the West with cowboys pitting their stock horses against each other in sprint races.

When men and their horses gather, it seems, racing is inevitable. Betting is, too, and throughout the twentieth century, horseracing was the one legal outlet for the betting urge, at least in states that allowed pari-mutuel meets. Until the 1980s, horseracing was the most popular sport of all in terms of attendance. Only at the end of the century did state governments begin permitting other forms of legalized gambling and, by then, too, broadcasting was offering a ceaseless parade of fast-moving spectator sports for everyman’s entertainment. Racing has been in decline for about twenty years. Since 1990 Thoroughbred races run annually in North America.
(approximately 90 percent of them in the United States; 10 percent in
Canada) declined steadily, from 79,971 to 57,495 in 2005, and the
number of North American Thoroughbreds starting in races those
same years went from 89,716 to 72,780 (The Jockey Club 2006).

Harness racing, in which Thoroughbreds race over jumps on longer
cross-country courses, has actually enjoyed some growth during this
same period, probably because of the festival-like ambiance cultivated
in the country settings. The thirty-nine steeplechase events run in
twelve states in 2006, during primarily spring and fall seasons, paid
out a total of $4.5 million in purses (NSA 2006). Quarter Horse racing,
mostly run in the West, has also suffered substantial declines in races
and starters since 1990, but the recent trend is somewhat upward
(AQHA 2004). Racing appears to be nearing its finish line, at least as
the prestige sport of the equestrian world.

The horses of the racing world are exceptional athletes when bred well,
trained intelligently, and managed carefully. They are also subject
to stress-related illnesses, such as ulcers, from their unnatural
lifestyle, and to stress injuries when not well trained or if there’s a mis-
step during the all-out gallop. The prime years for a runner are ages
three to five. Most stallions with outstanding race records in their three-
year-old campaigns are retired to stud immediately afterward. Insur-
ing such animals against a fatal or life-threatening injury, such as that
suffered by Kentucky Derby winner Barbaro during the 2006 Preakness
Stakes (Bloodhorse.com 2006), is extremely expensive and the loss of
breeding income from such an occurrence makes the risk too great
to bear. The everyday runners who fill the lower-level “claiming” and
“allowance” categories of races week after week just keep on going
for as long as they bring in an occasional check. After that, they may
recycle into the recreational or show world. With fewer races being
offered, U.S. Thoroughbreds ran, on average, only 6.5 races in 2005 (The
Jockey Club 2006). Racing appears to be nearing its finish line, at least as
the prestige sport of the equestrian world.

What Becomes of U.S. Horses?

U.S. horses are as mobile as the country’s human population. As
with the majority of people, horses rarely grow up and die where they
were born or even in their hometown. Unlike much of the pet pop-
ulation, which moves into human homes at weaning time and
remains with the same people throughout the rest of their lives,
horses tend to go through a series of owners. The serial ownership of
horses occurs not just because they are produced and marketed as
valuable commodities. Once they get into the equestrian pipeline,
multiple factors cause them to move from owner to owner:

• The animals’ size and management requirements restrict
where they can live. Even though a great many horse-
people do arrange the rest of their lives around the keeping
of horses, not all owners can take the animals along when
they must relocate.

• As owners’ interests change, horses are traded in for new
models or dispersed when the hobby/business is abandoned.
This happens commonly with youth involvement, indulged by
nonparticipating parents for the interest span or depend-
ency of the child, then dissolved upon college attendance or
independent living.

• Personal or financial pressures force owners to give up some
or all of their horses against their wishes.

• The animals become physically incapacitated and no longer
fit for the intended purpose, or they are too unruly or dan-
gerous for the current owners to handle.

• Their special caretaking needs become a burden, particularly
with the aged or those with chronic health conditions.

The NAHMS survey gathered data on the comings and goings of the
resident populations of commercial, work/ranch, and recrea-
tional establishments studied and found that in the previous year, just
13.4 percent of the animals permanently left those operations (USDA
1998). Table 14 ranks the destinations of the departed animals by
percentage of the surveyed population and converts the percentages
to head counts based on a current national population of 10 million.
Table 15 does the same for the reasons the respondents gave for dis-
persing the animals.

In the years since the study was done, dispersal patterns have prob-
ably remained consistent. Eco-
nomic forces have not been suffi-
ciently negative to cause owners to
liquidate or trim their herds for
financial reasons. The most likely
change in these percentages would
be an increase in the number of
horses sold privately for business
profit to accommodate the rise in
registered foal production since
1997. Assuming the study results
are a true reflection of the larger
world, today’s horses change own-
ership, aside from commercial
transactions, almost four times
more frequently because of owners’
personal problems or, considerably
less significantly, for financial rea-
sons, than because of the horses’
shortcomings. That only 10 per-
cent of horses changed ownership
because of temperamental difficul-
ties, physical problems, and old age
combined must mean either that
the country’s equine population is
just about perfect or the country’s owners are pretty willing to stick with their horses for worse as well as better. The latter is the likelier explanation, given the volume of equine business attended to in university veterinary clinics in 2005. As reported to Veterinary Medical Databases (VMDB), a central database for clinical data contributed voluntarily by the nation’s 27 veterinary schools, 16,441 horses received diagnosis/treatment at six institutions in 2005 (D. Folks-Huber, personal communication, March 24, 2006). If the visitation rate applied across all schools, that would be 75,600 equine medical visits for generally expensive and/or more heroic healthcare measures than most horses ever require.

Horses who are sold in this country have had three possible destinations:

• new residences, the majority in noncommercial operations,
• slaughter in three U.S. plants (which were closed in 2007) for human consumption overseas;
• export to other countries, some as performance or breeding stock, but the majority for slaughter either in Canada or Mexico.

Reports from USDA, the oversight agency for both animal imports/exports and slaughter inspection, indicate that approximately 10,000 purebred breeding animals are exported each year, but a much greater number—approximately 1 percent of the U.S. equine population in recent years—leaves the country intended for human consumption. In 2004, 111,500 horses met this fate, 60 percent exported as horse meat and the rest live to neighboring countries for slaughter there (Table 16).

Without reliable national equine population counts through previous decades, it is difficult to determine earlier slaughter percentages with any accuracy, but it is safe to assume that a much greater percentage of U.S. horses was sold to

### Table 14
**Destination of Permanently Removed Equidae on Surveyed Operations, by Percentage and Equivalent Count in Today’s National Population***

<table>
<thead>
<tr>
<th>Destination</th>
<th>Percentage</th>
<th>2006 Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sold to private party</td>
<td>55.0</td>
<td>737,000</td>
</tr>
<tr>
<td>2. Moved to another facility</td>
<td>17.5</td>
<td>234,500</td>
</tr>
<tr>
<td>3. Sold at public auction</td>
<td>13.3</td>
<td>178,220</td>
</tr>
<tr>
<td>4. Removed for other reasons</td>
<td>9.7</td>
<td>129,980</td>
</tr>
<tr>
<td>5. Given away to private party</td>
<td>2.5</td>
<td>33,500</td>
</tr>
<tr>
<td>6. Donated to charity/research</td>
<td>1.1</td>
<td>14,740</td>
</tr>
<tr>
<td>7. Sent direct to slaughter/slaughter buyer</td>
<td>0.8</td>
<td>10,720</td>
</tr>
<tr>
<td>8. Stolen</td>
<td>0.1</td>
<td>1,340</td>
</tr>
</tbody>
</table>

*Based on 13.4 percent permanently relocated in ten million population.


### Table 15
**Reasons for Permanent Removal of Equidae from Resident Operations, by Percentage and Equivalent Count in Today’s National Population***

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Percentage</th>
<th>2006 Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Business profit</td>
<td>52.0</td>
<td>696,800</td>
</tr>
<tr>
<td>2. Situation change (e.g., owner, children moved, owner illness)</td>
<td>34.9</td>
<td>467,660</td>
</tr>
<tr>
<td>3. Temperament problem</td>
<td>4.5</td>
<td>60,300</td>
</tr>
<tr>
<td>4. Aged</td>
<td>3.3</td>
<td>44,220</td>
</tr>
<tr>
<td>5. Too expensive to keep</td>
<td>2.6</td>
<td>34,840</td>
</tr>
<tr>
<td>6. Lameness/injury</td>
<td>1.2</td>
<td>16,080</td>
</tr>
<tr>
<td>7. Problem with horse not otherwise listed</td>
<td>0.9</td>
<td>12,060</td>
</tr>
<tr>
<td>8. Reproduction problem</td>
<td>0.6</td>
<td>8,040</td>
</tr>
</tbody>
</table>

*Based on 13.4 percent permanently relocated in ten million population.

slaughter for human consumption at the end of the 1980s and early 1990s than is the case in the current decade. That was a peak period in exports of metric tonnage of horse meat (1 metric ton equals 2,205 pounds, and horses average 400 pounds of dressed meat, meaning 1 MT equals approximately 5.5 live horses) and for live nonpurebred animals as well (Table 16).

Following the reduction of slaughter capability in this country through the closing of plants in Texas and Illinois, live shipments for slaughter, presumably all to Mexico and Canada (ocean-going shipment for slaughter horses is banned and air freight for live animals would be prohibitively expensive) have increased. Yet export numbers had been quite variable as of 2006 throughout the previous thirty years, reaching the lowest count of 10,284 head in 1984, with a portion of them exported as breeding and performance stock, after 66,886 live horses had been exported just three years before (USDA 2006a; FAO 2006). In the first quarter of 2006, almost 1,300 live slaughter-bound horses entered Mexico from New Mexico and Texas (USDA 2006b), projecting a total of 5,200 by year’s end. Canada, with four horse-slaughtering plants, was expected to process at least five times that number of U.S. animals imported live (Dudley 2006), though previous years’ total exports would indicate well more than 25,000 U.S. horses are processed in that country (USDA 2006a; FAO 2006).

The bulk of the U.S. horses remaining within the country are old, by equine standards, when they die. The NAHMS study found that the death rate of horses resident on the surveyed operations during three twelve-month periods was 2 to 2.5 percent. Adding some statistical wiggle room with a “confidence interval,” the study determined that in any given year, 1.5 to 3 percent of American horses die either of natural causes or euthanasia in the following order of likelihood (USDA 1998):
  - age twenty or older,
  - between birth and 6 months,
  - between five and twenty years of age,
  - between six months and five years of age.

As with the human population, the very old and the very young are most at risk for fatal health conditions. Foal deaths mostly went unexplained at the earliest stages, with a host of genetic and perinatal complications that could prove fatal. During the suckling stage, however, respiratory conditions

### Table 16

<table>
<thead>
<tr>
<th>Peak Years, High</th>
<th>Metric Tons Horse Meat</th>
<th>Equivalent Number Horses</th>
<th>Live Exports for Slaughter*</th>
<th>Total Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>55,373</td>
<td>304,551</td>
<td>73,686</td>
<td>378,237</td>
</tr>
<tr>
<td>1991</td>
<td>48,284</td>
<td>265,562</td>
<td>81,994</td>
<td>347,556</td>
</tr>
<tr>
<td>1989</td>
<td>59,000</td>
<td>313,482</td>
<td>29,350</td>
<td>342,832</td>
</tr>
<tr>
<td>1988</td>
<td>51,864</td>
<td>285,252</td>
<td>18,063</td>
<td>303,315</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,371,940</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peak Years, Low</th>
<th>Metric Tons Horse Meat</th>
<th>Equivalent Number Horses</th>
<th>Live Exports for Slaughter**</th>
<th>Total Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>8,094</td>
<td>44,517</td>
<td>38,540</td>
<td>83,057</td>
</tr>
<tr>
<td>2003</td>
<td>8,861</td>
<td>48,735</td>
<td>42,932</td>
<td>92,667</td>
</tr>
<tr>
<td>2001</td>
<td>11,940</td>
<td>65,670</td>
<td>35,993</td>
<td>101,663</td>
</tr>
<tr>
<td>2004</td>
<td>12,085</td>
<td>66,467</td>
<td>45,039</td>
<td>111,506</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>388,893</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Slaughter exports calculated by subtracting 10,000 from total exports reported as the approximate number of performance and breeding animals included.

**Actual numbers, USDA (2006a).
often called “foal pneumonia”) were the most common cause of death, followed by injury/wounds/trauma and leg/hoof problems. The elderly population contributed the single greatest cause of death affecting the entire population—“old age” at 22 percent—but the next most common mortal conditions were colic (18 percent) and injury/wounds/trauma (14 percent), which affect horses of all ages. According to this study, 64 percent of the horses dying of old age were euthanized, most commonly because of weight loss and the inability to ambulate, while the remainder died on their own without human intervention. When applied to current estimated population of 10 million, the study’s mortality figures would translate to between 150,000 and 300,000 “at home” deaths annually, the preponderance of which would be at age twenty or over.

The equine digestive tract and locomotion systems are the biggest problems during the lives and in the deaths of U.S. horses, according to the NHMS survey (Table 17). Both systems are subject to management practices far removed from the species’ innate biology, which is predicated on near-continuous grazing and moderately strenuous movement and rarely duplicated in modern domestication and use.

How Are U.S. Horses Faring?

Look hard enough in any community in the country, and you can find individual horses, ponies, or asses in distress of one sort or another. You may not have to look very hard at all in some places, but the nationwide indicators disclosed in this examination reveal the resources and capabilities for providing our equine population with better-than-adequate care. The equine species’ fence-straddling situation—half livestock, half companion animal—has produced a mix of benefits not available to the “either-or” species. Horses are commercially valuable enough to earn agricultural-research funding from government sources that aren’t available to purely pet species. At the same time, the emotional attachments formed between many owners (and not just recreational owners exclusively) and their horses assure a greater sensitivity to equine well-being than generally develops between livestock keepers and their animals. The larger American culture is also more inclined to hold horses in higher regard than the food species and invest them with somewhat more gravitas than the lap-pet set.

Basic Management and Handling

Horses today are well-served by their half-and-half status only when they’re maintained true to their nature, as neither feed animal nor pet. Some of the original nutritional research performed on horses in their new role as recreational creatures in the 1960s chose the same goals for feeding programs that applied to feeder cattle: grow ‘em big, and grow ‘em fast, getting the most inches and pounds added on in the shortest

---

Table 17

<table>
<thead>
<tr>
<th>Conditions Affecting Foals Under Six Months, Percentage Operations With Foals</th>
<th>Conditions Affecting Equidae Six Months and Older, Percentage Operations Surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digestive/Diet-related problems:</td>
<td></td>
</tr>
<tr>
<td>Colic</td>
<td>2.7</td>
</tr>
<tr>
<td>Diarrhea/Other digestive</td>
<td>13.4</td>
</tr>
<tr>
<td>Overweight/Obese</td>
<td>1.2</td>
</tr>
<tr>
<td>Chronic weight loss</td>
<td>0.7</td>
</tr>
<tr>
<td>Total Digestive</td>
<td>18.0</td>
</tr>
<tr>
<td>Injury/wounds/trauma</td>
<td>12.7</td>
</tr>
<tr>
<td>Leg/hoof problems</td>
<td>2.8</td>
</tr>
<tr>
<td>Respiratory problems</td>
<td>3.6</td>
</tr>
<tr>
<td>Eye problems</td>
<td>1.3</td>
</tr>
<tr>
<td>Skin problems</td>
<td>1.5</td>
</tr>
<tr>
<td>Reproductive problems</td>
<td>1.8</td>
</tr>
<tr>
<td>Behavioral problems</td>
<td>0.1</td>
</tr>
<tr>
<td>Neurological problems</td>
<td>0.3</td>
</tr>
<tr>
<td>Generalized infection</td>
<td>0.6</td>
</tr>
</tbody>
</table>

*Adapted from USDA (1998).
appears to have adjusted well to AIDS in its mechanism and implications, and strict monitoring of animal health status. Equine infectious anemia (EIA), a blood-borne disease with some similarity to AIDS in its mechanism and resilience, caused several large fatal outbreaks in the United States in the middle of the twentieth century. With the advent of a screening tool—the Coggins test (so named for its developer and now required for all equidae being transported to events, sales, and across states lines)—national and state agriculture departments could identify and isolate or destroy carriers as the only means to eliminate the incurable disease from the horse population. In 1972 the infection rate, mostly inapparent carriers, was 3 percent of the horse population; in 2004, only 333 samples from 2,013,376 horses were positive, an infection rate of .017 percent (Cordes and Issle 1996; USDA 2006c). The destruction of seemingly healthy positive reactors was and is a hardship and aberration to the people who care for the individual animals, but elimination of a once intractable killer and waster of horses may result in a greater good. It’s unlikely that such medical measures could ever be taken to eradicate the similar feline leukemia, for instance, partly because USDA funding does not apply to companion species but mostly because pet owners would not allow test-and-destroy practices. A more positive approach to horse health occurs when new disease threats receive rapid responses in prevention. When Potomac horse fever, a severe diarrheal condition with often fatal secondary effects, was first recognized in central Maryland about twenty-five years ago, the veterinary establishment saw only variations of already named conditions. Only with great pressure from frightened and frustrated horse owners did the scientific community begin to study the disease for cause and treatment. The cause is still not entirely understood, but the infection was eventually recognized to be a national problem, and a vaccine was developed several years after the outbreaks began. The most recent “new” equine threat, West Nile virus, arrived by airline via a mosquito “hitchhiking” from south Europe in 1999. Development of an equine vaccine began
almost as soon as the regulatory community recognized the threat to both horse and human, and the fatality rate dropped considerably in horses beginning in 2004. The difference in response had much to do with the zoonotic capabilities of the West Nile virus, but also can be attributed to commercial and recreational horse owners having become a block of educated consumers who demand responsive health care for their investments and their recreational partners.

**Disaster Management**

The Mississippi’s Great Flood of 1993, the West Coast’s perpetual wildfire dangers, Hurricane Andrew’s devastation of south Florida in 1992—natural disaster is always looming somewhere in this country.

Andrew was the first time a killer tropical storm threatened a large recreational horse population. The lessons learned at the time in protecting, identifying, and reuniting animals and owners initiated community and veterinary efforts to develop coherent disaster plans for managing the domestic animal population along with the human population. When the megastorms Katrina, Rita, and Wilma hit in 2005, equine organizations, including the American Association of Equine Practitioners (AAEP) and breed associations, provided assistance, and rescue and animal-protection organizations from other areas moved in to stricken areas to assist. The National Conference on Animals in Disasters, held in the Washington, D.C., area in June 2006, included a session on large-animal issues in disasters (The Humane Society of the United States 2006) for horse and livestock owners/responders.

Horse owners who care to learn have every opportunity to become expert in all horse-care and management areas, and many amateurs do just that. USDA’s agricultural extension service, working within the Land Grant university system, is the longest running educational institution regarding large-animal husbandry. More recently, equine veterinarians and their professional organization, the AAEP have incorporated formal healthcare and management programs into their practices along with the standard horse-side discussions. Equestrian magazines are generally a source of reliable medical and management information, but the Internet is now a primary information and advice-seeking resource for horse owners, as well as a sale barn, stable-aisle chat site, and equestrian soapbox. The following sites offer a sampling of opportunities for electronic community and commerce available to riders and owners.

- [http://www.equisearch.com](http://www.equisearch.com)
- [http://www.horseweb.com](http://www.horseweb.com)
- [http://www.netequine.com/horses-for-sale](http://www.netequine.com/horses-for-sale)

**Humane Treatment**

The ready accessibility of equine information and equestrian communication provided by the Internet is, in fact, probably the primary motivating force in a groundswell of action taken on behalf of horses and their welfare. Twenty years ago, only two national equine-welfare efforts had been organized: one to oppose soring of Tennessee Walking show horses and the other to protect wild horses and burros. Today, a few more equine-protection groups operate on a national level, but the real revolution is the appearance, since the mid-‘90s, of hundreds of mostly small, independent efforts focused on what are often called “unwanted horses” within their region. These organizations, approximately 300 of which have attained Internal Revenue Service (IRS) tax-exempt status, as listed on IRS Publication 78, attack the problem of “unwantedness” in several ways:

- taking in equidae, through legal action and/or owner relinquishment, and placing them in new, permanent private homes
- taking in equidae by the same mechanisms and placing them in permanent sanctuaries
- purchasing animals in the pipeline for slaughter, at either auction or another stop in the supply chain, and reselling them to good homes at cost
- serving as brokers, of sorts, between owners/trainers with horses, mostly from the track but sometimes specific breeds, to dispose of and potential buyers, leaving the transaction to continue between those parties.

In the grand scheme of things, 400 grass-roots efforts intervening in cases of ten or twenty unwanted horses annually can’t make much of a dent in the number of slaughter-bound animals, for instance, let alone all of the neglected and misused horses in the country. Rescue efforts can improve the quality of life for animals in their immediate vicinity, but the burnout rate has to be high. From the web site descriptions, many of these efforts begin as personal missions, with no long-term sources of income to pay for rescued horses’ basic needs month in and month out. Ryerss Farm for Aged Equines, the country’s longest running large-animal sanctuary, has an endowment to maintain the facility but still charges a lump sum of several thousand dollars for horses to enter the facility, then solicits donations for the continued upkeep based on expenses of $15 a-day (Ryerss Farm 2006). For concerned but not rich rescuers to rely on uncertain volunteer labor, donated supplies, and cash donations while tending to ill, starved, difficult animals, with more needy ones always in the pipeline is a stressful life that most people cannot withstand indefinitely, no matter how strong their...
will to help. Additionally, the mere existence of Good Samaritans in an area tends to encourage less responsible animal owners to dump their problems for the rescue to manage.

Results of a small, informal survey of these grass-roots rescues showed a very similar set of motivations behind the dispersal of horses to rescues as applied for the dispersal of horses in general, described in the NAHMS survey. Horses came to rescues not necessarily because they were treated cruelly, or at least intentionally so. They were generally not irreparably damaged goods, either physically or mentally. The weak links were mostly on the human side: ignorance of proper care, personal and financial difficulties, or failure to properly train the animals. Good intentions and love of horses without accompanying management capabilities are as likely to move horses into rescue facilities as is pure commercial greed.

The larger issue is balancing the pressures of horse ownership, both commercial and recreational, that arise from keeping a large species in a shrinking and increasingly costly world.

### Literature Cited


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