

USDA Perspective on Environmental Enrichment for Animals

Jodie A. Kulpa-Eddy, Sylvia Taylor, and Kristina M. Adams

Abstract

This article provides a brief historical background of the events and circumstances that led to the 1985 Animal Welfare Act (AWA) amendments. It describes the development of the regulations promulgated by the US Department of Agriculture (USDA) in 1991 as a result of these amendments, the reasoning given for the proposals, and the revisions that were made during the process. Information is included on USDA implementation of the regulations regarding exercise for dogs and environmental enhancement for nonhuman primates. Also mentioned briefly are the requirements for socialization of marine mammals and space requirements for certain other regulated warm-blooded species. These requirements apply to animal dealers (breeders and brokers), exhibitors, commercial transporters, and research facilities. The standards for exercise and environmental enhancement were different from any others previously contained in the AWA regulations, and required more research and understanding of species-specific needs by the regulated community. Finally, this article describes some of the initiatives being undertaken by the research community and USDA-Animal and Plant Health Inspection Services (APHIS)-Animal Care to provide the necessary education and guidance indicated by the violation history data.

Key Words: animal welfare; dog exercise; environmental enrichment; performance standards; primates; psychological well-being (PWB); social grouping; species-typical behavior (STB)

Introduction

The phrase “environmental enrichment” is defined in many ways. In 1925, Robert Yerkes introduced the concept by writing, “The greatest possibility for improvement in our provision for captive primates lies with

the invention and installation of apparatus, which can be used for play or work” (cited in Shepherdson 1998, p. 7). The Enrichment Working Group of the Behavior and Husbandry Advisory Group, a scientific advisory group of the American Zoo and Aquarium Association, defines enrichment as “a dynamic process in which changes to structures and husbandry practices are made with the goal of increasing behavioral choices available to animals and drawing out their species-appropriate behaviors and abilities, thus enhancing animal welfare” (BHAG 1999, p. 2). Newberry (1995) describes enrichment as an “improvement in the biological functioning of captive animals resulting from modifications to their environment” (p. 230). In the federal Animal Welfare Act (AWA¹) amendments of 1985, two new mandates became synonymous with environmental enrichment—exercise for dogs, and environmental enhancement to promote the psychological well-being of nonhuman primates.

“Enrichment” conjures images of the fortification of cereal or white bread with vitamins, and implies the addition of ingredients otherwise missing in an impoverished environment. During the 1980s, many North American zoo professionals began to view the typical captive environments for wild animals of that time as sterile, boring, and insufficient for psychological health. At first, “enrichment” meant simply placing objects for play or refuge inside small empty zoo cages in which the volume of confinement was fixed. Throughout the 1990s, the term spawned its own field of scientific inquiry and eventually referred to any physical, social, design, or management feature that would improve the behavioral microhabitat for captive animals in any setting, including research facilities (Shepherdson 1998; Young 2003). Although modern conceptions of animal well-being now include “feelings-based” approaches (Duncan and Fraser 1997), “psychological well-being,” as it appears in US law, derives from a classical functioning-based approach.

The 1985 amendments (AWA 1985) resulted from several years of intense lobbying and consideration of alterna-

Jodie A. Kulpa-Eddy, D.V.M., is a Staff Veterinarian at the USDA-APHIS-Animal Care headquarters in Riverdale, Maryland. Sylvia Taylor, D.V.M. (now deceased), was a Field Specialist with USDA-APHIS-Animal Care in Tampa, Florida, and contributed significantly to the preparation of the nonhuman primate section of this manuscript. Kristina M. Adams, M.S., is a Technical Information Specialist at the USDA-Agricultural Research Service-National Agricultural Library-Animal Welfare Information Center in Beltsville, Maryland.

¹Abbreviations: AC, Animal Care; APHIS, Animal and Plant Health Inspection Service; AWA or “Act,” Animal Welfare Act; CFR, Code of Federal Regulations; CR, Congressional Record; FR, Federal Register; HR, House of Representatives; IACUC, institutional animal care and use committee; NIH, National Institutes of Health; PWB, psychological well-being; S, Senate; STB, species-typical behavior; USDA, US Department of Agriculture.

tive bills in the House of Representatives (HR¹) and Senate (S¹) to ensure humane treatment of laboratory animals while maintaining the integrity of scientific research (Holden 1986). The newly amended AWA specified that pain and distress must be minimized in experimental procedures and that the principal investigator must consider alternatives to such procedures. It describes the requirement for an institutional animal care and use committee (IACUC¹) and established an information service at the National Agricultural Library to assist those regulated by the AWA (also known as Act¹). It also directed the Secretary of Agriculture to establish regulations to provide “exercise for dogs” and an “adequate physical environment to promote the psychological well-being of primates.” Since 1985, these mandates have become associated with the term “environmental enrichment.”

History and Intent

Before the addition of the specific mandates in the 1985 amendments, standards for other warm-blooded species had been introduced as a result of the 1970 amendments to the AWA. These standards include the following space requirement that currently exists in Title 9 of the Code of Federal Regulations (CFR¹) Section 3.128: “Enclosures shall be constructed and maintained so as to provide sufficient space to allow each animal to make normal postural and social adjustments with adequate freedom of movement. Inadequate space may be indicated by evidence of malnutrition, poor condition, debility, stress, or abnormal behavior patterns.” The US Department of Agriculture (USDA¹) decided not to promulgate more definitive regulations for space due to the “differences in sizes, activity patterns, social patterns and environmental needs” of these many species of animals (36 Federal Register [FR¹] 1971, USDA-APHIS 1971). It is interesting to note that in response to this proposed rule, USDA acknowledged receipt of numerous comments requesting that dogs held and used for research should be removed from their cages and allowed to exercise each day. At that time, however, USDA did not believe exercise for dogs should be a mandatory requirement.

By the early 1980s, the animal welfare movement was gaining momentum in the United States. In 1981, Alex Pacheco, cofounder of the newly formed group People for the Ethical Treatment of Animals (“PeTA”), volunteered at the Institute for Biological Research in Silver Spring, Maryland. He documented numerous violations of the Animal Welfare Act, eventually prompting the Montgomery county police to seize the 17 monkeys from the laboratory. The case, often referred to as the Silver Spring Monkey case, led to many legal trials and was highly publicized in newspapers nationwide (Carlson 1991). Congress held hearings before the House of Representatives Subcommittee on Science, Research and Technology in October 1981, prompted in part by Pacheco’s documented claims of animal mistreatment and the public concern that followed (Brown 1997).

Between 1981 and 1984, several bills were introduced into the House and Senate regarding the care of animals in research laboratories. HR 4406 (97th Congress), in 1981, proposed amending the AWA to change “minimum” to “proper” requirements, and was the first to include “space for normal exercise” as a standard for all animals (USC 1981). HR 5725 (98th Congress) was introduced in 1984 by Representative Brown, who stated he recognized the value of animal experimentation but felt that the trauma “experienced by these animals from procedures necessary to the experiments should be the only trauma they must face” (Brown 1984; USC 1984). Proponents of these bills believed that lack of exercise resulted in stress to the animals, whereas opponents cited a financial burden and difficulty in providing regulatory oversight of an exercise requirement (USC 1984).

Eventually Senator Dole (1985) of Kansas included Amendment No. 904 as part of the Food Security Act (Farm Bill) of 1985 to be signed into law by the President. The exercise statement called for “exercise for dogs and primates” as a standard (S 1233 99th Congress). The same day, Senator Melcher (1985), a veterinarian from Montana, proposed S 1792 (99th Congress), which included under the section for standards a paragraph reading “for physical environment adequate to promote the psychological well-being of research animals, particularly primates, including whatever apparatus the Secretary deems appropriate.” Over the weekend, Congressional staff members met to finalize the language that was presented by Senator Dole the following Monday, October 28. The standards now read “for exercise for dogs and for a physical environment adequate to promote the psychological well-being of primates” (Dole 1985). The intent of these amendments was to ensure the “standards for exercise for dogs to offer a variety of possibilities to allow the animal motion. It could consist of regularly letting the dog out of its cage for a period of time, the use of dog runs, or allowing ample room in animal housing. The intent of standards with regard to promoting the psychological well-being of primates is to provide adequate space equipped with devices for exercise consistent with the primate’s natural instincts and habits” (Conference Report 99-447, USC 1985).

Senator Melcher commented on psychological well-being (PWB¹) as follows: “I have seen the types of cages used in many facilities to house primates. These cages are not much wider than the average shower stall and there is hardly enough room to allow the animal to stand erect. Under the new provisions, I think we are not only providing humane treatment of these animals, but assur[ing] more confidence in the results in the experiments they are used in” (Melcher 1985). The purpose of the 1985 amendments was to set the bar higher. For example, the writers knew they wanted to see more primates in larger complex cages, housed together with other primates, receiving more mental and physical stimulation, and behaving in a more normal manner (J. Melcher, personal communication, 2004).

Regulations

Canine Exercise

The USDA-Animal and Plant Health Inspection Service (APHIS¹) began promulgating regulations to enforce the new amendments in March 1987. In March 1989, a proposal was issued on standards for the exercise and socialization of dogs. This section would be divided into four subsections: social contact while being housed, held, or maintained; release for exercise and socialization; methods and period of exercise; and exemptions from exercise. The reasoning put forth by the Department was that due to the social nature of dogs, they should be able to see and hear other dogs, or have “positive physical contact” (petting, stroking, or other touching) from a human because it would be beneficial to the well-being of the animal. In standard laboratory housing conditions at that time, the social environment for dogs often included individual housing with only auditory contact with other dogs, and social contact with humans was limited to daily cleaning procedures (Hetts 1991). The proposed standards also detailed the amount of space and interaction times the agency believed were necessary to ensure a dog’s health and well-being (54 FR 1989, USDA-APHIS 1989). One comment from an interested party responding to a request for information from the public led to the proposed minimum space standards. Based on the consensus of APHIS veterinarians who had training and experience in the care of dogs, USDA also proposed minimum exercise periods of 30 min per day (54 FR 1989, USDA-APHIS 1989). At that time, the availability of scientific data on these subjects was very limited. USDA used empirical evidence and expert opinion as guides (Schwindaman 1989).

The proposal described above was revised in August 1990, and again issued for public comment. APHIS had concluded “many of the provisions regarding exercise in our proposal were predicated on the premise that the increase of space available to dogs will predictably result in a concomitant increase in exercise activity. . . . The scientific evidence available to us now leads us to conclude that space alone is not the key to whether a dog is provided the opportunity for sufficient exercise. It appears that additional space provided to certain dogs would be underutilized (i.e., even if released into a relatively large run, many dogs will find a corner and lie down). The evidence available to us indicates that certain dogs can receive sufficient exercise, even in cages of the minimum size mandated by the regulations, if they are given the opportunity to interact with other dogs or with humans” (55 FR 1990, USDA-APHIS 1990). Although USDA did not specify the scientific evidence to which they were referring, two reports of that era were probably influential (Clark 1989; Hughes and Campbell 1989). Even though the public suggested it, no definitions of “exercise” or “socialization” were provided. In general, APHIS believed the standard dictionary meanings of the two words would be sufficient in complying with the regulations (55 FR 1990, USDA-APHIS 1990).

The final rule was issued in February 1991. The references to “socialization” were removed because APHIS agreed with comments that the Act does not include requirements for socialization, even though it was felt this was, in many cases, an integral part of the provision of adequate exercise. Instead, dealers, exhibitors, and research facilities were instructed to consider providing positive physical contact with humans that encourages exercise through play or similar activities in §3.8(c)(2) when developing their exercise plan for approval by the attending veterinarian (56 FR 1991, USDA-APHIS 1991).

Nonhuman Primate Environment Enhancement

The intent of the 1985 amendments and subsequent minimum standards was to allow for more exercise, play, and compatible social interaction for laboratory primates. During a period of serial regulatory proposals and revisions on primate PWB, Senator Melcher expressed concern that the concept would deteriorate into “hanging trinkets on the outside of the cage” (J. Melcher, personal communication, 2004).

Before its initial 1989 proposals of regulatory language, APHIS selected an advisory group of 10 primate experts recommended by the National Institutes of Health (NIH¹). APHIS also invited the American Association of Zoological Parks and Aquariums to recommend minimum standards. The consensus from both groups was that minimum standards would require “sufficient space to engage in species-typical behavior,” enclosure complexities, manipulable objects, and varying methods of feeding. Furthermore, “the reports [from these experts] indicated that social interaction and exercise are equally necessary to promote their PWB and that social grouping increases the primates’ physical activity” (54 FR 1989, USDA-APHIS 1989). The standards proposed in 1989 as a result of these committees’ recommendations contained many specific requirements for social groupings, multiple forms of inanimate enrichments, and regular exercise. The discussions of this proposal tacitly acknowledged that minimum cage sizes for primates might not be large enough for the performance of species-typical behavior, with or without other enrichments. The proposed standards appeared to try to resolve this problem by requiring regular release of primates from home cages for exercise.

APHIS revised its proposed standards, with much more general language, and explained that the new proposal (which became a final rule in 1991) merely “reworded and reformatted” the previous proposal. However, the new version also removed the requirement for release for exercise and for human contact, due to a realization of the risk to human safety. In its discussion, APHIS reasserted the primacy of social grouping and a balance of multiple enrichment forms in combination with adequate space as the keys to PWB. Concerns about the PWB of infants were rolled into a section that identified several different categories of

primates as requiring “special attention” (56 FR 1991, USDA-APHIS 1991). All of these concepts were to be formulated by the facility and its attending veterinarian into a written plan for environment enhancement.

Environmental Enrichment for Other USDA-regulated Animals

Although marine mammals, aquatic species, and flying species are used infrequently in research, they are housed at other entities regulated under the AWA. This information is included in brief to demonstrate that concepts relating to behavioral needs and environmental enrichment have been incorporated into standards for these other species.

Marine Mammals

The 9 CFR Section 3.109 requires housing marine mammals known to be primarily social in the wild in their primary enclosure with at least one compatible animal of the same or biologically related species (there are provisions for exceptions for health or well-being concerns). A written plan that includes the justification for the length of time the animal will be kept separated or isolated must be written for each singly housed animal. It must include information on the type and frequency of enrichment and interaction, if appropriate, and be reviewed periodically by the attending veterinarian. For safety and health purposes, Section 3.101(g) places restrictions on the type of any nonfood objects provided for the entertainment or stimulation of marine mammals in their enclosure or pool.

Adequate Enclosures for Flying Species and Aquatic Species

USDA-APHIS-Animal Care Policy #24 (USDA-APHIS 1998) provides clarification to licensees and registrants regarding the unique biological and physiological needs of flying and aquatic species to fulfill the requirements set forth under the general language of Section 3.128. “Normal postural and social adjustments” and “adequate freedom of movement” are to be determined according to what is normal for that species under natural conditions. Subpart F species that fly (e.g., bats) must be provided with sufficient unobstructed enclosure volume to enable movement by flying and sufficient roosting space to allow all individuals to rest simultaneously. For Subpart F species that under natural conditions spend a significant portion of their time in water (e.g., capybaras, beavers, river otters, hippopotami, and tapirs), compliance with space requirements will necessitate both dry and aquatic portions of the primary enclosure.

Implementation

The standards promulgated as a result of the 1985 amendments were different from any others previously contained

in the AWA regulations. They placed emphasis on a written, defined conceptualization by the facility of exercise and PWB and how to achieve them. The standard for §3.81 also required concordance with an unspecified body of literature on the subject, largely still in its infancy at that time. For many research facilities, compliance was not very difficult. However, for small exhibits and backyard breeders, it was an alien concept. These groups rarely had access to the kind of professional literature alluded to in §3.81, and their attending veterinarians were often not familiar with these ideas.

Written plans for providing exercise of dogs and for promoting the PWB of nonhuman primates were required by August 14, 1991. APHIS management and inspectors were still unsure exactly how to apply this standard fairly and consistently to such a wide variety of facilities. In a 1993 internal questionnaire, APHIS-Animal Care polled its field inspectors about their assessment of the new standards (USDA-APHIS-Animal Care, unpublished data, 1993). The most disconcerting trends were:

- One third of inspectors responded that they were unable to distinguish compliance from violation, or enforce these two standards.
- Nearly half of the respondents felt that exemptions to social grouping were being claimed by facilities for “convenience” rather than legitimate reasons.
- The majority of respondents felt that the requirement for “special considerations” for certain primates had failed to generate the needed increase in enrichment for these animals.
- More than one third of respondents indicated they were dissatisfied with how research facilities were implementing primate enrichment.
- All respondents said that at least half of the research facilities they were assigned to inspect were still generally single-housing primates.

There was also encouraging information from that poll:

- Inspectors felt they knew what resources, training, or regulatory improvements were needed to achieve the objectives of the AWA.
- More than two thirds of respondents said that they were observing instances of enrichment principles being applied to species other than dogs and primates.
- Most inspectors said facilities were generally providing twice the minimum cage size for dogs, and that dealers and exhibitors were group housing their dogs.

1996 Animal Care Survey

In December 1996, USDA-APHIS-Animal Care conducted a formal internal survey of its inspectors to obtain their opinions again on the effectiveness of the standards for dog exercise and primate PWB. The survey revealed that inspec-

tors perceived an improvement in the overall welfare of dogs and nonhuman primates after adoption of the standards in 1991. Approximately 60% indicated that the overall welfare of dogs was helped by the dog exercise plans, but 25% felt the criteria for dog exercise plans did not make clear what facilities needed to do to be in compliance. In addition, 45% expressed the same opinion of the criteria for primate environmental enrichment. Approximately 40% responded that the dog exercise criteria were not adequate for enforcement purposes, and almost 50% said the same for the primate environment enrichment criteria (USDA-APHIS-AC 1996). Survey results are shown in Figures 1, 2, 3, and 4.

1997 Animal Care Interviews

As a result of the concerns repeatedly expressed by inspectors about the standards on primate PWB, APHIS decided in 1997 to follow up with additional employee interviews and to review available professional literature and reference guides on the subject. Its findings were explained in the Final Report (USDA-APHIS-AC 1999). The Final Report listed and explained the major problems inspectors had consistently identified during the previous 5 yr.

Inspectors felt “the standards contain few solid criteria on which an inspector can judge the content of a plan as ‘in compliance’ or ‘out of compliance’” and “had concerns about Agency support for particular interpretations or judgment because of the vague language and nature of the performance standard.” Another problem was the difficulty in proving actual implementation of an enhancement plan.

Inspectors recommended clearer requirements for documentation of implementation. At that time, APHIS concurrently proposed publication of an interpretive policy, intended to resolve difficulties with application and enforcement. Although the associated proposed policy was not ultimately adopted as an official policy, the Final Report continues to guide inspectors and facilities, and has been effective in stimulating the dialogue on enrichment. We have not yet assessed the extent to which overall conditions and perceptions have changed from those of 1993, 1996, and 1997, but will probably do so within the next few years.

Inspectors also had concerns about facilities for which an “appropriate” enrichment plan was one perch, one rubber toy, and a few grapes now and then for each singly caged primate. This approach does not reflect well on performance standards. Similarly, some facilities stimulate only one area of species-typical behavior (STB¹), while neglecting other important forms of STB. For example, they may provide many sweet treats once daily but use no other items or strategies. This approach will not promote normal behavior and may lead to obesity. Appropriately complex and diverse enrichment programs require more thought and effort.

Some inspectors felt that too many primates were unnecessarily single-housed, especially at research laboratories and among small licensed exhibitors. Another major problem for inspectors was that production, rearing, and transport practices among licensed breeders, dealers, and some exhibitors often resulted in maladjusted primates that were passed from facility to facility because of their aberrant behavior. Many breeders remove very young (even 1-day-old) primates from their dams for human hand rear-

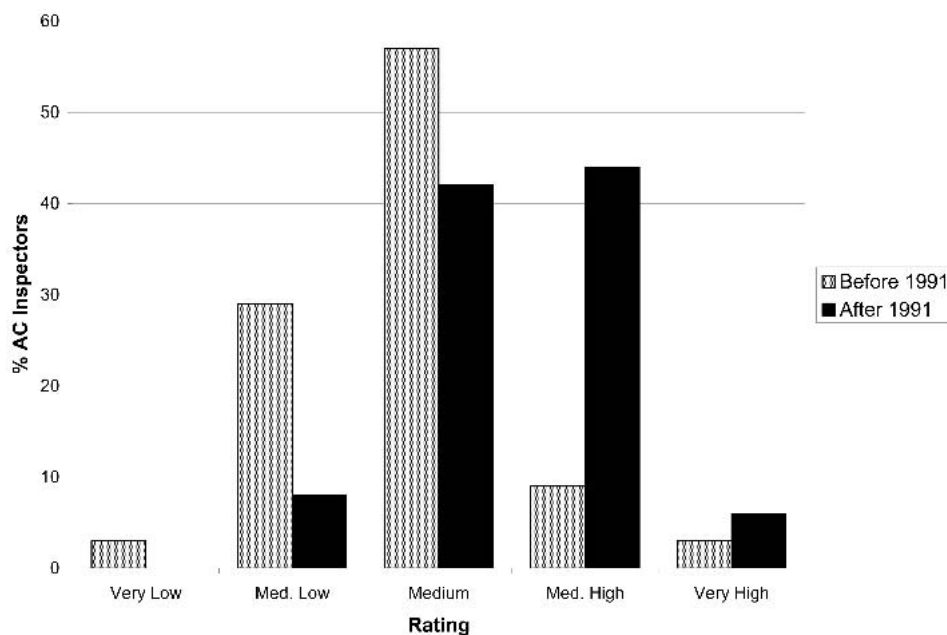


Figure 1 Results of a 1996 survey asking US Department of Agriculture/Animal Care (AC) inspectors (n = 34, number of inspectors with experience prior to 1991) to rate the welfare of dogs in animal care facilities before and after implementation of the new regulations in 1991.

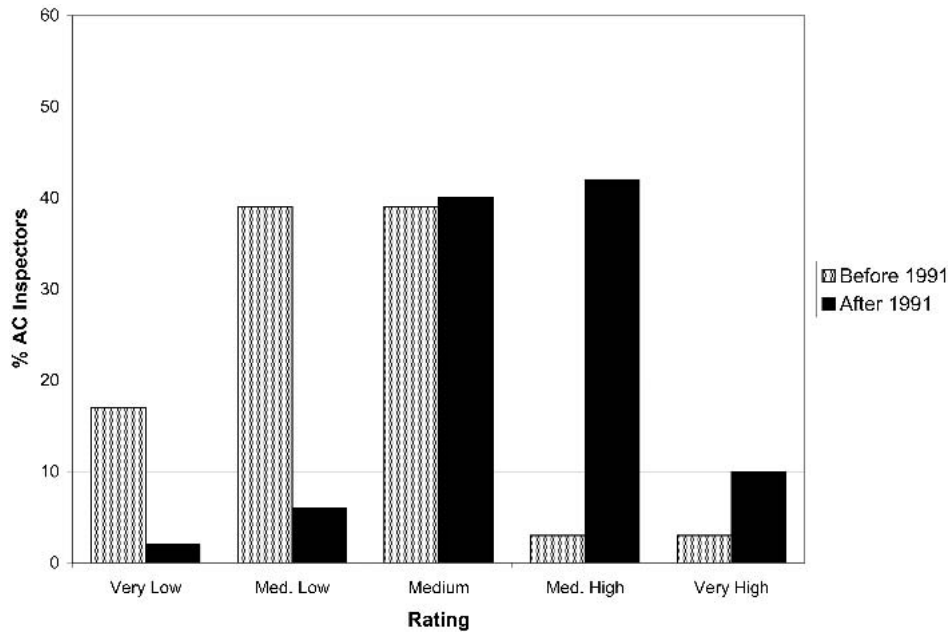


Figure 2 Results of a 1996 survey asking US Department of Agriculture/Animal Care (AC) inspectors (n = 34, inspectors with experience prior to 1991) to rate the welfare of nonhuman primates in animal care facilities before and after implementation of the new regulations in 1991.

ing. The purpose is to create a highly human-dependent animal that serves as a human infant substitute for pet owners or for special displays. Unfortunately, these animals develop severe behavioral pathologies but are never truly domesticated. As they mature, they express aggression toward humans and may have their teeth removed to facilitate handling. Moreover, these rearing practices often produce future breeding females with poor maternal skills, thus perpetuating social incompetence in future generations. These factors contribute to the low levels of social grouping identified above.

Violation History

Dogs

The vast majority of citations in the last 4 yr reference the introductory paragraph of 9 CFR Section 3.8, indicating the facility had not developed, documented, or followed an appropriate plan to provide dogs with the opportunity for exercise. Other citations were for not providing enough room for dogs housed individually to exercise or for not enough total space for dogs housed in groups. Only rarely was a facility cited for not providing an isolated dog with positive physical contact with humans (Figure 5).

Since 1999, eight federal cases have cited alleged violations of Section 3.8. This regulation by itself has not been prosecuted; it is always one citation of many. In general, these cases involve facilities lacking veterinary care and

adequate physical facilities. These cases have resulted in warning letters, fines, cease-and-desist orders, and license suspensions.

Nonhuman Primates

Citations for violations of the primate environment enhancement standard have been more evenly distributed be-

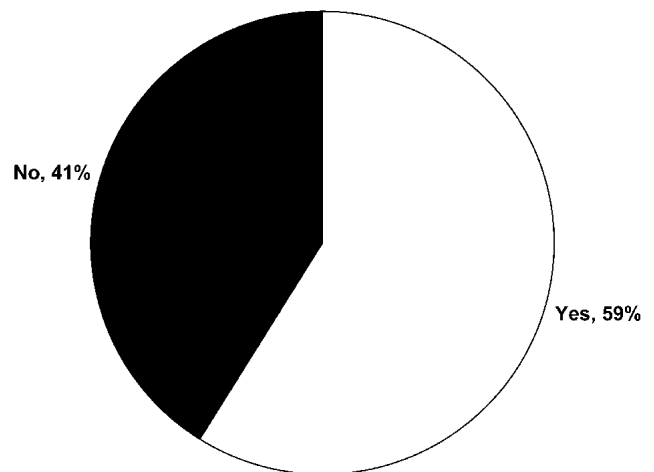


Figure 3 Responses of US Department of Agriculture/Animal Care Inspectors in 1996 (n = 53) when asked the question, "Do the canine exercise plans improve the welfare of the animals?"

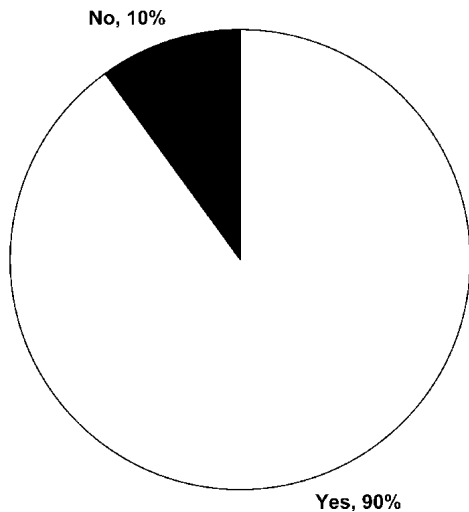


Figure 4 Perspectives of US Department of Agriculture/Animal Care Inspectors in 1996 (n = 53) when asked the question, “Do the primate environmental enrichment plans improve the welfare of the animals?”

tween the introductory part of §3.81 and the specific paragraphs. A relatively large proportion of these citations have involved the provision for primates requiring special attention (§3.81(c)). The number of citations for violations of the primate enhancement standard exceeded the number of violations of dog exercise every year from 2000 through 2003, even though USDA conducted approximately 5000 inspections of dog facilities annually during this time com-

pared with approximately 1200 inspections annually for primate facilities (Figure 6).

Since 1999, nine federal cases alleging violations of Section 3.81 have been prosecuted. As with the dog exercise standard, none of these cases has involved only a single citation; all have been instances of multiple noncompliant items. They have involved a serious lack of veterinary care or program failures resulting in facilities not able to meet minimum standards. These cases have resulted in warning notices, fines, and license disqualifications.

Interpretation

Exercise for Dogs (9 CFR Section 3.8)

Inspectors use different methods of measuring the effect of dog exercise plans, depending on the situation. If the facility does not meet the minimum space requirements, the inspector may look at records, conduct staff interviews, and make observations of the exercise program in progress. Alternatively, the inspector may examine the dogs to see whether they express normal behavior, have engaging temperaments, and are free from stereotypic behaviors.

Some of the difficulties encountered in enforcing this regulation include variations in interpretation of the term “exercise.” Inspectors indicate it could range from the dogs’ merely having sufficient space for physical movement and healthy muscle development, to the dogs’ having the freedom to get out of the primary enclosures, move around, express normal species behavior, and/or engage in playful

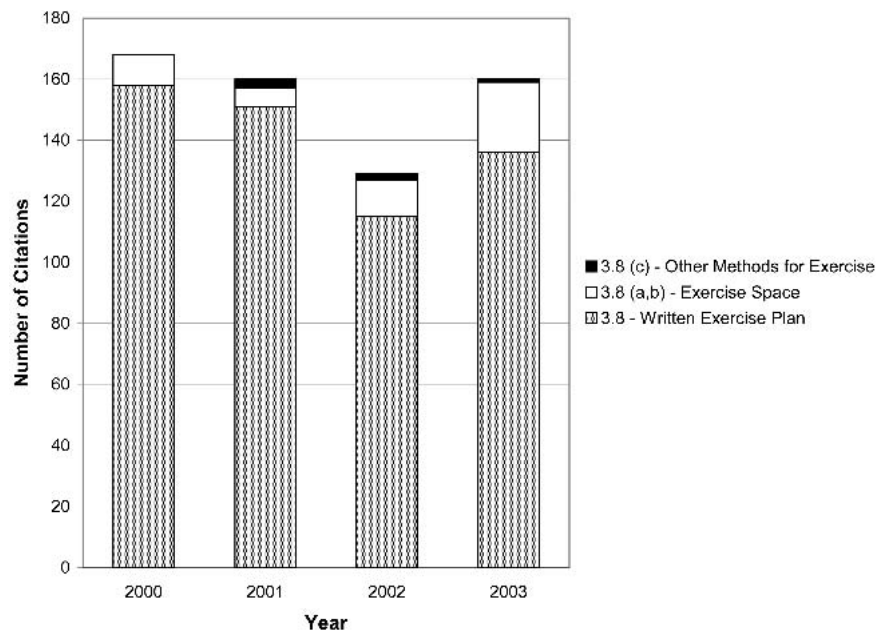


Figure 5 Number of US Department of Agriculture citations in inspection reports for violations of federal standards for dog exercise by year and subparagraph (9 CFR 3.8).

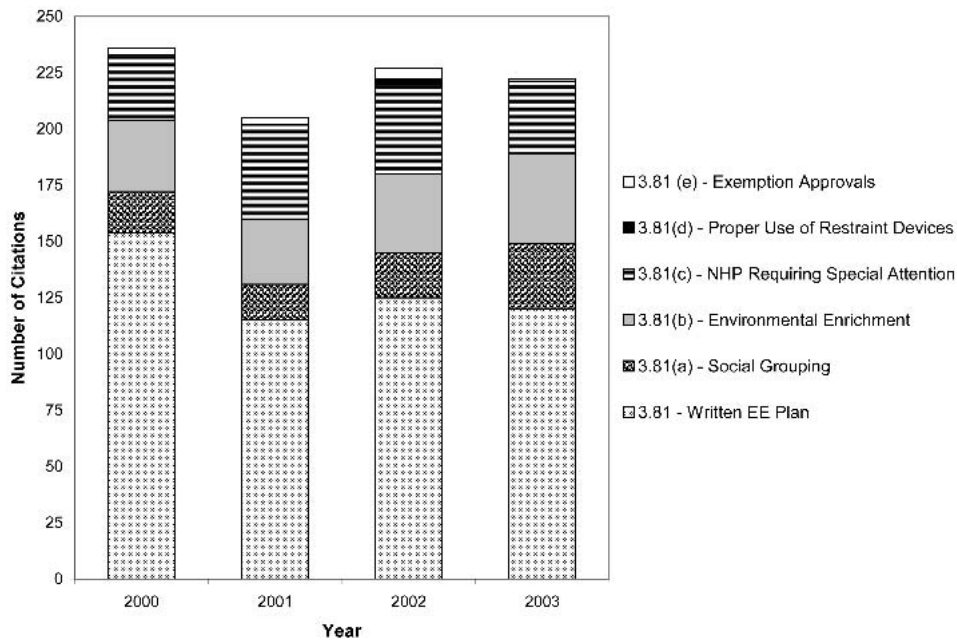


Figure 6 Number of US Department of Agriculture citations for violations of standards for nonhuman primate environmental enhancement by year and subparagraph (9 CFR 3.81).

interaction with other members of the species, caretakers, or environmental stimuli (USDA-APHIS-AC Survey 1996).

In April 1999, APHIS-Animal Care developed written guidance for field inspectors in interpreting this regulation. It is provided in inspection manuals known as “Animal Care Resource Guides.” Manuals for research facilities and dealers are available online (<http://www.aphis.usda.gov/ac/researchguide.html> and <http://www.aphis.usda.gov/ac/dealer/dealerguidepdf.html>, respectively). The regulatory requirements for dog exercise are clearly delineated into acceptable and unacceptable methods, and the guide includes a worksheet and instructions that may be used to help facilities develop their own exercise plan.

Nonhuman Primate Environmental Enhancement (9 CFR Section 3.81)

The language of the AWA itself places clear emphasis on measures taken in advance of welfare effects (i.e., to “promote psychological well-being”). Inadequate environments often produce latent effects (Mason and Latham 2004). The well-being of an animal depends not only on its current environment, but also on its early experiences and prior environments (Martin 2002; Novak 2003). Inspectors who recognize primates that are being maintained in a way that is likely to lead to poor psychological health need not wait until they perform abnormally to request a change in those conditions. Conversely, not every primate displaying abnormal behavior is in distress, at least not for reasons that implicate its current housing and care. Inspectors will seek

a diversified, complete program, which is likely to lead to the appropriate benefit for the majority of primates at a facility. They will also take into account how long a primate has been at the facility and how long it will remain. A good program will be designed to stimulate each major component of noninjurious STB and to facilitate each primate’s adaptation to its particular captive life, whether as a research subject or in public display (Roder and Timmermans 2002; USDA-APHIS-AC 1999).

Social Grouping, §3.81(a)

From the Federal Register discussions up to and including the final rule, one can see that social grouping was meant to become the default housing scheme: “In most cases, we expect group housing to be the most efficient and appropriate method of ensuring that the animals’ social needs are met” (56 FR 1991, USDA-APHIS 1991). Prolonged single caging does not promote well-being, especially when it is started at an early age (Lutz et al. 2003; Turner and Grantham 2002). In one modified preference test, the value level of social companionship was so high that primates chose it in lieu of food (Dettmer and Fragaszy 2000). This knowledge has not resulted in a prohibition of individual caging because there are instances in which shared caging would interfere with IACUC-approved research or health care or times when other compatible primates are unavailable.

Inspectors look for bona fide efforts of facilities to keep social primates in compatible pairs or groups. We realize that peculiarities such as the following will not allow some primates to be pair or group housed: species, age, sex, health

status, personality, study designs, length of time at the facility, partner availability, and veterinary care protocols. Each instance will be evaluated on its own merits, with an emphasis on observing the primates in action as thoroughly but unobtrusively as possible. Where appropriate pair or group housing has not yet been achieved, the environmental enhancement plan and IACUC semiannual review can map out a strategy for meeting long-term social grouping goals. Facilities should consider partial forms of social grouping (e.g., adjacent grooming compartments, connector tunnels, and social rotations) for cases in which routine pair or group caging is not appropriate. For large breeding colonies, the challenge for seasoned professionals is to know the difference between true incompatibility and acceptable oscillations and stresses of primate social life.

Environmental Enrichment, §3.81(b)

Inspectors should be able to see that the primates are in an environment where they can express the main STB within the bounds of research study demands. These activities include the following:

- Affiliative contact with one or more other primates;
- Normal resting, comfort-seeking, and self-maintenance behaviors;
- Normal movement (both gross motor and fine manual); and
- Expression of cognitive, exploratory, and foraging skills.

A good enrichment plan will ensure that the nonsocial aspect of the environment has all of the elements necessary to allow expression of species-typical behaviors (NRC 1998; USDA-APHIS-AC 1999). These elements include appropriate provisions for normal development of infants (where applicable); well-suited enclosure structures and substrates for the species; and foraging and manipulable items. Items and strategies can be combined in different ways, and many stimulate more than one major type of behavior (Baskerville 1999; Boinski et al. 1999; Bourgeois and Brent 2003).

When home cages are of minimum legal size, enlargements or exercise areas can be an aid to enrichment, as long as meaningful complexities are arranged within them (Jensvold et al. 2001; Prescott and Buchanan-Smith 2004; Buchanan-Smith et al. 2004). Examples of such space-displacing items are shelves, hammocks, perches, swings, nest boxes, large toys, or another animal.

Individuals may react differently to the same enrichment (Hosey et al. 1999). Ideally, the exact choice of such enrichments would be made on the basis of individual response observations (Bayne 2003). However, APHIS personnel realize it is necessary for large facilities to design their particular programs initially according to “majority rule” principles. In other words, it is necessary to provide what seems likely to work well most of the time for most of

the animals and then make case-by-case adjustments if needed.

Human-Animal Relationship

Although social interaction with conspecifics and a complex physical environment are essential, the human component of a primate’s environment can be a huge factor in the balance of the overall welfare equation (Baker 2004; Waitt and Buchanan-Smith 2002). Some primates develop increasingly fearful reactions to caretaker cues that signal the onset of involuntary restraint. It is possible to reduce or eliminate the potential confounding effects of handling stress on research through patience and the use of rewards (Reinhardt and Reinhardt 2000). Inspectors should take the time to observe and consider the quality of caregiver interactions with their nonhuman primate charges. To determine whether appropriate adaptation and habituation responses have occurred, one can assess whether a group of animals repeatedly exposed to a procedure has become more fearful over time or less so.

Primates in Psychological Distress

Primates in psychological distress are best treated as they would be with any other form of organic illness or abnormality, as prescribed by the attending veterinarian. Many such conditions will not be cured, but they can perhaps be managed where study procedures will permit. Appropriate amelioration therapy for an individual may be an environmental change (different enrichment), psychoactive medication, and/or other adjuncts (Hugo et al. 2003; Kessel and Brent 2001; Turner and Grantham 2002). Euthanasia may be the most appropriate therapy in severe refractive cases. It may be possible to identify and correct the underlying cause for that individual, but more likely it will be derived from a prior management or rearing practice that should be re-examined for its potential effects on other primates at the facility (Wolfe 2000).

New Initiatives

Research Community

We have encountered innovative techniques and methods that are being used in the research community. Examples of these approaches include the following:

- Socialization, habituation, and training programs for dogs established by laboratory animal suppliers and utilized by research facilities (Adams et al. 2004; Hubrecht 1995).
- Improved design of dog runs to increase cage complexity and human interaction (Hubrecht 1993; Loveridge 1998).

- Providing treats and toys to dogs (where appropriate) to encourage human interaction (Wells 2004).
- Increasing use of training of primates as an enrichment strategy, to reduce handling and procedural stress, and to facilitate other enrichments such as resocialization or release into exercise cages (Laule et al. 2003).
- Group caging of primates in large indoor built-in runs.
- Use of exercise areas (Storey et al. 2000), connector tunnels, very large windows, skylights, swimming tubs, and outdoor access. Large windows between rooms and service corridors give primates an opportunity to observe and habituate to humans under nonthreatening circumstances.
- Requests to primate suppliers to randomize and pair animals in advance of shipment. Socializing and training continue through quarantine.
- Personality profiling that allows faster re-pairing with new candidates for primates that have been separated during a study.
- Researchers realizing the benefits of using normally developed primates, and requesting that suppliers leave infants with their natal groups longer.
- Use of psychoactive drugs from human medicine to treat primates for self-injurious behavior, stereotypy or depression (Hugo et al. 2003; Troisi 2002).
- Voluntary enrichment of species other than primates and dogs, especially swine, cats, and rabbits.

APHIS-Animal Care

Animal Care (AC¹) is working to develop better tools for explaining, interpreting, assessing, and enforcing these performance standards. For dogs, AC recognizes that facilities usually fulfill the exercise requirement by providing a larger primary enclosure. We believe socialization with humans and/or other dogs is also important for the well-being of the dog. We will continue to educate and encourage facilities to consider this aspect.

The 2004 APHIS Strategic Plan emphasizes outreach and education as a strategy to ensure the humane welfare and treatment of animals. Accordingly, we will continue to host the “Canine Care” seminars, which began in 2002 with the objective to assist and educate dog breeders in expanding their knowledge of raising, breeding, and maintaining top quality pets. The course offers information on preventive medicine, puppy socialization, kennel design, canine nutrition, transportation of dogs and adequate veterinary care. It is held at locations around the country, open to all interested stakeholders and announced on our web site (www.aphis.usda.gov/ac).

We are planning educational symposia for small exhibitors and dealers with nonhuman primates and for their attending veterinarians. In the United States, the standards for dog exercise and primate enrichment apply equally to many types of facilities, including research, exhibition, and breeders for the pet trade. We also hope to develop workshops

and other interagency dialogue to address challenges raised by differing agency requirements. For example, testing laboratories may be reluctant to try new enrichments because they are unsure whether data will be viewed as confounded (Turner et al. 2003). The Centers for Disease Control and Prevention quarantine is not a categorical obstacle to providing social and other enrichment, but it does pose challenges (NRC 1998).

AC now has several employees specialized in certain species or topics, including nonhuman primates, elephants, and large exotic cats. These field specialists assist inspectors in evaluating difficult issues such as primate psychological well-being and they help develop training materials for inspectors and facilities. We also plan to provide focused training courses on primates for AC inspectors in the future.

AC collaborated with NIH on the development of standards for chimpanzee sanctuaries under the Chimpanzee Health Improvement, Maintenance and Protection (“CHIMP”) Act. We recently surveyed the national population of captive chimpanzees in all types of use (e.g., research, exhibition, pets) and are maintaining demographic data that could assist in determining placement or sanctuary needs for these animals.

Conclusion

It proved challenging to write regulations for all situations that captured the intent of the 1985 amendments and were still acceptable to our stakeholders. Our goal was to establish regulations that would both promote the well-being of the animals in question and be enforceable. It is just as difficult to explain thoroughly how we interpret them for every situation; a complete discussion of how APHIS interprets these standards would require more space than this article allows. Nothing can communicate the interpretation of standards better than an actual on-site discussion between each facility and its local inspector, and we encourage every licensee and registrant to do so.

Acknowledgments

We acknowledge the contributions of the following individuals in the preparation of this manuscript: Ms. D’Anna Jensen, Animal Welfare Information Center [AWIC]; Dr. Richard Crawford, AWIC; Mr. Gregg Goodman, USDA-APHIS-Biotechnology Regulatory Services (formerly of AWIC); and Dr. Diane McClure, University of California-Santa Barbara.

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