AC and OLAW
Perspective on Nonhuman Primate Enrichment and Social Housing

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The Animal Welfare Act
1985 Amendment to the AWA
(The Improved Standards For Laboratory Animals Act)

Section 2143(a)

“(1) The Secretary shall promulgate standards to govern the humane handling, care, treatment, and transportation of animals by dealers, research facilities, and exhibitors.

(2) The standards described in paragraph (1) shall include minimum requirements —
(B) …for a physical environment adequate to promote the psychological well-being of primates.” (Emphasis added)
AWA Regulations

Section 3.81 Environment enhancement to promote psychological well-being.

The written plan must address the following:

(a) Social grouping.
(b) Environmental enrichment.
(c) Special considerations.
(d) Restraint devices.
(e) Exemptions.
AWA Regulations

Section 2.81 (a) Social Grouping.

“The environment enhancement plan must include specific provisions to address the social needs of nonhuman primates of species known to exist in social groups in nature. Such specific provisions must be in accordance with currently accepted professional standards, as cited in appropriate professional journals or reference guides, and as directed by the attending veterinarian.”

(Emphasis added)
Social Grouping: Housing as Enrichment

**Group Housing**
- Outdoor or indoor
  - Large open areas (outdoor)
  - Large rooms
  - Runs
  - Caging
- Research studies
- Breeding groups or colonies
- Holding
- Family groups
- Age groups, e.g., juveniles
- Compatible social groups

**Pair Housing**
- Generally indoor
  - Caging
  - Runs
  - Compatible pairs
  - Research studies
Social Housing is Required

Housing nonhuman primates in social groups is the requirement in the regulations. Anything else is an exception.
Exceptions

The written plan may provide for exceptions to social housing for certain animals for the following reasons:

• Vicious or overly aggressive behavior,
• Debilitation as a result of age or other conditions,
• Contagious diseases,
• Incompatibility with other animals.
Exemptions to the Enrichment Plan

Exemptions to the facility’s environmental enrichment plan, including the need for social housing, can be granted for individual NHPs by:

**The attending veterinarian**
- For health reasons.
- In consideration of its well-being.
- Exemptions must be reviewed every 30 days unless condition is permanent.

**The IACUC**
- For scientific reasons set forth in a research proposal.
- Must be reviewed at appropriate intervals.
Registered research facilities must report all exceptions to the standards and regulations for housing NHPs approved by the IACUC on their Annual Report to USDA. That includes all IACUC-approved single-housing situations.

9CFR 2.36(b)(3)
Single Housing of NHPs

- Allowed for scientific necessity
- Must be justified
- Duration should be specified
- Must be approved by the IACUC
What is Scientific Necessity?

The need to employ or maintain certain conditions, procedures, practices, etc. in such a way that the results of the research study will be deemed to have scientific validity.
OLAW Mission Statement

OLAW provides guidance and interpretation of the PHS Policy, supports educational programs, and monitors compliance with the Policy by Assured institutions and PHS funding components to ensure the humane care and use of animals in PHS-supported research, testing, and training, thereby contributing to the quality of PHS-supported activities.
PHS Policy

PHS Policy is applicable to all PHS-conducted or supported activities involving animals.

All institutions are required to comply, as applicable, with the Animal Welfare Act, and other Federal statutes and regulations relating to animals.
Guide for the Care and Use of Laboratory Animals

- PHS Policy requires that Assured institutions base their programs of animal care and use on the *Guide*.
- In all instances where *Guide* recommendations differ from applicable legal or policy requirements, the higher standard shall apply.
- PHS Policy requires that Assured institutions comply with the applicable regulations (9 CFR, Subchapter A) issued by the USDA under the Animal Welfare Act.
- The *Guide* may differ from USDA regulations in some respects.
- Compliance with the USDA regulations is an absolute requirement of the PHS Policy.
U.S Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training

- **Principle IV** Proper use of animals, including the avoidance or minimization of discomfort, distress, and pain when consistent with sound scientific practices, is imperative.

- **Principle VII** The living conditions of animals should be appropriate for their species and contribute to their health and comfort.
Guide Language on Social Housing

• Animals should be housed with a goal of maximizing species-specific behaviors and minimizing stress-induced behaviors.

• For social species, this normally requires housing in compatible pairs or groups.

• When it is appropriate and compatible with the protocol, social animals should be housed in physical contact with conspecifics.

• Appropriate social interactions among conspecifics are essential for normal development in many species.

• It is desirable that social animals be housed in groups.

• Single housing of social species should be the exception.
Advantages of Social Housing

• Reduce behavioral abnormalities
• Increase opportunities for exercise
• Expand species-typical behavior
• Increase cognitive stimulation
• Buffer effects of stress
• Essential for normal development
Social Housing Exceptions

- Not all members of a social species can or should be maintained socially.
- Successful social housing may be precluded due to experimental, health, or behavioral reasons.
- Potential risks of social housing are reduced when animals are compatible and in stable social units.
Exemptions

• The institutional veterinarian may exempt a primate from inclusion in the environmental enrichment plan due to health considerations; unless permanent, the exemption must be reviewed every 30 days.

• The IACUC may exempt a primate from enrichment and/or social housing based on scientific justification.
  • Use pilot studies to support the alternative.
  • Take into account current science not historical precedent.

• The default for primates is social housing. Clear medical or scientific justification is needed for exemption.
Enrichment

Singly housed primates should receive other forms of enrichment

- Structural environment: cage furnishings, equipment
- Nutritionally balanced varied diet
- Noncontact communication: visual, auditory, olfactory
- Toys, foraging devices, swings, items to manipulate
- Safe interactions with personnel
- Social housing during times not precluded by study requirements
IACUC Responsibilities

• Provide oversight of the behavioral management of animals

• Approve formal written plans for primate enrichment and conduct periodic reviews

• Evaluate and monitor (i.e., semiannual review) the behavioral management program and outcomes

• Exemptions from environmental enrichment must be:
  • For scientific reasons
  • Documented in the protocol
  • Approved by the IACUC
  • Re-reviewed at least annually
  • Only for the period necessary during the study
Criteria for Protocol Review

(IV.C.1. of Policy, p 13-14)

- U.S. Government Principles
- Standards of the *Guide*
- Minimization of pain and distress consistent with sound research design
- Appropriate use of anesthesia and analgesia
- Humane endpoints
Criteria for Protocol Review (con’t)

- Living conditions and husbandry of animals appropriate for species
- Medical care available and provided by veterinarian
- Qualifications and training of personnel conducting procedures on animals
- Method of euthanasia appropriate and consistent with AVMA Guidelines on Euthanasia unless scientific justification provided in writing and approved by IACUC
Applying the Policy to Primate Studies

• IACUC is to ensure that staff caring for animals is appropriately trained - this includes staff providing behavioral management

• Ensure that procedures avoid or minimize discomfort, distress and pain - this includes capture, restraint

• Train animals to adapt to restraint equipment and personnel - positive reinforced training can be used to have primates present limbs or remain immobile for brief procedures
The Bottom Line

Humane care and use of nonhuman primates used in research includes appropriate social grouping and promotion of psychological well-being.

“With respect to NHPs, the [Guide] Committee endorses social housing as the default…”

Addressing these needs is a legal, ethical, and moral requirement and ultimately contributes to the overall quality of the research.
http://grants.nih.gov/grants/olaw/
Office of Laboratory Animal Welfare
National Institutes of Health
RKL-1, Suite 360, MSC 7982
6705 Rockledge Drive
Bethesda, Maryland 20892-7982
Finding Information on Social Housing and Environmental Enrichment for Nonhuman Primates

Presented by
Kristina M. Adams
Animal Welfare Information Center (AWIC)
What Should I Search?

Terminology Suggestions

- Environmental enrichment
- Environmental enhancement
- Enriched environment
- Enriched housing
- Environmental complexity
- Behavio(u)ral enrichment
- Play or playthings
- Manipulanda
- Foraging boards or puzzle feeder
What Should I Search?
Terminology Suggestions

• Social enrichment
• Pair or group or social housing
• Social environment or social groups
• Pair or group formation
• Social isolation or social deprivation
What Should I Search?

**Terminology Suggestions**

- Positive reinforcement training
- Operant conditioning
- Animal training or training animals
- Reinforcement (psychology)
Where Should I Look?

• Databases
• Website Resources
• Discussion Groups
• Books and Journals
Databases

• Agricola
  http://awic.nal.usda.gov

• PubMed

• PrimateLit
  http://primatelib.library.wisc.edu/

• Annotated Database on Environmental Enrichment and Refinement of Husbandry for Nonhuman Primates
  http://labanimals.awionline.org/SearchResultsSite/enrich.aspx
### environmental enrichment

**Definition**
Modification of the physical environment of animals, especially those in captivity, for the purpose of meeting behavioral needs and improving well-being.

**Definition Source**
NAL Thesaurus Staff

**Spanish**
enriquecimiento ambiental

**Used For**
enrichment, environmental
environmental enhancement

**Broader Term**
animal care

**Narrower Term**
social enrichment

**Related Term**
animal welfare
play
Toys

**Subject Category**
L Animal Science and Animal Products
We are unable to determine your institutional affiliation. Please click this link to select your institution.
NOTE: You can still search PrimateLit without selecting an institution.
Query: an((social OR group OR pair) AND (housing OR housed OR caging))

1. **Author:** Niehoff MO; Bergmann M; Wembauer GF  
   **Title:** Effects of social housing of sexually mature male cynomolgus monkeys during general and reproductive toxicity evaluation.  
   **Source:** REPRODUCTIVE TOXICOLOGY. 2010. 29(1). Pgs: 57-67  
   **PMID:** 19808089 [Links to NLM-PubMed Abstract]

2. **Author:** Anonymous  
   **Title:** Social housing of nonhuman primates with cranial implants: a discussion.  
   **Source:** LABORATORY PRIMATE NEWSLETTER. 2009. 48(2). Pgs: 1-2  
   **URL:** http://www.brown.edu/Research/Primate/current.html#implants

3. **Author:** Baker KC; Bloomsmith M; Neu K; Griffis C; Maloney M; Oettinger B; Schoof VAM; Martinez M  
   **Title:** Positive reinforcement training moderates only high levels of abnormal behavior in singly housed rhesus macaques.  
   **Source:** JOURNAL OF APPLIED ANIMAL WELFARE SCIENCE. 2009. 12(3). Pgs: 238-252  
   **PMID:** 20183477 [Links to NLM-PubMed Abstract]

4. **Author:** Branco Pirse J; Mariman Marin ML; de la Rica Cambray E; Loeches Alonso A  
   **Title:** Changes in the behaviour of a group of capuchin monkeys (Cebus apella) influenced by novel housing. [Abstract]  
   **Source:** FOLIA PRIMATOLOGICA. 2009. 80(6). Pgs: 415  
   **OpenURL:** Find It

5. **Author:** Dreescher I; Walt C  
   **Title:** Social housing of surplus males of captive Javan langurs (Trachypithecus auratus): Implication of castration as a management tool. [Abstract]  
   **Source:** FOLIA PRIMATOLOGICA. 2009. 80(2). Pgs: 156-157  
   **OpenURL:** Find It
Environmental Enrichment for Primates
Annotated Database on Environmental Enrichment and Refinement of Husbandry for Nonhuman Primates

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Environmental enrichment is the provision of stimuli which promote the expression of species-appropriate behavioral and mental activities in an understimulating environment.
### Keyword List: Social enrichment & Group formation & Group introduction & Group integration

<table>
<thead>
<tr>
<th>Reference</th>
<th>Title</th>
</tr>
</thead>
</table>
Other Databases

- Scopus
- Biosis Previews
- CAB Abstracts
- Zoological Record
- PsycInfo
- Embase
- Web of Science
Website Resources

• AWIC’s Website – see sections on Research Animals, and Zoo, Circus and Marine Animals
  http://awic.nal.usda.gov

• OLAW’s Enrichment for Nonhuman Primates

• UC Center for Animal Alternatives, Readings and Resources on Environmental Enrichment
  http://www.vetmed.ucdavis.edu/Animal_Alternatives/enrich.htm

• Disney’s Animal Enrichment and Training Programs
  http://animalenrichment.org/
  http://animaltraining.org
The Animal Welfare Information Center (AWIC) is mandated by the Animal Welfare Act (AWA) to provide information for improved animal care and use in research, testing, teaching, and exhibition.

In the News

Mexico, Canada Increase Horse Slaughter Production

APHIS Holds National Employee Meeting On Animal Welfare

2010 Recommended Animal Handling Guidelines & Audit Guide

Guidance for Industry: Anesthetics For Companion Animals from Food and Drug Administration

How can institutions and their IACUCs best prepare for a pandemic?

Spotlights

Environmental Enrichment for Nonhuman Primates, 2009

Camels, Old World: Arabian and Bactrian, 2010

Dogs, 2008

Big Cats, 2009

Horses, 2008
Environmental Enrichment for Nonhuman Primates Resource Guide

AWIC Resource Series No. 32
2006 (Updated March 2010)
Updates Environmental Enrichment For Nonhuman Primates Resource Guide, AWIC Resource Series No. 5 - March 1999

Table of Contents

- About this Document

- Introduction
  - U.S. Government Agency Information
  - U.S. Laws, Regulations and Guidelines for Environmental Enhancement of Nonhuman Primates

- USDA Final Report on Environmental Enhancement to Promote the Psychological Well-Being of Nonhuman Primates

- USDA Draft Policy on Environmental Enrichment For Nonhuman Primates (PDF 47 KB)

- Bibliography
  - General Environmental Enrichment
  - General Primate Enrichment
  - Abnormal Behavior
  - Great Apes and Gibbons
  - Macaques
  - Old World Monkeys
  - Marmosets and Tamarins
  - New World Monkeys
  - Lemurs, Lorisas and Tarsiers
A six-booklet series on providing appropriate enrichment for baboons, capuchins, chimpanzees, macaques, marmosets and tamarins, and squirrel monkeys.
Readings / Resources on Environmental Enrichment

Alternatives Search Resources

Bibliographies
AltWeb: Refinement - Enrichment
Animal Welfare Information Center (AWIC) Publications

Primates
PubMed search on Environmental Enrichment in Primates
Agricola search on Environmental Enrichment in Primates

Environmental enrichment for primates: An annotated database.
Reinhardt, V.; Reinhardt, A. Animal Welfare Institute, Washington DC

Refinements in husbandry, care and common procedures for non-human primates
Ninth report of the BVAAWF/FRAME/RSPCA/UFAW Joint Working Group on Refinement, 2009

Articles on environmental enrichment and psychological wellbeing
Laboratory Primate Newsletter 23(1)-45(3), 1984-2006.

Social housing of nonhuman primates with cranial implants: A discussion
LAREF, Laboratory Primate Newsletter 48(2), 2009

Risk factors and remediation of self-injurious and self-abuse behavior in rhesus macaques
Rommeck I, Anderson K, Heagerty A, Cameron A, McCowan B.
At Disney’s Animal Programs, the Mission of the Behavioral Husbandry Team is to:

- Integrate training and enrichment methods into daily care of animals to enhance their welfare.
- Motivate staff by building technical and leadership skills that provide professional development to ensure excellence in animal care.
- Inspire our guests to take action for wildlife and wildlife places through a better understanding of animal enrichment, training, and welfare.

Species Specific Enrichment Ideas

Welcome
Our Training Program
Creating a Program
Teamwork / Staff Development
Training Stories
Engaging Guests in Animal Training
Resources

Target training of spotted eagle rays.

At Disney's Animal Programs, the Mission of the Behavioral Husbandry Team is to:
Website Resources

• NC3R’s Information Portal
  http://www.nc3rs.org.uk/landing.asp?id=38

• The Ft. Worth Zoo’s Enrichment Online – find enrichment ideas by animal category or keyword
  http://www.enrichmentonline.org

• Laboratory Primate Newsletter: Articles on Environmental Enrichment and Psychological Well-being
  http://www.brown.edu/Research/Primate/enrich.html
Website Resources

- The Shape of Enrichment, Inc.  
  http://www.enrichment.org/

- The Enrichment Record  
  http://www.enrichment.org/
Non-human primates

Use the links above to access information on the housing, husbandry and care of non-human primates.

Also see our pages on Non-human primate welfare.

Basic requirements for good primate housing include the following:

- Housing in stable, compatible groups (pairs at least)
- Enough space for exercise, a range of normal behaviours and suitable enrichment
- Solid floors with substrate
- Sufficient enclosure height to allow vertical flight if alarmed; no double tiers
- Climbing structures to increase usable space (perches, platforms, swings, ropes, ladders); sufficient for all animals to occupy simultaneously
- A varied diet appropriate for the species
- The ability to forage, including appropriate artificial feeding devices and scatter feeding
- Adequate light levels
- Access to outdoors whenever possible
- Nest boxes for species that use them, e.g. marmosets
- Wood for gnawing and scent-marking for species that use it, e.g. marmosets
- Visual barriers for control over social interactions
- Toys, chew, tactile materials, destructible materials to provide a degree of control over the environment
- Novelty - minor changes in furniture, feeding practices, toys
- Adequate socialization and habituation to humans, and training where appropriate

Videos of some enrichment strategies

Anecdotal and empirical observations suggest that provision of a small mobile swimming pool for short periods of time is effective enrichment for macaques in the laboratory. These animals show high motivation to manipulate the water surface, immerse themselves, dive, swim and play (including underwater), even in the absence of submerged food rewards (e.g. raisins, nuts, banana chips). Advantages of this enrichment technique are that it is based on a natural behavioural inclination, encourages play rather than food-orientated enrichment, provides exercise, keeps both animals and their enclosure clean, and can facilitate thermoregulation in hot weather.

The first video shows long-tailed (cynomolgus) macaques using a custom made polypropylene pool built to fit within their enclosure. Stock and experimental macaques at this laboratory are group housed and given access to the pools about once per week to maintain some novelty. The macaques can be seen swimming, dive bombing and wrestling. The second video shows long-tailed macaques diving into a swimming pool at BFC Israel Ltd.
Welcome!

At Enrichment Online, you have hundreds of tested enrichment methods at your fingertips and can share your own ideas with animal care managers around the world.

Start your search for an enrichment idea right from this page!

If you wish to submit an idea or comment - please start by registering with Enrichment Online. Click HERE to set-up your account.

Browse by Animal Category

Choose a category...

Choose...

Search by Keyword

Enter a single phrase.
[boomer ball, hay...]

GO!
Articles on Environmental Enrichment and Psychological Well-Being

Contents

Social Enrichment

Pair Housing

Group Housing

Environmental Enrichment

Foraging and Feeding Enrichment

Toys and Non-Food Related Objects

Perches and Swings

Other Environmental Enrichment

Training

Physiological and Other Measures of Stress and Psychological Well-being

Rearing and Social Development
Welcome to the official website for The Enrichment Record

Featured in the April 2010 Issue:

- Post-Surgical Environmental Enrichment in Rodents
- Searching for Environmental Enrichment Information for Laboratory Animals
- Enrichment Adventures: Taking the Initiative—Creating a Program That Works

Click here for Issue No. 3 ("Flip Book")

PDF Version
Questions?

awic@ars.usda.gov
Questions about primate social housing?

Photographs courtesy of
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