

ANIMAL CARE AND USE TRAINING HANDBOOK

**IDAHO STATE UNIVERSITY
POCATELLO, IDAHO**

Prepared by the Animal Welfare Committee, 2002

Revised and Approved by ISU's
Institutional Animal Care and Use Committee, 2011

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*Additional specialized policies concerning animal care & use
appear on the [Animal Care Facility Website](#)*

Introduction

Given Idaho State University (ISU)'s mission in Health Education and supporting disciplines such as the biological sciences, research and instruction involving the use of animals is often warranted. ISU's Animal Care Facility is designed to assist both researchers and academic users in accomplishing their work, and in complying with government regulations, applicable laws, and standards for care and use. *As used herein, "animal" refers to any living vertebrate animal* (there are a few exceptions involving stages of development in certain creatures such as tadpoles and chickens; consult with the Animal Facilities Manager if you have questions in this regard).

Animal Care Facility resources include a main facility and various satellite locations. It has or can provide suitable housing for a variety of small animal species (mammals, birds, reptiles, amphibians, and fish), individually or in colonies. The Animal Care Facility is fully accredited by the non-profit organization known as AAALAC, which means ISU has high standards for care, usage, security, and management of animals. Having AAALAC accreditation is beneficial for obtaining external funding for research, and for ensuring the animal care follows the best of research and instructional practices.

This Handbook is intended to guide you through ISU's policies and procedures concerning animal use. Note that this Handbook covers *all* animal usage by ISU personnel – i.e., **animals do not necessarily have to be housed in a unit of the Facility to fall under the policies and procedures expressed herein**. For example, researchers studying wild animals “in the field” will still have to file for approval of their protocols, etc.

This Handbook is divided into three parts totaling 12 chapters, covering topics that include administrative oversight, what animals are covered by these policies, proper husbandry and veterinary care, ethical and humane considerations, the responsibilities of faculty and staff using animals, and more. It includes links to all required forms. There is an Appendix, including a glossary.

Given the complexity of pertinent laws and regulations, as well as the sensitivity of the subject matter, this Handbook seeks to balance required thoroughness with both clarity and brevity. The ISU Office of Research and/or Institutional Animal Care and Use Committee (IACUC) invite you to provide feedback on any of these three areas, so as to improve revisions.

Faculty and Investigator Responsibilities

While this Handbook pertains most directly to individuals using animals in teaching or research, it also has a broader audience. In many fields, including biological sciences, instructing students in proper animal care and use is an essential component of education. As a matter of education policy, even faculty who do not use animals should be aware of the regulations and policies in this Handbook, since their students may use animals at a later time.

Individuals using animals in teaching or research (including field work involving animals) are, by law, accountable for conforming to basic regulations and policies governing animal use. There are multiple points of origins of such regulations and policies, from a variety of federal, state, and local sources. ISU has drawn on all these sources to develop this Handbook. As suggested by the Handbook's *Table of Contents*, the topics of concern are wide-ranging, including but not limited to: (a) the acquisition, care and use of animals, (b) efforts to minimize animal pain and distress, (c) the training of personnel using animals, (d) consideration of alternatives to animal use, and (e) obtaining approval of protocols.

Faculty and Investigators using animals in teaching or research are responsible for reading, understanding, and adhering to the policies and procedures laid out in this Handbook. Such Faculty and Investigators are also responsible for ensuring any of their subordinate staff or students caring for, working with, or having access to the animals also understand and comply with these policies and procedures.

Before Faculty or Investigators can obtain animals or make use of ISU's Animal Care Facility, they will have to sign an acknowledgment that they have read and understood the policies and procedures laid out in this Handbook. Failure to comply with the provisions of this Handbook can result in disciplinary action, up to and including dismissal. If the underlying laws and regulations upon which the Handbook is based (e.g., Animal Welfare Act, USDA and APHIS policy) are violated, the result may also include civil or criminal prosecution. In some cases, violations may also lead to the suspension of funding and/or animal research activities, not just for the offender, but also for his/her colleagues or even the entire University.

Any concerns or issues regarding the proper treatment of animals used for research or instruction may be reported to the [IACUC](#) or any of its individual members.

Ethical and Humane Considerations In the Use of Animals for Research and Teaching

Scientists, theologians, philosophers and the lay public have debated questions concerning the ethics of using animals in research and teaching since the use of animals for such purposes began. Even when consideration is restricted to recent discussions of the issue, there are almost as many ethical positions as there are writers on the subject. The prevailing view is that animals can and should be used in research provided that certain key conditions are met:

- Such research must offer expected benefits to human beings and/or the ecosystem (i.e., benefits outweigh any harm caused to the animals involved),
- there must in each case be no acceptable alternative to the use of animals, and
- the animals used must be treated humanely. Most conscientious researchers and regulatory agencies accept that an animal's well-being is dependent on its mental and social states, as well as its physical state.

Directly or indirectly, these concerns are repeated themes throughout this Handbook. They should be considered by faculty and researchers when they are designing their projects and developing protocols. This Handbook is but one resource to assist you with these considerations; you are also invited to contact ISU's Institutional Animal Care and Use Committee, the Animal Facilities Manager, and/or the Attending Veterinarian for help or clarification, as appropriate.

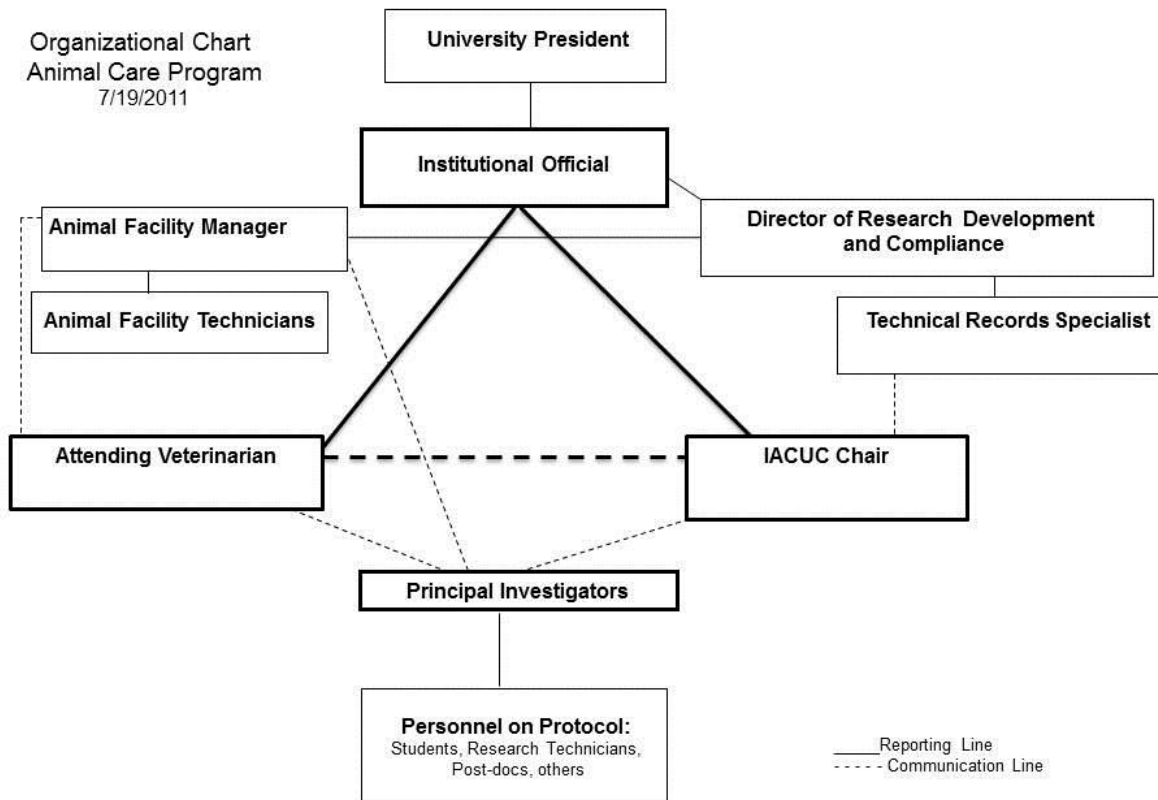
US Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training

The principles below were prepared by the Interagency Research Animal Committee. All ISU research and instructional use of animals must conform to these Principles.

- I. The transportation, care, and use of animals should be in accordance with the Animal Welfare Act (7U.S.C.2131 et seq.) and other applicable Federal laws, guidelines and policies.
- II. Procedures involving animals should be designed and performed with due consideration of their relevance to human or animal health, the advancement of knowledge, or the good of society.
- III. The animals selected for a procedure should be of an appropriate species and quality and the minimum number required to obtain valid results. Methods such as mathematical models, computer simulation, and *in vitro* biological systems should be considered.
- IV. Proper use of animals, including the avoidance or minimization of discomfort, distress, and pain when consistent with sound scientific practices, is imperative. Unless the contrary is established, investigators should consider that procedures that cause pain or distress in human beings may cause pain or distress in other animals.
- V. Procedures with animals that may cause more than momentary or slight pain or distress should be performed with appropriate sedation, analgesia, or anesthesia. Surgical or other painful procedures should not be performed on unanesthetized animals paralyzed by chemical agents.
- VI. Animals that would otherwise suffer severe or chronic pain or distress that cannot be relieved should be painlessly killed at the end of the procedure or, if appropriate, during the procedure.
- VII. The living conditions of animals should be appropriate for the species and contribute to their health and comfort. Normally, the housing, feeding, and care of all animals used for biomedical purposes must be directed by a veterinarian or other scientist trained and experienced in the proper care, handling, and use of the species being maintained or studied. In any case, veterinary care shall be provided as indicated.
- VIII. Investigators and other personnel shall be appropriately qualified and experienced for conducting procedures on living animals. Adequate arrangements shall be made for their in-service training, including the proper and humane care and use of laboratory animals.
- IX. Where exceptions are required in relation to the provision of these Principles, the decisions should not rest with the investigators directly concerned but should be made, with due regard to Principle II, by an appropriate review group such as an institutional animal care and use committee. Such exceptions should not be made solely for the purpose of teaching or demonstration.

Administrative Oversight of Animal Care and Use at ISU

Federal regulations (i.e., Animal Welfare Act, PHS Policy, etc.) stipulate the basic structure for overseeing animals care and use in university research programs. At ISU, the authority and responsibility for administering the animal program and ensuring compliance with the NIH Office of Laboratory Animal Welfare (OLAW) Assurance are as follows:



Institutional Animal Care and Use Committee (IACUC): IACUC (pronounced *Aye-ah-kook*) is a generic name for this type of committee, as well as the specific name for ISU’s committee. It is the backbone of the University’s animal care and use program oversight. IACUC’s functions include:

- Semiannual review of the institution’s program for the humane care and use of animals.
- Semiannual inspection of all institutional animal facilities.
- Review of all proposed uses of vertebrates for research and teaching.
- Review and development of institutional policy on care and use of laboratory animals.
- Review specific concerns or complaints about animal care and/or use.

- Provide recommendations to the responsible Institutional Official regarding all aspects of the campus animal care and use program.
- Authority to suspend any activity involving the use of animals which is not being conducted in accordance with the National Research Council's *Guide for the Care and Use of Laboratory Animals* ("The Guide") standards, or with applicable laws, regulations and institutional policies.

The committee is appointed by ISU's Institutional Official (below). It must be composed of at least five members, including an individual unaffiliated with the institution, a veterinarian with program responsibilities, a practicing scientist experienced in research involving animals, and a non-scientist. It must be headed by a chairperson (who cannot be the Attending Veterinarian).

Institutional Official (IO): Generically, this is the administrator to whom an IACUC reports, and is either the university's president or his designee. At ISU, the President has designated the Vice President for Research to fulfill this role. Note, however, while the IACUC reports to the Institutional Official, that official does not have unfettered power over the Committee. For example, to quote from an OLAW website: "Nothing in the PHS Policy precludes the Institutional Official or another authorized official from unilaterally suspending, terminating, or imposing sanctions on any activity involving animals, regardless of whether it was previously approved by the IACUC. However, no Institutional Official may approve animal activities or reinstate animal activities that were suspended by the IACUC."

The Animal Facilities Manager (AFM):

The Animal Facilities Manager (AFM) is responsible for the day-to-day management of the Animal Care Facility and its staff. In general, the AFM is the "go-to" person should you have questions or concerns about animal care operations, need assistance in obtaining proper veterinary care, etc.

Certain activities discussed *require* going through the AFM. Only the AFM may purchase animals, and the AFM is also responsible for arranging suitable housing. Any transportation of animals must be coordinated with the AFM. Any deviation from standard diets must be arranged through the AFM. If you wish to involve any outside groups with the Animal Care Facility, you must make arrangements in advance through the AFM. The AFM serves as your liaison to the Attending Veterinarian and the IACUC. The AFM may also assist in providing veterinary and diagnostic services. The AFM can also arrange for training in animal care for faculty, research assistants, students, or project staff, if desired/required. During the development process of a project, the AFM can help develop appropriate budgets for animals and related equipment, and aid in the design of Animal Use Protocols before submission to the IACUC.

ISU Animal-Related Training Programs

At minimum, all users of animals at ISU **must** complete the *Core Training* program described below. Also, before any work with animals may begin, it is the responsibility of the faculty member or investigator to make sure any students or staff accessing the animals have the proper and appropriate training.

Training may be required for legal reasons, or to meet educational objectives. In some cases, the faculty member or investigator may wish to have, or be required to, undergo additional (customized, or one of the standard programs below) training themselves. For more information about customized training, please contact the IACUC Chair or the Animal Facilities Manager for assistance and/or referral.

ISU's three standard training programs for those working with animals are: the mandatory Core Program, Animal or Use-Specific Training, and Occupational Health and Safety Instruction (OHSI). Each of these is described briefly below.

Core Training Program: This mandatory program has three components:

- An annual/as-needed training and orientation program to the Animal Care Facility, held by the IACUC Chair and/or the Animal Facilities Manager
- Anyone (faculty, staff, students) who participates in activities involving living vertebrate animals is to complete the on-line CITI (Collaborative Institutional Training Initiative) *Animal Care and Use Course*, available at www.citiprogram.org – completing the CITI program is estimated to take an average of two to eight hours, depending upon variables such as animal species involved, etc.
- Reading and understanding this Handbook

Participation in the Core Program is a prerequisite for any work (research or instruction) involving animals. IACUC will not approve any submitted protocols until the following outcomes of the Core Training are in place:

- a completed [Personnel Statement](#), signed by the user, acknowledging responsibility for knowing applicable rules and institutional policies, and for ensuring that all staff and students under their supervision also know and comply with these rules and policies. This statement will be kept on file in the Animal Care Facility.
- a completed [Occupational Health and Safety Form](#).
- a completed [Code of Ethics](#) Form.
- verification of attendance of the training/orientation program (provided by CITI).

Occupational Health and Safety Instruction (OHSI): This program is designed to reduce the health risk (e.g., bites, venom, disease, etc.) to people using animals in research and teaching to

an acceptable level. The entire OHSI program is in manual form, and is available in the Animal Facilities Manager's office and [here](#) on the Animal Care Facility site. Content of the Training is summarized in the next chapter, *Occupational Health and Safety Concerns*. The specifics of the training is dependent upon the animal-use role of the person taking the training, as well as such variables as the species involved; it may take anywhere from a few minutes to a couple of hours to finish. Completion of OHSI training is verified by the Occupational Health and Safety Form referenced above.

Animal- or Use-Specific Training: In some cases, animal protocols call for procedures which may or do carry the potential of risk to the animal. On such occasion, the faculty member or investigator may, at the discretion of the IACUC, be required to obtain additional instruction or certification. Such instruction or certification may be obtained on a group or individual basis, depending on the specific situation. Likewise, instruction may be by direct instruction, or by the use of audio-visual materials covering the specific procedure, as appropriate to the circumstances. Instruction may be provided by the Attending Veterinarian, the Animal Facilities Manager, other Animal Care Facility personnel, or by faculty with expertise in the specific procedure.

Occupational Health and Safety Concerns

Many different kinds of physical, environmental, or biological hazards are associated with the use of animals in teaching, instructional training or research. The Centers for Disease Control, Code of Federal Regulations, Public Health Service, AAALAC, and others all have requirements for an occupational health program for people working with laboratory animals. The program must include: Hazard Identification and Risk Assessment; Personnel Training; Personal Hygiene; Facilities, Procedures, and Monitoring; Personal Protection; and Medical Evaluation and Preventive Medicine. These concerns are the basis of ISU's mandatory OHSI Training.

Covered Personnel: Generally, "covered personnel" includes anyone involved in the direct care of animals and/or their living quarters; those individuals who have direct contact with animals (live or dead); their viable tissues, body fluids or wastes. Assessment of individual's risk is determined by frequency of contact, intensity of exposure, hazards associated with the animals being handled, hazardous properties of agents used in research/instruction, the susceptibility of individual employees, the hazard-control measures available, and the occupational history of individual employees.

Specifically included are: Animal Care Facility staff, Investigators and their technical staff, and Instructors and students involved with animal related work. Also covered are some personnel in facilities management, security, custodial services, and certain students, consultants, volunteers and visitors. IACUC provides an [Occupational Health and Safety Form](#) for each covered person to sign.

Exemptions: For situations where non-ISU students or ISU undergraduate or graduate students will be involved in ISU-supported programs, a request for variance from selected OHSI/medical criteria may be initiated. The participating Occupational Health Service Specialist (OHSS) will review such requests.

Investigator/Instructor Responsibilities: The principal investigator or class instructor is responsible for informing all staff and students about the occupational health program. All individuals covered under the program are to complete the [Occupational Health and Safety Form](#). The Animal Care Facility staff and IACUC are only responsible for the administration of the program, not to provide medical advice or care to individuals.

Animal Use Protocols

As used herein, *Animal Use Protocol* refers specifically to a document which must be submitted to ISU's IACUC. The Protocol **must be fully approved** before the applicant may acquire, house, or use animals in any capacity.

Prior to Protocol Development: Please visit www.isu.edu/anmlcare/Policies.shtml and review the specialized policies posted there concerning specific species or other specific concerns. If your work involves any of these, you will be expected to adhere to them, and incorporate them into your Protocol accordingly. Familiarize yourself with them according to your needs.

Some research projects will require “sentinel animals” to monitor the population’s general health. Such animals are periodical euthanized and tested for disease; you may need to build this into both your protocol and project budget. If you have questions on this or other topics, the Animal Facilities Manager, staff, Attending Veterinarian, and IACUC members can assist you with clarification during the Animal Use Protocol development process. Their guidance may reduce delays in obtaining approval for your submission.

Who Must Submit an Animal Use Protocol: The lead researcher or faculty member for the animal project/program is to submit the Protocol, and be identified therein as the Principal Investigator (PI).

Protocol Content: The protocol form requires:

- A non-technical description of the research project
- The purpose of the project and justification concerning how the use of animals will meet the goals of the project
- Justification concerning the species used
- A rationale for the number of animals used
- Assurance that the project is not unnecessary duplication of experiments
- Information concerning ways to reduce, refine, and replace animal use
- Information concerning care and housing
- A detailed description of all procedures to be performed on animals
- Information on surgical or painful procedures, and procedures used to minimize pain and distress (including humane Endpoints; see *Glossary*)
- Information on euthanasia
- A personnel statement demonstrating qualifications of individuals working on the animals
- Information concerning occupational health issues and risks associated with the proposed work
- A literature search to show alternatives to the use of animals has been considered

Thorough preparation of protocols facilitates the review process, reduces the chance of delay in initiating projects, and facilitates review by extramural funding agencies. A template for an

Animal Use Protocol, instructions, sample of a completed form, and other material is available at <http://www.isu.edu/anmlcare/protocol%20info.shtml>.

The Protocol's purpose is to give IACUC a clear and precise understanding of all proposed activities involving animals. IACUC needs to review Animal Use Protocols on a variety of levels (legal, ethical, medical, etc.). Preparing your Animal Use Protocol with IACUC's needs in mind will facilitate their review and avoid unnecessary delays (information follows on common, easily-avoidable errors in preparing Animal Use Protocols). PIs with questions regarding protocol preparation should contact the Animal Facilities Manager or IACUC. The Attending Veterinarian, IACUC Chair, and the Animal Facilities Manager are available to review protocols prior to submission to the entire committee. This may also facilitate IACUC's review process.

Timetable for Protocol Submission: Animal users must prepare and submit their protocols at least 7 days in advance of the scheduled meeting and well in advance of research proposal start date. Scheduled meeting dates are available [on-line](#). IACUC meets once per month during the fall and spring semesters, and as-needed during the summer months. Protocols are submitted electronically to anmlcare@isu.edu. *Note that no animals may be used or obtained until an approved protocol is in place.*

Protocol Review Process: Each member of IACUC will review the protocol to ensure that all information and proposed animal use meet the standards set forth in *The Guide* and comply with requirements of the Animal Welfare Act and USDA Policy, PHS Policy, and University guidelines and policies. The protocol is then voted upon by the IACUC. The committee can:

- Fully approve the protocol
- Request revisions to the draft protocol, with subsequent review to be carried out either by the full Committee or by a designated individual member of IACUC
- Disapprove the protocol.

Duration: Approved Protocols will be held on file as "active" for three years or until the project's completion (whichever comes first). Active protocols must be reviewed and updated yearly with a current literature search, current personnel statements, and any changes in procedures and/or reports of adverse events involving animals or personnel. It is helpful if the PI (i.e., the researcher or instructor in charge of project, as specified in the Protocol) sends [IACUC](#) a message when their project/protocol is complete.

Common Problems Encountered in Initial Protocol Submissions:

- animal use numbers don't match throughout
- animal use doesn't clearly explain what happens to each animal (a flow chart helps)
- techniques are not written for the layperson to understand
- all deviations from standard procedures are not justified clearly
- lack of online CITI training (see *ISU Animal-Related Training Programs*)
- the literature search doesn't address alternatives, pain and stress reduction, and refinements to techniques

Design Considerations: Selecting Animals/Animal Models for Use in Research and Teaching

The use of animals in research and instruction generally occurs in one of two contexts: (a) the animals serve as model systems for the investigation of processes which cannot be studied directly, or (b) the animals are studied to investigate a problem specific to the particular species. Most biomedical research falls in category “a”. Examples of “b” include field studies of the behavioral and ecological adaptations of animal species, studies of taxonomic relationships among species, or captive studies of the physiological or behavioral processes which form an important part of the adaptations of one or more species.

Selecting a Model for Research: Choosing an appropriate model must be based on extensive familiarity with the problem or system to be studied (so as to determine the range of biological responses necessary to the experimental design). This familiarity may be developed by either extensive review of the literature or from pilot studies. The lead researcher/instructor (herein after referred to as “PI;” i.e., the person listed as the PI on the Animal Use Protocol) can then proceed to select an appropriate model: a whole animal, tissue cultures, or non-animal.

An animal model is a living organism in which normal biological processes can be studied, or in which a spontaneous or induced pathological process can be studied. To be effective, the process being modeled should closely resemble the analogous process in humans or some other species, in one or more ways. Some important criteria of animal models are: relevance to the problem being studied; the accuracy with which the model reflects all or some important aspects of the problem; the model’s predictability; and the model’s availability to researchers/instructors. In addition, general species characteristics such as life history parameters, behavior and diet can be as important as physiological parameters in species choice.

Alternatives to the Use of Animals in Research: Critics of animal research have suggested that most, if not all, uses of animals in research and education could be eliminated by the use of alternatives such as tissue culture or computer models. In 1986, the US Congress’ Office of Technology Assessment produced an extensive study of the use of animal models and options for alternatives to animal use in research, education and testing. The general conclusion of the report was that the very nature of research in many areas makes it highly unlikely that reasonable alternatives to animal use will be developed. In some areas, however, alternatives exist or appear feasible to develop, and in some cases such alternatives may be more economical than the use of whole animals. Recent legislation has required alternatives to be considered. Alternatives can be divided into four broad categories:

- Modification of existing use of animals. It is sometimes possible to substitute one species of animal for another: e.g., invertebrates may be substituted for vertebrates, or laboratory species (e.g. rats and mice) may be substituted for companion animals (dogs or cats).

- Use of animal-derived material in place of whole animals. Although critics of animal research seek alternatives as a way to eliminate animal use in research, many suggested replacements consist of animal-derived material, e.g., cell, tissue and organ culture. Working with culture specimens avoids potentially painful manipulations of live animals, although these materials must originate in a living animal.
- Replacement of living systems with non-living ones, e.g., using physical or chemical models to study living systems. The study of many biochemical mechanisms, for example, makes use of materials isolated from organs or tissues. Some physical and mechanical models have been developed (mainly for educational uses) and are available commercially. IACUC encourages using such when feasible.
- Use of mathematical or computer models. Whenever a function or a relationship within a living system can be described mathematically, the possibility exists for developing a mathematical model. Scientists have long employed such models in biological and medical research because they provide the opportunity to vary the parameters involved and to predict what effects different parameters will have on the system. Based on information derived from animal studies, computer models have been developed to analyze relationships within and between living systems.

Animal Acquisition, Housing, and Records

Acquisition and Housing: All arrangements for acquiring and housing animals from any source must be made through the Animal Facilities Manager. Per Diem charges will be assessed, with rates dependent upon species and number of animals housed – the Animal Facilities Manager should be contacted for the latest information on Per Diem charges. PIs (the lead researcher or instructor listed on the Protocol) are to include such costs in their project budget.

Prior to purchasing or acquiring animals, arrangements must be made with the Animal Facilities Manager, an approved Animal Use Protocol must be on file, any required permits obtained, and quarantine (if any) arranged. Unless immediately undergoing terminal procedures, all animals are to be acclimated to their new environment before any use (usually for three to seven days – see next chapter). *Note that only the Animal Facilities Manager may purchase animals.*

PIs requiring special care, equipment, or supplies for their animals, or any exemptions from standard animal care procedures, must have prior IACUC approval and must inform the Animal Facilities Manager so that appropriate arrangements can be made. *PIs must notify the Animal Facilities Manager if their animals will be exposed to materials or procedures which may be hazardous to personnel.*

Animal Transportation: If animals are to be shipped or PI-transported from other than an approved/registered facility, the Attending Veterinarian and Animal Facilities Manager must be consulted beforehand. They will assist the PI in making sure transportation conditions and containers are species-appropriate and conform to pertinent standards, laws and regulations.

Animal Identification and Record Keeping: Appropriate identification of animals and maintenance of animal records is required. Accepted methods of animal identification include:

- room, rack, pen and cage cards with written or bar coded information (see also next paragraph);
- collars and bands;
- colored stains;
- ear notches and tags;
- tattoos;
- subcutaneous transponders; and
- freeze brands.

Identification cards should include the source of the animal, the strain or stock, the PI's name and contact information, pertinent dates, and approved protocol number. All animal's records should accurately reflect all procedures performed, treatments, diagnostics, drugs or medications used (including dosages and times given), physiologic parameters, illnesses and injuries, any clinical or abnormal observations, and date of death, euthanasia, or final disposition. Individual

animal records will be kept on all animals except rodents and ectotherms. Rodents and ectotherm will have one record for each colony. (Note: as used herein, “colony” refers to all the animals contained within a single animal room.) Colony records will be kept in the animal room, or in the Animal Facilities Manager’s office.

The Animal Facilities Manager maintains individual clinical records for all species and maintains a colony record for rats and mice. However, all technicians, users (including Research Assistants) are all responsible for entering pertinent data on the records. These records are a means of communication between PIs and animal care personnel. All animal manipulations and drug use, as well as objective observations on health status, should be recorded by PIs and/or by animal care personnel. Current records will be maintained in the animals’ room; records of completed projects are retained in the office of the Animal Facilities Manager for three years.

Animal Husbandry and Veterinary Care

Husbandry: *The Guide* has established housing and husbandry standards, and ISU is committed to conforming to those standards. The Animal Facilities Manager is to select suitable cages or other housing, in accordance with *The Guide*. Environmental factors, such as temperature, humidity, ventilation, illumination, feed, bedding, sanitation, waste disposal, and vermin control are all important and necessary to providing optimal housing conditions for the animals. IACUC may approve environmental conditions that differ from the conventional situations only if strong scientific justification is established in the Animal Use Protocol.

Compiling and maintaining animal health records are the foundation of both husbandry and veterinary care. Record procedures provided in the previous chapter (“Animal Acquisition, Housing, and Records”), and are the joint responsibility of all staff and users.

Veterinary Care: The Attending Veterinarian maintains regular on-campus hours (~5 hours per week), and is available “on-call” to:

- assess animal health
- aid in prevention, control, diagnosis and treatment of animal disease and injury
- consult with researchers on handling, restraint anesthesia, analgesia and euthanasia
- train personnel in appropriate surgical techniques and procedures
- monitor surgical procedures and post-surgical care.

Acclimation and Quarantine: A plan for adequate quarantine and health surveillance/testing will be established prior to animals entering the facility. Rooms for such animals have additional restrictions concerning access by personnel; please discuss any concerns in this regard with the Animal Facilities Manager. The extent of any quarantine period is determined by the species and by knowledge of the animal’s source and previous history. In quarantine, animals will be separated by species. The isolation, quarantine and acclimation program for newly arrived animals is necessary to provide time to assess their health status, allow them to recover from the stress of shipment, have an opportunity to adapt to their new environment, and to minimize introduction of disease into the facility.

Arriving animals, regardless of source, must be allowed an acclimation period before use. Effects of transport, large temperature fluctuations, as well as changes in feed, water and housing conditions are physiological stressors which can impact both animal health status and research results. Acclimation times are three days for rodent species, seven days for non-rodent mammals, and as-needed for non-mammal species. Animals may be exempt from this policy only if they meet the following criteria:

- Animals undergo immediate terminal procedures

- PI gives scientific justification for why acclimation is not necessary or would have a negative impact on the project.

Quarantine and surveillance is **required** for all animals from non-commercial sources. Colonies may be exempt only if they meet the following criteria:

- The colony will only be in existence for six weeks or less
- All the animals will be eliminated and the room completely emptied and sanitized before any new animals are introduced.

Initial Health Status: Upon arrival, Animal Care Facility staff will visually inspect each animal, reporting any concerns to the Attending Veterinarian. Rodents from vendors or approved outside sources (e.g., transferred from another university) must have accompanying health records. Fecal samples will be collected for medical testing during this initial inspection. Sentinel animals (if applicable) will be selected and placed in appropriate racks. (Sentinel animals are periodically euthanized and tested for disease as a means of monitoring colony health; PIs need to be aware that if sentinels are required, they must be included in their project budget. Questions concerning sentinel animals should be addressed to the Animal Facilities Manager or IACUC.) Non-rodents species will have an Initial Health Plan formulated by the Attending Veterinarian, Animal Facilities Manager, and the PI, based on species, source of animals, and risk to staff and other animals/colonies.

Surveillance, Diagnosis, Treatment and Control of Disease: All animals will be checked daily in their rooms, including weekends and holidays. Signs of illness, injury, or abnormal behavior are reported to the Animal Facilities Manager. Daily records of monitoring are kept in the room. For rodents there is a specialized “Rodent Health Monitoring” document. As with the Initial Health Plan, the Attending Veterinarian, Animal Facilities Manager, and PI will formulate a plan based on species, source of animals, and risk to staff and existing colonies.

All health concerns are to be recorded and reported to Attending Veterinarian. After initial examination and evaluation, a plan will be formulated by the Attending Veterinarian with the PI and Animal Facilities Manager for diagnosis, treatment, and control. This may include euthanasia and necropsy, blood work or other diagnostic modalities, and removal/quarantine of individuals.

Anesthesia and Analgesia: The Attending Veterinarian, as an IACUC member, reviews procedures to ensure that proposed anesthetics and analgesics are appropriate for the species and research objectives. The Attending Veterinarian is available to provide assistance with, or training in, the proper administration and use of anesthetics.

Animals that may experience more than momentary or slight pain/distress require appropriate sedation, analgesia, or anesthesia unless there is suitable scientific justification. Assessment of pain and distress in animals is difficult and can be subjective. As such, procedures that cause pain/distress in humans should be assumed to cause similar effects in animals, unless the contrary is established. The Attending Veterinarian has the authority to ensure the provision of adequate sedation, analgesia, or anesthesia. The PI must provide in the Animal Use Protocol a detailed description of how pain or distress will be assessed and how agents will be used to alleviate pain and distress. When animals are subjected to major survival surgery, routine provision of post-surgical analgesia is required. If the PI feels it necessary to withhold sedatives, analgesics, or anesthetics, or to deviate from the recommendations of the veterinary staff, the PI must provide the IACUC a reasoned, scientific justification beforehand. The justification should include the rationale or evidence that the agents would compromise the scientific aspects of the research protocol. PIs are strongly encouraged to consult with the veterinary staff during Protocol planning, to reach agreement on appropriate use of drugs for control of pain and distress. The IACUC may also require animals be euthanized to avoid suffering if their condition is moribund, unless scientific justification is approved in the Animal Use Protocol (see glossary discussion of “Humane Endpoint”).

MONITORING: All anesthetized animals must be continually attended and monitored to assess adequate level of anesthesia. There are many acceptable methods to monitor anesthesia. The following lists the most common methods to show if an animal is too-lightly sedated:

- Toe Pinch: A gentle pinch which does not break the skin or cause any deep tissue damage. Any observed movement (withdrawing the paw) indicates insufficient anesthesia for surgery.
- Skin Pinch: A gentle pinch of a small fold of skin (more-sensitive areas of the skin work best) or the nose, which does not break the skin or cause any deep tissue damage. Any observed movement (twitching of the skin) indicates insufficient anesthesia for surgery.
- Jaw Tone: Generally a good indicator of muscle relaxation. The lower jaw is gently opened to its maximum extent. Any observable closing of the mouth indicates insufficient anesthesia for surgery.
- Respiration: A good indicator of the depth of anesthesia. Rapid, shallow respirations usually indicates insufficient anesthesia for surgery. Normal respiration rate varies by species; consult a veterinary text for normal values.
- Heart Rate: An increased heart rate and/or blood pressure usually indicates a decrease in anesthetic depth. Normal heart rates vary greatly among species; consult a veterinary text for normal values.
- Palpebral Reflex: The eyelid blink reflex is quite variable, depending on the anesthetic agent used, and difficult to assess in small animals (i.e. mice and rats). **DO NOT USE FOR RODENT ANESTHESIA!**
- Corneal Reflex: The cornea can be damaged if not protected, but when used carefully, it is a good indicator. Touch the edge of the cornea with a gauge sponge or cotton q-tip. Movement of the eyelids indicates insufficient anesthesia for surgery.
- Body Temp: Most anesthetic agents depress body temperature to a significant degree.

Therefore, it is important anesthetized animals be maintained on a material which shields them from contact with cold surfaces and reduces the possibility of heat loss. The use of a supplemental heat source is a good idea, but must be used with caution, since burns can occur from electric blankets or water bottles that are too hot.

All animals recovering from anesthesia must be constantly attended until they have recovered their protective reflexes (see *Surgery, Care & Room Requirements, and Post-surgical Care* below). With rodents and other small species, this is usually indicated by the animal starting to move around. All animals should be kept in appropriate environments (see “CARE” below) during recovery. With rodents, this can be accomplished by placing the animal under a heat lamp or on a heating pad, placing the animals in a cage warmed on a heating pad, or wrapping the animal in a small towel. Care must be taken to avoid overheating when using a heat lamp or heating pad. Whenever a heat source is used, a thermometer should be placed at the animal's level to monitor actual heat. Animals will overheat and can “sun burn.” Animals which have had any significant blood/fluid loss during surgery are to be provided with fluid or blood replacement during surgery and/or the anesthesia recovery period. In small rodents, this is best accomplished by intraperitoneal or subcutaneous means.

Surgery, Care & Room Requirements, Pre- & Post-surgical Care: Below are five types of general surgical procedures, each of which has different requirements:

- Survival Surgery is any surgery from which the animal recovers consciousness.
- Non-survival Surgery is any surgery from which the animal will not regain consciousness.
- Major Surgery is any surgical intervention in an animal that is expected to recover and which a) penetrates a body cavity, b) has the potential for producing a permanent impairment of physical or physiological functions, or c) alters a major organ system.
- Minor Surgery is any operative procedure in which only skin or mucous membrane is incised, does not expose a body cavity or causes little or no physical impairment (e.g. vascular cut down for catheter placement or implanting pumps or other implant in the subcutaneous tissue). However, it does include procedures involving biopsies or placement of probes or catheters requiring entry into a body cavity through a needle or trocar in combination with a minor surgical procedure.
- Multiple Major Survival Surgeries is defined as two or more major survival surgical procedures performed at separate times on a single animal. It is permitted by the IACUC only under special circumstances, such as when the surgeries are essential and related components of a single scientific study. Cost alone is not an adequate reason for performing multiple major survival surgeries on an animal.

ROOMS & EQUIPMENT: Major surgical procedures on mammals other than rodents must be conducted in surgical facilities intended for that purpose, using aseptic techniques. These techniques include wearing sterile surgical gloves, gowns, caps and facemasks; using sterile supplies and instruments; and maintaining an aseptically prepared surgical field.

Minor surgical procedures on mammals other than rodents must be performed in an approved

and suitably located/equipped area. Appropriate aseptic techniques for these procedures include a clean uncluttered work area, preparation of the surgical site including clipping of the hair, disinfection of the skin, draping the surgical site with sterile drapes, use of sterile supplies and instruments, and the use of sterile gloves and surgical mask by the person performing the surgery.

Non-survival surgery may be performed in a suitably located and equipped area.

CARE: Prior to surgeries (indeed, as part of the Animal Use Protocol), a Care Plan must be in place, having been developed in consultation with Attending Veterinarian. As appropriate for the species, fasting of up to 12 hours may be required prior to anesthesia and surgery to prevent vomiting, aspiration, and problems associated with a distended intestinal tract. Post-surgical care includes observation to ensure uneventful recovery from anesthesia and surgery. The animal must be monitored for post-procedural complications; it may be returned to its housing only when protective reflexes have returned and the animal regains sternal recumbence, is swallowing and capable of holding its head up. The animal should be kept in an appropriate controlled environment (e.g., warm and dry for mammals, etc.); fluids, analgesics and antibiotics are to be administered as required. Incisions will be monitored daily (generally 7-10 days, as appropriate for the procedure and species), catheters or other devices will be monitored daily, daily observation of all animals for any other signs of complications, records of all concerns, treatments, or other post-operative procedures will be kept in animal rooms. Surgical wounds should be kept clean, and dressings changed as necessary to keep them clean and dry.

Subsequent care may include supportive fluids, analgesics, and other drugs as required; monitoring of the animal to include daily body temperatures; clinical observations for signs of pain, abnormal behavior, appetite and excretory functions, providing adequate care of surgical incisions and maintaining appropriate medical records.

Euthanasia: *The Guide* defines euthanasia as the act of killing animals by methods that induce rapid unconsciousness and death without pain or distress. Federal regulations require IACUC determine that methods of euthanasia used are consistent with the *Report of the American Veterinary Medical Association Panel on Euthanasia* (AVMA Panel Report). Consultation of the most current AVMA Guidelines on Euthanasia is required prior to Protocol submission and approval. Unless a deviation is justified in the Protocol for scientific or medical reasons, methods should be consistent with the most current AVMA Guidelines on Euthanasia.

Personnel properly trained in the procedures and for the species in question should carry out euthanasia. Measures should also be taken to ensure that euthanasia is performed in a way that minimizes reactions among other animals that may be present. Protocols must contain a description of procedures designed to assure that discomfort and injury to animals will be in the conduct of valuable research and limited to that which is unavoidable. Therefore a PI must discuss in the Animal Use protocol criteria for allowing removal and euthanasia of animals if undue pain and distress is established. See discussion of Endpoints in the Glossary.

Death must be verified after euthanasia and prior to disposal. Use of a different and redundant method of euthanasia is recommended to verify death. Unintended recovery must be obviated by using appropriate dosages and methods, close monitoring, and/or secondary methods such as thoracotomy.

PIs may choose to have Animal Care Facility Personnel perform any euthanasia. The Animal Care Facility personnel require PIs or their designee to legibly complete and sign an euthanasia cage card for each animal or cage of animals to be euthanized. Every animal must have access to food and water and be housed within cage density guidelines until they are euthanized.

ANIMAL CARE FACILITY GENERAL RULES & REGULATIONS

The Animal Care Facility provides services, including labor, related to the maintenance of all animals used for teaching and research at ISU. The Animal Care Facility also provides ISU researchers and instructors with guidance and assistance in complying with national animal care standards and applicable local, state, and federal regulations. If you have any questions or concerns about the following, please contact the Animal Facility Manager.

Basic Animal Care:

Typically, and as required by pertinent national standards, laws and regulations, the following describes the most basic level of care for animals in the facility:

- all animal care is supervised by the AFM
- all animals have adequate water and are fed food that meets or exceeds standards for good nutrition for laboratory animals (as noted above, any special diets must be handled through the AFM)
- all feeding and watering devices are cleaned as needed (minimum once weekly)
- cages/housing are cleaned as needed; cleaning intervals must be based on individual species' needs
- all animals leaving the facilities for use in other areas will be properly housed in clean cages or other appropriate housing.

User Regulations:

APPROPRIATE CLOTHING:

- Lab coats, shoes and shoe covers, hair nets, beard covers, and Bengal card ID are required to be worn in the Animal Care Facility. No open-toed shoes are allowed. Cosmetics may not be applied in areas where animals are used or housed.

OUTSIDE ITEMS:

- No outside food or drink is allowed.
- No unauthorized animals will be allowed in the facility areas.
- No cameras (including cell phone cameras) or photos are allowed unless cleared through the AFM. Cell phones and MP3 players *are* allowed; however, one ear must be available to hear at all times (e.g., only one ear bud may be used).

ADMINISTRATION:

- All training and paperwork has to be completed before working with animals or entrance to the facility.
- To purchase animals, you must fill out the [Animal Order Form](#) and submit it to the AFM.

- You will be notified by phone when your animals have arrived. Unless otherwise requested, they will automatically be housed in suitable space within the facility. You should then check your animals for compliance with your order. Notify the AFM immediately of any problems.
- Animal Inventory Sheets will be completed daily by Animal Care Facility personnel and abnormalities will be reported to the AFM. However, despite this service, it remains the duty of the User to monitor and check his animals.
- Users of infectious, hazardous, or toxic material(s) must notify the AFM prior to use, and a Material Safety Data Sheet (MSDS) must be on file with the AFM.
- PI is responsible to provide his/her own research equipment (e.g., gloves, syringes, needles, etc.), and clean up their work area afterward.
- Only personnel designated by the AFM may operate equipment such as sterilizers, cage washers, etc.
- Tours and visits are discouraged. When visits are required, contact the AFM well beforehand. Visits will be conducted during normal working hours only, and an [Occupational Health and Safety Form](#) must be signed by all visitors and turned in to the AFM.
- Concerns or complaints may be directed to the AFM, the [Chair of IACUC](#), or any IACUC member.

ANIMAL INTERACTIONS:

- All injuries by animals to users will be reported to the AFM and an Accident Report will be filed with the AFM and recorded on the Procedure Sheet in the animal room.
- Injuries to animals will be reported to the AFM immediately. Do not attempt to handle an injured animal. All users unfamiliar with the proper handling techniques are required to get assistance from qualified Animal Care Facility personnel.
- Should an animal become seriously ill or injured, the AFM will take immediate steps to stabilize the animal's condition and contact the Attending Veterinarian (AV). Every effort will be made to contact the PI to discuss further therapy. If the PI cannot be reached, the AFM and/or AV will continue treatment under their own judgment.
- Special diets or watering will be administered as per the approved Animal Use Protocol.
- All cages will be properly identified by number of animals, sex, Date of Birth, PI, species, strain/source, Date of Arrival, and protocol number. It is the responsibility of the User to label his/her own animals, or to verify the Animal Care Facility label.
- All animal carcasses need to be double bagged to ensure body fluids are completely contained, identified by name of PI, and placed in the refrigerator if a necropsy is necessary (notify AFM); otherwise they are to be placed in the freezer.
- Each PI is responsible for the humane care and supervision of experiments involving his/her animals and for all procedures conducted by members of his/her project, including post-operative care. All such projects must be conducted within the guidelines set forth by federal and state regulation.

PROJECT DEVELOPMENT:

- PIs anticipating use of laboratory research animals should contact the AFM to ascertain space and housing needs.
- Special requirements for housing, feeding, watering, etc., will be discussed with the AFM prior to submission of the Animal Use Protocol to the IACUC.
- The interval between ordering and receiving species of animals varies considerably. Please consult with the AFM to determine the lead-time required for your particular order, to ensure your project has a practical & workable schedule.

APPENDIX A

GLOSSARY

– As used herein, "animal" refers to living vertebrate animals –

AAALAC – Association for Assessment and Accreditation of Laboratory Animal Care.

Acclimation – a required time period in which newly-arrived animals are allowed to recover from the stress/trauma of transportation and arrival in a new environment. Acclimation times are three days for rodent species, seven days for non-rodent mammals, and as-needed for non-mammal species. See page 16.

Animal- or Use-Specific Training – Training which may be required by ISU's IACUC for certain circumstances. See page 8.

Animal – as used in this Handbook, and with a few rare exceptions, this term refers to any living vertebrate animal. The exceptions involve such things as specific stages of development in certain creatures such as tadpoles and chickens; consult with the Animal Facilities Manager if you have questions in this regard.

Animal Use Protocol – a document that must be submitted to, and approved by, ISU's IACUC before any activities involving animals may begin, and/or before animals may even be obtained. See page 10.

APHIS – *Animal and Plant Health Inspection Service*, a division of the US Department of Agriculture (USDA).

Assurance – See *OLAW*.

Attending Veterinarian (AV) – at ISU, a veterinarian who is an Animal Care Facility staff member and part of the IACUC.

AV – see *Attending Veterinarian*.

AVMA – American Veterinary Medical Association.

AWA – the federal *Animal Welfare Act* of 1966 and amendments.

CFR – Code of Federal Regulations, as printed in a multi-volume set of books. CFR's Title 9 deals with Animals and Animal Products.

CITI Training – The Collaborative Institutional Training Initiative (CITI) *Animal Care and Use Course*, an ISU-required on-line training program for anyone involved in activities with animals.

Colony – as used herein, "colony" refers to the entire population of an individual animal room.

Core Training Program – a mandatory ISU training program for all faculty, staff and students involved in working with animals. See page 7.

Death as an Endpoint – meaning a situation in which the animal’s condition is clinically irreversible and leading inevitably to death. The use of death as an endpoint, while objective and unequivocal, is discouraged and must always be scientifically justified (vs. using a Humane Endpoint).

Endpoints – see *Experimental Endpoint*, *Death as an Endpoint*, and *Humane Endpoint*.

Euthanasia – defined by *The Guide* as the act of killing animals by methods that induce rapid unconsciousness and death, without pain or distress. Protocols must choose from those approved for the species by the AVMA Guidelines on Euthanasia.

Experimental Endpoint – The Experimental Endpoint of a study occurs when the scientific aims and objectives have been reached.

Guide for the Care and Use of Laboratory Animals – a guide published by the National Research Council concerning animal care and use; adherence with the guide is required to receive PHS funding.

Guide, The – see *Guide for the Care and Use of Laboratory Animals*.

Humane Endpoint – Humane endpoints are chosen to minimize or terminate the pain or distress of the experimental animals via euthanasia rather than waiting for Death as an Endpoint.

IACUC – *Institutional Animal Care and Use Committee*. Pronounced *Aye-ah-kook*. Universities involved in animal use are required by federal law to form an IACUC to oversee their animal-related usage and programs.

Institutional Official (IO) – the local administrator to whom an IACUC reports. At ISU, this is the Vice President for Research.

IO – see *Institutional Official*.

Major Surgery – any surgical intervention in an animal that is expected to recover and which a) penetrates a body cavity, b) has the potential for producing a permanent handicap or c) alters a major organ system.

Minor Surgery – any operative procedure in which only skin or mucous membrane is incised (e.g., a vascular cut down for catheter placement, implanting pumps, or other implant in the subcutaneous tissue).

Multiple Major Survival Surgeries – two or more major Survival Surgeries (which see) performed at separate times on a single animal. It is permitted by the IACUC only under special circumstances.

NIH – *National Institutes of Health*, part of the U.S. Department of Health and Human Services.

Non-survival Surgery – as any surgery from which the animal will not regain consciousness.

Occupational Health & Safety Instruction (OHSI) – a mandatory ISU training program for all faculty, staff and students involved in working with live animals. See page 7.

OLAW – *Office of Laboratory Animal Welfare*, a division of the National Institutes of Health (NIH) within the US Department of Health and Human Services. To receive PHS funding, ISU is required to file Assurance with OLAW. ISU's Assurance number is **A3623-01**; it became effective in August, 1988.

OHSI – see *Occupational Health & Safety Instruction*

PHS – *Public Health Service*, a division of the US Department of Health and Human Services.

PI – see *Principal Investigator*.

Principal Investigator – the researcher/instructor responsible for the designing and overseeing a project involving animal use, as identified in an IACUC-approved Animal Use Protocol.

Protective Reflexes – after surgery, an animal must be monitored and may only be returned to its cage once these reflexes are regained: examples include the righting reflex, swallowing, and capability of holding its head up.

Sentinel Animal – A healthy animal placed in an animal room for the purpose of detecting the presence of disease in the room.

Survival Surgery – any surgery from which the animal recovers consciousness.

USDA – the *United States Department of Agriculture*.

US Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training – A set of nine guiding principles to be considered whenever involving animals in research or instruction. These appear in full on page 4.

APPENDIX B

Underlying Regulations & Policies

This Handbook is based on a variety of laws, regulations, policies, and nationally-recognized standards for animal care and use. Only a few of the major underlying sources will be covered here, and briefly. Interested readers are invited to do their own on-line searches for further information, or to contact ISU's Animal Facilities Manager for further information.

Animal Welfare Act (AWA): This federal law was enacted in 1966, with numerous amendments since. Its provisions are broad, including such topics as transportation, purchase, care and treatment of animals, whether they are used for research, exhibition, or to be sold as pets. Overseeing compliance with the Act is the responsibility of the US Department of Agriculture (USDA), especially the ***Animal and Plant Health Inspection Service*** (APHIS) Division. Under the Act, all research facilities using animals - including those at ISU - must register with the USDA, and comply with USDA and APHIS regulations. Facilities are subject to unannounced inspections by the USDA. Universities must also establish an ***Institutional Animal Care and Use Committee (IACUC)***, pronounced *Aye-ah-kook*) to oversee internal animal use, programs, and compliance with pertinent regulations.

Public Health Service (PHS) Policy: The Public Health Service, part of the US Department of Health and Human Services, has various policies and regulations, including the *Policy on the Humane Care and Use of Laboratory Animals*, for any institution receiving PHS funding.

Office of Laboratory Animal Welfare (OLAW): OLAW is a division of the National Institutes of Health (NIH). Any institution receiving PHS funds must file an Assurance with OLAW. ISU's Assurance (number **A3623-01**) became effective in August of 1988. The Assurance commits the institution to compliance with all of the above laws, policies, and regulations, among others.

Guide for the Care and Use of Laboratory Animals: Hereinafter referred to as "*The Guide*," it is published by the National Research Council, and compliance is required under ISU's OLAW Assurance (see above).

US Government Principles for the Utilization and Care of Vertebrate Animals Used in Testing, Research, and Training: A set of nine guiding principles created by the ***Interagency Research Animal Committee***, to be considered whenever involving animals in research or instruction. These appear in full on page 4.

Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC): AAALAC is a private, international, non-profit organization that promotes the humane treatment of animals in science through voluntary accreditation and assessment programs. AAALAC provides the recognized benchmark standards for animal care and use. ISU's animal care and use program has achieved and maintained full accreditation by the AAALAC since 1990.