Appalachian State University
Vivarium Facility

User's Manual

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1.0 INTRODUCTION

1.1 Purpose

Appalachian State University (University) is committed to providing the Appalachian academic community with a safe, clean, humane, and efficient Vivarium Facility (Vivarium). The Appalachian State University Vivarium User's Manual (Manual) is intended to provide guidance to Vivarium staff, Principal Investigators, and other teaching and research personnel in the Appalachian community regarding the following:

-- Veterinary medical care

-- Vertebrate animal health and husbandry

-- Vivarium maintenance

-- Occupational health and safety of Vivarium personnel

The Manual is designed to promote and sustain a safe and high-quality Vivarium that supports the University's teaching and research mission and ensures the humane care and use of vertebrate laboratory animals in accordance with federal requirements while respecting the University's policy on the *Care and Use of Animals in Research, Teaching Or Demonstration http://policy.appstate.edu/ Care_and_Use_of_Animals_for_Research_Teaching_or_Demonstration*. While the Manual focuses primarily on the care of animals housed in the Vivarium, it also serves as a resource for the care of animals housed outside the Vivarium. The Manual plays a critical role in ensuring the growth and success of a comprehensive animal care program at the University. All personnel involved in animal research, care, and safety at Appalachian State University are expected to become familiar with and follow the procedures set forth in this Manual. Failure to follow the guidelines set forth herein can result in unsafe or unhealthy conditions for animals and/or personnel and will have adverse affects on research outcomes. University reserves the right to amend, modify, or update the Vivarium User's Manual. Appropriate corrective action will be taken to address any noncompliance, as described in Section 8.0. Appalachian State appreciates your cooperation and invites your comments.

Appalachian Protocols

Public concerns regarding the use of animals in teaching and research will be addressed only by the Vice Chancellor for Public Affairs at 262-2092.

1.2 Background

Standards for the humane care and use of animals in teaching and research have been established by several federal agencies. It is important that faculty, staff, and students

using the Vivarium understand and comply with these policies and regulations, which are briefly outlined below.

1.2.1. *Animal Welfare Act* - The Animal Welfare Act (AWA) of 1966 and its amendments (1989 parts I, II, III) regulate the transportation, purchase, sale, housing, care, handling, and treatment of animals used in research, for exhibition, and sold as pets. The AWA specifically includes dogs, cats, nonhuman primates, guinea pigs, hamsters, rabbits, wild vertebrates, and any other warm-blooded animals that the Secretary of Agriculture determines are being used or are intended for use for research, testing, experimentation, exhibition purposes, or as pets.

The AWA is administered by the United States Department of Agriculture (USDA), specifically, the Veterinary Services component of the Animal and Plant Health Inspection Service (APHIS). Research facilities are subject to unannounced inspections by USDA veterinarians. Additionally, the University is required to furnish annual reports that include, in addition to other information and assurances, the common names and numbers of animals used and the levels of pain and distress they are subject to during testing. Routine procedures such as injections are exempt from the reporting requirements. The report must certify that anesthetic, analgesic, and tranquilizing drugs were used appropriately during research and testing and that the principal investigator has considered alternatives to painful procedures.

Recent amendments address such issues as: exercise and socialization for dogs; care of nonhuman primates to ensure their psychological well-being; the composition and duties of the IACUC; adequate veterinary care and responsibilities of the Consulting Veterinarian; training of all personnel using laboratory animals in humane methods of animal maintenance and experimentation; and record keeping.

The investigator is responsible for a thorough search of appropriate databases (see Appendix A) to insure alternatives to live animals are not available and to reduce the duplication of research involving live animals. Noncompliance with USDA standards for the humane handling, treatment, and transportation of animals may lead to substantial fines and/or suspension of animal research activities.

The AWA further specifies that any employee of the Institution may report protocol deviation(s) or lack of appropriate animal care without fear of reprisal from either the Institution or investigators.

Additional information regarding USDA policy, the AWA, and IACUC guidelines are available at http://www.aphis.usda.gov/ac.

1.2.2. *Public Health Service Policy on Humane Care and Use of Laboratory Animals* - The Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals incorporates the changes in the Public Health Service Act (PHS Act) mandated by the Health Research Extension Act of 1985, Public Law 99-158. The PHS Policy, frequently referred to as the National Institutes of Health (NIH) Policy, requires that each

institution receiving PHS funds for research involving animals submit detailed information regarding the institution's program for the care and use of animals (including farm animals, mice, and rats) to the Office of Laboratory Animal Welfare (OLAW). This information is in the form of an Animal Welfare Assurance statement, and it must be resubmitted at least every five years. Significant changes in existing assurance status or problems encountered in implementing this policy must be reported immediately to the OLAW.

Institutions are required to identify an institutional official who is ultimately responsible for the institution's program for the care and use of animals, and a veterinarian qualified by experience and training in laboratory animal medicine who will participate in the program. The institutional official at Appalachian State University is the Vice Provost of Research; the Attending Veterinarian is supplied by Mast Mobile Veterinary Care.

PHS policy requires Institutional Animal Care and Use Committees (IACUC) to review and approve those sections of PHS grant applications that relate to the care and use of animals before submission of the grant to PHS. The structure of the Appalachian's IACUC follows both USDA and PHS guidelines. This committee is responsible for reviewing all protocols using animals to make certain they meet criteria listed in the amendments. In addition, it must conduct semiannual inspections of all animal study areas and animal facilities and ensure that there are no significant deviations in the use of animals from approved protocols. The importance of this requirement is underscored by the fact that the Chief Executive Officer of the Institution must certify that the Consulting Veterinarian and the IACUC have the authority to enter any animal area at any reasonable time.

Institutions are required to conduct semiannual self-assessments of the institution's program, based on the NIH Guide for the Care and Use of Laboratory Animals *(Guide)*. Additionally, each investigator using the Vivarium must consult and follow these guidelines in both planning and implementing their projects. A copy of the *Guide*, as well as the AVMA Euthanasia Report and general PHS policy are available online at http://grants.nih.gov/grants/olaw/olaw.htm.

Significant deficiencies in the institution's program must be identified and the institution must adhere to an approved plan and schedule for correction of the deficiencies. An institution's failure to comply with these policies may lead to various actions including the termination of support for all projects involving animals.

The following are additional sources of guidelines and regulations that every investigator should also consult in planning their projects.

1.2.3. *Association for Assessment and Accreditation of Laboratory Animal Care* - The Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC) is the organization for voluntary peer-review accreditation of laboratory animal care facilities and programs in North America. AAALAC judges animal care by the standards

set forth in the *Guide*. Periodic return visits and inspections are made by representatives of this organization to assure that the institution continues to meet these standards. The NIH, in its current policies, accepts AAALAC accreditation as the best means of demonstrating conformance with the NIH requirements for animal care and use. Obtaining AAALAC accreditation is the goal of the ASU Facility.

1.2.4. *American Association for Laboratory Animal Science* - The American Association for Laboratory Animal Science (AALAS) is an organization whose purpose is to provide resources, training programs, and licensor for animal care technicians. These resources can be viewed online at http://www.aalas.org/.

1.2.5. *Good Laboratory Practice Regulations* - The Good Laboratory Practice (GLP) regulations pertain to non-clinical laboratory studies conducted in support of applications for research or marketing permits for products regulated by the Food and Drug Administration (FDA).

The GLP regulations, as they apply to the use of animals, address such issues as construction and maintenance of facilities; quarantine and isolation; disease diagnosis and treatment; animal identification; caging and routine care; sanitation; and documentation requirements. Details are available online at http://www.fda.gov/ora/compliance_ref/bimo/GLP/default.htm.

1.2.6. *Controlled Substance Act* - Potentially addictive or habit-forming drugs used in human or animal studies are regulated under this law. Examples of controlled substances include barbiturates and narcotics. The Department of Justice, Drug Enforcement Administration (DEA) enforces this law and requires appropriate security and record management of these substances. Complete records and security are mandated. Investigators considering the use of controlled substances in their research should consult the DEA website http://www.usdoj.gov/dea/pubs/csa.html as well as contacting the Facility Manager regarding Appalachian's current procedures.

1.2.7. *Policies of Various Granting Agencies* - Most granting agencies have established policies for the care and use of laboratory animals. Investigators should understand fully the requirements of each agency from which they seek funds. The Appalachian State Office of Research and Sponsored Programs may be contacted for specific information at
http://www.graduate.appstate.edu/rsp/.
1.2.8. *American Veterinary Medical Association Panel on Euthanasia* - Methods of euthanasia recommended by the American Veterinary Medical Association (AVMA) Panel on Euthanasia are considered to be acceptable by both NIH Policy and the AWA. A copy of the AVMA Euthanasia Report can be viewed at the OLAW website http://grants.nih.gov/grants/olaw/olaw.htm.

1.3 Administration

The Vivarium is maintained and operated by the College of Arts & Sciences. The operation of the Vivarium is under the direction of the reserach Operations Manager, a professional laboratory animal technician holding AALAS certification. The Research Operations Manager is responsible for all day-to-day administrative matters, including animal care, space assignment, and financial management. The Manager reports to the Assistant Dean of the College of Arts & Sciences. The Manager receives guidance from the Attending Veterinarian and the IACUC.

2.0 DESCRIPTION OF FACILITY

The Vivarium is located on the first floor of Rankin Science North (rooms 131N-154N), which also houses two Biology Department faculty research laboratories and the Biology Department's Vertebrate Museum. Access to the Vivarium proper is from the central corridor on the ground floor. The Vivarium itself has a single corridor floor plan. The Vivarium has a restricted access entrance. The Vivarium comprises six housing rooms, two quarantine rooms, a surgical suite, a cage cleaning room, morgue, a feed and storage area, seven observation/experimental rooms, and the office of the Manager. All housing, quarantine, and observation rooms are equipped with independent temperature and lighting controls. All rooms have separate exhaust systems. Three of the housing rooms and one of the observation rooms are environmental chambers, capable of maintaining precise temperature control (45^{o}F-80^{o}F, +/- 1.0^{o}F) for experimental procedures. The Vivarium is equipped with a generator to provide emergency lighting and heating.

3.0 ANIMAL PROCUREMENT

3.1 IACUC Approval

The NIH Policy and the amendments of the AWA require the establishment of a committee referred to by the generic name as the IACUC whose function is to ensure that the care and use of animals is appropriate and humane. The IACUC is responsible for monitoring the University's animal care and use program, and ensuring that there are no deviations from approved animal use protocols that adversely affect animal welfare. An animal use protocol must have been filed with Appalachian's IACUC, and have received approval, prior to ordering animals that are to be housed in the Vivarium.

3.2 Education Program

A mandatory training program is required for personnel who care for or use laboratory animals. Principal Investigators are responsible for ensuring that all research staff involved with their respective animal protocol(s) have completed the necessary education components. The Education Program is provided in accordance with the PHS Policy. A shortened version of this training program is offered for class settings by contacting Appalachian's Research Operations Manager.

3.3 Animal Purchasing

All animals authorized for use by the IACUC must be ordered through the Vivarium, unless otherwise allowed under the IACUC-approved protocol. The Manager, in consultation with the PI, is responsible for procuring animals approved by the IACUC from either commercial or noncommercial sources. The Manager, in consultation with the PI, is responsible for making sure the order is placed through the University accounting system. The IACUC-assigned protocol number must be included in the order. Upon arrival, animals will be placed in species-specific rooms and the Manager will notify the PI of their arrival and location. The animals will be housed according to the specifications identified in the IACUC-approved protocol.

The Vivarium generally discourages ordering or housing any animals from noncommercial sources because of the risks involved (e.g., possible spread of disease or parasites, potential adverse effects on research protocols). When animals from noncommercial sources are accepted into the Facility, the procedures set forth in the IACUC-approved protocol must be strictly followed. In these cases, the IACUC protocols will take into account the increased risk of procuring animals from noncommercial sources.

3.4 Per Diem Charges

Per diem charges should be included in any application for outside funding sources. The per diem charges recover some of the cost of labor, disposal, feed and bedding, equipment, maintenance, and security. Per diem charges do not cover the cost of purchasing animals. Investigators who need assistance in identifying a source of funds for animal purchasing and care should contact The Graduate School. Current per diem rates can be obtained by calling the Manager.

4.0 ANIMAL HUSBANDRY

4.1 Vivarium Staff

4.1.1. *Reserach Operations Manager* - The daily operation of the Facility is under the supervision of theManager. The general responsibilities of the Manager will be to:

-- Monitor the general care and health of animals. Plan and delegate animal husbandry and treatment procedures. Set priorities and assign work to technicians and students as available. Be prepared to perform duties as necessary in the absence of other personnel.

-- Hire, supervise, direct, and evaluate students and technicians employed in the Vivarium.

-- Organize the daily operation of the Vivarium by designing the work flow, procedures, staffing, space requirements, and the like.

-- Maintain records and files on breeding programs, health care, animal history, and the like. Provide access to these records by state and federal regulators (e.g., USDA inspectors) as requested.

-- Plan and implement on-the-job and formal training programs/workshops in animal care procedures for laboratory animal technicians, students, and faculty. Participate in Continuing Education.

-- Determine how funds are used within budgetary frame-work, authorize purchases related to animal husbandry. Plan facility budget needs in conjunction with supervisor (Assistant Dean, College of Arts & Sciences), analyze goals and priorities and project future husbandry needs.

-- Purchase animals, animal food, bedding, medicines, instruments, and other supplies necessary for animal care. Purchase supplies for the maintenance of and minor repairs to the physical facility.

-- Discuss experimental protocols with researchers and ensure compliance with state and federal regulations.

-- Perform independently a variety of laboratory tests related to the diagnosis and treatment of animal diseases, internal and external parasites, and specific chronic diseases under study. Confer with Attending Veterinarian as needed.

-- Recommend policies and procedures to supervisors to ensure that the operation of the Vivarium meets all appropriate federal, state, and AAALAC standards. Implement said procedures.

-- Serve on University committees related to animal care and use.

-- Be available 24 hours/day, 7 days/week, 52 weeks/year, unless appropriate backup personnel are available.

-- Perform other related duties as required.

4.1.2. *Animal Care Technicians* - The Facility will maintain an appropriate number of part time Animal Care Technicians. Animal Care Technicians' responsibilities will include, but are not limited to, the following:

-- Observing all animals twice daily on weekdays and as scheduled on weekends and holidays. If any problems arise, contact theManager, who in turn will contact the Principle Investigator, Attending Veterinarian, and/or the IACUC Chairperson.

4.2 Animal Care - General

Animals are housed in the Vivarium rooms located on the 1st floor of Rankin Science North. The Attending Veterinarian makes rounds at the Vivarium on a regular basis to ensure that all animals are in good health and to check for any possible deviations from their animal care protocol. The Attending Veterinarian, Manager, and/or designated staff makes regular checks of outside facilities to ensure operating procedures are being followed. Twice each year, IACUC inspects all facilities where animals are housed as part of its semiannual program and facility inspection, as required by OLAW.

PIs who have animals housed in IACUC-approved animal rooms outside the Vivarium are responsible for providing humane animal care in accordance with the *Guide*.

4.3 Caging and Housing of Animals

During the IACUC approval process, the investigator should talk with the Manager regarding housing and/or laboratory space needed for the project. Animal housing rooms and labs will be assigned on a first come first serve basis with funded projects receiving the highest priority. Housing rooms or general use labs will NOT be permanently assigned.

4.3.1. *Structure and Animal Safety—All Animals* - The *Guide* states "Proper management of animal facilities is essential to the welfare of animals, validity of research data, and health and safety of the animal care staff. A good husbandry program provides a system of housing and care that permits animals to grow, mature, reproduce (where appropriate under the protocol) and maintain good health. Good husbandry minimizes variations that can modify an animal's response to experimentation." Thus, the Vivarium adopts the following provisions as standards for good husbandry:

Small Cages - The Vivarium provides small cages for PI needs. The Manager is responsible for the tracking and inventory of small cages. PIs should notify the Manager of any unusual or special need for cages. All cages for mice and small animals must be placed above the floor on a nonporous surface.

Ventilation and Animal Access - All cages or areas of animal confinement are provided with adequate ventilation and ready access to animal food and water receptacles.

Cages and Enclosure Construction - Cages and enclosures for animals housed indoors (i.e., within the Vivarium or other location within an IACUC-approved facility) are constructed of materials that can be easily cleaned and sanitized. Enclosures for animals housed outdoors shall be constructed of appropriate materials as determined by the IACUC and the Attending Veterinarian.

Inspection - All cages or enclosures are routinely inspected by staff or other individuals approved by the IACUC and/or the AttendingVeterinarian to ensure security of animal confinement as well as animal safety.

Animal Enrichment Activities - Animals are given opportunities, as compatible with the IACUC-approved protocol, to establish and/or reinforce species-specific social activities, including physical exercise.

Animal Security in Vivarium Rooms - All animal rooms have the ability to be locked. PIs can be given keys for each room in which their animals are housed. The Manager, the Attending Veterinarian, staff, and senior university officials have master keys to all animal rooms in the Vivarium. Emergency contact information, including telephone numbers and/or beeper numbers of the PI and other designated project personnel, is posted on each animal room door, with the Manager (828-262-7340) listed as the final contact. If the primary emergency contact personnel cannot be reached, the Manager will be called.

Animal Security in IACUC-Approved Animal Rooms Outside the Vivarium - Rooms housing animals shall be adequately secured to prevent access by unauthorized individuals. Emergency contact information, including telephone numbers and/or beeper numbers of the PI and other designated project personnel, shall be posted on each animal room door, with the Manager (828-262-7340) listed as the final contact. If the primary emergency contact personnel cannot be reached, the Manager will be called.

4.4 Feed and Bedding

Animals being maintained by the Vivarium are fed a complete nutritional diet and provided species-appropriate bedding. For some projects, animals may be fed specialized diets (provided by the PI) approved by the IACUC and the Attending Veterinarian. Animal feed and bedding are stored in appropriately marked containers inside the room for small animals and in a designated location outside the room for large animals. Feed and bedding containers must remain in small animal rooms unless they are being transported to the cage washer for cleaning. All containers with animal feed or bedding are clearly labeled, without abbreviations. Animal Care Technicians are trained to periodically check the mill date and to calculate expiration dates of the feed. Most animal feed can be used up to 6 months after the mill date. Expired feed is discarded in the nearest waste container; if it contains biohazardous elements, it is discarded in a red biohazard waste container. Bagged animal feed and bedding are stored off the floor on non-wood pallets. Once delivered to the Vivarium, the feed is transported on a flatbed cart that has been sprayed down with Nolvasan cold sterilizer and wiped dry with clean paper towels by an Animal Care Technician prior to transportation.

4.5 Environmental Control

4.5.1. *Environment of Animals Housed at the Vivarium* - Environmental parameters in the Facility are maintained as follows, unless otherwise allowed under an IACUC-approved protocol:

Temperature - Each room where animals are confined is set at a temperature appropriate for the housed species. The temperature of each animal room is monitored and recorded daily on the chart located in the animal room (Appendix C). The PI will be notified promptly if the temperature deviates from either the animal-specific norms or the temperatures designated in the IACUC-approved protocol.

Noise - Noise levels are species appropriate. Species that are sensitive to noises are housed as far as possible from species that are more vocal. Animal room doors are kept closed to minimize noise pollution.

Lighting - All animal rooms have timed lighting devices with a 12-hour light and 12-hour dark cycle, unless otherwise required by the species or as allowed under an IACUC-approved protocol.

Pest Control - See Section 6.3.

Failures in Environmental Control Systems - Vivarium staff shall take reasonable and necessary steps to address any failures in environmental control systems to ensure that the animals are maintained at an acceptable temperature and receive an appropriate lighting schedule. The PI will be promptly notified of any environmental control system failures affecting his or her animals.

4.5.2. *Environment of Animals Housed in IACUC-Approved Animal Rooms Outside the Vivarium* - In those rare situations where the IACUC approves housing of animals outdoors, the IACUC and the Attending Veterinarian shall ensure, through the approved protocol, that the animals are provided appropriate shelter from the weather and are housed in a secure structure to contain the animals. The PI is responsible for maintenance of environmental parameters outside the Vivarium, unless otherwise allowed under an IACUC-approved protocol, as follows:

Temperature - The room where animals are housed must be maintained at a temperature appropriate for the species.

Noise - Noise levels must be species-appropriate.

Lighting - Species-appropriate light/dark cycles must be established, unless otherwise allowed under an IACUC-approved protocol.

Pest Control - Adequate pest control must be in place.

Failures in Environmental Control Systems - Any failures in environmental control systems must be remedied to ensure the animals have acceptable temperature levels and lighting schedules. Staff are prepared to respond to any environmental control problems observed by staff or reported by the PI. The Attending Veterinarian, Manager, and designated Vivarium staff make regular checks of any outside facility to ensure compliance with IACUC-approved protocols and University guidelines. Twice each year, IACUC inspects all facilities where animals are housed as part of its semiannual program and facility inspection, as required by OLAW.

4.6 Records and Identification

4.6.1. *Records* - The Manager is responsible for maintaining a record of all animals in the Vivarium, including the housing location of each animal. Animal counts are tallied by the Manager daily. The Manager maintains records concerning the acquisition of all animals housed in the Facility, including but not limited to those species regulated by the USDA (e.g., dogs, cats, guinea pigs, gerbils, hamsters, rabbits, and wild rodents).

4.6.2. *Identification of animal rooms and animals in the Vivarium* - All doors to individual animal rooms have signs describing the species housed and any special precautions that must be taken or considered prior to entry, including protective clothing that may be needed and the type, if any, of hazardous materials in use. Each animal room door has a sign listing emergency contact personnel, their telephone number(s), and, where appropriate, their pager number(s).

In addition to door signs, the Vivarium staff places printed cards on each small-animal cage, containing the following information:

-- Name of the PI

-- Animal species

-- Number of animals initially housed in the cage

-- IACUC protocol number

-- Date animals were born into or received at the Facility

-- Sex, age, and weight of animals upon arrival

-- Vendor

-- Any other pertinent information

The PI may further mark the animals for identification as long as such marking is consistent with the *Guide*. If questions arise regarding the information contained on the cage cards, Vivarium staff will notify the PI. When the last animal in a cage is euthanized or otherwise dies, the card is returned to theManager with the date of euthanasia or death. When fewer than all of the animals are euthanized or die, the number of animals noted on the card is revised to reflect the new number of animals.

4.6.3. *Identification of Animals and Rooms in IACUC-Approved Animal Rooms Outside the Vivarium* - The PI is responsible for ensuring that the door to each animal room is appropriately identified and includes, at a minimum: emergency contact information; protective clothing required, if any; identification of any biohazardous material; and any appropriate biohazard markings. The PI is responsible for adequately identifying animals in the room and, to follow the *Guide* if body markings are used. The Attending Veterinarian and Manager provide appropriate oversight and monitoring of this process.

4.7 Animal Care - Daily Procedures

A Standard Daily Operating Procedures manual is maintained in the Manager's office. Investigators, students, or technicians requiring information on specific care, handling, medical, or equipment-operating procedures should consult this manual.

5.0 ANIMAL HEALTH

5.1 Veterinary Care

Veterinary care is an essential part of animal care and consists of effective programs for assessment of animal well being, including: preventive medicine; surveillance, diagnosis, treatment, and control of disease; anesthesia and analgesia; surgery and post-surgical care; and euthanasia.

The AttendingVeterinarian provides part-time services to the University and is available to research personnel and Vivarium staff to address animal care and/or use issues. The Attending Veterinarian visits the Vivarium at least one day each month (except during holidays/vacation) or more often as necessary for appropriate animal care. Emergency coverage is arranged when the AttendingVeterinarian is not available.

The Attending Veterinarian has the authority to use appropriate treatment or control measures, including euthanasia if indicated, following diagnosis of an animal disease or injury. If possible, the veterinarian should discuss the situation with the PI to determine a course of action consistent with experimental goals. However, if the PI is not available, or if agreement cannot be reached, the veterinarian has the ultimate authority to act to protect the health and well being of the institutional animal colony.

5.2 Preventive Measures to Protect Animals

Preventative measures to protect the health and well being of all animals housed in the Facility begin with the standards adopted for procurement, outlined previously in Section 3.3. Insuring the health of each animal, once procured, involves standards for quarantine and daily monitoring, outlined below.

5.2.1. *Quarantine* - The Vivarium has established quarantine procedures to protect the health of incoming animals and animals housed at the Vivarium. Information signs are posted on the door of rooms housing quarantined animals. Failure to follow the quarantine procedures can result in the spread of disease or parasites and can have potential adverse affects on research protocols. Noncompliance is a serious breach of Vivarium procedures and will result in corrective action; please see Section 8.0 for details.

Specific quarantine protocols depend upon the species and the manner by which it was obtained (e.g. commercial vendor vs. wild-trapped). Any tests or treatments needed before the animal can released from quarantine are the financial responsibility of the Investigator. PIs should consider quarantine procedures when preparing their IACUC proposals for submission.

Quarantine Table

Animal	Source	Length of Quarantine	Tests needed
Rodent	Commercial vendor	14 days	None
Rodent	Wild caught	30 days	Serologic Testing +parasite screen
Reptile	Commercial vendor	30 days	Parasite screening
Reptile	Wild caught	60 days	Parasite screening
Amphibian	Commercial vendor	14 days	
Amphibian	Wild caught	30 days	

5.2.2. *Surveillance* - Each animal will be observed at least daily and more often as possible on weekdays, and once daily on weekends and holidays by Vivarium staff who are trained to recognize signs of illness, injury, or abnormal behavior in animals. If an animal is found in an unhealthy condition, the staff will contact the responsible PI on the project involving the affected animal(s). If the PI or other personnel assigned to the protocol involving the affected animal cannot be reached or fail to respond, and the animal is in distress beyond the IACUC-approved protocol, the Attending Veterinarian will make an immediate decision as to the treatment of the animal. If severe breaches of IACUC protocols occur, the Attending Veterinarian will consult with the IACUC Chair and PI, if available, to ensure humane treatment of the affected animal(s). If the PI or associated project personnel are not immediately available or fail to respond, the Vivarium

Manager will notify the PI of what has occurred and place a written report in the protocol.

5.3 Surgery, Anesthesia, Analgesia, Euthanasia

5.3.1. *Surgery* - The surgery room is available for use by investigators and their students for research and teaching purposes. There will be no permanent modifications to the surgery room without prior approval. Any approved changes to the surgery room will become the property of the Vivarium. This area is a clean area and requires lab coats and gloves. The surgery suite is equipped with an instrument autoclave, digital scale, operating table, large storage cabinet, and refrigerator/freezer. Unless otherwise labeled, all listed equipment is available for use. Drawers in the storage cabinet will be available for storage of investigator-owned tools. The drawers can be labeled with the user's name and locked. The investigator will be issued one key; a second key will be held in the Manager's office.

A sign-up sheet is posted on the surgery room door. Investigators must sign up to use the room to avoid scheduling conflicts. If a scheduling conflict arises, a compromise will be reached with the Manager's mediation. After use of the surgery room, the investigator is responsible for disposal of trash, carcasses, sharps, and any hazardous material in appropriate containers. The Vivarium staff will clean and disinfect the room between uses.

5.3.2. Anesthesia and Analgesia - The AWA requires anesthetics and analgesics for potentially painful procedures in designated animals. Appalachian operates under one drug license. Drugs not obtained under the official license will not be permitted in the Vivarium and use of such drugs will result in expulsion from the Vivarium. The differences between species, protocols, drugs, investigator preference, and the resources available prevent the use of inflexible recommendations for anesthesia and analgesia. A current list of appropriate anesthetics and analgesics can be found in Appendix B.

5.3.3. Euthanasia - Trained personnel using acceptable techniques in accordance with applicable laws should carry out euthanasia. Techniques should follow current guidelines established by the AVMA Panel on Euthanasia. Personnel should perform euthanasia in the surgery room, morgue, or minor procedures room out of view of other animals. Death must be ascertained before disposal. Animal carcasses are held for disposal in the freezer labeled for such in the morgue. See current AVMA guidelines for euthanasia at: http://grants.nih.gov/grants/olaw.

5.3.4 Drug Storage and Use- Appalachian holds an Institutional License for controlled substances. Only those controlled substances listed on an approved IACUC protocol can be used in the Facility. All drugs covered by the license will be stored in a safe in Room 105N in the Rankin North. All controlled substances must be ordered by the licensee. Under no circumstances can drugs be brought into or removed from the Vivarium without prior approval. Violation of drug laws or of the policy set forth in this manual will result in immediate expulsion from the Vivarium.

6.0 VIVARIUM MAINTENANCE

The Vivarium staff will handle routine facility maintenance with the assistance of Facilities Operations personnel. Such maintenance includes temperature and humidity control, machine checks, and mechanical problems. Any problems should be reported to the Manager for correction.

6.1 Cleaning and Sanitation

The Vivarium staff is responsible for cleaning and disinfection of common areas, holding rooms, and quarantine rooms. Thorough cleaning will occur on Fridays. Such cleaning includes but is not limited to, wipe down, sweeping, and mopping with an odor free bactericide.

The investigator is responsible for maintaining the sanitation of assigned labs. Labs are to be kept free of clutter. Trash must be emptied on a regular basis and floors are to be kept free of debris.

6.2 Waste Disposal

All trash is taken to the dumpster by the Vivarium staff on Fridays. Hazardous waste is stored in appropriate containers located throughout the Vivarium. Animal carcasses are stored in the freezer in the morgue. Facilities Operations handles final disposal of hazardous waste and animal carcasses in accordance with the laws of Watauga County.

6.3 Pest and Vermin Control

At least twice a year a reliable pest control company under contract to the University will inspect the Vivarium and treat as needed. Any sighting or evidence of pests or vermin should be immediately reported to the Manager.

7.0 OCCUPATIONAL HEALTH AND SAFETY

PHS Policy and the *Guide* identify the need for an occupational health and safety program for all personnel who work in laboratory animal facilities. The emphasis of the Vivarium training program is to prevent illness, which includes early diagnosis and treatment when an injury or illness occurs. PI's are responsible for ensuring appropriate occupational health and safety measures for themselves and their students who work with laboratory animals.

7.1 Protective Clothing

Faculty, student, and Vivarium staff should wear lab coats when handling animals, when in surgery, and when working in the morgue. Shoes should be closed toed with rubber soles to protect the feet from injuries. Masks should be worn when there is a potential for transmission of upper respiratory tract diseases shared by humans and animals or when allergy risk is a concern. Gloves are strongly recommended when handling animals. Gloves are required when handling chemicals, including cage-wash detergent, preservatives, and cleaning solutions.

7.2 Physical Exams and Immunizations

A pre-employment physical examination is recommended for all University personnel who work with animals in order to develop a baseline against which subsequent changes can be measured. Personnel who work with animals should have a tetanus booster every ten years. Staff and students employed by the Vivarium will be provided with necessary inoculations. Students who work with animals as part of their studies can obtain a tetanus booster through the Student Health Service (262-3100). Pre-exposure rabies vaccinations are important for employees working with high-risk animals.

Researchers proposing to do fieldwork should provide evidence in their IACUC protocol that they are aware of the health risks associated with trapping and handling animals and will take precautionary measures to protect personnel. Of particular concern are species that are venomous or carry zoonotic diseases. Faculty who use animals in teaching should inform students of any potential hazards associated with classroom or field contact with animals. An excellent resource can be found at:
http://www.cdc.gov/healthypets/browse_by_diseases.htm or
http://www.cdc.gov/healthypets/browse_by_animal.htm.

7.3 Medical Conditions

Persons (students) with medical conditions are required to speak to their supervisor (PI) and the Manager to determine a safe working /learning environment. All such information will be handled confidentially. Personnel who are immunosuppressed should consult Student Health Services (262-3100) or their personal medical professional regarding exposure to animals. Pregnant women or women who become pregnant should contact their personal health care provider about the increased risks to themselves and

their unborn child. Persons known to be allergic to animals or who develop allergies should take steps to limit exposure to animal dander, saliva, bedding, and urine.

7.4 Personal Hygiene

Good personal hygiene goes hand-in-hand with good safety practices to help maintain a safe work environment. Hand washing is mandatory upon entering and exiting the Vivairum. Sinks, soap, and paper towels are located in the holding rooms, cage wash area, surgery room, the morgue, labs, and the rest rooms. Coat hooks are located at each end of the Vivarium and outside of N140. Lockers are provided in the restrooms and can be used to store coats, clothing, bookbags, and personal items not used in the Facility.

7.5 Training, Safety, and Accidents

A limited amount of Safety Training is included in the Vivarium Training Program. Specific training for equipment such as the fume hood, autoclave, and cage washer will be administered on an as needed basis. Material Safety Data Sheets are stored in the Manager's office and are available to all users. Anyone can and should report unsafe working/learning conditions to their PI or the Manager.

Appalachian houses a wide range of vertebrate animals. In order to ensure safety for all involved, rooms housing venomous animals will be kept locked at all times. The "buddy rule" will be observed when working with venomous animals. In case of a bite from a venomous animal, there should always be someone who can call for help.

In case of a bite from a venomous animal, Watauga Medical Center should be contacted immediately at 262-4100. All other bites and injuries should be attended to at the Appalachian Health Center (262-3100) or by the individual's personnel health care provider. All injuries should be reported to the PI and the Manager. In the event of a public incident or demonstration, students and faculty are instructed to first contact Security at 262-2150, followed by the Vice Provost of Research and the Assistant Dean of Arts and Sciences at 262-3078. Signs stating contact information are posted on the Office door and over both phones located in the main hall.

8.0 CONFLICTS, VIOLATIONS, AND CORRECTIVE ACTIONS

The Manager will attempt to resolve those conflicts not involving violation of IACUC-approved protocols. Such conflicts might include: the assignment of holding and observation rooms to PIs for their projects; scheduling the surgical suite; and off-hours access to the Facility. If the Manager is unable to resolve such conflicts, the issue will go to the Assistant Dean of the College of Arts & Sciences. The Assistant Dean has final authority when dealing with such conflicts.

It is also the responsibility of the Manager to correct violations involving Facility policies as outlined in this document. Violations may or may not involve animal well being. If the Manager is unable to resolve the violation, the issue will be

forwarded either to the IACUC (i.e., when animal well being is involved), or the Assistant Dean of the College of Arts & Sciences, or both. Corrective action can include, but is not limited to, the following:

-- Additional education and/or training

-- Verbal warning

-- Written warning

-- Suspension of protocol (where animal health or safety is compromised as a result of misconduct by the PI and/or his or her staff)

--Suspension of privileges in the Vivarium

-- Termination of association with the University

The Manager is ultimately responsible for the conduct of Vivarium staff. The PI is responsible for his or her own conduct and the conduct of his or her personnel. Noncompliance or misconduct of research personnel will be reported to the Manager, and the responsible PI, for appropriate disciplinary action. Where the misconduct may affect another project, the PI for that project will also be notified.

Appendix A

Selected Online Databases

AGRICOLA	ASFA	BIOSIS	BIOAB	MEDLINE OR PUBMED	PSYCINFO
General agriculture	Aquaculture	General agriculture	Animal Behavior	Clinical med.	Psychology
Animal science	Aquatic bio.	Aerospace bio.	Animal science	Experimental med.	Psychiatry
Chemistry Biochemistry	Biology Chemistry	Biochemistry Anatomy	Physiology	Pharmacology	Medicine
Microbiology	Ecology	Bacteriology	Anatomy	Microbiology	Nursing
Cytology	Policy	Cell Biology	Microbiology	Administration	Communication
Nutrition	Pollution	Botany	Nutrition	Nutrition	Sociology
Biotech	Law	Anatomy	Biotech	Pathology	Education
Physiology	Policies	Physiology	Biochemistry	Anatomy Physiology	Pharmacology
Vet medicine	Marine Biology	Clinical med	Vet med	Vet med	Linguistics
Wildlife	Acoustics Optics	Pathology	Wildlife	Occupational Med	Anthropology
Zoology	Fisheries	Biophysics	Zoology	Parasitology	Physiology
Entomology	Diving	Toxicology	Entomology	Toxicology	Business

Appendix B

Drug Formulary for Laboratory Animals

MICE

Drug	Dose(mg/kg)	Route	Frequency
Anticholinergics			
Atropine	0.04	SC,IM	once
Tranquilizers			
Acepromazine	1.0-2.0	IM	
Chlorpromazine (Thorazine®)	4.0-8.0	IM	
Diazepam (Valium®)	5	IP	
Xylazine HCl (Rompun®)	10	IP	
Analgesics			
Aspirin	400	SC	q24 hours
Butorphanol tartrate (Torbutrol®)	1.0-5.0	SC	q4 hours
Buprenorphine (Buprenex®CV)	0.05-0.1	SC	q4-6hours
Flunixin	2.5	SC	q12hours
Meperidine (Demerol HCl®)	10.0-20.0	SC	q2-3 hours
Morphine 10 SC q2-4h	10	SC	q2-4hours
Anesthetics - INJECTABLE			
Alpha-chloralose	114	IP	terminal studies only
Ketamine HCl	100-200	IM	
Ketamine HCl/Acepromazine	100/2.5	IM	
Ketamine HCl/Diazepam	200/5	IM/IP	Ketamine 100mg/ml-Diazepam 5mg/ml
Ketamine HCl/Xylazine (Rompun®)	200/10	IM/IP	Ketamine 100mg/ml-Xylamine 5mg/ml
Pentobarbital sodium (Nembutal®)	35-60	IP	Narrow margin of safety: males are more sensitive than females
Thiopental sodium (Pentothal®)	40	IP	
Anesthetics - INHALANT			
Halothane (Fluothane®)	to effect		
Isoflurane (Forane®)	to effect		

These agents should be used only in ways that prevent exposure to personnel. Induce anesthesia in a closed container and maintain with a nose cone in an appropriately ventilated hood.

RATS

Drug	Dose mg/ml	Route	Frequency
Anticholinergics			
Atropine	0.04-0.1	SC/IM	once 30 minutes prior to other agents
Tranquilizers			
Acepromazine	1.0-2.0	IM	
Chlorpromazine (Thorazine®)	1.0-2.0	IM/IP	
Diazepam	2.0-4.0	IM/IP	
Analgesics			
Aspirin	100-450	PO	q4hours
Buprenorphine	0.01-0.05	SC/IV	q4-6hours
Butorphanol	2	SC	q4hours
Carprofen	5	SC	q24 hours
Ketoprofen	5	SC	q24 hours
Meperidine (Demerol HCl®)	10.0-20.0	IM/SC	q2-3hours as needed
Morphine	10	SC/IM	q2-3hours as needed
Pentazocine (Talwin-V®)	8.0-12.0	SC	hourly
Anesthetics - INJECTABLE			
Alpha-chloralose	55	IP	terminal studies only
Fentanyl /droperidol (Innovar-Vet®)	2	IM	q30-40 minutes
Ketamine HCl	44	IM	
Ketamine HCl/Acepromazine	40-80/2.5	IP	40-80mg/ml Ketamine-2.5mg/ml Acepromazine
Ketamine HCl/Diazepam (Valium®)	40-80/5-10	IP	40-80mg/ml Ketamine-5-10mg/ml Diazepam
Ketamine/Medetomidine	75/0.5	IP	75mg/ml Ketamine-0.5mg/ml Medetomidine
Ketamine HCl/Xylazine(Rompun®)	80/10	IP	80mg/ml Ketamine-10mg/ml Xylazine
Pentobarbital sodium (Nembutal®)	40-50	IP	
Telazol	20-30	IM/IP	
Thiopental sodium (Pentothal®)	20-40	IV/IP	
Anesthetics - INHALANT			
Halothane (Fluothane®)	to effect		
Isoflurane (Forane®)	to effect		

These agents should be used only in ways that prevent exposure to personnel. Induce anesthesia in a closed container and maintain with a nose cone in an appropriately ventilated hood.

AMPHIBIANS

Drug	**Dose (mg/kg)**	**Route**
Injectable Anesthetics		
Ketamine	50-150	IM, IP, or dorsal lymph sac
Pentobarbital	6mg/100gm body weight	dorsal lymph sac, IV, IP, intracoelomically
Inhalation Anesthetics		
Fluothane	1-3%	0.5-1.0 ml/liter jar induction for 2 minutes then remove from jar, anesthesia maintained for about 40 minutes: recover for 7 hours at 22-26C; keep moist, but not immersed
Isoflurane	1-5%	Use to effect, as above.
Others		
Tricaine methanesulfonate (MS 222®)	300-500mg/L H2O	larvae and newts
	1-2 g/L	adult frogs, salamanders
	up to 3 g/L	toads. Concentrations above 1 g/L should be buffered with sodium bicarbonate at 10-25 mEq/L
		induce 5-20 min., maintain by moist cloth contact with MS 222 solution; recover at 22-26C for faster recoversy, MS 222 can be given at 13 mg/kg into dorsal lymph sac; must be a sterile soln.
Benzocaine	10-50 mg/L H2O	larvae
	300 mg/L	adult frogs and salamanders

NOT RECOMMENDED:

Thiopental (Pentothal®), Chloral hydrate, Urethane, 2-phenoxyethanol, Chlorobutanol, Quinidine, 4-styrlpyridine, Chlorpromazine (Thorazine®), Methylpentynol, Tertiary amyl alcohol.

REPTILES		
Drug	**Dose (mg/kg)**	**Route**
Pre-anesthetics		
Atropine	0.01-0.02	SQ, IM
Glycopyrrolate	0.01	SQ, IM
Injectable anesthetic		
Ketamine (Ketaset®, Vetalar®)		
- turtle	15-60	IM
- snake	22-66 (lasts 72 hrs)	IM
- lizard	12-25	IM
Thiopental (Pentothal®)		
- turtle	10-16	IP, IV, IM
- snake	15-30	IP
- lizard	11-15	IP
Pentobarbital (Numbutal®)		
- turtle	16	IP, IM, IV
- snake	15-30	IP
Tricaine methanesulfonate (MS 222) (prepare a sterile soln.)		
- snake	15-30	IM, IP
- lizard	40-88	IM
Others		
Tiletamine (Telazol®)		
- tortoise and iguana	10	IM
- snake	15-30	IM
- rattlesnake	50-75	IM
- lizard	1-4	IM
- alligator	4-8	IM
Succinylcholine (for intubation)		
- alligator	0.5-2.0	IM
- turtle	0.5-1.5	IM, IV
Anesthetic Combinations		
Ketamine and Halothane or Ketamine and Isoflurane		
- turtle	40-60 & 3%	Ket IM, hal, iso inhalation (IH)
- snake	50 & 3%	Ket IM, hal, iso IH
- lizard	10-25 & 1-2%	Ket IM, hal, iso IH
Inhalation Anesthetics		
Fluothane (Halothane®)		
- snake	Induce with saturated cotton or gauze in jar to effect	
Isoflurane (Aerrane®, Isoflo®)	Induce at 5%, intubate and maintain at 1-2%	
(Note: Reptiles require intermittent positive pressure ventilation, 6-10 times/min.)		

Analgesics		
Flunixin meglamine (Banamine®)	0.5-1	IM q 24-72 h
Meperidine	5-10	SQ, IM q 12-24 h
Oxymorphone (Numorphan®)	0.05-0.2	SQ, IM q 12-48
Nalbuphine (Nubain®)	1	IM q 12 h
Pentazocine (Talwin®)	2-5	IM q 6-24 h
Buprenorphine (Buprenex®)	0.005-0.02	IM q 24-48 h
Butorphanol - gopher tortoise	0.2	IM

NOT RECOMMENDED: Urethane, hypothermia

Appendix C
Check Sheets

Room _____

Week of_____

Duties	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Animals fed							
Watered							
Cages changed							
Room Swept							
Temp.							
Tech Initials							
Time							

Week of_____

Duties	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Animals fed							
Watered							
Cages changed							
Room Swept							
Temp.							
Tech Initials							
Time							