Disaster Plan for Animal Care and Use at the St. Cloud State University Aquatic Vertebrate Facility, WSB 291

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Reviewed by:
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Purpose

This document sets forth policies and procedures designed to prepare for, prevent, and respond to most foreseeable disasters which may affect the St. Cloud State University aquatic vertebrate facility located in rooms 291A-F of the Robert H. Wick Science Building (WSB). It provides essential information regarding the causes and nature of disasters which have occurred, or may occur, and their potential impact on animals or personnel. Further, it explains the basic functions of the building mechanical systems upon which the facility depends, and describes the use of animal housing systems both during and prior to a disaster.

All information pertaining to matters of personnel health and safety is intended to complement, but does not supersede, policies and procedures set forth in the *St. Cloud State University Emergency Procedures Guide*. This guide is accessible online at http://www.stcloudstate.edu/emergency/procedures and is posted on the bulletin board in the aquatic vertebrate facility.

1. GENERAL INFORMATION

A. Terminology

The following terms are used throughout this document as defined below:

i. *Holding room*: any of rooms 291A, B, C, or D in which animals currently are housed or could be housed.

ii. *Aquatic vertebrate facility*: rooms 291A-F and all other spaces secured by the perimeter door of the facility.

iii. *Disaster*: any circumstance or event occurring, or anticipated to occur, within or near the aquatic vertebrate facility, which may endanger the health and/or safety of either personnel or animals or compromise infrastructure upon which health and safety depend.

B. Potential disasters

The disasters described below include circumstances and events which either have occurred or are considered likely to occur in the aquatic vertebrate facility. Management of these disasters is discussed in section 3, *Disaster Response*, beginning on page 15. Other disasters are possible and must be managed in accordance with policies and procedures described below and in the *St. Cloud State University Emergency Procedures Guide.*

i. Natural gas leak

Natural gas is used as a source of thermal energy in numerous laboratory applications throughout WSB. Although principally methane, natural gas also contains one or more sulfur-based compounds, which give it a "rotten egg" smell to aid in detection of a leak. No outlets for natural gas currently exist in the aquatic vertebrate facility. Detection of its characteristic odor, therefore, must be assumed to indicate a leak elsewhere within or near WSB.

Exposure to relatively low concentrations of natural gas generally does not pose a risk to human or animal health. As the concentration increases, however, the risk of explosion or adverse effects on both human and animal health and safety also increases.

ii. Fire/Smoke

Fire or smoke occurring anywhere within WSB or an adjoining building can endanger personnel and animals. Not only may fire damage facility infrastructure or equipment and cause physical harm to personnel and animals, it can also release potentially hazardous chemicals that may be transported to the aquatic vertebrate facility via the building ventilation system.

iii. Chemical fumes

With the exception of ethanol and Tricaine methanesulfonate (commonly known as MS-222), potentially hazardous chemicals are not routinely used or stored in the aquatic vertebrate facility. Nonetheless, fumes from hazardous chemicals used outside of WSB may be drawn into the facility via the building ventilation system. Obvious examples include sealants, adhesives or solvents used in building construction and renovation projects.

iv. Civil disturbance

Civil disturbances may include animal rights demonstrations, threats of violence against personnel, or the discovery of unknown or suspicious individuals or incendiary/explosive devices within or near the aquatic vertebrate facility. Such events may require evacuation of animal care personnel, which can reduce the level of care and security provided to animals.

v. HVAC failure

A building heating, ventilation and air conditioning (HVAC) system regulates the temperature within a building, as well as the balance between the rates at which air is supplied to and exhausted from building spaces. Air is drawn into and distributed throughout a building by air handlers and exhausted from a building by exhaust fans. Several of each of these devices are mounted on the roof of WSB.

Changes in air temperature within the aquatic vertebrate facility can result in changes in temperature within the various static housing systems in which aquatic vertebrates are maintained. Failure of either an air handler or exhaust fan to supply air to or exhaust it from the aquatic vertebrate facility can result in rapid increases in humidity within holding rooms and greatly affect the quality of air provided to animals.

vi. Electrical failure

The health and safety of all animals housed in the aquatic vertebrate facility are critically dependent on an uninterrupted supply of electricity. Loss of electricity can result in immediate cessation of holding room ventilation, disrupt breeding activities or other physiological processes that depend upon or follow a circadian rhythm, and cause spoilage of animal foods kept in frozen storage.

vii. Water system failure

City water reaches the aquatic vertebrate facility via the campus water system. It is the sole source of water for all animal housing systems used in this space. Two whole-house water filtration systems are installed in room 291B and remove suspended particulate matter and dissolved chemicals such as elemental chlorine and chloramines from city water prior to use in an animal housing system.

A reduction or loss of pressure or a change in the quality of water in the campus water system can reduce the quality of care provided to aquatic vertebrates and affect performance of the water filtration systems. Similarly, a failure to replace cartridges in the water filtration systems on a regular basis and monitor water quality can permit contaminants to enter aquatic housing systems, resulting in reduced animal health and mortality.

viii. Outbreaks of disease among laboratory animals

Any disaster that reduces sanitation or inhibits normal animal care activities can promote the introduction and spread of microbial pathogens in the aquatic vertebrate facility. Such an event not only affects the health and longevity of infected animals, but it can diminish the quality and reliability of data obtained from animal models.

ix. Epi- or pandemics

The emergence of an infectious disease at the municipal, county, state, or national level can preclude safe use of the aquatic vertebrate facility and spaces that support activities conducted therein by students and personnel responsible for animal care and use. Guidance provided by governmental agencies and/or the university in response to such an event may require reduction, suspension, or termination of selected or all animal care and use activities.

x. Severe weather

Severe weather includes exceptional amounts of precipitation (snow, sleet, hail, or rain), electrical storms, and/or strong winds and tornadoes. Such events can cause mechanical or electrical failures and create safety concerns for animal care personnel attempting to travel to and from work.

C. Policy

In order of priority, the following general rules apply in a disaster situation.

i. All persons present in the aquatic vertebrate facility, as well as those responding to a disaster, must act in ways that do not endanger their own health and safety or that of others. Actions taken to ensure personnel safety may include leaving the facility and proceeding to a safe location without attempting to secure the health and safety of the animals.

REGARDLESS OF THE NATURE OF A THREAT TO THE ANIMALS, THE HEALTH AND SAFETY OF PERSONNEL ARE PARAMOUNT AND SUPERSEDE THE HEALTH AND SAFETY OF ANIMALS UNDER *ALL* CIRCUMSTANCES.

ii. If the health and safety of personnel are not endangered, personnel should act in ways to secure the health and safety of the animals.

iii. Upon discovery of a disaster, one or more of the authorities or emergency responders listed below must be notified immediately. If reasonable to do so, the conditions of personnel, animals, animal housing systems and facility infrastructure should be reported.

D. Authorities (*also see contact list on page 20)*

i. In *all* matters of personnel health and safety, emergency responders such as SCSU Public Safety, the St. Cloud Police Department, and/or the St. Cloud Fire Department have authority and must be contacted first.

ii. *Brian Lorenz, Facility Manager - primary contact.*

Brian Lorenz will ensure that all individuals requiring knowledge of a disaster are contacted immediately. In consultation with other authorities, he will determine an appropriate course of action for addressing damage to facility infrastructure and animal housing systems and any threats to the health and safety of animals. In the absence of the veterinarians serving on the IACUC, Brian will have authority for animal health and disposition.

iii. *Nancy Cowardin, DVM*.

As a veterinarian serving on the IACUC, Dr. Cowardin is the authority for animal health and disposition during a disaster. In her absence, however, Brian Lorenz will have this authority.

iv. *Dr. Timothy Schuh, Professor of Biology*.

As a faculty member in the SCSU Department of Biology with extensive research and teaching experience involving aquatic vertebrates, particularly *Xenopus* spp., Dr. Schuh will serve as an alternate contact in the event that Brian Lorenz is unavailable.

E. Critical equipment

i. *Water filtration and distribution system*

Two two-stage, Home Master® whole-house water filtration systems (**Figures 1a and 1b**, Perfect Water Technologies, Inc., Scottsdale, AZ, model no. #HMF2SmgCC) are installed on the south wall of room 291B and treat city tap water prior to use in all animal housing systems. The first stage is a four-gradient sediment filter (model no. CFDGD2501-20BB), which removes particulate debris and microorganisms as small as 1 micron in diameter from incoming tap water. The second stage is a granular activated catalytic carbon filter (model no. CFKDF85GCC-20BB), which removes chlorine, chloramines, pesticides, herbicides and other potentially toxic compounds. Both filters have a 1-inch-diameter core to permit filtration rates up to 15 gallons per minute.

Pressure gauges are installed on the inlet and outlet lines serving each water filtration system (**Figure 1b**). The difference in pressure values between these gauges provides an indication of the performance of a water filtration system. When the difference is greater than 10 psi, both the sediment filter and carbon filter need to be replaced. Replacement filters are stored in a gray metal cabinet in WSB 291F. Either a 291F or AAB key (Biology master key) is required for access to this space.

Prior to entering either water filtration system, hot and cold tap water are mixed in one of two "Apollo" mixing valves (**Figures 1a and 1c**, Conbraco Industries, Matthews, NC, model no. 34ELF104S). The proportions of hot and cold water entering a mixing valve, and thus the temperature of water exiting the valve, are adjustable by means of lockable knob (**Figure 1c**). A thermometer is installed along the outlet line of each mixing valve to allow assessment of water temperature.

The temperature of tap water, either hot or cold, entering a mixing valve varies widely with seasonal fluctuations in outdoor temperature. During summer, for example, cold tap water ranges from 65 to 70ºF, whereas hot water may be only 100 to 110ºF. During winter, cold tap water ranges from 40 to 55ºF, whereas the temperature of hot tap water may be as high as 130ºF during very cold months. Such seasonal variations in tap water temperatures require that each mixing valve be checked and adjusted at least once each month to accommodate for these changes and ensure that the temperature of water exiting a mixing valve remains between 68 and 72ºF.

Only one water filtration system and one mixing valve may be in service at any time. A quarter-turn ball valve is installed along the inlet and outlet lines of each water filtration system and mixing valve. A unit can be "turned on" or "turned off" by opening or closing its respective ball valves. A ball valve is fully open when the valve handle is parallel to the piping on which it is installed; the valve is fully closed when the handle is perpendicular to this piping.

When a water filtration system or mixing valve is not in service, the unit serves as an alternate for use at times when the other is in need of maintenance or repair. This arrangement ensures an uninterrupted supply of tempered filtered water for use in animal housing systems.

No bypass valves are present on the water filtration and distribution system. This ensures that untreated city tap water may not enter this system and thus be delivered unwittingly to an animal housing system.

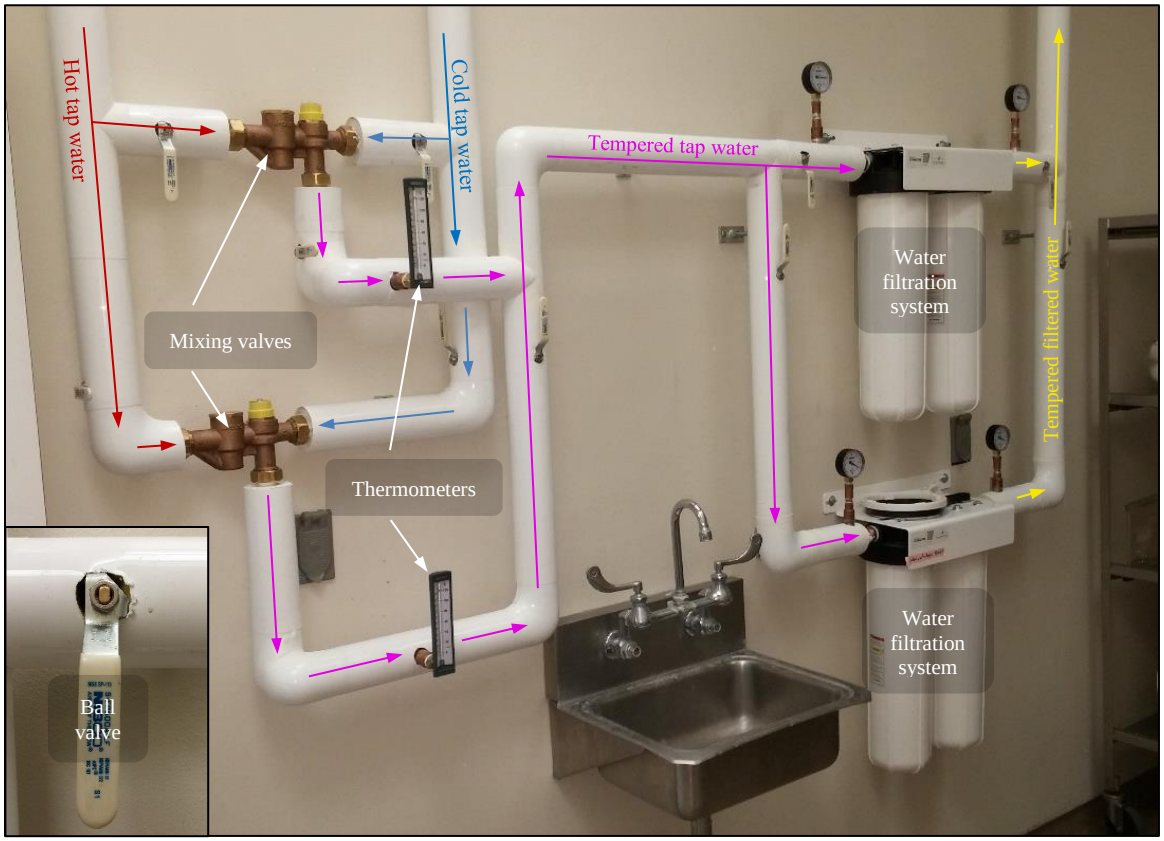


Figure 1a. Two two-stage whole-house water filtration systems, two mixing valves, and insulated copper piping are installed in WSB 291B and provide tempered filtered water for use in all animal housing systems. A quarter-turn ball valve is installed along the inlet and outlet lines of each water filtration system and each mixing valve. A unit may be "turned on" or "turned off" as needed by opening or closing the ball valves serving it. Note that a ball valve is open when its handle is parallel to the piping on which it is installed; a ball valve is closed when its handle is perpendicular to the same. A thermometer is installed along the outlet line of each mixing valve to allow monitoring of the temperature of water exiting the valve.

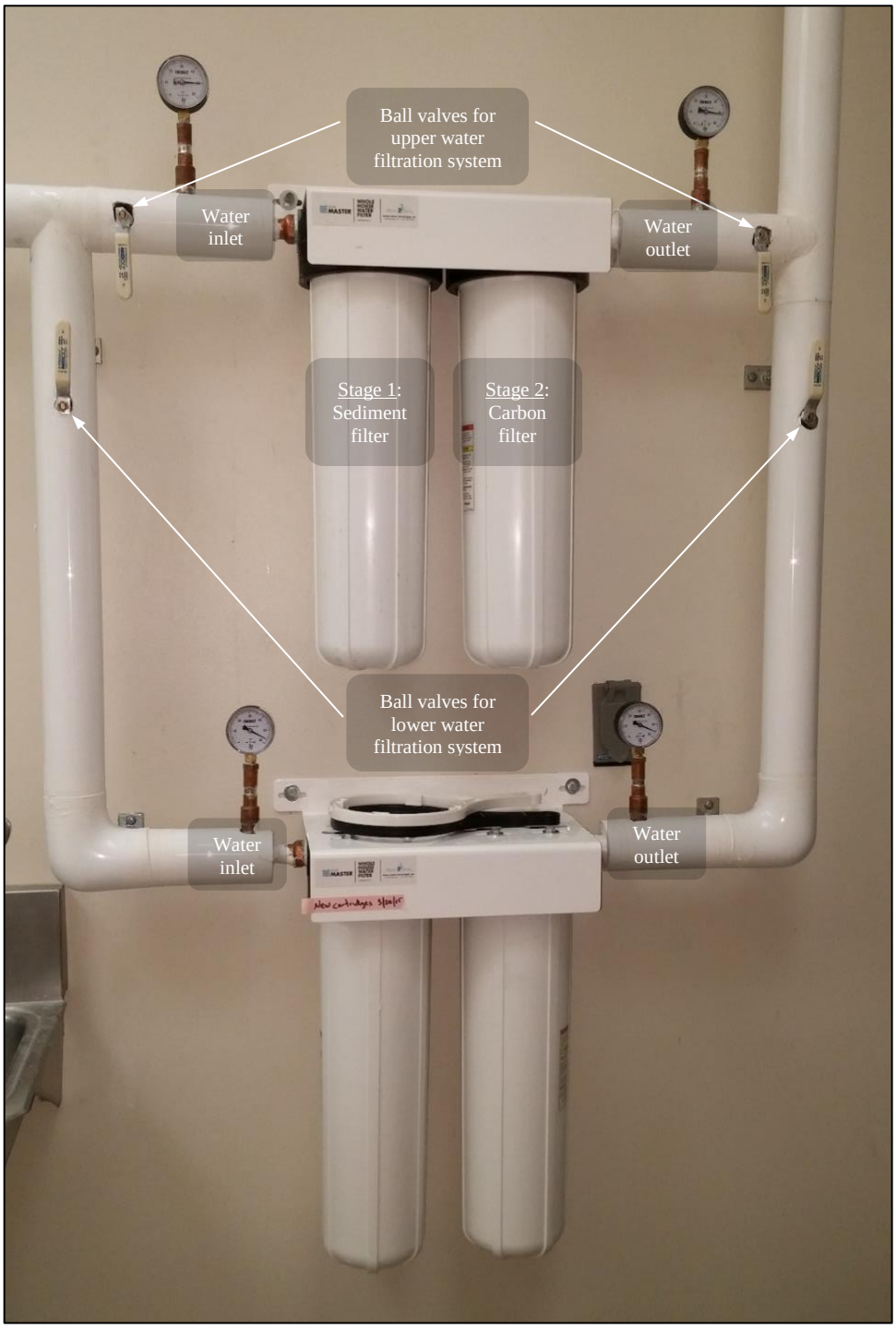


Figure 1b. Two-stage whole house water filtration systems installed in WSB 291B. Only one system is in service at any time. A water filtration system may be "turned off" for replacement of filtration cartridges or other service needs by closing the ball valves on the inlet and outlet lines serving the unit. In the image above, the lower water filtration system is in service (both ball valves are open) and the upper unit is out of service (both ball valves are closed). Note the pressure gauges rising vertically from the inlet and outlet lines of each system. The difference in pressure values between these gauges provides an indication of the performance of a system. If the pressure difference is greater than 10 psi, both the sediment and carbon filters need to be replaced.

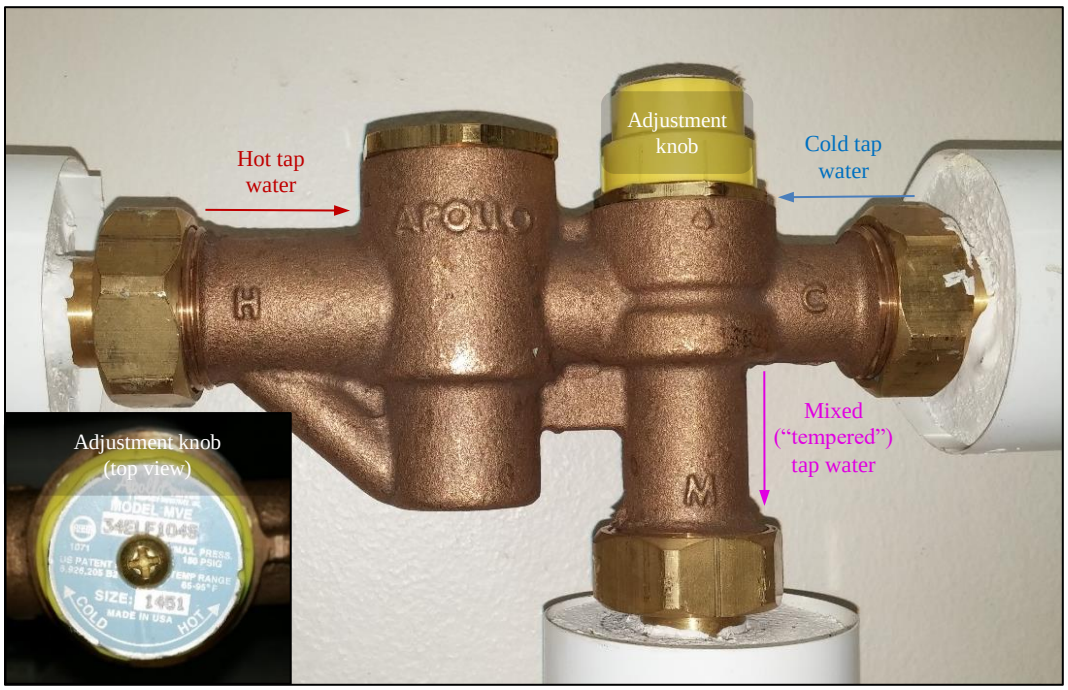


Figure 1c. One of two "Apollo" mixing valves installed in WSB 291B. Hot and cold tap water, designated H and C respectively on the valve inlets, are mixed in fixed proportions as governed by the setting of the mixing valve adjustment knob. When turned *clockwise* as far as it will travel, the Phillips locking screw on the top of the adjustment knob prevents the setting of the mixing valve from being changed inadvertently. To change the setting of the knob, the locking screw must be turned *counterclockwise* sufficiently to permit the knob to be pulled upward and above a toothed ring beneath the knob that prevents it from turning when the locking screw is secured (the adjustment knob will not work properly if the screw is removed). Temperature adjustments of several degrees of Fahrenheit, either higher or lower, require that the adjustment knob be turned only a few angular degrees when the ball valves allowing hot and cold tap water to enter the mixing valve are fully open. A thermometer installed along the outlet line of each mixing valve permits quick assessment of the temperature of water exiting the valve. Note that when water is being mixed within the valve, temperature readings will stabilize after several minutes. *Do not turn the adjustment knob rapidly or attempt to turn it with a tool. It must be turned manually to prevent damage (these mixing valves are VERY expensive, ~$1,000 each)*!

Tempered filtered water is distributed to all holding rooms via insulated copper piping suspended from the ceiling. Within each holding room, water descends from this piping into a series of three to four ball valves mounted along one wall (**Figure 2**). The outlet of each ball valve terminates in a threaded female end, allowing attachment of a variety of plumbing fittings for connecting aquatic vertebrate housing to the water distribution system. A SharkBite® ½" brass male pipe thread adapter x PEX barb (model no. UC120LFA) is currently installed on each ball valve. Attached to each PEX barb is a short length of ½" ID flexible clear polyvinyl tubing, which is secured with a stainless steel hose clamp.

Installed along the piping descending into each holding room is a solenoid valve to which a timer may be attached to provide water to animal housing systems at set intervals. At present, water may only be dispensed from the ball valves in a continuous flow, as timers have not been installed. A gate valve and backflow preventer (Watts model ¾ LFN9-CD) are installed immediately above each series of ball valves to prevent water dispensed from this system from re-entering the potable water supply due to vacuum pressure in a water line.

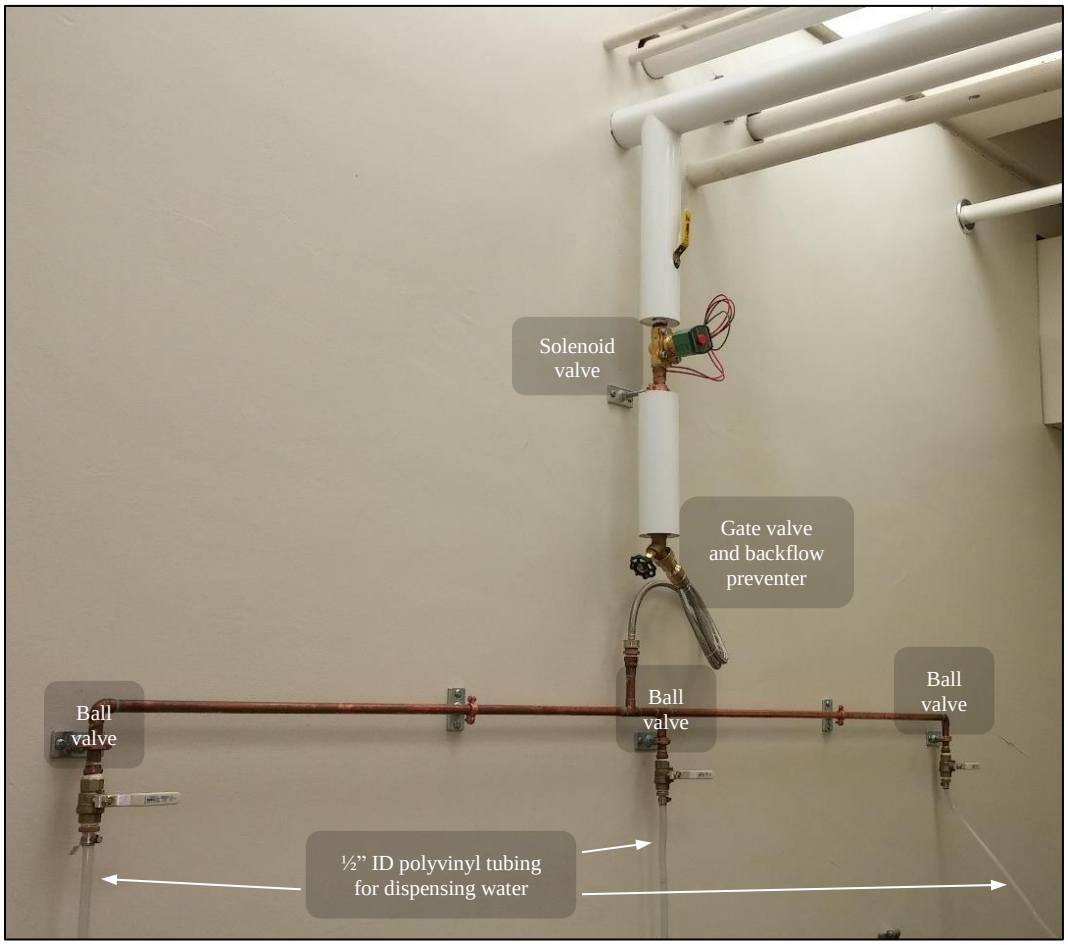


Figure 2. A series of three to four ball valves is installed along one wall in each animal holding room. The threaded female end of each ball valve permits attachment of a variety of plumbing fittings that can be used to connect different types of aquatic vertebrate housing to the water distribution system. A solenoid valve installed ahead of each set of ball valves allows water to be delivered to housing systems at set intervals rather than by means of continuous flow. A gate valve and backflow preventer are installed between the solenoid valve and ball valves to prevent backflow of water dispensed from this system into the potable water supply.

ii. *Static housing*

The aquatic vertebrate facility houses approximately 250 African clawed frogs (*Xenopus laevis*), all of which are maintained in three 150-gallon fiberglass tubs (72"L x 24"W x 20"D, **Figure 3**). All frogs that are greater than 80 mm snout-vent length (SVL) are housed in two tubs in WSB 291D. All frogs less than 80 mm SVL are housed in one tub in WSB 291C. This arrangement minimizes the potential for cannibalism of smaller frogs by larger ones, which is common among *Xenopus* species.

The volume of water in each tub is maintained at approximately 90 gallons, or about 60% of the nominal capacity of a tub. A 14-inch section of straight, 2-inch PVC pipe placed in the drain opening of each tub serves as an overflow pipe to limit water depth to a maximum of 13 inches. This depth ensures that the water surface is at least 8 inches below the upper edge of the tub, effectively preventing frogs from escaping. Each tub can support approximately 75 adult female or 100 adult male frogs. Several 1-foot sections of 3-inch-diameter PVC tubes have been placed in each tub to provide environmental enrichment.

Surrounding the overflow pipe is a cylinder of green, PVC-coated, ½"-inch hardware cloth measuring 18 inches in height and 9 inches in diameter (**Figure 4**). The cylinder allows particulate debris to accumulate around the base of the overflow pipe for subsequent flushing from the tub through the drain opening. It also serves as a barrier to prevent frogs from entering the drain opening during water exchanges.

Approximately 25% of the water in each tub is removed daily by lifting the overflow pipe from the drain opening and allowing 3 to 4 inches of water to be released onto the holding room floor. The beveled floor of each holding room directs all wastewater to the room's central floor drain. At the same time that the overflow pipe is lifted from the drain opening, light pressure is applied to the upper edge of the hardware cloth cylinder to prevent frogs from passing under the cylinder. The overflow pipe is reinserted in the drain opening after the desired amount of water has been released. All particulate debris surrounding an overflow pipe is flushed from the tub during this process.

An additional 150-gallon fiberglass tub is used in room 291C as a storage tank for treated water from the water filtration and distribution system. The overflow pipe in this tub is approximately 20 inches in length, which permits storage of approximately 125 gallons of water, or slightly more than the total volume exchanged among all tubs on a daily basis. Filtered water is stored in this way to allow the temperature to stabilize at approximately 68-72^{o}F overnight. No animals are kept in this tub at any time.

Water is transferred from the storage tank to each tub via a 25-foot garden hose attached to a portable submersible pump. The storage tank is refilled daily via a length of flexible polyvinyl tubing attached to a ball valve on the water distribution system in room 291C (**Figure 2**).

All frogs receive Ward's Science Food for Adult Xenopus (catalog number 470008-018) three times per week. This is a nutritionally complete diet with a pellet size of 1/8", which is easily consumed by frogs, regardless of size. The diet is stored in vermin- and water-proof containers in a cabinet in room 291F. Each tank is provided approximately *four times* as many pellets as frogs per feeding. Extreme care must be taken not to overfeed the frogs!

Figure 3. Two 150-gallon fiberglass tubs are used in room 291D for housing African clawed frogs (*Xenopus laevis*) greater than 80 mm SVL (the tub farthest to the right in this image is not currently in use). One 150-gallon fiberglass tub houses approximately 95 frogs less than 80 mm SVL in room 291C – a second 150-gallon tub in room 291C holds clean, filtered water for use during tank water exchanges. Each 150-gallon tub contains approximately 90 gallons of water and can support approximately 75 adult female or 100 adult male frogs. Approximately 25% of the water in each tub is changed daily.

Figure 4. Overflow pipe and hardware cloth cylinder. The overflow pipe limits water depth to a maximum of 13 inches. During water exchanges, the pipe is removed manually from the drain opening to allow approximately 3 to 4 inches of water to drain from the tub. The hardware cloth cylinder allows particulate debris and animal wastes to accumulate at the base of the overflow pipe for subsequent flushing from the tank during water exchanges. In Figure 3 above, note the presence of weights positioned atop the cylinder. The pressure applied to the cylinder by these weights prevents frogs from passing under the cylinder and near the overflow pipe.

2. DISASTER PREPAREDNESS AND PREVENTION

A. Ongoing preparations

i. Ensure that sufficient food is available at all times to sustain animal colonies for up to two weeks in the event that these items need to be reordered.

ii. Ensure that at least one new sediment filter and one new carbon filter for the water filtration systems are available at all times.

iii. Test mixing valves monthly to ensure that they are functioning properly. Replace/repair as needed to ensure uninterrupted delivery of tempered water to water filtration systems.

iv. Maintain a fully supplied, all-purpose first aid kit in the aquatic vertebrate facility.

v. Have basic tools available for simple repairs, turning off or disconnecting equipment, or removing/opening doors.

vi. Have flashlights and batteries readily available in the storage room (WSB 291F). Replace the supply of batteries at least every three years to insure against loss of charge.

vii. Maintain up-to-date contact information for all authorities, emergency responders, and student employees who can assist with disaster response.

viii. Keep up-to-date inventories of animal colonies.

ix. Post and maintain a current version of the disaster plan and the *St. Cloud State University Emergency Procedure Guide* on the bulletin board in the aquatic vertebrate facility.

x. Review and revise the disaster plan regularly to keep all information up to date. Distribute the disaster plan in electronic and hardcopy forms to all contacts, members of the IACUC, and Barb Kjellberg and Denise Schaefer in the Biology department office (WSB 262).

xi. Review the disaster plan in full with all student employees of the aquatic vertebrate facility at the start of their employment. The facility manager will review this document with student employees at least once per year.

B. Preventive measures

The following preventive measures are intended to reduce the likelihood of disease outbreaks or events resulting from unauthorized access to the aquatic vertebrate facility.

i. The facility manager will ensure that all scheduled tasks related to animal care and facility sanitation are completed daily and in a satisfactory manner to support the long-term health and safety of animals and personnel.

ii. All SCSU faculty, staff and students will be required to complete training as described below prior to utilizing or providing care to animals housed in the aquatic vertebrate facility.

1) The online safety training course entitled “Laboratory Emergencies – BASE” offered through the St. Cloud State University Office of Occupational Health and Safety.

2) Online training in laboratory animal welfare offered through the Collaborative Institutional Training Initiative (CITI) Program.

iii. ONLY animals currently housed in the aquatic vertebrate facility or acquired from a widely recognized vendor of aquatic vertebrates (e.g., Nasco) will be allowed to enter/re-enter the facility.

ABSOLUTELY NO OTHER ANIMALS, OR PARTS THEREOF, ARE ALLOWED IN THE AQUATIC VERTEBRATE FACILITY.

iv. The facility manager will maintain a list of individuals with access to the aquatic vertebrate facility.

v. All students engaged in research or instructional activities involving use of animals housed in the aquatic vertebrate facility must obtain approval from the facility manager or a member of the IACUC in order to be granted access to the facility.

vi. All sanitation tasks will be performed by an employee of the aquatic vertebrate facility. General Maintenance Workers have been instructed not to enter the facility, except in the event of an emergency. This preventive measure is intended to minimize the likelihood of contamination of equipment by individuals unfamiliar with its use and also to minimize access to the facility for the health and safety of the animals.

3. DISASTER RESPONSE

A. General responsibilities

During a disaster, anyone present in the aquatic vertebrate facility must:

i. Determine immediately whether to exit the facility and proceed to a safe location.

ii. Evaluate the status of all personnel present (injured, conscious, etc…), if reasonable to do so.

iii. Contact SCSU Public Safety, the St. Cloud Police Department, and/or the St. Cloud Fire Department immediately if any threats to personnel health and/or safety exist.

iv. Contact Brian Lorenz, the facility manager, if he is away from the aquatic vertebrate facility.

If Brian is unavailable, contact Dr. Maureen Tubbiola.

See contact list on page 20.

v. Evaluate the status of animal housing systems and any damage to or malfunction of electrical and HVAC systems within the aquatic vertebrate facility.

vi. Return all animals in use to their holding tanks.

B. Responding to specific conditions and events

i. Unsafe conditions

ALL PERSONNEL MUST EVACUATE THE AQUATIC VERTEBRATE FACILITY *IMMEDIATELY* IF ANY OF THE FOLLOWING CONDITIONS ARE DISCOVERED WITHIN OR NEAR THE WICK SCIENCE BUILDING:

a. Natural gas leak
b. Fire/smoke
c. Incendiary/explosive device
d. Intruder(s) threatening violence in any form against personnel

Other conditions may develop which pose an immediate threat to the health and/or safety of personnel. Under all such conditions, immediate evacuation of personnel is mandatory. See the *St. Cloud State University Emergency Procedure Guide* on the bulletin board of the aquatic vertebrate facility for additional information regarding personnel health and safety procedures.

ii. Animal rights demonstration

If an animal rights demonstration is known to be occurring on or near campus, all doors within the aquatic vertebrate facility, as well as the single perimeter door of the facility, must remain closed and locked at all times. All entrance into the facility should be monitored closely by one of the authorities listed in this document for the duration of the demonstration.

If a demonstration threatens the safety of personnel in any way, immediate evacuation of personnel from the aquatic vertebrate facility is mandatory. SCSU Public Safety and/or the St. Cloud Police Department must be contacted immediately.

iii. HVAC failure

a. *Ventilation*

Air is supplied to all spaces within the aquatic vertebrate facility via a supply fan on the roof of the Wick Science Building. In the event that air is no longer proceeding from one or more of the ceiling-mounted air diffusers, SCSU Facilities Management must be notified immediately.

See contact list on page 20.

Air is exhausted from all spaces within the aquatic vertebrate facility via an exhaust fan on the roof of the Wick Science Building. This fan is linked to a standby generator, which should enable exhaust ventilation to persist during an electrical failure. In the event that air is no longer being exhausted from the aquatic vertebrate facility, however, SCSU Facilities Management must be notified immediately.

See contact list on page 20.

b. Excessive heat

The air temperature throughout the aquatic vertebrate facility is maintained at 72-74°F. If the air temperature in any space is found to exceed 79°F, SCSU Facilities Management must be notified immediately.

See contact list on page 20.

Check the water temperature in all holding tanks containing frogs using a thermometer. One is kept in the glass-fronted cabinets in room 291E. The temperature should be 79ºF or less. If the water temperature in a holding tank exceeds this value, it must be lowered as described below:

1) Drain the storage tank used to hold clean filtered water in room 291C. This is the tank labelled “Filtered Water”.
2) Refill the storage tank with water from the water distribution system at a temperature of about 55-60ºF. Review the method described on pages 4 through 7 for adjusting the

temperature of water in a mixing valve. Be sure to identify correctly which mixing valve in room 291B is currently in service and make the appropriate temperature adjustments to that valve only.

3) When the storage tank in room 291C has been refilled as described, verify that the water temperature is now 55-60ºF.
4) Drain 10-15% of the water from each holding tank in which the temperature exceeds 79ºF. (Keep in mind that the 150-gallon fiberglass tubs typically contain 80-90 gallons of water)
5) Replace this water with cooler water from the storage tank in room 291C. Add the cooler water slowly, making certain that it becomes well distributed as it is being added.
6) When finished, re-check the water temperature in all holding tanks. If the temperature in any holding tank still exceeds 79ºF, repeat this process and re-check the temperature in ***all*** holding tanks throughout the aquatic vertebrate facility.
7) Continue to monitor the water temperature in all holding tanks as described until the air temperature throughout the aquatic vertebrate facility is restored to 72-74ºF.

In light of the sensitivity of small fish to sudden changes in water temperature, dissolved gases, or other microenvironmental factors, no action should be taken to alter the temperature of the water in the aquaria in room 291A.

c. Insufficient heat

The air temperature throughout the aquatic vertebrate facility is maintained at 72-74°F. If the air temperature in any space falls below 64°F, SCSU Facilities Management must be notified immediately.

See contact list on page 20.

The professional judgment of one or more of the authorities listed on page 20 should be considered when the temperature within a holding room containing frogs falls below 64°F. African clawed frogs, as well as many other species of aquatic vertebrate, can tolerate significant, but gradual, reductions in water temperature.

When the temperature within a holding tank containing frogs falls to a point considered by one or more of the authorities to be potentially detrimental to the health of the animals housed within it, it must be raised as described below:

i. Drain the storage tank used to hold clean filtered water in 291C. This is the tank labelled "Filtered Water".
ii. Refill the storage tank with water from the water distribution system at a temperature of about 80ºF. Review the method described on pages 4 through 7 for adjusting the temperature of water in a mixing valve. Be sure to identify correctly which mixing valve in 291B is currently in service and make the appropriate temperature adjustments to that valve only.
iii. When the storage tank in 291C has been refilled as described, verify that the water temperature is approximately 80ºF.
iv. Drain 10-15% of the water from each animal holding tank in which the temperature needs to be raised. (Keep in mind that that the 150-gallon fiberglass tubs typically hold 80-90 gallons of water)
v. Refill each holding tank to the top of the overflow pipe with warmer water from the storage tank in 291C. Add the warmer water slowly, making certain that it becomes well distributed as it is being added.
vi. When finished, re-check the water temperature in all holding tanks. If the temperature in any tank is still considered too low, repeat this process and re-check the temperature in ***all*** holding tanks throughout the aquatic vertebrate facility.
vii. Continue to monitor the water temperature in all holding tanks as described until the air temperature throughout the aquatic vertebrate facility is restored to 72-74ºF.

In light of the sensitivity of small fish to sudden changes in water temperature, dissolved gases, or other microenvironmental factors, no action should be taken to alter the temperature of the water in the aquaria in room 291A.

iv. Electrical failure

In the event of an electrical failure, SCSU Facilities Management must be contacted immediately.

See contact list on page 20.

The building exhaust fan serving the exhaust ducts in the aquatic vertebrate facility is linked to a standby generator. As such, exhaust ventilation should continue in the event of an electrical failure. Supply ventilation, lighting, and power to electrical receptacles, however, will terminate.

All animal housing systems must be checked to determine whether actions are necessary to preserve the life of the animals. Flashlights and batteries are available in the gray metal storage cabinets in room 291F.

For animals housed in static systems that do not require a means of aeration, daily water exchanges, feeding, and general sanitation tasks must be performed within each holding room as indicated on task charts.

For animals housed in systems that utilize a means of aeration, automated feeding, or other automated means of supporting life, the professional judgment of one or more of the authorities listed on page 20 must be considered to determine a course of action appropriate for these animals.

Air temperature throughout the aquatic vertebrate facility must be monitored for the duration of the electrical failure.

v. Food and water

In the event that conventional foods, such as fish diet, become unavailable, alternative foods may be used. In most cases, however, an attempt should be made to acquire appropriate animal foods from a local feed supply company (e.g., Luxemburg Feed Service) or pet store (e.g., PetSmart, or Petco).

In the event that filtered water from the water filtration and distribution system becomes unavailable, well water may be obtained from WSB 32 for use in animal housing systems. Well water, however, must be allowed to warm to 68ºF or higher prior to use.

vi. Epi- or pandemics

In light of the highly variable nature of infectious agents, their communicability, and the severity of symptoms that may result from exposure to them, management of the animal colonies housed in the aquatic vertebrate facility must be responsive to evolving information, most notably any changes in the level of threat that an epi- or pandemic presents to those who utilize the facility or support activities conducted therein. This response must be guided by the facility manager, Brian Lorenz, and the IACUC and must incorporate all guidance provided by the university administration, the Chancellor of the Minnesota State Colleges and Universities system, the Minnesota Department of Health, the Minnesota Governor's Office, and any federal agencies with oversight in epi-/pandemic response.

vii. Severe weather

If student employees and/or authorities listed in this document are unable to travel safely to the aquatic vertebrate facility as a result of severe weather, all animal care activities, including disaster response, will be postponed until safe travel is possible.

Personnel present in the aquatic vertebrate facility during or immediately prior to a tornado or damaging winds must seek shelter in the areas designated on the emergency evacuation route map on page 20. Additional information regarding severe weather response is provided in the *St. Cloud State University Emergency Procedures Guide* posted on the vivarium bulletin board and accessible online at http://www.stcloudstate.edu/emergency.

If severe weather is anticipated to occur, the following steps should be taken on the day prior to the anticipated weather event to minimize risks to the health and safety of the animals:

a. Make certain that the water storage tank in room 291C is filled to maximum capacity;

b. Replace 30-50% of the water in all static housing systems;

c. Unplug all electrical equipment that does not require a continuous supply of electricity.

C. Evacuating animals

Any decision regarding the removal of animals and housing systems from the aquatic vertebrate facility must be made by, or in consultation with, one or more of the authorities listed on page 20. In general, however, animals will remain in the aquatic vertebrate facility throughout a disaster, as no other spaces suitable for maintenance of aquatic housing systems are presently available.

D. Euthanasia

All animals currently housed in the aquatic vertebrate facility are fish and frogs. A widely accepted and well-documented agent of humane euthanasia for finfish and amphibians is Tricaine methanesulfonate, commonly known as MS-222 (*AVMA Guidelines for the Euthanasia of Animals: 2013 Edition)*. For use in euthanasia, an aqueous solution of MS-222 is prepared as described below and buffered to a pH of 7.0 to 7.5 with sodium bicarbonate. Containers of MS-222 and sodium bicarbonate, as well as pH test strips, are kept in a gray metal storage cabinet in room 291F for this purpose.

Examination gloves must be worn at all times when handling MS-222!

For euthanasia of frogs or fish:

Add 10 liters of water from the large storage tank in room 291C to a large container (e.g., 5-gallon bucket);
Dissolve 50 grams of powdered MS-222 in the 10 liters of water;
Slowly add sodium bicarbonate to this solution, while stirring, until a pH of 7.0 to 7.5 is reached – check the pH of this solution with test strips regularly while sodium bicarbonate is being added;
Place animals to be euthanized in the neutralized MS-222 solution and leave them there for one hour – animals must be immersed completely in this solution;
After 1 hour, transfer animals from the MS-222 solution to an empty bucket and place the bucket on a shelf in the walk-in freezer in WSB 60;
Leave the animals in the freezer overnight to ensure death;
On the following day, transfer the frozen animal carcasses into a large, opaque garbage bag; tie the bag closed and place it in the trash dumpster next to the WSB Addition loading dock.

Note: If smaller volumes of an MS-222 solution are desired, the volume of water and mass of MS-222 combined must be reduced in equal proportions. For example, in order to make 5 liters of MS-222 solution, add 25 grams of powdered MS-222 to 5 liters of water and buffer with sodium bicarbonate to a neutral pH.

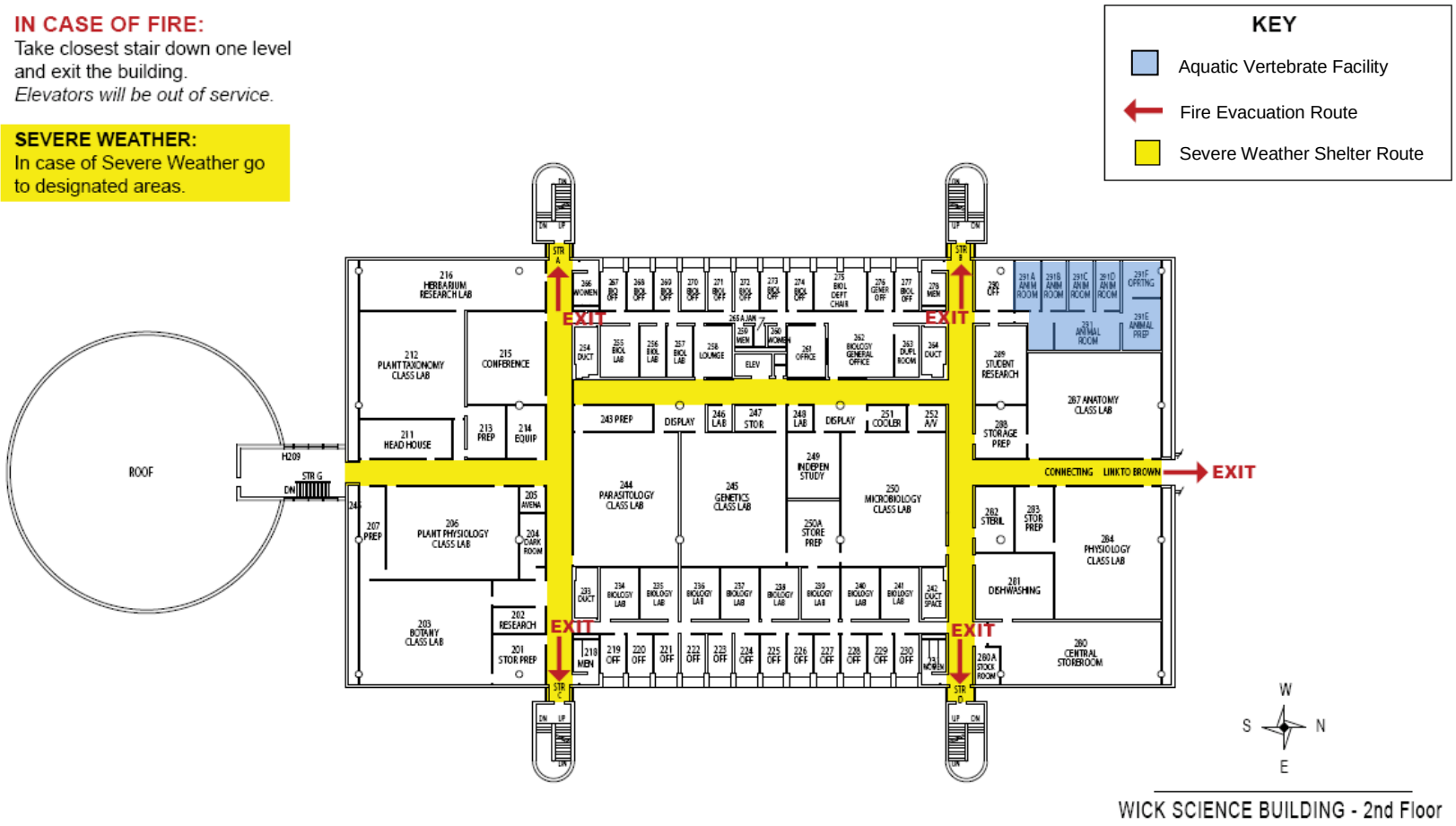
IN THE EVENT OF A DISASTER, EUTHANASIA MAY BE PERFORMED *ONLY* BY THE AUTHORITIES LISTED BELOW.

Contacts	Position	Contact information
Authorities		
Brian Lorenz	Animal Facility Supervisor	Wick Science Building 290 Office: 320-308-4911 Mobile: 320-249-9686
Dr. Timothy Schuh	Professor of Biology	Wick Science Building 224 Office: 320-308-5433 Mobile: 320-230-9455
Dr. Nancy Cowardin, DVM	IACUC Veterinarian	Companions Animal Hospital Office: 320-252-6700 Home: 320-202-9478 Mobile: 320-291-2689
Emergency Responders		
SCSU Public Safety Department	n/a	Safety/Security Concerns: 320-308-3333 Emergencies: 911
St. Cloud Police Department	n/a	Non-emergency: 320-345-4444 Emergencies: 911
St. Cloud Fire Department	n/a	Non-emergency: 320-650-3500 Emergencies: 911
Electrical, HVAC, plumbing, or other building mechanical issues		
Facilities Management	n/a	During business and non-business hours: 320-308-3166

Emergency Evacuation Route Map

IN CASE OF FIRE:
Take closest stair down one level and exit the building.
Elevators will be out of service.

SEVERE WEATHER:
In case of Severe Weather go to designated areas.



UPON EVACUATING THE WICK SCIENCE BUILDING OR ITS ANNEX, PROCEED TO A LOCATION ON THE *OPPOSITE SIDE* OF ANY OF THE STREETS SURROUNDING THESE BUILDINGS. **DO NOT REMAIN NEAR THE BUILDINGS**.