Title: Husbandry Care of Fish

I. Purpose:

The purpose of this policy is to outline the UC Davis minimum standards of care for fish.

II. Policy:

All units providing animal care for fishes must meet or exceed these minimum requirements based on the ILAR Guide for the Care and Use of Laboratory Animals (Guide). Deviations or exceptions must be approved by the Attending Veterinarian and the IACUC.

III. Procedure:

Daily (365 days a year without exception):

- Observe each animal and check for health concerns (Guide pg. 112).
- Ensure adequate feed is available, though depending on the species and life stage this may be done less frequently (Guide pg. 65-68).
- Record sick and dead animals, and report them to Campus Veterinary Services (CVS) or designated clinical veterinarian per standard operating procedure.
- Record minimum and maximum water temperatures.
  - Temperature range varies by species, but general recommendations are 5-15°C (41-59°F) for cold water fishes, 12-26°C (53.6-78.8°F) temperate water fishes, and 18-35°C (64.4-95°F) warm water fishes.
  - It is recommended to record each individual tank water temperature daily, but for large subsets of tanks minimally 10% of the tanks must be recorded on a rotational basis.
- Clean any excessively soiled tanks (Guide pg. 85).
- Clean and organize room, anterooms, and surrounding premises (Guide pg. 86). Record daily completion of each task, initial each task, and date the log.

Weekly (not to exceed every 7 days)

- For static tanks, record water quality (suggested parameters are: dissolved oxygen, ammonia/nitrite/nitrates, pH, and conductivity) (Guide pg. 78).
  - Ranges vary by species, but zebrafish recommendations are > 6.0 mg/L dissolved oxygen, < 0.02 mg/L Ammonia (NH₃), < 1.0 mg/L Nitrite (NO₂),
and < 50 mg/L Nitrate (NO₃) (Guide pg. 78), pH (6.5-7.5), conductivity (500-2500 µS).

- More frequent water quality checks may be needed when setting up a systems biologic ecosystem.
- Minimally 10% of the tanks should be recorded on a rotational basis for all water quality measurement.

- Replace at 10-25% of the tank water volume using conditioned water.
- **For recirculating tanks**, see above
- **For flow-through tanks**, it is recommended that dissolved oxygen levels are measured and evaluated.

**Biweekly (not to exceed every 14 days):**
- For recirculating tanks, replace at least 10-25% of the tank water volume using conditioned water.
  - This can be split into lower volume and increased frequency as needed

**Monthly (not to exceed every 30 days):**
- Disinfect nets, shelves, racks, tank cleaning utensils, scrub brushes, and enrichment devices.
  - The use of certain disinfectants may be contraindicated for some aquatic species, as residues may be highly deleterious.

**Semi-Annually (every 6 months):**
- Flow-through tanks are recommended to have tanks and/or source water quality evaluated.
  - Since water quality is constantly changing in flow-through systems more frequent evaluation may not be necessary. If high mortality or other clinical concerns are recognized, water quality intervals may be increased.

**As needed:**
- Disinfect the animal room including walls, floors, and ceilings (if possible) (Guide pg. 86).
- Remove and replace worn or damaged equipment from primary enclosures and surrounding facility (Guide pg. 86).
- Pelleted feed must be discarded after 6 months of the milling date unless manufacturer guidelines recommend a shorter or longer expiration (Guide pg. 66). Manufacturer guidelines will be followed for frozen feed.
- Clean and sanitize feed storage containers (Guide pg. 67).
- For filtration system and pumps, clean or replace all filters per manufacturer’s instruction.
- Each facility will develop their own best practices with sanitization typically occurring every 6 months or whenever there is a change in species but may vary with facility.

**Environmental Enrichment:**
- Refer to the Environmental Enrichment policy (SOC-30-102).
Facilities:
- Temperature alarms must be installed in all rooms housing fishes *(Guide pg. 136).*
- Adequate ventilation must be provided for the health and comfort of the animal at all times, governed by thermal and moisture loads *(Guide pg. 80).*
- Floors shall be moisture-resistant, non-absorbent, impact-resistant, and relatively smooth *(Guide pg. 137).* Refer to Physical Plant SOC 50-102.
- All outlets should be rated GFCI *(ground faulted conductance interrupted)*. *(Guide p.150)*
- Electrical components should be placed away from water and wet surfaces.
- Drains must be guarded with a fine mesh screen to prevent escape of detrimental, restricted or transgenic species of fish. The mesh shall be fine enough to prevent release of viable gametes/embryos or untreated transgenic material.

Housing:
- Whenever possible and depending on the species, fish should be socially housed in compatible groups *(Guide pg. 82).*
- Space requirements will vary by species and life stage, but zebrafish should be housed 5 adults per liter of water *(Guide pg. 83).*
- Recommendations for (optimal) stocking densities are not readily available for most fish species and life stages, so we recommend using the following parameters to determine whether a tank is overcrowded: degraded water quality, disparity in body condition or size, increased evidence of trauma to skin/fins, increased morbidity or mortality, or increased prevalence of infections requiring treatment.