

Bullfrog Euthanasia

The American Bullfrog (*Lithobates catesbeianus*) is an introduced species in British Columbia (BC). Populations of bullfrogs are common in areas on Vancouver Island and in the Lower Mainland. As an introduced species the bullfrog causes negative impacts on ecosystems and native species, so may be humanely euthanized where captured to protect native ecosystems. Only introduced frog species may be euthanized in BC. Other frog species are protected under the Wildlife Act and it is illegal to capture or harm them.

It is important to confirm species identification with a professional biologist before bullfrog euthanasia. You can also send a photograph to either Dr. Purnima Govindarajulu (Purnima.Govindarajulu@gov.bc.ca) or Dr. Helen Schwantje (Helen.Schwantje@gov.bc.ca) for confirmation.

The Canadian Council for Animal Care (CCAC) recommendations for humane euthanasia of amphibians can be referred to (<http://www.ccac.ca/Documents/Standards/Guidelines/Wildlife.pdf>), but these guidelines are targeted to researchers under laboratory conditions. We offer practical guidelines for individuals or stewardship groups to perform humane bullfrog euthanasia. Euthanasia is defined as "good death" and methods used must ensure rapid brain death without pain – techniques used on mammals are less effective for amphibians and their delivery under field conditions can be a challenge. There are two methods that we consider humane, cost effective and easy to use:

1. The first step in bullfrog euthanasia is to induce a deep level of anaesthesia and there are two chemicals that can do this that are readily available.
 - a. Orajel® is an over-the-counter ointment for relieving toothaches that contains benzocaine, a chemical approved by CCAC for anesthetising amphibians.
 - i. Squeeze an amount (proportional to the size of the frog) Orajel® on your finger and spread it generously over the back of the frog.
 - b. Another compound used as an anaesthetic for amphibians is pure clove oil, also available over-the-counter at many pharmacies.
 - i. Add about 20 drops of clove oil to a litre of water and shake it up thoroughly until the oil is completely emulsified in the water. This is most easily done in a large plastic or Ziploc bag.
 - ii. Immerse the frog in the clove oil-water emulsion.
2. Both Orajel® and clove oil will induce anaesthesia in the frogs in about 15 to 30 minutes.
3. To test the level of anaesthesia, place the anesthetized frog on its back – if it doesn't respond and turn over within 1 minute, it indicates a deep level of anaesthesia.
4. Another method of testing is to pinch the toes for a reaction. If the leg does not retract it indicates a deep level of anaesthesia.
5. Once the frog is deeply anaesthetized, they can be decapitated or placed in the freezer to complete euthanasia.
6. It is important to perform the final step because frogs will recover from deep anaesthesia over time. If frozen, the frog should be left in the freezer for at least a day to ensure death.
7. The frog bodies can be disposed by composting them or in domestic garbage as you would kitchen scraps.
8. All the above steps are necessary to ensure humane and effective euthanasia and should be completed in sequence.

If you have further questions, please contact:

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Canadian Council for Animal Care species-specific recommendations on: Amphibians and Reptiles (2004)

Excerpt of Section 11

11. Euthanasia

The main reference to be used with regard to euthanasia is the Report of the AVMA Panel on Euthanasia (AVMA, 2000). Euthanasia is a rapid loss of consciousness and death, with no pain or distress accompanying the procedure. For ectothermic animals, euthanasia must take into account differences in metabolism, respiration and tolerance to cerebral hypoxia.

Adult amphibians and reptiles may be humanely killed through an overdose of anesthetics such as injectable sodium pentobarbital for reptiles or solutions of buffered TMS (MS-222®) for amphibians. Anesthetics such as TMS may be used for very small or larval animals.

TMS is acidic, and in concentrations ≥ 500 mg/L it should be buffered with sodium bicarbonate to result in a solution of pH 7 to 7.5. TMS may also be injected into lymph spaces and pleuroperitoneal cavities. There are standard protocols for the use of TMS (e.g., http://www.nwhc.usgs.gov/research/amph_dc/sop_anesth.html). However, TMS should only be used by those who have received training in its use for euthanasia. Sodium pentobarbital, 60 to 100 mg/kg, can be administered intravenously, intra-coelomically, intra-abdominally or intrapleuroperitoneally. Subcutaneous lymph spaces may also be used in frogs and toads. Barbiturates other than pentobarbital can cause pain on injection.

Benzocaine hydrochloride may also be used in a bath for amphibians. Benzocaine itself is not water soluble and needs to be prepared as a stock solution in ethanol. Benzocaine hydrochloride is water soluble and can be used directly at a concentration > 250 mg/L for euthanasia. The use of benzocaine is also discussed on the NWHC website but it is not specifically recommended by the NWHC for post-metamorphic anurans.

Many reptiles and amphibians can hold their breath and survive long periods of anoxia (up to 27 hours for some species) (Bennett, 1991). Therefore, euthanasia of some amphibians and reptiles using inhalation agents, such as CO₂, is difficult. Snakes will become paralysed by anesthetic and stop breathing, and thus cannot be overdosed by inhaling a gas anesthetic.

Decapitation does not lead to rapid unconsciousness, and therefore should not be used unless followed by pithing to instantaneously destroy the brain and not merely sever the spinal cord to render the animal insensitive to pain. Propofol and short acting barbiturates can be used to produce rapid general anesthesia prior to pithing.

Cooling or freezing is generally not a recommended method of euthanasia as formation of ice crystals on the skin and in the tissues of an animal may cause pain and distress. Quick freezing of deeply anesthetized animals is acceptable.