ALBERTA WILDLIFE ANIMAL CARE COMMITTEE
CLASS PROTOCOL # 005

Adopted 11 February 2005

CLASS ACTIVITY: *CAPTURE, HANDLING, IMMOBILIZATION[1], AND RELEASE OF BEARS*

SPECIFIC ACTIVITIES: live capture of bears by way of leg snares, culvert/barrel traps, or remote darting from air or ground

OBJECTIVES

- humane capture and handling of live bears, primarily for research and management purposes
- safety to humans and bears
- limited trauma and stress to bears

PRIMARY CONTACT/AUTHORITY: Director of Wildlife (for research activities), Director of Enforcement (for problem bear activities)

APPLICABLE PERSONNEL:

- Project leads must be an experienced Wildlife Biologist or Wildlife Veterinarian with Biologist III level or equivalencies OR Fish and Wildlife Officers currently certified as Bear Response Team Leaders OR persons with equivalent experience and training.
- Project team must include persons trained in general wildlife capture and handling as per an approved wildlife capture/ immobilization course.
- Capture crews will include persons with experience in capturing and handling bears. At least one person certified and trained in use of firearms must be on site during all capture activities. Captures involving a grizzly bear require participation of three team members of which at least two members are certified and trained in the use of firearms. At least one person who has completed an approved wildlife immobilization course must be on site during all immobilization activities.
- The program will provide for input from a veterinarian as a member of the capture crew OR within cell-phone/satellite phone contact during field operations. Preferably the veterinarian has experience with wildlife handling and capture.
- All members of the capture team must be trained in first aid and CPR.
- All members of teams involved with chemical immobilization should be educated on the safe handling of drugs to be used, their effects, and emergency human treatment.
- Before the trapping program commences, a Regional Problem Wildlife Specialist, Provincial Problem Wildlife Coordinator, Provincial Species Specialist, or the District Fish and Wildlife Officer musts be contacted and the project discussed in detail. An emergency contact and contingency plan should be identified for dealing with capture of dangerous non-target species such as grizzly bears, black bears, or cougars.

SPECIES: grizzly bear, black bear

APPLICABLE GEOGRAPHIC RANGE: provincial

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[1] [1] If using immobilization drugs, applicants should refer to Appendix A – Drug Dosages from The Chemical Immobilization of Wildlife − 2nd Edition (2005) Canadian Association of Zoo and Wildlife Veterinarians.

CAPTURE METHODS

GENERAL ASPECTS:

- Avoid handling bears during periods of particular sensitivity one month before and after denning.
- Preferably, capture bears for research purposes in the spring (May-June) well after den emergence. If capturing bears at other times of the year, discuss mitigations relating to weather, immobilization, or safety/survival risks of the bears with experienced Fish and Wildlife staff.
- Bear captures for management purposes in response to situational issues or problems will occur at any time, with due concern and attention to specific aspects for safety and survival of the bears.
- Project leads must contact District Fish and Wildlife Officers to discuss closures/notifications of baited sites.
- All bait sites and capture sites must be properly marked, ribbons and warning signs posted to properly inform public of area closures when applicable
- Where applicable maintain all warning signage for one week after removal of bait due to residual bait contamination
- Appropriate firearms (twelve-gauge shotgun or 30-06 rifle-preferred) will be on-hand in case of emergency during all aspects of trapping, including the initial setting of traps. Firearm must be readily available at all times and fixed on the animal when appropriate.
- Before approaching any trapped or darted bear, make particular efforts to determine whether a second or third bear is in the vicinity.
- Approved drug delivery systems include blowpipe, darts, or suitably modified rifle or pistol. Blowpipes and low velocity darts from CO_s powered pistols and rifles are preferred since they cause considerably less tissue damage than high velocity rapid injection explosive darts. Use the least traumatic method possible without compromising human safety.
- Use dart and needle size appropriate to the intended species and drug delivery system.
- Make all efforts to collect unsuccessful darts.
- Avoid capturing more than one bear at a time, unless necessary – for example, retain dependent offspring with female. In such cases, capture/dart female first. First year cubs should be captured without immobilization, if possible.
- Process and release bears as soon as possible, particularly nursing females, but not at the expense of ensuring safety to all persons involved with the activities.
- Account for and ensure the safety of all members of the capture team before final release of captured bears.
- Remove all bait from the site upon completion of the trapping activity.
- Post-trapping monitoring is encouraged, within the scope of the opportunities for follow-up.

LEG SNARE AND CULVERT / BARREL TRAPS:

Snares and traps should be set in well shaded, but not dark, areas with prominent visual warnings placed on the access routes [to warn humans of trapping activity].

- Ensure a clean line of sight to allow assessment of the snare/trap and trapping site from a safe distance.
- Traps will not be set near potential safety risks to humans or bears.
- Generally, set snares and traps early to midday to avoid bear activity.
- Tailor culvert trap design and bait as appropriate to the trap location and target species.
- Check snares/traps a minimum of each 24 hours, and at least twice daily or more in accessible front-country areas or when ambient temperatures exceed 20°C.
- Use snares of braided steel cable of appropriate thickness for the target species (3/8” in areas frequented by grizzly bears.

- Rubber padded snare equipment may become available upon field trials to minimize foot/tendon damage.
- Snares not in use will be tripped, rather than left with safety catches attached. Similarly, deactivate culvert traps when not in use.
- Immobilize captured bears as described below.
- Process and release trapped bears as soon as possible, particularly nursing females. If held in the trap for recovery or transport, provide drinking water. Total time to process and release should not exceed 24 hours.
- As needed, trapped bears can be relocated prior to processing. However, if a trapped bear is immobilized it should be fully recovered (able to stand on four legs) before moved over long distances.

- ***NON-TARGET CAPTURES****:* Trapping programs must include contingency plans for dealing with dependent bear offspring and non-target species. The plan should include:

  - Previous enquiries regarding other studies or management purposes for which non-target species might be used.
  - For small non-targets (*e.g.,* fox or coyote) in a snare: apply physical restraint (neck pole), inspect for injuries, administer local or long-lasting antibiotics if there are significant lacerations or injuries, and release on site. If injuries are likely to interfere with survival, euthanize by gunshot.
  - For dangerous non-targets (*e.g.,* cougar, unplanned species of bear) in snares: before going to the field, contact Provincial Problem Wildlife Specialists or species specialists to learn appropriate measures to immobilize and safely release these non-targets from traps. Ensure that appropriate equipment and materials are directly accessible to the on-site capture team.
  - Release all non-target species caught in culvert traps without handling or immobilization. Ensure that a clear escape route is available to humans and the released animal.
  - All species immobilized will be tagged.

REMOTE DRUG DELIVERY – DARTING:

- All persons directly involved in darting activities, including pilots in aerial situations, must have significant and relevant experience.
- Generally, do not dart bears if outside ambient temperature exceeds 20°C.
- Conduct aerial darting in or near large open areas; avoid areas with cliff bands, dense cover, or nearby water.
- When helicopter darting, continuous chase length should be $\leq$ 1 minute, and if several darting attempts are made, the total chase length must not exceed 5 minutes (to reduce muscle and thermal stress). Pursuit must be terminated sooner if bear shows obvious signs of fatigue (panting, stumbling). Further capture attempts of fatigued bears should be delayed at least 24 hours.
- Avoid darting attempts in locations where there is good possibility of losing sight of darted bears. Follow up on all darted bears.
- Apply reversal drugs if and when appropriate, and in the context of providing safety of all on-site persons.
- Direct darts to large muscle masses with minimal fat overlay – the rump in lean bears, shoulders/neck in fat bears.
- If more than one dart is required before an animal is safely immobilized, allow 10-15 minutes to elapse after injection of the first dart. If the animal shows some drug effect, but does not go down, re-administer 50% of the original dose. If the animal shows no drug effect 15 minutes after the first dart, re-administer the entire original dose. If there is little or no evidence of induction after three darts, abort the capture attempt since this

strongly suggests a problem with either the drug delivery system or the drug quality. Nevertheless, monitor all darted bears from a safe distance to determine the extent of drug effects, if any. Over the next 24 hours, try to relocate the animal and assess its status.

IMMOBILIZATION

- *Snares:* Ensure the animal is snared securely before approaching. If so, approach the bear with two team members; one with the drug delivery system, the other with a loaded firearm, in the case of a grizzly bear, three team members, one with the delivery system and two with firearms. Use CO_2 or air-powered pistol, powder charge remote dartgun, or blowpipe delivery system on snared bears.
- *Traps:* Use pole syringes, blowpipes, or dart pistol delivery system on trapped bears. Shielded pole syringes reduce the chance of the needle breaking.
- *Aerial captures:* Use remote darting systems with the appropriate charge, such as PneuDart™, CapChur™, or Paxarms™ using the lowest possible gunpowder charge (*i.e.,* brown charge on Pneu-Dart™).
- Keep all team members away once the drug is administered and remain quiet (increases chance of successful immobilization).
- **The use of supplemental oxygen for immobilized bears has been shown to be extremely beneficial and is strongly recommended, but is not mandatory in field situations at this time.**

ACCEPTABLE DRUG COMBINATIONS AND DOSAGES:

- Calculate drug dose based on body weight and deliver an adequate volume in a single dose to ensure rapid, effective immobilization within the maximum safe dosage margins for the drug in question.
- Use appropriate drug protocols and volumes as per the attached species-specific information from Alberta Fish and Wildlife at the end of this document and Appendix A – Drug Dosages in the Canadian Association of Zoo and Wildlife Veterinarians "Chemical Immobilization of Wildlife" course manual, 2005.

HANDLING DRUGS

NOTE – All scheduled drugs (e.g. Ketamine) must be properly secured at all times, including under field conditions.

- *Storage* - Refrigerate reconstituted drugs; store all other drugs at room temperature and out of direct sunlight.
- *Transporting* - Carry drugs in a leak proof, uncrushable container. Carry a 'sharps' container for used needles.
- *Labelling, handling, and documentation* - Label all drugs accordingly.
- Avoid cross-contaminating drugs and sterile water. *i.e.,* one needle for one task.
- Document and account for all used or unused drugs or vials.

HANDLING IMMOBILIZED BEARS

- Minimize the number of people on hand to those needed for safe and efficient handling of the bear.
- Minimize sudden movements as well as auditory, visual, and touch stimuli as much as possible. Prior to induction, leave drugged bears undisturbed.

- Ensure safety and comfort of the animal at all times. Also ensure personal safety of all people involved.

  - Place drugged bears in sternal recumbency, with the head higher than the body and the nose pointing down.
  - Ensure unobstructed breathing.
  - Ensure there are no sharp projections under the bear that could injure it.
  - Do not leave bears in direct sun or harsh winds.
  - Apply ophthalmic ointment and a blindfold to all drugged bears.

- Monitor vital signs (temperature, pulse, respirations) throughout handling activities at 5-10 minute intervals. Use appropriate mitigation to counter hypothermia and hyperthermia.
- Complete a thorough physical examination to determine general health and snare-related injuries, in particular those to the mouth (broken teeth, lodged sticks) or legs and feet. Consider a long-lasting antibiotic if the bear receives extensive lacerations or injuries. Clean and treat dart wounds as necessary and flush with sterile water or apply topical antibiotic. If major injuries are involved, a veterinarian should be consulted before euthanasia or release is considered.
- Do painful (e.g., tooth extraction) or manipulative (e.g., weighing) procedures first while bear is still deeply immobilized.
- Finish handling within 30-40 minutes
- Monitor recovery from a safe location for bear and human safety.

PROCEDURES

This handling protocol is appropriate for taking basic body morphometrics, collecting faecal samples, taking hair samples, drawing blood, attaching ear tags, attaching radio collars, attaching ear tag transmitters, taking tissue samples or biopsies, tattooing, and tooth extraction under authority of a Fish and Wildlife Research Permit or Collection Licence OR for processing problem bears. For all noted procedures, previous training and experience is necessary.

Taking hair samples:

- A small hair sample (no more than 25 hairs with roots) plucked manually from the back of the neck for genetic analysis.

Use of the following more invasive procedures should be limited to those that are absolutely necessary for the objectives of the study.

Drawing blood:

- No more than 60cc of blood drawn by aseptic technique. Preferred sites for venipuncture include femoral or brachial.
- Ensure there is no residual bleeding before animal is released.

Attaching ear tags and transmitters:

- Use tags that will not interfere with normal behaviour of the bear.
- Use a sterile 6mm biopsy punch to make the hole for the ear tag. Retain the tissue biopsy if a tissue sample is required.
- Standard Fish and Wildlife Division ear tags identifying an immobilized animal are required and Fish and Wildlife Division immobilization cards must be completed and forwarded as per the Treated Animal Incident Program (TAIP).

Attaching radio collars:

- Combined weight of transmitter and neck collar should not exceed 4-5% of the animal's body weight (BC Animal Care guidelines p.15; BC Wildlife Radio-telemetry guidelines p.15Collar will be fitted to appropriate snugness and tailored to the size and age of the bear.
- Collars should have a breakaway device or 'rot-off' insert appropriate to the life expectancy of the transmitter battery.
- Attention must be paid to attaching radio collars to young animals that are still growing. If possible, modifications to collars (such as expandable collars) will be made or capture team should consider not radio collaring the animal.
- Avoid attaching collars to bears in poor body condition.

Taking tissue samples or biopsies:

- Take the minimum tissue necessary to satisfy research goals.
- Minimize stress and pain to the bear.
- Use aseptic technique and prepare the area appropriately.

Tattooing:

- Apply identification tattoos to an inside thigh (groin).

Tooth extraction:

- If a grizzly bear has not been captured previously, remove an upper or lower premolar for aging using a dental elevator and extractors.

<u>If other more invasive procedures are proposed, specific details must be included in the research application.</u>

EVALUATION

If the rate of injury or mortality associated with capture exceeds 2 or 3%, review all activities. If corrective factors cannot be identified, discontinue the operation.

EUTHANASIA

In the event there is unforeseen irreversible injury or intolerable pain to a captured bear, euthanasia must be done safely and humanely, with minimal stress and pain. Acceptable methods include gunshot to the brainstem of immobilized bears or to the heart/lung area of non-immobilized bears[2].

COMMUNICATIONS AND MEDICAL EMERGENCIES

- All members of the capture team should understand risks associated with fieldwork and with using specified immobilization drugs.
- Develop an emergency medical plan that includes evacuation to the nearest medical facility before the capture and handling activity begins.
- In the event of an emergency, provide all appropriate information to local medical staff regarding immobilization drugs and other potential hazards that were involved in the activity.
- It may be appropriate to notify local municipal officials regarding general location of

[2] *Based on the Canadian Council on Animal Care (CCAC) guidelines and the Report of the American Veterinary Medical Association on Euthanasia.*

trapping, net-gunning, or darting activities.

- Public information regarding the proposed activity should be tailored to the specific situation and project.
- Adequate signage must be erected on all trails and roads leading to any bear capture site.

ACKNOWLEDGEMENTS and REFERENCES

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The following documents also were consulted:

1) Canadian Council on Animal Care. 2003. Guidelines on: the care and use of wildlife. http://www.ccac.ca/english/gui_pol/GUFRAME.HTM
2) Cattet, M., T. Shury, and R. Patenaude. 2005. The Chemical Immobilization of Wildlife − 2nd Edition. Canadian Association of Zoo and Wildlife Veterinarians. 231 pp.
3) Resources Inventory Branch for the Terrestrial Ecosystems Task Force. 1998. Live animal capture and handling guidelines for wild mammals, birds, amphibians & reptiles. http://srmwww.gov.bc.ca/risc/pubs/tebiodiv/index.htm
4) Resources Inventory Branch for the Terrestrial Ecosystems Task Force. 1998. Wildlife radio-telemetry. Standards for components of British Columbia's biodiversity No. 5. http://srmwww.gov.bc.ca/risc/pubs/tebiodiv/index.htm
5) American Veterinary Medical Association. 2000. 2000 Report of the AVMA Panel on Euthanasia. Electronic document: http://www.avma.org/resources/euthanasia.pdf

Last updated: (*Jan 31, 2005)*

Drug Volume Table for Grizzly Bear

Drug Protocol[a]		One[b] (non-reversible)	Two[b] (reversible)		Three[b] (reversible)	
Drugs		Zolazepam + tiletamine (ZT; Telazol or Zoletil)	Xylazine (X) + ZT	Atipamezole	Medetomidine (M) + ZT	Atipamezole
Formulation		1.8 ml sterile water per vial of ZT	1.1 ml X (@300 mg/ml) + 1.0 ml sterile water per vial of ZT	10 ml solution per vial	2.5 ml M (@ 10 mg/ml) per vial of ZT	10 ml solution per vial
Concentration (mg/ml)		227	132X + 200ZT	5	9M + 172ZT	5
Dosage (mg/kg)		8	2X + 3ZT	0.2	0.125 M + 2.5 ZT	0.5
Body mass		**Total Volume (ml)**				
Kg	**lb**					
10	*22*	0.4	0.2	0.4	0.1	1
20	*44*	0.7	0.3	0.8	0.3	2
30	*66*	1.1	0.5	1.2	0.4	3
40	*88*	1.4	0.6	1.6	0.6	4
50	*110*	1.8	0.8	2.0	0.7	5
60	*132*	2.1	0.9	2.4	0.9	6
70	*154*	2.5	1.1	2.8	1.0	7
80	*176*	2.8	1.2	3.2	1.2	8
90	*199*	3.2	1.4	3.6	1.3	9
100	*221*	3.5	1.5	4.0	1.5	10
110	*243*	3.9	1.7	4.4	1.6	11
120	*265*	4.2	1.8	4.8	1.7	12
130	*287*	4.6	2.0	5.2	1.9	13
140	*309*	4.9	2.1	5.6	2.0	14
150	*331*	5.3	2.3	6.0	2.2	15
160	*353*	5.6	2.4	6.4	2.3	16
170	*375*	6.0	2.6	6.8	2.5	17
180	*397*	6.3	2.7	7.2	2.6	18
190	*419*	6.7	2.9	7.6	2.8	19
200	*441*	7.0	3.0	8.0	2.9	20
220	*485*	7.8	3.3	8.8	3.2	22
240	*529*	8.5	3.6	9.6	3.5	24
260	*573*	9.2	3.9	10.4	3.8	26
280	*617*	9.9	4.2	11.2	4.1	28
300	*662*	10.6	4.5	12.0	4.4	30
320	*706*	11.3	4.8	12.8	4.6	32
340	*750*	12.0	5.1	13.6	4.9	34
360	*794*	12.7	5.4	14.4	5.2	36
380	*838*	13.4	5.7	15.2	5.5	38
400	*882*	14.1	6.0	16.0	5.8	40

[a] Under most circumstances, reversible drug combinations should be used in preference to ZT alone.

[b] For top-up doses at ≤ 20 minutes following the first drug injection, use 1/3 the volume of drug that was required for the immobilization dose. For top-up doses at > 20 minutes following the first drug injection, use ketamine at 3-4 mg/kg in grizzly bears.