ONTARIO, PRAIRIE and ARCTIC ANIMAL CARE COMMITTEE ANIMAL USE PROTOCOL

Protocol Number (ACC use): **OPA-ACC-2025-XX**
Previous Protocol Number: **OPA-ACC-2024-37**

1. **Project Title:** Movement and chemical ecology of fishes in Hudson Bay

2. **Keywords:** Arctic char, marine fishes, gill net, angling, acoustic telemetry, surgery, tagging, AQUI-S, marine microplastics, Hudson Bay
(***5-10 keywords*** *that focus on animal use procedures rather than research objectives or results.)*

3. **This application is a/an:** *(double click to activate a square)*

   a) **New AUP** ☒

   b) **Renewal** **1** ☐ **2** ☐ **3** ☐
   (Please highlight the changes from the previous AUP)

   c) **Amendment to the original** ☐

4. **What type of work is this protocol for?**
   Research ☒ Fish Holding ☐ Other ☐ *Please specify:* _____

5. **Proposed Starting Date:** June 4, 2025 **Finishing Date:** December 31, 2025
Please review the 2025 submission schedule for approval dates.
All AUPs expire December 31st and must be renewed if the project is to be carried over into the new year.
Annual reporting is required for all AUPs.

6. **Contact Person for AUP:** Connor Faulkner
   Affiliation: Aquatic Science Biologist, Fisheries and Oceans Canada
   Address: 501 University Crescent, Winnipeg, MB, R3T 2N6
   Phone number: (204) 914-8147
   E-mail: Connor.Faulkner@dfo-mpo.gc.ca

   Project Authority: Connor Faulkner
   Affiliation: Aquatic Science Biologist, Fisheries and Oceans Canada
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   E-mail: Connor.Faulkner@dfo-mpo.gc.ca

7. Names, Affiliations and Descriptions of the Qualifications* of the Project Members Who Will Be Handling Animals

List any technical training/relevant experience/courses in ethical use and handling of animals in research, **ideally including course names and dates taken. Note that the Project Authority is responsible for providing and tracking all required training for project members. Please refer to CCAC training modules https://www.ccac.ca/en/training/ and online training courses such as: https://www.upei.ca/professional-development/certificates/experimental-fish-canadian-aquaculture-institute*

Connor Faulkner, lead field biologist, Fisheries and Oceans – Experimental Fish certificate (UPEI, March 2024). Has been trained by FWI staff to surgically implant acoustic transmitters in May 2023 and 2024. Has four years of experience participating in stock assessments of Arctic char in Nunavut via deploying and retrieving gill nets (multi-panel, 5.5” mesh), angling, and dip netting methods. Has two years (2023, 2024) of experience tagging Arctic char and Greenland cod in Rankin Inlet, the latter year being the lead field biologist on the project.

Amanda Olsen, field technician, Fisheries and Oceans – Experimental Fish certificate (UPEI, May 2024). Has been trained by FWI staff to surgically implant acoustic transmitters in May 2024. Has one year of experience participating in stock assessments of Arctic char in Nunavut via deploying and retrieving gill nets (5.5” mesh) and angling methods. Has one year (2024) of experience tagging Arctic char and Greenland cod in Rankin Inlet.

Bastien Rubin, PhD student, Université Laval – Experimental Fish certificate (UPEI, in progress). Will be trained by FWI staff to surgically implant acoustic transmitters in the field. Will be observing and under supervision and guidance of trained DFO staff to assist in with tasks such as transport of fish between nets, pens, and coolers, and release of fish post-surgery.

Field technician (TBD), Fisheries and Oceans – The trained staff from DFO will provide training and guidance on proper safe handling and sampling protocols, as well as deploying and retrieving gill nets (5.5” mesh) and angling methods for sample collection.

Local research assistant (TBD), Kivalliq Wildlife Board/Kangiqliniq HTO (Rankin Inlet) & Sanikiluaq HTA/Arctic Eider Society (Sanikiluaq) – Local technicians are hired through the local HTO and have many years of experience handling live fish whether through commercial or subsistence fishing. The trained staff from DFO will provide training and guidance on proper safe handling and surgical insertion of the acoustic transmitters and/or sampling protocols.

Local research assistant (TBD), Kivalliq Wildlife Board/Kangiqliniq HTO (Rankin Inlet) & Sanikiluaq HTA/Arctic Eider Society (Sanikiluaq) – Local technicians are hired through the local HTO and have many years of experience handling live fish whether through commercial or subsistence fishing. The trained

staff from DFO will provide training and guidance on proper safe handling and surgical insertion of the acoustic transmitters and/or sampling protocols.

8. Location of the Study:
Provide geographic name and coordinates.

Rankin Inlet, Nunavut: 62.808375º, -92.085285º
Sanikiluaq, Nunavut: 56.540988º, -79.223240º

9. a) Category of Invasiveness: **A**☐ **B**☐ **C**☐ **D***☒ **E***☐
See Appendix 2, and the following CCAC guidelines:
CCAC Guidelines - Wildlife
CCAC Policy - Categories of Invasiveness in Animal Experiments

b) *Detailed Scientific Justification:
Only necessary if category of invasiveness falls into D or E, or if CCAC Guidelines are not being followed.

Acoustic telemetry study: Gill nets, dip nets, and angling have proven to be effective methods for capturing Arctic char, Greenland cod, marine sculpins (*Myoxocephalus* spp.), lumpfish, and capelin in marine habitats, and in general, there are a limited number of methods that can be used to capture these species in such areas. Continually monitoring gill nets and removing fish from the net as soon as they become entangled greatly reduces mortality, and no mortality is anticipated from dip netting or angling (using barbless hook). We will capture Arctic char at the river mouth via angling and gill netting during their downstream spring migration run to the marine environment, as the water during this period is cooler than during the upstream run in August and may cause less stress to the fish upon capture and recovery. We will capture Greenland cod, marine sculpins (*Myoxocephalus* spp.), lumpfish, and capelin within Rankin Inlet via angling and dip netting. The acoustic program in Rankin Inlet during the summers of 2023 and 2024 saw minimal Arctic char mortality (<15%, all mortalities due to tagged fish being recaught in the nets and sustaining additional injury post-surgery) and no Greenland cod mortalities caused by the surgical procedure. Given previous tagging recapture data, we anticipate Arctic char populations will be highly mobile with high potential for stock mixing within Rankin Inlet for foraging purposes, which will be used for estimating marine home ranges. These results will undoubtedly provide critical information for informing management of this species. Lumpfish are currently being considered for listing as a species at risk, and therefore, it is important to gain a further understand of critical habitat use. In addition to tagging lumpfish and Arctic char, we will be tagging Greenland cod, marine sculpins (*Myoxocephalus* spp.), and capelin to better understand predator/prey interactions and home ranges of these species within the marine environment. We will be using AQUI-S as an anaesthetic for all species prior to surgery, as its previous use in 2024 proved to be a more effective and efficient (shorter time to knockout, faster handling and recovery times) than tricaine methanesulfonate (MS-222).

Marine microplastic study: Gill nets, dip nets, and angling have proven to be effective methods for capturing Arctic char, lake trout, Greenland cod, marine sculpins (*Myoxocephalus* spp.), sand lance, capelin, and threespine stickleback in marine and freshwater habitats, and in general, there are a limited number of methods that can be used to capture these species in such areas. Microplastic pollution is a contaminant of emerging Arctic concern, and these small particles (<5 mm) have been identified in environmental compartments ranging from glacier ice to the stomachs of Arctic fishes. This is of concern for Northern communities given their reliance on traditional country food sources and the environment, such as Rankin inlet and Sanikiluaq; therefore, these results will assist in better understanding the burden of microplastics and plastic additives in the Hudson Bay marine food webs.

c) Purpose of Animal Use: **1**☒ **2**☐ **3**☐ **4**☐ **5**☐
See Appendix 3

10. Species to be Used *(include scientific names)*:

- Arctic char (*Salvelinus alpinus*)
- Lake trout (*Salvelinus namaycush*)
- Greenland cod (*Gadus ogac*)
- Marine sculpins (*Myoxocephalus* spp.)
- Lumpfish (*Cyclopterus lumpus*)
- Capelin (*Mallotus villosus*)
- Sand lance (*Ammodytes* spp.)
- Threespine stickleback (*Gasterosteus aculeatus*)

11. Maximum Number of Animals

ATS: acoustic telemetry study
MMS: marine microplastics study
RI: Rankin Inlet
SQ: Sanikiluaq

a) to be handled/released/unharmed:
- Arctic char: 50 (ATS – RI)
- Greenland cod: 20 (ATS – RI)
- Marine sculpins (*Myoxocephalus* spp.): 20 (ATS – RI)
- Lumpfish: 10 (ATS – RI)
- Capelin: 5 (ATS – RI)

b) to be euthanized:
- Arctic char: 50 (MMS – RI)
- Arctic char: 50 (MMS – SQ)
- Lake trout: 20 (MMS – RI)

- Greenland cod: 30 (MMS – RI)
- Greenland cod: 50 (MMS – SQ)
- Marine sculpins (*Myoxocephalus* spp.): 30 (MMS – RI)
- Marine sculpins (*Myoxocephalus* spp.) : 50 (MMS – SQ)
- Capelin: 50 (MMS – RI)
- Capelin: 50 (MMS – SQ)
- Sand lance: 50 (MMS – RI)
- Sand lance: 50 (MMS – SQ)
- Threespine stickleback: 50 (MMS – RI)
- Threespine stickleback: 50 (MMS – SQ)

c) Estimated baseline mortality rate *(include justification)*:
Based on capture/experimental methods and not planned euthanasia

- **ATS:** <15%. Based on the previous two years (2023, 2024), we estimate unplanned mortality during handling or surgery to be minimal as all species used in this study have shown high recovery success post-surgery upon monitoring and release.

- **MMS:** 100%. Time from capture to mortality will be reduced through routine checking of gill nets. Mortality is necessary as we will be sampling captured fish for biological samples and data (digestive tract, muscle, liver, fin clip, otoliths, length, weight, sex, maturity, fat and nutrient content).

12. Incidental Catch

a) Please list the potential non-target species:

- Given we are collecting samples largely in the marine environment using 5.5” mesh gill nets, based on previous years we do not anticipate there to be any non-target species captured, given species present in the marine environment that are not listed (eelpouts, snakeblennies) are too small to become entangled in the gill nets and typically found in deeper water than we will be deploying gill nets. Should these species somehow become entangled in gill nets, they will be carefully removed and released unharmed at the site of capture.

b) Indicate the potential for injury or mortality due to the method of capture:

- Fish may become stressed and gills/fins may sever when entangled in gill nets and/or hooked via angling, leading to injury and/or mortality.

c) How by-catch will be disposed of:

- Any non-target species will be removed from the method of capture (gill net, dip net, angling) and released unharmed at the location of capture.

13. Supplier OR Source of Animals:

a) If laboratory experiment, please list: N/A.

i) their location (FWI or CCIW):
ii) fish batch number:
iii) Have these animals been subjected to protocols previously?
YES ☐ **NO** ☐
If yes, list the AUP number and year:
iv) Have these animals experienced experimentation or treatment as eggs or larvae?
YES ☐ **NO** ☐
If yes, provide a full description of the previous treatments on the eggs or larvae, where any expected impacts on future survival of animals as a result of these treatments are identified:

b) For commercially available animals, please list: N/A.
i) the name of supplier:
ii) and their location:
iii) method of transportation:

c) For wild animals, please describe:
i) location of capture: Rankin Inlet and Sanikiluaq (see coordinates above).

ii) method of capture: continuously monitored gill nets, dip nets, angling with barbless hooks.

iii) restraints used (either physical or chemical): Upon removal from the gill or dip net or after being angled, fish will be placed in 4’ x 6’ x 4’ holding pen and monitored. Prior to surgery, fish will be anaesthetized in a cooler containing a solution of 40-80 mg/L isoeugenol (AQUI-S; Iverson et al. 2003; Durhack et al. 2020) and subsequent to surgery, they will recover in a cooler of fresh, brackish, or saltwater (depending on location of capture) before being released.

iv) method of transportation: N/A, fish are not being transported.

v) housing of animal: as mentioned in iii), upon removal from the gill or dip net or after being angled, fish will be placed in 4’ x 6’ x 4’ holding pen and monitored. Prior to surgery, fish will be anaesthetized in a cooler containing a solution of 40-80 mg/L isoeugenol (AQUI-S; Iverson et al. 2003; Durhack et al. 2020) and subsequent to surgery, they will recover and be monitored in a cooler of fresh, brackish, or saltwater (depending on location of capture) before being released.

vi) potential mortality or injury that may occur during capture and/or transportation:

- **Acoustic telemetry study:** Fish may become stressed and gills/fins may sever when entangled in gill nets and/or hooked via angling, leading to injury and/or mortality. Mortality may occur when removing animals from gill nets and during the surgical implantation of acoustic tags, however, we expect mortality to be very low. Gillnets will be monitored the entire time the nets are soaking in the water and fish will be removed promptly upon hitting the nets. When we are not actively catching fish to tag, the nets will be removed from the water to reduce possible fish capture and/or mortality due to gill nets soaking in the water.

- **Marine microplastics study:** Time from capture to mortality will be reduced through routine checking of gill nets. Mortality is necessary as we will be sampling captured fish for biological samples and data (digestive tract, muscle, liver, fin clip, otoliths, length, weight, sex, maturity, fat and nutrient content). Mortality may be due to prolonged stay in the nets (this will be reduced through routine checking of the nets).

14. Permit for Field Capture *(indicate if you have applied and to whom you have applied):*

a) For License to Fish for Scientific Purposes (LFSP)
DFO Permit Office: Nunavut permitting. Application being submitted alongside this AUP application (NTNUPermit-PermisNUNT.MPO@dfo-mpo.gc.ca).
DFO Fisheries officer: N/A.

b) Indicate any additional permits needed for this study:
(e.g., OMNR, Species at Risk, etc)

- Nunavut Planning Commission. Application being submitted alongside this AUP application.

15. Purpose/Objectives of the Study

Describe why this work should be done and how the environment and public will benefit from the research findings. This must be written in plain language. Spell out all acronyms and explain / define scientific terms.

Acoustic telemetry study: Given previous tagging recapture data, we anticipate Arctic char populations will be highly mobile with high potential for stock mixing within Rankin Inlet for foraging purposes, which will be used for estimating marine home ranges. These results will undoubtedly provide critical information for informing management of this species. Lumpfish are currently being considered for listing as a species at risk, and therefore, it is important to gain a further understand of critical habitat use. In addition to tagging lumpfish and Arctic char, we will be tagging Greenland cod, marine sculpins (*Myoxocephalus* spp.), and capelin to better understand predator/prey interactions and home ranges of these species within the marine environment.

Marine microplastics study: Microplastic pollution is a contaminant of emerging Arctic concern, and these small particles (<5 mm) have been identified in environmental compartments ranging from glacier ice to the stomachs of Arctic fishes. This is of concern for Northern communities given their reliance on traditional country food sources and the environment; therefore, these results will assist in better understanding the burden of microplastics and plastic additives in the Hudson Bay marine food webs.

16. Summary of Project

Outline methods, including a detailed description of the sequence of procedures to be undertaken from the time live animals are acquired or caught until they are euthanized or have another fate (to be specified), with time intervals between procedures (experimental timelines). If this project is a renewal, please describe any significant changes to the species used, methods or sampling protocol. Significant changes may include additional types of sampling, changes in gear being used for field capture, changes to surgeries being done or tags being used.

Acoustic telemetry study:

Fish Capture: Arctic char, Greenland cod, marine sculpins (*Myoxocephalus* spp.), lumpfish, and capelin will be captured using gill nets, dip nets or via angling. The 5.5” gill nets will be continually monitored in order to reduce as much as possible the time the fish will spend in the net. This will also help prevent struggling fish to entangle themselves too much. When a fish is caught, it will be carefully removed from the net using wet gloves. In order to minimize stress and damage to the fish, the net will be cut whenever the fish is too entangled to be removed rapidly. Wet gloves will be worn whenever a fish is handled. The depth in which we are fishing will vary depending on the location we set the gillnets, however, we anticipate depths to range from 2 m to 10 m.

When angling, barbless hooks will be used to reduce handling and fish will be reeled in as quickly as possible to reduce stress and fatigue. We will be using a large rubber dip net to land each fish to prevent harm and reduce handling time of the fish which will be immediately placed into a cooler with water.

Arctic char >40cm, Greenland cod, marine sculpins (*Myoxocephalus* spp.), and lumpfish >30 cm, and capelin >10cm, or where the tag is <2% of the fishes body weight will be selected for tagging. Fish deemed not suitable for tagging will be released immediately unharmed. Captured fish will be placed in holding pen placed within the waterbody of capture (fresh, brackish, or saltwater; typically >6 hours) for assessment of tagging suitability. If a fish is deemed suitable for tagging, it will be transferred to a tub containing anesthetic solution (AQUI-S), as AQUI-S has been an effective and approved method in past years. The fish will then undergo the transmitter insertion surgery. Upon completion, the fish will be transferred to a tub containing water from the location of capture until the fish is fully recovered (swimming upright and responding to visual cues). Once

recovered, the fish will be released back into the holding pen and monitored for several hours before being released.

Anesthesia: A fish selected for surgical implantation (body weight <2% of the transmitter weight) of transmitters will be placed into an induction tub and anaesthetized using a solution of 40-80 mg/L isoeugenol (AQUI-S). A fish will be considered fully anaesthetized when it loses equilibrium and rolls upside down. The total expected amount of time required for a fish to be fully anaesthetized is approximately 20-30 minutes. We will be using AQUI-S as an anesthetic for all species prior to surgery, as its previous use in 2024 proved to be a more effective and efficient (shorter time to knockout, faster handling and recovery times) than tricaine methanesulfonate (MS-222).

Transmitter Description: Fish will be marked with an internal acoustic transmitter: V16 (Arctic char), V13 (Greenland cod, lumpfish), V9 (marine sculpins (*Myoxocephalus* spp.)), and V6 (capelin) manufactured by Innovasea. Some transmitters will record date, time, temperature, and pressure (depth). Tag length is 68 mm (V16), 46 mm (V13), 31 mm (V9), and 19 mm (V6), weight in water is 24 g (V16), 6.3 g (V13), 2.8 g (V9) and 0.6 g (V6). There is no external antenna; the entire unit is contained within the fish's' body cavity.

Surgical Implantation of Transmitters: (Following procedures described in Moore et al. 2016). This procedure has been approved by the ACC multiple times in the past and has been very successful in the field. During the summers of 2023 and 2024, we saw minimal Arctic char mortality (<15%, all mortalities due to tagged fish being recaught in the nets and sustaining additional injury post-surgery) and no Greenland cod mortalities caused by the surgical procedure.

Anaesthetized fish will be placed ventral side up in a padded (using a moist towel), V-shaped tagging cradle. The fish will be provided with a constant stream of a weaker maintenance bath solution (20-40 mg/L isoeugenol (AQUI-S) over the gills. The maintenance solution will be used to bathe the gills until the first suture is tied, then water from the location of capture will be used until the surgery is completed. All surgical tools as well as the transmitters themselves will be sterilized in ethanol or betadine prior to use.

The tissue surface will be cleansed with iodine or alcohol wipes, and a 2 cm long incision will be made on the ventral side of the fish just to the left of the fish's center, exposing the peritoneal cavity. This incision will run parallel to the long axis of the fish. The transmitter will then be inserted into the body cavity through the incision. Simple interrupted stitches (3-0 curved needle, monofilament) will be used to close the incision. It will take two or three stitches per fish to close the incision. The total amount of time for surgery is expected to be less than 5 minutes as has previously been the case for Arctic char, lake trout, and Greenland cod in this and other study systems. Upon completion of the surgery,

fish will be placed in a post-op tub of water taken from the location of fish capture and observed. The recovery tub will have two battery operated stone aerators for constant oxygen circulation. The recovery tub water will be monitored for temperature using a thermometer. When the fish appears to be fully recovered (remains upright, swims, responds to visual stimuli), it will be released back into the water at the location of capture. If the fish does not appear to be fully recuperated after 30 minutes in the recovery tub, it will be euthanized via overdose of AQUI-S (300 mg/L) followed by cervical dislocation.

Marine microplastic study:
Arctic char, lake trout, Greenland cod, marine sculpins (*Myoxocephalus* spp.), sand lance, capelin, and threespine stickleback will be captured using gill nets, dip nets or via angling. The 5.5" gill nets will be continually monitored in order to reduce as much as possible the time the fish will spend in the net. All captured fish will be humanely euthanized with an initial blow to the head followed by a cervical dislocation or exsanguination. Biological data and samples (length, weight, sex, maturity, otoliths, fin clip, gastrointestinal tract, liver, muscle) will be collected. Depending on the size of the fish, samples will either be preserved as whole fish (for smaller fish <30mm) to be sampled at the FWI in Winnipeg, or fully sampled in the field for larger fish (>30mm).

Binder, T.H, Holbrook, C.M., Miehls, S.M., Thompson, H.T., and Krueger, C.C. 2014. Use of oviduct-inserted acoustic transmitters and positional telemetry to estimate timing and location of spawning: a feasibility study in lake trout, *Salvelinus namaycush*. Animal Biotelemetry, 2:14

Durhack, T.C., Jeffrey, J.D., and Enders, E.C. (2020). In search of an anesthesia alternative for field-based research. Aquaculture, 525: 735285.

Iverson, M., Finstad, B., McKinley, R.S., and Eliassen, R.A. 2003. The efficacy of metomidate, clove oil, Aqui-S™ and Benzoak® as anaesthetics in Atlantic salmon (*Salmo salar* L.) smolts, and their potential stress-reducing capacity. Aquaculture, 221(1-4): 549-566.

Moore, J.-S., Harris, L.N., Kessel, S., Bernatchez, L., Tallman, R.F., and Fisk, A.T. 2016. Preference for near-shore and estuarine habitats in anadromous Arctic char (*Salvelinus alpinus*) from the Canadian high Arctic (Victoria Island, NU) revealed by acoustic telemetry. Canadian Journal of Fisheries and Aquatic Sciences 73(9): 1434-1445.

17. Endpoint Determination & Humane Intervention Points

CCAC Guidelines - Identification of scientific endpoints, humane intervention points, and cumulative endpoints

Scientific endpoints are the earliest points at which the approved objectives of the scientific activity can be achieved while also ensuring that the welfare impact

experienced by the animals is minimized. When the scientific endpoints are reached, the approved live animal use is complete.
Humane intervention points are the pre-established criteria (e.g., observable health impacts, physiological changes, behavioural signs) that indicate when an intervention (e.g., supportive care, analgesia, euthanasia) should occur in order to reduce welfare impacts to a level that has been approved by the animal care committee.

Do you expect the subject animal to experience any discomfort as a result of this protocol? **YES** ☒ **NO** ☐ *If yes, please answer the following:*

a) Describe the scientific endpoints ***and*** humane intervention points for animals in this protocol, and how these points will be monitored and assessed.

i) Scientific endpoints:

ATS: once fish have been captured, tagged, recovered, and released.

MMS: once fish have been euthanized for sampling.

ii) Humane intervention points:

ATS: Once fish are captured via gill net, dip net, or angling, they will be placed in a 4’ x 6’ x 4’ holding pen placed within the waterbody of capture (fresh, brackish, or saltwater; typically >6 hours) for assessment of tagging suitability. If a fish is deemed suitable for tagging, it will be transferred to a tub containing anesthetic solution (40-80 mg/L isoeugenol (AQUI-S)), as AQUI-S has been an effective and approved method in past years. The fish will then undergo the transmitter insertion surgery. Anaesthetized fish will be placed ventral side up in a padded (using a moist towel), V-shaped tagging cradle. The fish will be provided with a constant stream of a weaker maintenance bath solution (20-40 mg/L isoeugenol (AQUI-S) over the gills. The maintenance solution will be used to bathe the gills until the first suture is tied, then water from the location of capture will be used until the surgery is completed. Upon completion, the fish will be transferred to a tub containing water from the location of capture until the fish is fully recovered (swimming upright and responding to visual cues). Once recovered, the fish will be released back into the holding pen and monitored for several hours before being released. If at any time the fish shows signs of impact from capture and holding, it will be removed from the holding pen and a release will be attempted. If the fish shown no sign of recovery, it will be euthanized via overdose of AQUI-S (300 mg/L) followed by cervical dislocation.

MMS: N/A. All fish will be euthanized upon capture and sampled.

iii) Monitoring and assessment plan: See ii) ATS for monitoring and assessment of captured fish.
CCAC Guidelines - Animal Welfare Assessment

b) Describe what will be done to relieve the discomfort of the animal should the scientific endpoint or humane intervention point be reached.
(This may include but is not limited to removing the stimulus or irritant, administering an analgesic or euthanizing the animal)
If a fish is deemed suitable for tagging, it will be transferred to a tub containing anesthetic solution (40-80 mg/L isoeugenol AQUI-S), then a weaker maintenance bath solution (20-40 mg/L isoeugenol (AQUI-S) will be used to bathe the gills until the first suture is tied, then water from the location of capture will be used until the surgery is completed. Upon completion, the fish will be transferred to a tub containing water from the location of capture until the fish is fully recovered (swimming upright and responding to visual cues). Once recovered, the fish will be released back into the holding pen and monitored for several hours before being released. If at any time the fish shows signs of impact from capture and holding, it will be removed from the holding pen and a release will be attempted. If the fish shown no sign of recovery, it will be euthanized via overdose of AQUI-S (300 mg/L) followed by cervical dislocation.

c) Will animals be exposed to more than one procedure? **YES** ☐ **NO** ☒
If yes, please describe the cumulative endpoints.

d) Has the range of effects of this protocol been pre-determined by carrying out a preliminary experiment on a small number of test subjects **OR** has it been outlined in published scientific literature?
Multiple papers have been published that have used the methods specifically outlined in this application to address similar questions/objectives as those described here. See 25) for references.

e) **FOR LEVEL E PROTOCOLS ONLY** – To mitigate suffering and/or death in extremis, identify observable health impacts, physiological changes, and/or behavioural signs that indicate severe suffering and imminent death, and outline the actions to be taken if these points are reached.
N/A.

18. Temperature Range

Given recent climate change-related issues with animal stress and survivability, as well as the history of incidents involving temperature, please provide air and water temperature ranges (minimum to maximum degrees Celsius) in which capture, handling, surgeries, and/or recovery will be performed.

The acoustic tagging and marine microplastic work will occur between the months of June and August around Rankin Inlet and Sanikiluaq, with air

temperatures typically falling between 0ºC and 20ºC and water temperatures typically falling between 2ºC and 8ºC.

19. Anaesthetics and Analgesics used:

Indicate dosage and methods for each procedure being performed.

A fish selected for surgical implantation (body weight <2% of the transmitter weight) of transmitters will be placed into an induction tub and anaesthetized using a solution of 40-80 mg/L isoeugenol (AQUI-S). We will begin with the 40 mg/L dose, and if that is not a sufficient dosage we will slowly up the concentration to a maximum of 80 mg/L. A fish will be considered fully anaesthetized when it loses equilibrium and rolls upside down. The total expected amount of time required for a fish to be fully anaesthetized is approximately 5 minutes. Anaesthetized fish will marked with an external floy tag. Further, a reward program will be advertised in the community, so that if the fish that underwent surgery are caught, there will be a reward for the return of the fish and transmitter. AQUI-S will be disposed of in the body of water at the location of fish capture (fresh, brackish, or saltwater), and we do not anticipate any negative effects due to the dilution of AQUI-S in a large body of water.

20. Euthanasia

a) Method of euthanasia *(two-step euthanasia is required)*:

Acoustic telemetry study: This is not expected, but if required, fish will be euthanized by placing it in a tub with 300 mg/L AQUI-S in localized water. Fish will be maintained in AQUI-S for a minimum of thirty minutes following cessation of opercular movements. This will be following by cervical dislocation and pithing.

Marine microplastics study: Due to the remote location and the potential for fishing hours from town, bringing anesthetic chemicals is logistically difficult on a boat. Additionally, Arctic char fish carcasses are returned to the community and distributed for consumption, and all species, including Arctic char, lake trout, Greenland cod, marine sculpins (*Myoxocephalus* spp.), capelin, sand lance, and threespine stickleback will undergo further processing for marine microplastics and we do not know if the anesthetic will have an effect on these results. Therefore, a chemical euthanasia is not recommended. Physical euthanasia will be used for this study, which will include both cervical dislocation and pithing. For smaller species of fish, such as Greenland cod, marine sculpins (*Myoxocephalus* spp.), capelin, sand lance, and threespine stickleback, the fish will be shipped whole back to the Freshwater Institute in Winnipeg for further processing in the lab.

b) Provide justification for use of physical forms of euthanasia or for any methods that deviate from those described in the CCAC Guidelines
CCAC Guidelines - Euthanasia of Animals Used in Science

N/A.

21. Will any bio-hazardous or hazardous materials (infectious, biological/chemical agents, or radioisotopes) be used during your experimentation? **YES** ☐ **NO** ☒
If yes, provide a detailed explanation of safety protocols and proof of institutional approval.

N/A.

22. List relevant standard operating procedures which will be referred to while conducting this research:

The following SOPs pertaining to general duties and conducting work in the field will be followed:

- Fish handling and tagging
- General laboratory activities
- Working in on or near water
- Safe lifting, manual handling, carrying supplies
- Small/medium boat operations
- Handling hazardous materials
- SWP for use of sharps and SOP for performing surgery include the SOP for handling sharp utensils to avoid injury.
- Firearms handling
- Safe ATV use
- OPA-ACC SOP03 Finfish tagging_Final_Apr2024edit
- OPA-ACC SOP05 General Handling of Fin Fish
- OPA-ACC SOP07 Catching Fish in the Wild
- OPA-ACC SOP08 Anesthetics for Fin Fish
- OPA-ACC SOP09 EuthanasiaFinFish

23. Disposition of animals following termination of the project:
(check all that apply)

☒ Euthanasia (marine microplastics study – RI and SQ)

☐ Kept for future projects:
Include a specific description and justification of any planned holding or re-use of animals.

☒ Released into the wild (acoustic telemetry study – RI)

☐ Other, specify:

24. Justification:

a) Why is it necessary to use vertebrates in this study?
We are specifically interested in the movement ecology and habitat use of the aforementioned species in this application which are all of

subsistence, commercial, and ecological importance to Nunavummiut. Thus, no invertebrate model would be appropriate.

We are also specifically interested in marine microplastic accumulation in the organs of the aforementioned species in this application which are all of subsistence, commercial, and ecological importance to Nunavummiut. Thus, no invertebrate model would be appropriate.

b) What is the rationale for using this particular species?

Arctic char in this area is the target of an important commercial fishery and are also a species of cultural and subsistence importance. Better knowledge of this species' migratory behaviour and home range as they continue to be impacted by changing climatic conditions or anthropogenic stressors is required for the development of sound management practices that ensure the sustainable exploitation of these species. Further, understanding and assessing other cultural, subsistence, and/or ecological species to better understand predator/prey interactions and home ranges of these species within the marine environment is keystone within a rapidly changing Arctic.

Assessing the presence, abundance, and types of plastic pollution/chemical additives in species of subsistence, commercial, and ecological importance. To assess inter-regional differences in potential microplastic ingestion and accumulation, we will also sample the same fish species in Cambridge Bay and Whale Cove, Nunavut.

c) What is the rationale for the number of animals used?

Acoustic telemetry study: One of the main goals of the current project is to obtain detailed information on marine and estuarine habitat use, including home range estimates. Because a proportion of animals that are tagged may never be detected (this is especially true for animals tagged in freshwater that we hope enter marine habitats, although may not due to life history differences (resident versus anadromous forms)), it is crucial that enough individuals are tagged in order to maximize the likelihood of detecting these fish. Additionally, statistical analyses of fine-scale positioning and home range estimation will ensure confidence in inferences made by the study, and we estimate that 20 fish is an absolute minimum for such confident inferences. Further, due to high recapture rates of Arctic char in subsistence and commercial fisheries observed in 2024, we have determined that tagging 50 Arctic char is a minimum sample size for this research project. Additionally, tagging of Greenland cod, marine sculpins (*Myoxocephalus* spp.), lumpfish and capelin is a pilot project, and therefore, we will be tagging a minimal amount of Greenland cod (20), marine sculpins (*Myoxocephalus* spp.; 20), lumpfish (10), and capelin (5). We will be collecting and redeploying 37 acoustic receivers

placed in the marine environment and two (2) acoustic receivers placed in two freshwater systems with gates at each of the river mouths (Diana and Meliadine Rivers) fished for subsistence purposes within Rankin Inlet. This will allow us to track when fish are moving into and out of the marine environment. Arctic char will be tagged at the river mouths of the Diana and Meliadine Rivers, and we expect fish to move back into these respective river systems to overwinter in the fall. All other species will be opportunistically tagged within Rankin Inlet upon capture.

Marine microplastics study: We will be using the minimum number of individuals required for assessing marine microplastics and plastic additives in both predator (Arctic char, lake trout) and prey (Greenland cod, marine sculpins (*Myoxocephalus* spp.), capelin, sand lance, and threespine stickleback) set by the Arctic Monitoring and Assessment Program's Litter and Microplastic Expert Group (n = 50 in one year, or n = 50 across two years) depending on previous years sampling efforts and successes, hence the variability in numbers of each species used between Rankin inlet and Sanikiluaq.

d) Have you considered the CCAC's "Three R Principles?"
(Please see CCAC - Canadian Council on Animal Care: Three Rs for further clarification.)

REDUCTION of number of animals required
YES ☒ NO ☐ If yes, explain how and if NO, explain why not.

Acoustic telemetry study: We are using what we believe is a minimal number of individuals in order to address our study objectives. Given inter-individual variation in migratory behaviour and habitat use is expected to be high, any characterization that can be applied generally to the entire population requires the use of a minimum number of individuals. Additionally, we expect some animals to never be detected and therefore this number increases the likelihood that we will detect at lease some fish within our acoustic array. 20 is the minimum amount of individuals required to achieve statistically significant data, although due to high recapture rates of Arctic char in subsistence and commercial fisheries observed in 2024, we have determined that tagging 50 Arctic char is a minimum sample size for this research project.

Marine microplastics study: We will be using the minimum number of individuals required for assessing marine microplastics and plastic additives set by the Arctic Monitoring and Assessment Program's Litter and Microplastic Expert Group (n = 50 in one year, or n = 50 across two years).

REFINEMENT of procedures so as to reduce the pain and distress placed on animals

YES ☒ NO ☐ If yes, explain how and if NO, explain why not.

Care is taken when removing fish from gill net to minimize handling and any potential injury. The procedures described above for the surgeries constitute best practices in terms of animal care for surgical implantation of tags. All live samples will be euthanized humanely (described above) prior to sampling for biological samples.

REPLACEMENT of animals with alternatives whenever possible in the design of this project
YES ☐ NO ☒ If yes, explain how and if NO, explain why not.

We did not consider replacement in this particular case because we are specifically interested in the migratory behaviour of the aforementioned species and no appropriate replacement is possible.

We did not consider replacement in this particular case because we are specifically interested in the ingestion of microplastics and contaminants of the aforementioned species and no appropriate replacement is possible.

25. Provide evidence that the project involving animals has been subjected to peer review for scientific merit:
DFO Science Senior Management makes all decisions on the scientific merit of research projects; the OPA-ACC is not responsible for scientific merit review. If scientific merit is considered absent, DFO Science Senior Management will solicit two reviews from independent scientists. References can be provided as background material, but these do not constitute evidence of scientific merit.

Was peer review for scientific merit conducted during the funding process for this project? **YES** ☒ **NO** ☐
If yes, please describe below.

Acoustic telemetry study: Multiple papers have been published that have used the methods specifically outlined in this application to address similar questions/objectives as those described here. Some of these papers are listed below:

Harris, L.N., Yurkowski, D.J., Malley, B.K., Jones, S.F., Else, B.E.G., Tallman, R.F., Fisk, A.T., and Moore, J.-S. 2022. Acoustic Telemetry Reveals the Complex Nature of Mixed-Stock Fishing in Canada's Largest Arctic Char (*Salvelinus alpinus*) Commercial Fishery. North American Journal of Fisheries Management, 42: 1250-1268.

Munaweera Arachchilage, I. P., Harris, L.N., Moore, J.-S., Tallman, R.F., Fisk, A.T., Gillis, D.M., and Muthukumarana, S. 2022. Estimating Survival Probabilities of Cambridge Bay Arctic Char Using Acoustic Telemetry Data and Bayesian

Multi-state Capture-recapture Models. Canadian Journal of Fisheries and Aquatic Sciences, 79(12): 2191-2203

Caza-Allard, I., Mazerolle, M.J., Harris, L.N., Malley, B.K., Tallman, R.F., Fisk, A.T., and Moore, J.-S. 2021. Annual survival probabilities of anadromous Arctic Char remain high and stable despite interannual differences in sea ice melt date. Arctic Science, 7(2): 575-584.

Harris, L.N., Yurkowski, D.J., Gilbert, M.J.H., Else, B.G., Duke, P.J., Ahmed, M.M., Tallman, R.F., Fisk, A.T., and Moore, J.-S. 2020. Depth and temperature preference of anadromous Arctic char *Salvelinus alpinus* in the Kitikmeot Sea, a shallow and low-salinity area of the Canadian Arctic. Marine Ecology Progress Series, 634: 175-197.

Harris, L.N., Swanson, H.K., Gilbert, M.J.H., Malley, B.K., Fisk, A.T., and Moore, J.-S. 2020. Anadromy and marine habitat use of Lake trout (*Salvelinus namaycush*) from the central Canadian Arctic. Journal of Fish Biology, 96(6): 1489-1494.

Moore, J.-S, Harris, L.N., Le Luyer, J., Sutherland, B.J., Rougemont, Q., Tallman, R.F., Fisk, A.T., and Bernatchez, L. 2017. Genomics and telemetry suggest a role for migration harshness in determining overwintering habitat choice, but not gene flow, in anadromous Arctic Char. Molecular Ecology, 26(24): 6784-6800.

Moore, J.-S., Harris, L.N., Kessel, S.T., Bernatchez, L., Tallman, R.F., and Fisk, A.T. 2016. Preference for nearshore and estuarine habitats in anadromous Arctic char (*Salvelinus alpinus*) from the Canadian high Arctic (Victoria Island, Nunavut) revealed by acoustic telemetry. Canadian Journal of Fisheries and Aquatic Sciences, 73(9): 1434-1445.

Davoren, G.K. 2013. Divergent use of spawning habitat by male capelin (*Mallotus villosus*) in warm and cold year. Behavioural Ecology, 24(1): 152-161.

VanGerwen-Toyne, M., Day, C., Taptuna, F., Leonard, D. Frame, S., Tallman, R. 2013. Information in support of assessment of Buffalo River Inconnu, (*Stenodus leucichthys*), Great Slave Lake, Northwest Territories, 1945-2009. DFO Canadian Science Advisory Secretariat Research Document 2012/069. vii +81p.

Marine microplastics study: Multiple papers have been published that have used the methods specifically outlined in this application to address similar questions/objectives as those described here. Some of these papers are listed below:

Hidalgo-Ruz, V., Gutow, L., Thompson, R.C., and Thiel, M. 2012. Microplastics in the marine environment: a review of the methods used for identification and quantification. Environmental Science & Technology, 46(6) : 3060-3075.

Munno, K., De Frond, H., O'Donnell, B., and Rochman, C.M. 2020. Increasing the accessibility for characterizing microplastics: Introducing new application-based and spectral libraries of plastic particles (SLoPP and SLoPP-E). Analytical Chemistry, 92(3): 2443-2451.

If peer review was previously conducted on this study, have there been significant changes to the research objectives or procedures since it was reviewed?
YES ☐ **NO** ☒
If yes, please describe below.

26. Source of Funding

- DFO A-base and NIF will be used to cover some of the costs of the overall fishery-independent research programs.
- Nunavut Wildlife Management Board, Nunavut Wildlife Research Trust – TBD
- Nunavut Contaminants Program – TBD

27. Collaborating Institutions and/or Organizations

CCAC - Projects involving two or more institutions

- Kivalliq Wildlife Board (Rankin Inlet, NU)
- Kangiqliniq Hunters and Trappers Organization (Rankin Inlet, NU)
- Sanikiluaq Hunters and Trappers Association (Sanikiluaq, NU)
- Arctic Eider Society (Sanikiluaq, NU)
- Université Laval (Québec City, QC)
- Environment and Climate Change Canada (Egbert, ON)

28. Your signature and checking all boxes below, indicates:

☒ That techniques employed during the execution of this project are in accordance with the Guidelines of the Canadian Council on Animal Care and that animals used in this research project will be cared for in accordance with the principles contained in the "Guide to the Care and Use of Experimental Animals, Canadian Council on Animal Care", and the "Guidelines for the Use of Fish in Field Research".

☒ That alternative procedures that do not involve the use of living animals have been considered.

☒ That the minimum number of animals consistent with the objectives of your research/teaching program will be used.

☒ That the species proposed for use in this project have been carefully selected.

☒ That you are required to submit an AUP report form within 30 days of completion of the project, outlining the protocol followed, changes to the protocol, the number of animals used and any unanticipated results.

☒ That if an incident (injury or mortality) occurs, an incident report form must be completed and sent to the ACC chair as soon as possible. You are required contact the ACC immediately if a major incident occurs, as these events must be reported to the CCAC within 10 days.

☒ That you may be subject to post-approval monitoring (PAM) and may be asked to submit photos/videos of the actual procedures and methods that were done to the animals for the OPA-ACC to view and/or an unannounced visit may occur at any time during the length of your project.

☒ That you have read and understand Appendix 4: Animal Use Protocol Non-Compliance.

☒ If the researcher wishes to appeal an adverse decision, they must appeal to the senior management responsible for animal care and use (Regional Director, Science). The Regional Director will then arrange and oversee a separate, fair and impartial appeal panel.

Project Authority

February 19, 2025
Date

For any concerns or assistance in completing the Animal Use Protocol form, contact the Ontario, Prairie and Arctic Animal Care Committee directly, at DFO.OPAAnimalCareCommittee-ComitedeprotectiondesanimauxOPA.MPO@dfo-mpo.gc.ca.

The OPA-ACC has veterinarians on the committee. If you have questions regarding your study design or animal health, please contact: Dr Charlene Berkvens at (204) 204-467-7643 cberkvens.fwi.acc@gmail.com, or Dr. Kathy Delaney vpckdjk@gmail.com.
Please review the 2025 submission schedule for approval dates.

PRIVACY NOTICE STATEMENT

The information you provide on this form is collected under the authority of the *Fishery (General) Regulations* for the purpose of determining eligibility for a licence, and to create the licence and related conditions for, a licence to fish for Scientific, Experimental, Educational, Public Display or Aquatic Invasive Species control purposes. The information may be used for planning or management, reporting, safety or security purposes, audit, evaluation, statistical, research, policy development, administration or enforcement of a law, the detection, prevention, or suppression of crime, and/or investigative purposes and disclosed to Parks Canada (PC) when a licence is issued in a park under PC's jurisdiction. Failure to provide this personal information may result in your licence being denied. You have the right to the correction of, access to, and protection of,

your personal information under the *Privacy Act* and to file a complaint with the Privacy Commissioner of Canada over DFO's handling of your information. Personal information collected through the processing of your application is described in the Personal Information Bank, DFO PPU 085 and can be accessed and assessed for accuracy. For more information visit Info Source www.infosource.gc.ca.

APPENDIX 1

WHEN IS AN ANIMAL USE PROTOCOL REQUIRED?

Any research project that involves handling and/or euthanizing live fish or marine mammals requires an approved Animal Use Protocol to ensure that the relevant project methods conform to the guidelines established by the Canadian Council on Animal Care (CCAC).
CCAC - Canadian Council on Animal Care: Guidelines

Activities requiring Animal Use Protocols include the following:

1. All holding of living vertebrates (even for very short periods of time) for research, display, teaching or testing.
   a) When using populations reared from eggs or larvae (still relying on yolk nutrients) that have been experimented on, the OPA-ACC requires a full description of the previous treatments on the eggs or larvae, where any expected impacts on future survival of animals as a result of these treatments are identified. For at least the first year, the activities would need to be submitted as research protocols at Category of Invasiveness "C", with subsequent years being submitted as holding protocols at the Committee's discretion.

2. All activities that involve physical tagging or chemical restraint and/ or the taking of measurements or tissue samples.

3. All tagging/identification activities including insertion/attachment of transmitters on fish or mammals.

4. All lethal field sampling for research, teaching or testing purposes.

5. Dosing of animals and/or their habitats with toxic or hazardous chemicals, including those studies administering non-lethal concentrations or doses of analgesics or other pharmaceuticals.

The OPA-ACC advises that an Animal Use Protocol should be submitted for projects involving behavioural observations of marine mammals by drone or boat.

Activities not requiring Animal Use Protocols include the following:

1. Projects involving fish eggs or larvae that have not yet developed beyond exclusive reliance on their own yolk nutrients.

2. Hatchery fish reared for release, unless specifically used in experiments.

3. Lethal sampling of fish required for regulated or legislated routine scheduled monitoring of contaminant/toxin burdens, disease, abundance and other population parameters by government agencies such as Canadian Food Inspection Agency, Health Canada, DFO, Environment Canada, and provincial or territorial departments.

4. Fish already killed in the course of an established aquaculture industry.

5. Sampling from commercial operations or subsistence fisheries where the animals are already dead as a result of standard commercial practices or subsistence catch.

6. Pets or display animals (often fish) kept in offices or public areas, unrelated to teaching or research.

If research or teaching animals are involved in community outreach activities, an “Oversight of Animal-Based Community Outreach Activities Form” must be completed and forwarded to the OPA Animal Care Committee. Please contact the chairperson for more information.

For additional information on AUP requirements: CCAC Guidelines - Requirement for Submitting an Animal Protocol

APPENDIX 2

Categories of Invasiveness in Fish Experiments**
Ontario, Prairie and Arctic Animal Care Committee (OPA-ACC)

Note: *If more than one procedure is to be used, please indicate the* ***highest*** *category of invasiveness on the AUP form. Protocols must be submitted to the OPA-ACC for all studies which involve the use of vertebrates in Categories B through E.*

Category A – Non-invasive, e.g.:

- collection of tissues post-mortem from fish caught by recreational or commercial fishers (e.g. otoliths, scales, fin rays)
- use of eggs (terminated prior to hatching)
- behavioural observations in the wild without capture or interference (e.g. visual surveys of spawning, migration)

Category B - Experiments which cause little or no discomfort or stress, e.g.:

- short-term skillful restraint of fish without anesthesia (to be live-released) for length and weight measurements, physical examination
- capture of fish with seines, dip nets, or live traps (e.g. Gee minnow traps, trap nets, fyke/hoop nets)
- lethal sampling with approved methods of euthanasia:
    - rapid unconsciousness and anesthetic overdose by immersion in tricaine methanesulfonate (=”TMS”, “MS-222”, or “Finquel”)
    - a stunning blow to the head followed by pithing or cervical dislocation and severing the gills.
- transport of live fish from supplier to lab
- maintaining fish in the laboratory for breeding and culturing purposes
- holding fish for use in approved future experiments (e.g. pre-trial acclimation, grow-out, behavioural trials)
- maintaining captive fish at study sites, e.g. in mesh cages, mesocosms, or simulated cage aquaculture operations
- blood sampling (small volume, non-lethal) with anesthesia
- subcutaneous, intramuscular, or intraperitoneal injection of material in amounts that will not cause adverse reactions

Category C - Experiments which cause minor stress or pain of short duration, e.g.:

- projects involving animals that have experienced experimentation or treatment as eggs or larvae
- minor surgical procedures under anesthesia (biopsies, fin clips, scale removal)
- external tagging (e.g. visible implant, floy, spaghetti tags)
- non-lethal chemical exposure studies
- gill netting – constant monitoring by watching with a go pro or watching the set buoy on the surface and checking every hour to two hours

Category D - Experiments which cause moderate to severe distress or discomfort, e.g.:

- major surgical procedures under general anesthesia, with subsequent recovery
- insertion of internal tags/intraperitoneal implants
- cannulation or catheterization of blood vessels or body cavities

- capture of fish using longlines
- rapid retrieval of fish from depths causing decompression trauma
- prolonged periods of physical restraint
- procedures which cause severe, persistent or irreversible disruption of sensorimotor organization
- exposing fish to noxious stimuli from which escape is impossible
- exposing fish to drugs or chemicals at levels that impair physiological systems
- capture of fish using gill netting over a 2 hour soak time up to 12 hours set time, electro fishing, or benthic trawling

Category E - Procedures which cause severe pain near, at, or above the pain tolerance threshold of unanesthetized conscious animals. This category is not necessarily confined to surgical procedures, but may include:

- gillnetting if over 12 hour soak time
- exposure to noxious stimuli or agents whose effects are unknown; exposure to drugs or chemicals at levels that (may) markedly impair physiological systems and which cause death, severe pain, or extreme distress
- completely new biomedical experiments which have a high degree of invasiveness
- behavioral studies about which the effects of the degree of distress are not known
- burn or trauma infliction on unanesthetized animals
- a euthanasia method not approved by the CCAC
- any procedures (e.g., the injection of noxious agents or the induction of severe stress or shock) that will result in pain which approaches the pain tolerance threshold and cannot be relieved by analgesia (e.g., when toxicity testing and experimentally-induced infectious disease studies have death as the endpoint).

**Please note that by 2030, the CCAC will be requiring implementation of the policy “Categories of Welfare Impact” to describe the impact of a scientific activity on animals. While there are five letters describing the categories of welfare impact, as in the policy describing the categories of invasiveness, the two systems should not be considered equivalent, due to the shift to an animal-centric focus with categories of welfare impact.
CCAC Guidelines - Categories of Welfare Impact

APPENDIX 3

PURPOSE OF ANIMAL USE

Choose the item (1-5) below that best describes the purpose of animal use (determined by ACC and investigator):

1. Studies of a fundamental nature in sciences relating to essential structure or function (e.g., biology, psychology, biochemistry, pharmacology, physiology, etc.).
2. Studies for medical purposes, including veterinary medicine, that relate to human or animal disease
3. Studies for regulatory testing of products for the protection of humans, animals, or the environment
4. Studies for the development of products or appliances for human or veterinary medicine
5. Education and training of individuals in post-secondary institutions or facilities

APPENDIX 4

ANIMAL USE PROTOCOL NON-COMPLIANCE

1. Non-compliance of an AUP may arise for several reasons, including gaps in knowledge, protocol drift, equipment failures, inadequate record-keeping, lack of communication, and human error. Concerns in regards to non-compliances may be identified by a principle investigator (PI), member of the research team, veterinarian, animal care staff, or others. These concerns can likely be resolved quickly and effectively through collaborative work between animal care staff, veterinarians, and the research teams, and then be reported to the ACC via the AUP post-project report or animal incident report.

2. Protocol non-compliance occurs when an AUP approved by the ACC is not followed, including the use of more animals than have been approved in the AUP, performing unapproved procedures, using unapproved anesthetics, making unapproved changes to an AUP, failing to provide analgesics as approved, using unauthorized agents, or having unauthorized or untrained members conduct research. Failure to submit an annual AUP or failure to make changes or to address concerns as required by the ACC may also constitute non-compliance.

3. If concerns in regards to non-compliance are verified, the ACC can require corrections and impose specific conditions for continued animal use, as needed.

4. Serious non-compliance with an approved AUP includes situations where:
    a) animals suffer pain or distressed that is not consistent with the approved AUP, or
    b) the health and welfare of the animals is seriously compromised by inadequate housing, maintenance, or monitoring of the animals in question

    In these cases, if the non-compliance impacts additional animals, or if the risk of repeated non-compliance is considered to be high, the initial course of action may include temporary suspension of the animal use protocol, which would prevent the PI from conducting any new work associated with the suspended protocol, until the incident is reviewed by the full ACC.

Unapproved Animal Use

1. Failure to obtain ACC approval for animal use in research and testing constitutes non-compliance and is a serious contravention of the *Animal Ethics Policy* and CCAC requirements.

2. Non-compliance may be identified by ACC members, veterinarians, research team members, or others and can be reported by anyone.

3. The ACC may follow one or more courses of action to address non-compliance and to ensure the humane treatment and welfare of animals used in research, and to ensure the problems are adequately addressed and will not reoccur. They may include, but are not limited to:
    a) Implementing measures to correct the problem and prevent recurrence;
    b) counselling, such as meeting with the PI and research team;
    c) issuing warning letters;
    d) mandating specific animal user training aimed at preventing future incidents;
    e) monitoring by ACC;

f) revoking a PI's privileges to provide animal care or to conduct research, testing, or training procedures that involve animals, pending compliance with ACC-mandated conditions;
g) temporary or permanent suspension of one or all of a PI's AUPS.