Canadian Council on Animal Care
Conseil canadien de protection des animaux

Good Animal Practice in Science
Bonnes pratiques animales en science

CCAC guidelines on: the care and use of fish in research, teaching and testing

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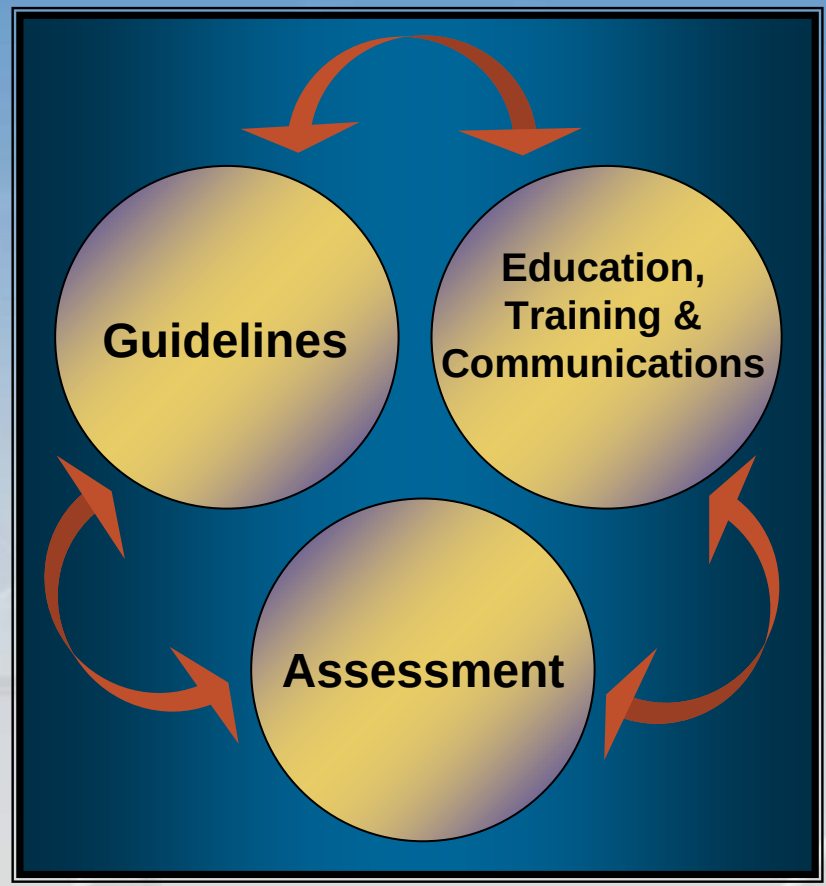
Guidelines Program Director

Harmonisation of the Care and Use of Fish in Research
Gardermoen, Norway May 23-26, 2005

The Canadian Council on Animal Care

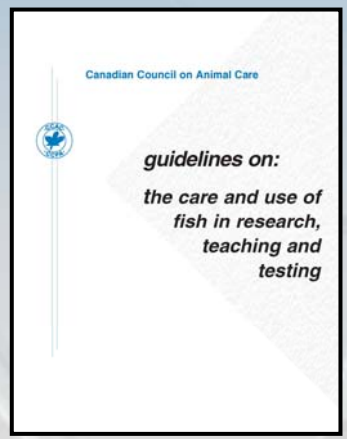
CCAC Programs

- An evidence-based learning loop model involving scientists, veterinarians, animal care personnel, community representatives and the animal welfare movement
- Peer involvement in developing and implementing standards



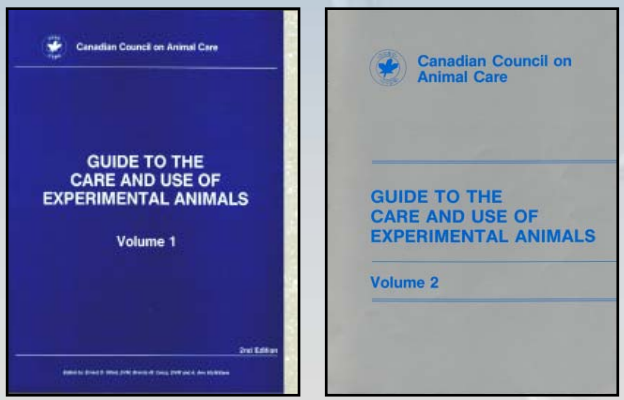
CCAC Guidelines

- **Guidelines are developed in response to:**
  - Current and emerging issues for the Canadian research community
  - Advances in laboratory animal care
  - Requirements of the Assessment Program



Guidelines' Audience

- Scientists
- Veterinarians/ animal care staff
- ACC members



Guidelines Development

- Uses sound scientific evidence and expert opinion, subject to peer review
- Incorporates societal concerns and interests of the animals

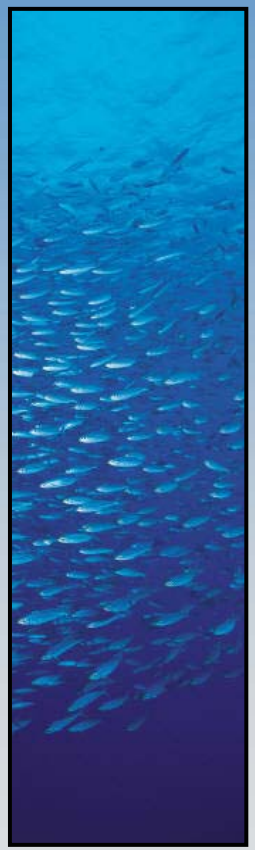
CCAC & the Three R's

- Principles of Three R's enshrined in legislation in several countries
- CCAC – Ethics of Animal Investigation

Burch and Russell

- "Animals should be used only if the researcher's best efforts to find an alternative have failed….."
- Those using animals should employ the most humane methods on the smallest number of appropriate animals required to obtain valid information

CCAC & Cost / Benefit



- *Ethics of Animal Investigation* requires that any use of an animal has a benefit to society
- Guidelines provide assistance to investigators and to ACCs on how to balance well being of animal subjects and goals of scientific research
  - *Ethics of Animal Investigation*
  - CCAC *guidelines on: choosing an appropriate endpoint in experiments using animals in research teaching and testing*

Harmonization

- International harmonization of standards is one of the two overriding priorities for the CCAC Guidelines Program due to:
  - broad implications for international scientific collaboration;
  - global acceptance of research data; and
  - international trade.

CCAC Five-Year Plan 2004-2009
March 2004

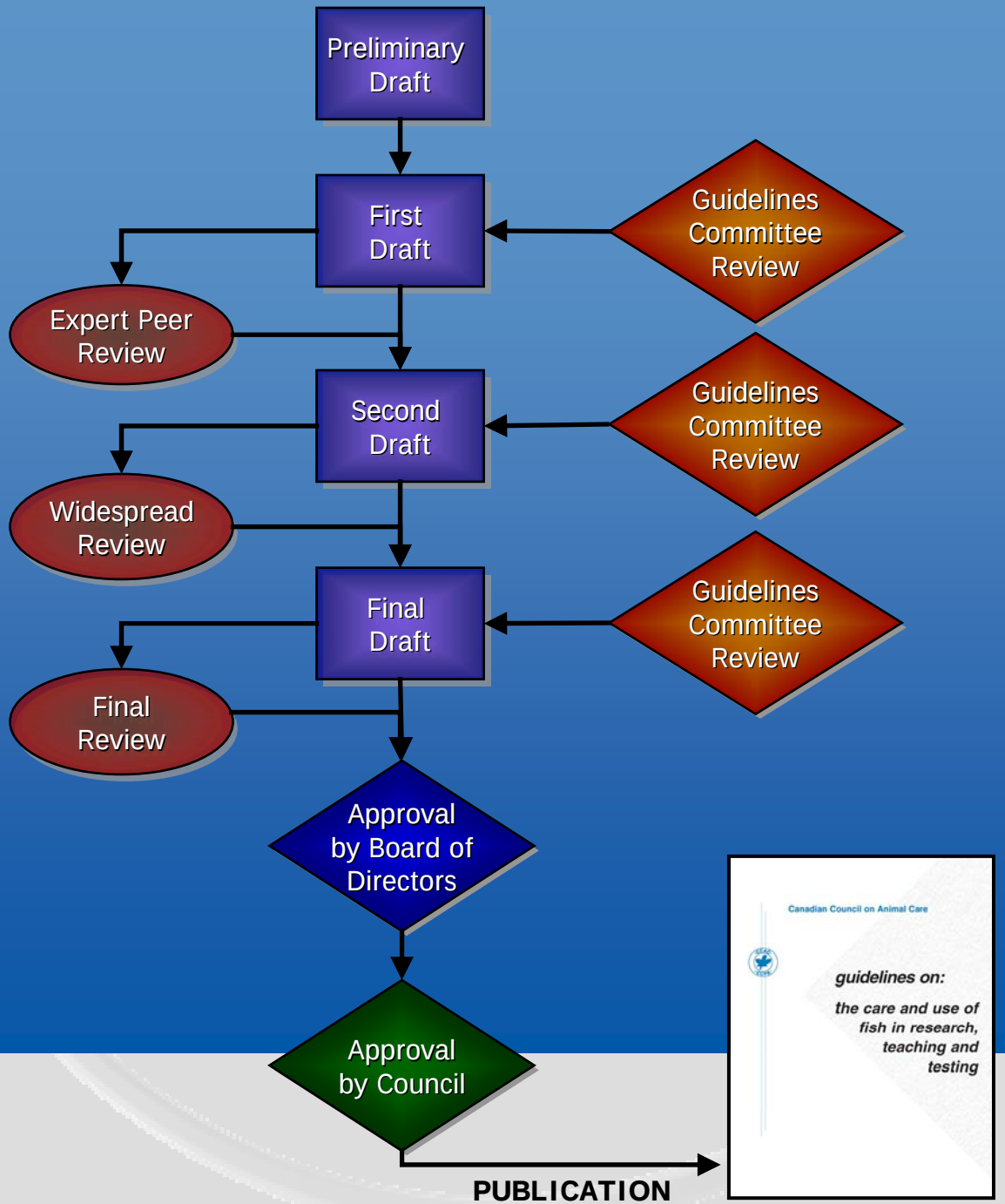
Guideline Development Process

- Selection of Chair(s):
  - expert in area of guideline to be developed
- Formation of subcommittee composed of experts
- Development of rationale and scope
- Preparation of outline and first draft

Guidelines Development Process

- Subcommittee of experts (national and international)
- Targeted contact with organizations involved in the area under consideration
- Peer review by experts (national and international)
- Widespread review – web-based consultation
- Approval and release

Process for Guideline Development

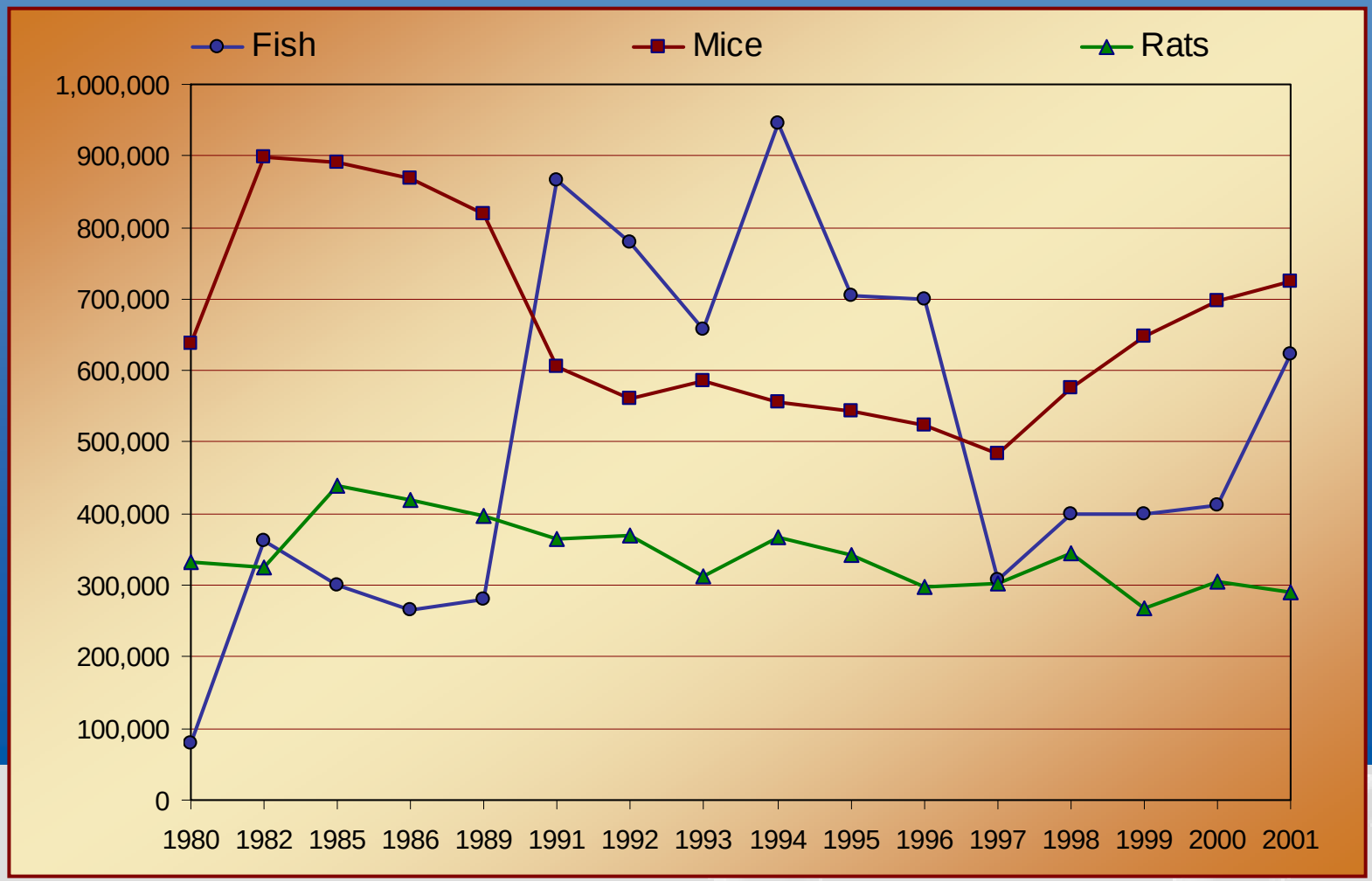


CCAC guidelines on: the care and use of fish in research, teaching and testing

Why CCAC guidelines on: fish?

- Vertebrate species – covered under CCAC's mandate
- CCAC focus on animals, not just as a means to an end
- Respect for animal life (CCAC *guidelines on: institutional animal user training*)
- Moral stewardship

Patterns of Animal Use



CCAC guidelines on: the use of fish – A History

- initiated September 1996
- in response to increase in use of fish as a research animal
- revision of Chapter 1, Vol. 2 of the CCAC *Guide to the Care and Use of Experimental Animals*
- additional sections: pain and distress; transgenic fish

Ad hoc subcommittee on the use of fish

- Dr Chris Harvey-Clark
  (Dalhousie University)
- Mr John Batt
  (Dalhousie University)
- Mr Cyr Couturier
  (Marine Institute of Memorial University)
- Dr Larry Hammell
  (University of Prince Edward Island)
- Dr George Iwama
  (University of British Columbia)
- Dr Santosh Lall
  (National Research Council)
- Dr Matt Litvak
  (University of New Brunswick)
- Prof David Noakes
  (University of Guelph)
- Dr Don Rainnie
  (Atlantic Fish Health, Inc.)
- Dr Don Stevens
  (University of Guelph)
- Dr Jim Wright
  (University of Calgary)
- Mr Henrik Kreiberg
  (Fisheries and Oceans Canada)

Fish Guidelines

- The CCAC *guidelines on: the care and use of fishes in research teaching and testing*
  - Support the leadership role that Canadians play in fish research
  - Ensure that the welfare of fish is carefully considered

International harmonization

- US American Fisheries Society
  - Guidelines for the use of fishes in research (2004)
    - Rose JD (2002) The neurobehavioral nature of fishes and the question of awareness of pain. *Reviews in Fishery Science* 10:1-38
- European Convention for the Protection of Vertebrate Animals used for Experimental and other Scientific Purposes
  - Appendix A – species-specific provisions for fish
    - FSBI (2002) Fish Welfare. Briefing paper 2. FSBI@grantis.demon.co.uk

Table of Contents

- Introduction
- Aquatic facilities
- Facility management, operation and maintenance
- Capture, acquisition and transport
- Husbandry
- Health and disease control
- Experimental procedures
- Euthanasia
- Disposition of fish

Introduction

Good Animal Practice in Science

- Definition of Fish
  - Invertebrates not covered
- Ethical Overview
- Responsibilities
  - Investigators, ACCs, veterinarians
- Government Regulations

Aquatic Facilities

Aquatic facilities

- Water supply
- Water quality
- Engineering and design
  - Materials, ventilation, mechanical and electrical requirements, lighting, redundancy
- Types of system
  - Flow-through, recirculation, static
- Fish Housing (tanks/enclosures)

Fish housing

- Fish well-being
  - Aquatic environments should be designed to meet the established physical and behavioral requirements of fishes in terms of shelter, social grouping, overhead cover and lighting

Facility management, operation and maintenance

- Security
- General maintenance
- Environmental monitoring and control
- Management of water quality
  - Temperature, oxygen, supersaturation, pH, nitrogen compounds, CO_2, salinity, toxic agents

Water quality management

- Monitoring
  - An environmental monitoring system is essential. The complexity of the monitoring system should be designed to suit the water-management system

Capture, acquisition and transportation

- Capture of wild stock
- Killed specimens
- Piscicidal compounds
- Acquisition of hatchery fish
- Transportation
- Quarantine and acclimation

Acquisition of hatchery fishes

- Fishes should come from hatcheries with defined health status and preferably known genetic history. Hatcheries should be encouraged to develop husbandry and management practices consistent with those used in the production of other laboratory animals.

Husbandry

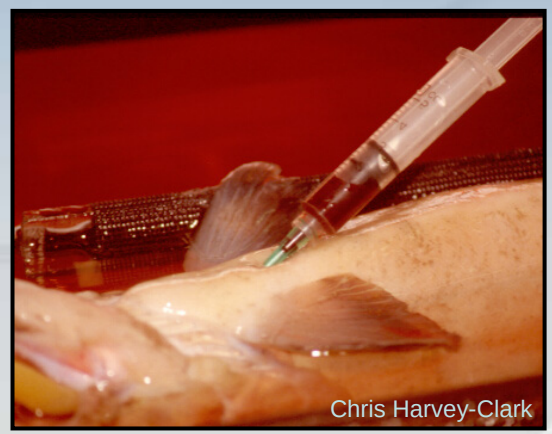
- Record keeping and documentation
- Density and carrying capacity
- Food, feeding and nutrition
- Broodstock and breeding

Density and carrying capacity

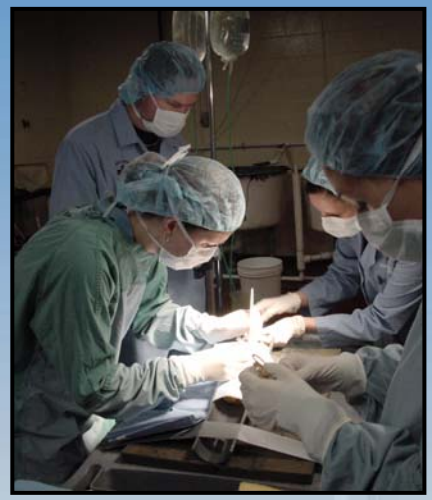
- Each species should be housed at a density that optimizes the well-being of the fish while meeting experimental parameters
- However, in some cases the ideal environment will have to be developed using performance-based criteria such as growth rate

Health and Disease Control

- Fish health program
  - Disease prevention
  - Disease diagnosis
  - Injuries
    - Handling, behavioral interactions, feed-related disorders, toxicities
  - Healthy fish are pre-requisites for reliable data



Experimental Procedures



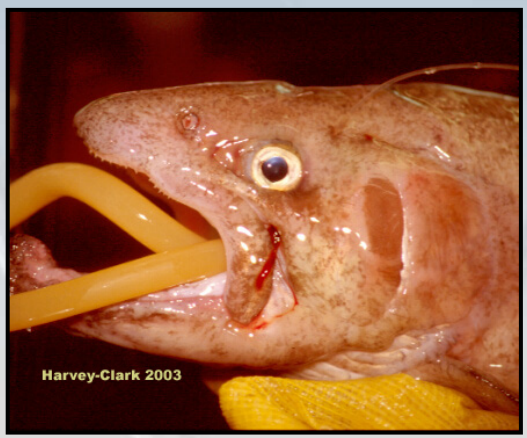
- Handling and Restraint
- Restricted Environments
- Surgery
- Administration of Compounds and Devices
- Tagging and Marking
- Collection of Body Fluids
- Endpoints
- Monitoring
- Negative reinforcement
- Exercise to exhaustion
- Environmental extremes
- Genetically modified fish

Endpoints / Monitoring

- In any study where there is expected morbidity and mortality, the criteria for early euthanasia should be defined
- A list of parameters should be established to permit objective assessment of health status
- Frequency of monitoring should allow for the timely removal of fish, before severe morbidity occurs

Euthanasia and Disposition

- Where feasible, two step process (anaesthesia to loss of equilibrium followed by physical or chemical method to cause brain death)
- Fishes should not be held indefinitely without a protocol



Further challenges

- Procurement of healthy fish
- Monitoring
- Pain and distress
  - “animals must not be subjected to unnecessary pain or distress…”
  - “if pain or distress is a necessary concomitant to the study, it must be minimized…”
  - “an animal observed to be experiencing severe unrelievable pain should immediately be killed…”

CCAC *Policy on: Ethics of Animal Investigation* (1989)

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THANK YOU !!!

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