

Field research: The animal welfare view



Photo: USFWS

Anton Krag, scientific adviser for NAPA

Harmonisation of the Care and Use
of Animals in Field Research

21 – 22 May 2008, Oslo, Norway

Dyrevern
alliansen 

Norwegian Animal Protection Alliance (NAPA)

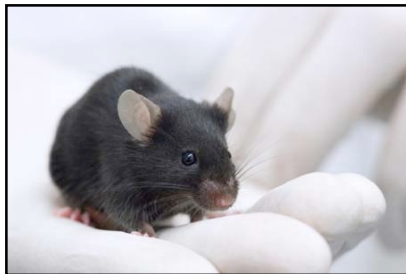
Adr.: Brenneriveien 7, 0182 Oslo

Tlf/Fax: +47 22 20 16 50

www.dyrevern.no/english

anton@dyrevern.no

About NAPA



Norwegian Animal Protection Alliance (NAPA)

- Established in 2001
- Represents 8 local animal protection organizations.

Vision: A world where human activities do not involve intentionally causing suffering to other sentient beings.

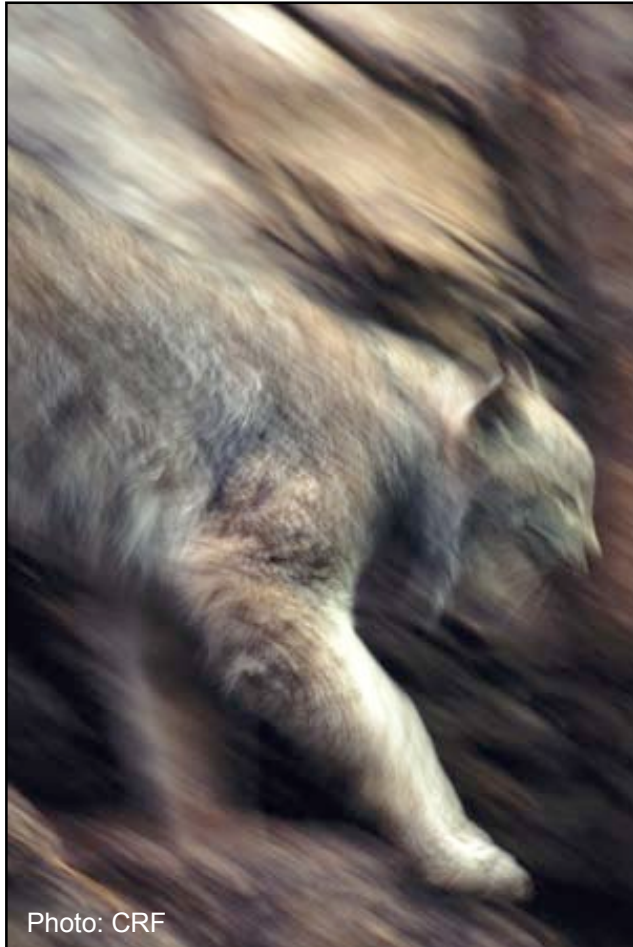
In practice: Work non-violently to reduce the harm caused by humans - particularly in **farming** and **research**.

Dialog with **authorities**, **academia** and **industry**.
Consumer information to the **public**.

Represented in (amongst others):

- Norwegian Animal Research Authority
- Norwegian Council for Animal Ethics
- Norecopa - consensus platform for alternatives
- Relevant public consultations & working groups

Overview



The aim of this presentation is to:

- Present **ethical views** relating to field research.
- Outline **animal welfare** concerns.
- Offer **suggestions** to all stakeholders.

Focus will be on **biologging** (marking/tagging) as these are the most common techniques in Norway.

However, the views presented should also be relevant for other areas of field research. E.g.:

- Removal/addition of species to study ecosystems
- Manipulation of populations to study life histories
- Manipulation of individuals to study behaviour
- Removal of rare specimens for collections

Animal protection

“The question is not, Can they reason?, nor Can they talk?
but, Can they suffer?”¹



Photo: CRF

Two main branches of animal protection:

- **Animal rights** - animals are sentient beings and “subject-of-a-life”, they have vital interests that humans must not override.² Calls for an end to exploitation.
- **Animal welfare** - animals can suffer, their interests must be taken into account in relation to human interests.³ Work to end unnecessary suffering.

The distinction between these branches may vary from country to country.

Usually, the outcome of most peoples' views and practices reflect a combination of these approaches.

1) Jeremy Bentham, 1748-1832. 2) Regan, Tom, The Case for Animal Rights, University of California Press, 1983. 3) Singer, Peter, Animal Liberation, Random House, 1975. Photo: www.istockphoto.com

Animal ethics and science

"A consideration of ethical questions [...] involves applying to science itself the scientific spirit of scepticism, rationality, and a demand for evidence."¹



Having ethical concerns about animal research is **not anti-science**. All areas of modern science are now required by society to adhere to ethical norms.

Science is seldom **value-free**. The questions asked, the methods used, and the conclusions reached, are influenced by ethics, religion, culture, politics, funding etc.

For example:

The scientific use of animal in research is based on the belief that humans have a privileged place in the world. One could argue that this makes the non-animal (alternatives) road to scientific progress harder to envisage, and less motivating to follow.

1) Bekoff, M. and Jamieson D., Ethics and the study of carnivores, *In Carnivore Behavior, Ecology, and Evolution*. Cornell University Press, Ithaca, New York, 1996.

Animal ethics and nature management

"The welfare of wild animals has only occasionally been included in the formal consideration of sustainability of wildlife."¹



Nature management principles can conflict with animal welfare concerns. For example:

Conservation point of view: a lack of nature management is a threat to animal **species** or **populations**.

Animal welfare point of view: nature management often results in harm and suffering to **individual animals**.

Nature management principles could apply to individuals:

- **Precautionary principle**: when in doubt about welfare, give animals the benefit of the doubt.
- **Polluter pays principle**: the “cost” of avoiding animal suffering should be placed on the animal user.
- **Prevention principle**: the prevention of animal suffering should be integrated into management.

1) Taylor V.J. & Dunstone N., The exploitation, sustainable use and welfare of wild animals, *In The exploitation of mammal populations*. Chapman & Hall Press, 1996.

Animal ethics and field research

”Although most countries have ethical guidelines for research involving human subjects and other sentient animals, the ethical issues associated with field research have received little attention.”¹



Foto: USFWS

Field research has undoubtedly contributed greatly to the view that animals are **sentient beings**.

Better understanding of animals has in turn led to greater **public interest** in animal ethics.

Field research on wild animals continues to vary greatly in its invasiveness and thus also in its ethical acceptability.

By not paying proper attention to animal ethics, field researchers risk undermining their own public position.

1) Marsh, H.D., The role of ethics in experimental marine biology and ecology, Journal of Experimental Marine Biology and Ecology, (300), 2004.

Animal welfare concerns

"[...] researchers tend to choose markers that intuitively seem least likely to induce abnormal behaviour or survival, even though data supporting that assertion usually are weak or lacking."¹



Photo: Massey University.

Sea lion with brand mark, flipper tag, satellite transmitter, time-depth recorder and VHF transmitter.

Wildlife studies are regularly carried out on the assumption that they have insignificant negative effects on the animals involved.

However, this assumption is often undocumented, thus raising legitimate scientific and animal welfare concerns.

The lack of systematic evidence from researchers, combined with anecdotal cases of animal suffering from other sources, amplifies public concern.

1) Murray D.L. & Fuller M.R., A Critical Review of the Effects of Marking on the Biology of Vertebrates, *In Research Techniques in Animal Ecology*, Columbia University Press, 2000.

Effects of capture and restraint

”[...] animal capture and restraint is probably one of the most stressful situations that a wild animal can experience. [...] there is substantial literature on the radical physiological changes that accompany capture.”¹



Reindeer being captured. Photo: NAPA.

Capture and restraint can have **short term** and **long term** effects. However, usually only severe injuries or deaths are recorded and reported.

Other effects are seldom investigated:

- Avoidance of capture area
- Long term stress from restraint
- Long term injuries from capture
- Behavioural changes

“Reuse” of wild animals through recapturing and remarking is of particular concern.

1) Wilson R.P. & McMahon C.R., Measuring devices on wild animals: what constitutes acceptable practice? *Frontiers in Ecology and the Environment*: Vol. 4, No. 3, 2006.

Effects of attached devices

“Attaching or implanting devices to animals will always have an impact on physiology or behaviour, and this can be significant.”¹



Bat with radio tag glued on. Photo: Cal Butchkoski

A number of reviews show that far too little has been done to document effects:

Withey et al. reviewed 5 leading wildlife journals between 1972 and 2000. They found only 96 articles properly assessing effects of radiotransmitters.²

Murray & Fuller surveyed 9 relevant journals for 1995. Of the 238 articles they found only 7% included information about marking effects.

Godfrey & Bryant surveyed all 1990 radio-tracking literature and found that only 10,4% of 836 studies directly addressed the effects of tags.

Effects of attached devices (contd.)

"A common characteristic of marker evaluation studies is the use of subjective or qualitative measures of marking effects."¹

A wide range of effects have been reported:^{1,2}

Growth

- resulting from reduced hunting success

Survival

- vulnerability to predators (even poaching!)

Health

- increased parasite load

Behaviour

- increased grooming
- changed social relations

Breeding success

- biased mate choice
- reduced brood survival

Movement

- changed use of space
- change in migration time



1) Murray D.L. & Fuller M.R., A Critical Review of the Effects of Marking on the Biology of Vertebrates, *In Research Techniques in Animal Ecology*, Columbia University Press, 2000. 2) Mech D.L. & Barber S.M., A critique of wildlife radio-tracking and its use in national parks, A report to the U.S. National Park Services, February 6, 2002.

Effects of attached devices (contd.)

“ [...] finding no evidence for an effect of tags on survival does not prove that tags do not effect survival.”¹

Specific examples:

In Adélie **penguins** flipper-tags directly damaged flippers, increased swimming costs by 24%, decreased survival in the first year after banding by 28%, and may have accelerated decline of a dwindling colony by 3%.²

In radio-collared Kit **foxes**, the post-collaring acclimation period was about 30 days. During this time there was body mass loss and reduced survival.³

Chinook **salmon** with implanted transmitters were unable to pass a dam when heading up to spawning grounds, and eventually migrated downstream.⁴



Penguin with flipper tag. Photo: OSU, Katie Dugger

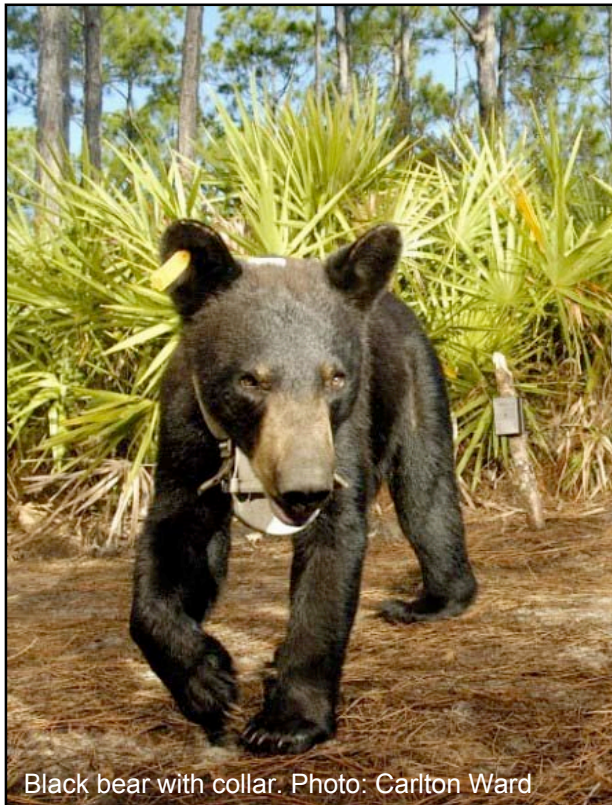


Internal electronic tag for salmon. Photo: USFWS

1) Godfrey & Bryant, 2003 - see list on final slide. 2) Jackson S. & Wilson R.P., The potential costs of flipper-bands to penguins. *Functional Ecology*, (16) 2002. 3) Cypher BL. Effects of radiocollars on San Joaquin kit foxes. *J Wildl Manage* (619, 1997. 4) Haynes, J. M. & Gray, R. H. 1979. Effects of external and internal radio transmitters attachment on movement of adult chinook salmon. pp. 115-128 *In* F.M. Long (ed.) *Proceedings of the 2nd International Conference on Wildlife Biotelemetry*, University of Wyoming, Laramie, WY, July 30-August 1, 1979.

Alternatives

"The greatest scientific experiments have always been the most humane and the most aesthetically attractive, conveying that sense of beauty and elegance which is the essence of science at its most successful."¹



Black bear with collar. Photo: Carlton Ward

There is strong consensus that the **3R's** should be applied to all animal research.

Yet **Replace**, **Reduce** and **Refine** appear to be less frequently applied to field research:

- Fewer **papers** on the subject compared to laboratory research.
- No specialized **databases** for alternatives in field research.

A number of **extra Rs** have been proposed by animal protection organizations including:

- **Redirection**
- **Rejection**

1) W.M.S. Russell and R.L. Burch, The Principles of Humane Experimental Technique, Methuen, London, 1959. http://altweb.jhsph.edu/publications/humane_exp/het-toc.htm

Replacement

"Replacement means the substitution for conscious living higher animals of insentient material."¹



Use of Remote-Sensing Cameras in Wildlife Management. Photo: Doniga

Unlike much laboratory research, the ultimate subjects of interest for most field research are wild animals themselves.

In some cases computer modelling can do away with specific field experiments.

Replacement usually involves substituting invasive studies with **non-invasive** or **hands-off** research.

Examples:

- Faeces/hair for DNA/"stress hormone"/parasite analysis.
- Camera traps and remote weighing stations.
- Natural markings to identify individuals.
- Biometrics to identify individual animal by their tracks.²

1) W.M.S. Russell and R.L. Burch, The Principles of Humane Experimental Technique, Methuen, London, 1959. http://altweb.jhsph.edu/publications/humane_exp/het-toc.htm 2) E.g. www.wildtrack.org

Reduction

"Reduction means reduction in the numbers of animals used to obtain information of a given amount and precision."¹



Unlike laboratory research involving standardized animals, field research often involve relatively large numbers of wild animals under less predictable conditions.

However, practical constraints (eg. inaccessible or rare animals) can result in sample sizes being too small.

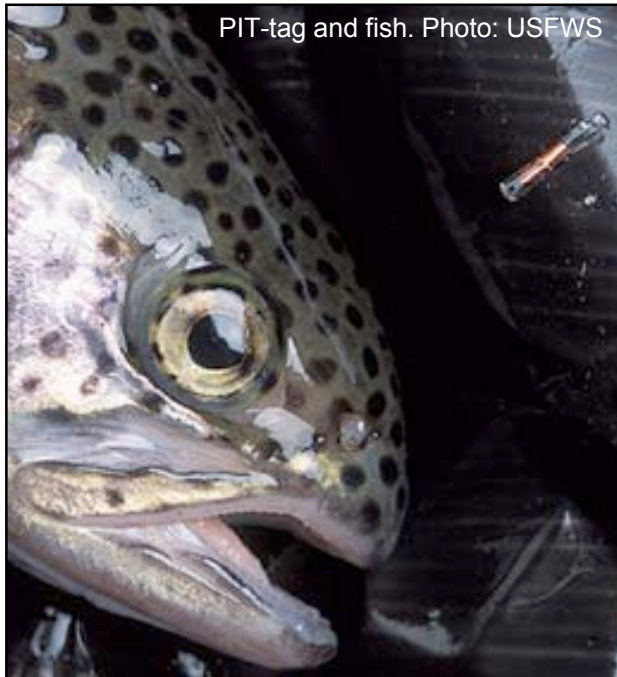
Examples of reduction in field research:

- GPS-tags give more data per individual than VHF-tags.
- Improved statistical methods can reduce numbers.
- Avoiding duplication of experiments.
- Pilot studies to ensure feasibility of larger projects.

1) W.M.S. Russell and R.L. Burch, The Principles of Humane Experimental Technique, Methuen, London, 1959. http://altweb.jhsph.edu/publications/humane_exp/het-toc.htm

Refinement

” Refinement means any decrease in the incidence or severity of inhumane procedures applied to those animals which still have to be used.”¹



Refinement has great potential in field research. Use of the best available technology and techniques to ensure that animals are harmed as **little as possible** for as **short a time as possible**.

Examples:

- Improved trapping and handling
- Drop-off collars for mammals
- Suction cups to attach devices to cetacea
- Smaller, lighter, more accurate loggers

More curious examples:

- Bloodsucking insects for blood sampling²
- Radio-triggered anesthetic-dart collar for recapture³

1) W.M.S. Russell and R.L. Burch, The Principles of Humane Experimental Technique, Methuen, London, 1959.

2) Voigt C.C. et al., An Alternative, Less Invasive Blood Sample Collection Technique for Serologic Studies Utilizing Triatomine Bugs (Heteroptera; Insecta), Journal of Wildlife Diseases, 42(2), 2006. 3) Mech, L. D., R. C.

Chapman, W. W. Cochran, L. Simmons, and U. S. Seal. 1984. A radio-triggered anesthetic-dart collar for recapturing large mammals. Wildl. Soc. Bull. 12(1), 1984.

Redirection

"There are no right or wrong answers to many questions about how humans should treat animals. However, there are better and worse answers."¹



Photo: Harald Kryvi

Redirection is Replacement in a wider perspective. Redirection seeks to solve problems outside the realm of animal research - by political, social or other means.

An example from field research:
The arctic fox is an endangered species in Scandinavia.

In an attempt to boost numbers, **experimental captive breeding** has been undertaken in Norway. The project has been heavily criticized for animal welfare reasons.

In Sweden the approach no longer involves animal experimentation, but instead efforts have been **redirected to supplementary feeding** of wild arctic fox with promising results.

1) Bekoff, M., The importance of ethics in conservation biology: Let's be ethicists not ostriches, Endangered species update, vol. 19 no. 2, 2002.

Rejection

"We must accept that ethics might dictate the demise of certain projects."¹



Dead wolverine with bioglogger.
Photo: Bjørn Brendbakken

Because something is doable, does not not necessarily mean it should be done.

From an animal welfare point of view there are a number of instances where invasive procedures on animals should simply be rejected for ethical reasons. Or because suitable technology does not yet exist.

Candidates from field research:

- Certain capture techniques
- Amputation of functional body parts
- Implanted transmitters for mammals
- Force-fed transmitters for reptiles

1) Bekoff, M., The importance of ethics in conservation biology: Let's be ethicists not ostriches, Endangered species update, vol. 19 no. 2, 2002.

Suggestions to stakeholders

"We will come to a consensus about ethics of specific practices only if we expose our differences to the light of day, and frankly discuss the issues that are involved."¹



Photo: CRF

There is **growing public concerns** for the welfare of animals in field research.

These concerns need to be met by all stakeholders – field researchers, equipment manufacturers, regulatory bodies and animal protection groups.

We should more actively seek to pinpoint the shortcomings of present methods, rather than leaving it for the future to reveal.

1) Murray D.L. & Fuller M.R., A Critical Review of the Effects of Marking on the Biology of Vertebrates, *In Research Techniques in Animal Ecology*, Columbia University Press, 2000.

Suggestions to academia

"Behavioural research, because it does not seem to contribute to human health or welfare, may be especially vulnerable to criticism."¹



Photo: CRF

Field scientists tend to focus on mortality. More focus should be given to measures of reduced welfare - **discomfort, pain, stress** etc.

Animal welfare **considerations** and **consequences** should be more widely published. Also equipment failures need to be extensively reported.

Zoological societies should provide more **specific, binding** and **progressive** guidance on ethical issues of field research.

Scientific journals should promote **high standards** of animal welfare. More **negative results** need to be shared to avoid duplication. *Journal of Negative Results in Biomedicine* would be a good example to follow.²

1) Bekoff, M. and Jamieson D., Ethics and the study of carnivores, *In Carnivore Behavior, Ecology, and Evolution*. Cornell University Press, Ithaca, New York, 1996. 2) www.jnrnm.com

Suggestions to authorities

”Perhaps the way forward is for an assessment of the possible negative effects of intervention on individual animals to be included as an integral part of all research projects.”¹



Photo: CRF

Licensing bodies need to be more aware of animal welfare challenges in field research. Where information is lacking, they should **encourage investigation**.

Funding bodies should do more to support **technique evaluation studies**. Resources are wasted if poor animal welfare leads to bad science.

Authorities should **regularly inspect** field research. Otherwise it is difficult to evaluate if permits and protocols are practiced properly.

Authorities should encourage **transparency** in all areas of field research in order to stimulate informed debate.

1) Clutton-Brock J., Risk assessment for animals: should the routine assessment of negative effects of intervention in wild animals be built into research projects?, J. Zool., 2003.

Suggestions to manufacturers

”Collars do not always perform as advertised by the manufacturers. [...] We also commonly faced animal-welfare and ethical issues when recapturing grizzly bears with failed collars.”¹



Photo: CRF

Manufacturers of equipment should **rigorously test** products before they are used by scientists. Wild animals should not be a testing ground for new products.

Better information about **reliability and margins of error** should be made readily available to all parties involved with the application and regulation of field studies.

Developing **“animal friendly”** and **“welfare monitoring” technologies** should be a higher priority for wildlife equipment manufacturers.

1. Gau R.J., Uncontrolled field performance of Televilt GPS Simplex collars on grizzly bears in western and northern Canada, Wildlife Society Bulletin 32(3), 2004.

Suggestions to animal protection groups

”Field studies contribute information on the complexity and richness of animal lives that is very useful to those interested in animal well-being and animal rights.”¹



Animal protection organisations have traditionally focused on laboratory experiments.

Yet, in Norway at least, a large proportion of animal research is done on wild animals.

Fish often undergo treatments that would be unthinkable to do on mammals or birds.

Animal protection organizations should focus more on field research, and in particular research on fish.

1. Clutton-Brock J., Risk assessment for animals: should the routine assessment of negative effects of intervention in wild animals be built into research projects?, J. Zool., 2003.

In summary...

Animal ethics should be seen as a natural part of field research.

Animal welfare effects of field research should receive more attention.

The **5-R principles** should be more widely implemented in field research.

All stakeholders have a part to play to improve animal welfare.

Ultimately, **public perception** will be a measure of our success.

Essential reading

Farnsworth E.J. & Rosovsky J., **The Ethics of Ecological Field Experimentation**, Conservation Biology, 7 (3), 1993.

Bekoff, M. and Jamieson D., **Ethics and the study of carnivores**, *In Carnivore Behavior, Ecology, and Evolution*. Cornell University Press, Ithaca, New York, 1996.

Murray D.L. & Fuller M.R., **A Critical Review of the Effects of Marking on the Biology of Vertebrates**, *In Research Techniques in Animal Ecology*, Columbia University Press, 2000. [http://www.earthscience.org/r3/ES14780/02ch\(15-64\).pdf](http://www.earthscience.org/r3/ES14780/02ch(15-64).pdf)

Thorsteinsson V., **Tagging Methods for Stock Assessment and Research in Fisheries**, Report of Concerted Action (CATAG), Marine Research Institute Technical Report 79, 2002. <http://www.hafro.is/catag/>

Godfrey J.D., & Bryant D.M., **Effects of radio transmitters: Review of recent radio-tracking studies**. *In Conservation Applications of Measuring Energy Expenditure of New Zealand Birds: Assessing Habitat Quality and Costs of Carrying Radio Transmitters*. Science for Conservation 214. Department of Conservation, Wellington, New Zealand, 2003. <http://www.doc.govt.nz/upload/documents/science-and-technical/SfC214F.pdf>

Mellor D.J. et al., **Marking amphibians, reptiles and marine mammals: animal welfare, practicalities and public perceptions in New Zealand**. Department of Conservation, Wellington, New Zealand, 2004. <http://www.doc.govt.nz/upload/documents/science-and-technical/MarkingPre.pdf>

Hawkins P., **Bio-logging and animal welfare: practical refinements**. Mem Natl Inst Polar Res 58:58–68, 2004. <http://www.nipr.ac.jp/~penguin/oogataHP/pdfarticles/06p58-68.pdf>

Wilson R.P. & McMahon C.R., **Measuring devices on wild animals: what constitutes acceptable practice?** *Frontiers in Ecology and the Environment*: Vol. 4, No. 3, 2006.