Ethical principles and review of research on the environment and organisms

Natural Resources Institute Finland Luke
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1. Introduction

The Natural Sciences Ethics Committee was established at Luke in January 2022. It was asked to draw up ethical principles for natural science research.

Luke's goal is to minimise the harm and risks caused by research to the environment, citizens, researchers, and species. With the help of ethical principles and review, the aim is to pay more attention to the selection of research methods and test sites and their impacts on nature and the environment, and to support researchers in ethical reflection and weighing the benefits and harms of research. On the other hand, the aim is to preserve the potential of experimental research. If the research has significant direct and harmful effects on the environment, citizens, researchers or species, the necessity, methods, and choice of research subjects should be considered particularly carefully. The drafting and continuous evaluation of ethical principles is part of Luke's responsibility goals and strengthens Luke's responsible operations in line with our values.

No national or international ethical principles or guidelines for natural science research have yet been drawn up. TENK has investigated the need for ethical principles and review in the fields of nature and environmental research and has published the results in its report[1]. The report recommends that "In Finland, a process to draw up national ethical principles in the fields of nature and environmental research will be initiated. In connection with this work, the need for preliminary ethical evaluation of research in the field must be both assessed and anticipated."

In drafting the ethical principles of research on the environment and organisms, the ethical principles and review from the human sciences have been used as a reference[2].

In addition to the authors, the following experts have been consulted in the preparation of the principles: Sirja Viitala, Mikko Kurttila and Jarkko Hantula from Luke and Simo Kyllönen and Anna Meller from the University of Helsinki. In addition, Luke's personnel has had the opportunity to comment on the principles in workshops.

2. Scope of application

The ethical principles of research on the environment and organisms apply to experimental or observational, invasive research that focuses on the natural, production or cultural environments (incl. barns, aquaculture facilities), wild organisms or livestock.

The ethical principles apply to Luke's research activities, official and expert services and customer projects, as well as research carried out by other research parties in Luke's research infrastructures.

Legislation and various permits constitute a minimum level for preventing harm caused by research. In ethical review, stricter requirements may be set for the acceptability of research. If a research project applies for a prior authorisation from the Project Authorisation Board (formerly known as the Animal Experiment Board, ELLA), it will not be assessed by the Natural Sciences Ethics Committee from the perspective of significant harm or risks to animal welfare or health. In cases where special permits have been sought based on the research, the researcher should consider whether an ethical review is necessary or if the minimum level defined by legislation is sufficient. For this reason, studies that have been evaluated

[1] Launis Veera & Kaila Eero (2023). Luontoon ja ympäristöön kohdistuvan tutkimuksen kansallisten eettisten periaatteiden ja eettisen ennakkoarvioinnin tarvekartoitus. Tutkimuseettisen neuvottelukunnan julkaisuja 1/2023 https://tenk.fi/sites/default/files/2023-02/LYTE-selvitys_2022.pdf

[2] https://tenk.fi/sites/default/files/2021-01/Ihmistieteiden_eettisen_ennakkoarvioinnin_ohje_2020.pdf.

by the Project Authorisation Board or have received a special permit based on the research will also request a statement from the Natural Sciences Ethics Committee if the criteria are met.

In multidisciplinary research projects, research designs may need to be evaluated from the perspectives of several different ethical principles, such *as The Ethical principles of research with human participants*, *The Ethical Guidelines for Research Involving the Sámi People in Finland*, and *Ethical guidelines for responsible academic partnerships with the Global South*. If it is unclear whether an ethical review statement should be requested from the Natural Sciences Ethics Committee or the Human sciences ethics committee, the secretary of the Natural Sciences Ethics Committee should be contacted for instructions. In some cases, it may be necessary to carry out an assessment from the perspective of both committees.

In addition, a funder may require a separate ethical consideration. For example, many EU projects require an ethical self-assessment or establishment of an ethics board, and EU's RFF projects require a "do no significant harm" assessment. The publisher of a scientific article may also require ethical review. The ethical principles of research on the environment and organisms support and supplement funder- or publisher-specific ethical review, but Luke's ethical review does not replace it. In international projects, Luke's ethical principles only apply to Luke's contribution to the research plan.

In ethical review, the risk of significant harmful effects on the environment or organisms is assessed. In addition, it is evaluated whether efforts have been made to sufficiently minimize the likelihood and impact of such risks.

The Natural Sciences Ethics Committee does not handle:

- **Animal testing activities** carried out in projects: in research falling within the scope of application of *the Act on the Protection of Animals Used for Scientific or Educational Purposes*, when the procedures in the project cause pain to the animal equal to or greater than a needle stick, a prior authorisation must be applied for from the Project Authorisation Board.
- **Research in human sciences** that focuses on people or uses research methods in the human sciences: In human sciences research, ethical review must be requested from the Human Sciences Committee in the case of research designs that can be reviewed in accordance with TENK's *The ethical principles of research with human participants and ethical review in the human sciences in Finland 2019*.
- **Medical research** that falls within the scope of application of the Medical Research Act 984/2021.
- **GMO and gene editing research**, which requires permission from the Board for Gene Technology.

3. Ethical principles of research on the environment and organisms

- Research is carried out only if the information cannot be obtained with sufficient accuracy by other means. Before starting an experiment, it should be ensured that equivalent or sufficient data are not already available. However, in experimental research, experiments may need to be repeated to confirm results, when the environment changes, or in long-term follow-ups and experiments (long time series).
- The location of the test areas and research methods are selected in such a way as to minimise the harm caused to the environment and organisms, especially endangered species and habitats. However, the quality of research will not be compromised.
- Particular attention must be paid to animal welfare. No unnecessary pain and suffering are inflicted on animals. Animals are always handled as discreetly as possible and handling times are kept as short as possible.

- According to the processing procedure for action plans for Luke's research forests, sites located in Luke's research forests that were left unresolved due to differing viewpoints in the negotiations between Metsähallitus and environmental organisations are subject to ethical review.

- The openness of research data is a key principle of open science. The results of the experiments shall be made available as widely as possible, at least for the use of the scientific community, so that the experiments are not unnecessarily repeated, and the harm caused by them can be minimised.

- We will ensure that personal data and information related to the habitats or nesting sites of endangered species are protected in accordance with legislation: https://www.luke.fi/en/privacy-policy.

- If unforeseen adverse effects occur during the study, the conduct of the study shall be discontinued and the grounds for continuing it shall be reassessed. In addition, where necessary, measures shall be taken to minimise adverse effects. If the research design changes, an ethical review statement may be requested for the research plan, if necessary.

4. Ethical review

4.1. General principles of ethical review

The research group first conducts an ethical reflection and review. The Natural Sciences Ethics Committee issues an ethical review statement based on the material provided by the research group. The statement can be positive, conditionally positive, or negative. In a conditionally positive opinion, the Committee needs further clarification or requires changes to the research plan to issue a final statement. The Committee may refuse to issue a statement if the research does not require a review based on the ethical principles.

In ethical review, the following factors are assessed on a case-by-case basis:

- Do the benefits of the study outweigh the disadvantages. The benefits can be environmental, economic, social, or societal. The benefit may also be the production of significant scientific information
- The planned method and location of the research from the perspective of the occurrence and minimization of harm, threats, and risks. In addition, it is assessed whether the measures are sufficient from the perspective of minimising harm and risks
- Direct effects on the environment, organisms and humans or their property. Indirect and long-term impacts can be considered if the research design provides strong grounds for doing so
- Does the result of the study pose a dual-use risk. Dual-use research is defined as "any item that can be used for both benevolent and malicious purposes" and that may therefore pose a threat to environmental or human health or safety. These items could be, for example, some chemicals and microbes[3]

Ethical review is always carried out **in advance**. The project manager conducts an ethical reflection and requests an ethical review statement before submitting a funding application or at the latest before starting the experiment measures. It is the project manager's responsibility to apply for a review statement from the Natural Sciences Ethics Committee.

[3] Sissonen, S. (2018). The ethics and risks of dual use research. https://vastuullinentiede.fi/en/planning/ethics-and-risks-dual-use-research. Read 27.12.2023.

The Natural Sciences Ethics Committee issues a statement at the request of the project manager. The statement is issued based on written material submitted to the Committee. In addition to ethical review, key documents include the research plan and the instructions for conducting the experiment. The responsibility for the ethical implementation of the project remains with the project manager. The project manager is also obliged to arrange the research and special permits required for the experiment.

The Committee's statements are public, and they are published on Luke.fi.

4.2. Research designs to be reviewed

The purpose of the ethical principles is to identify research designs that may cause significant harm or risks to natural environments, production environments, wild organisms, farm animals or researchers or citizens moving around the experimental areas. The researcher must request an ethical review statement from the Natural Sciences Ethics Committee if the research includes any of the following research designs:

A) Research may cause significant harm or threat to endangered species or habitats, cultural environments or biodiversity

Here, endangered species refer to all species defined as threatened in the *2019 Red List of Finnish Species*[4] and species classified as having an unfavorable conservation status reported by the *Habitats Directive*. Correspondingly, threatened habitat types refer to all threatened habitat types listed in the *Red Book of Finnish Habitat Types*[5] and habitat types identified as having an unfavorable conservation status reported by the *Habitats Directive*. In addition, nationally significant built cultural environments, managed cultural environments, architectural heritage sites and archaeological sites[6] must be considered in the same way as endangered habitat types. Biodiversity refers to the variety and diversity of living nature at three levels: genetic diversity within species, species diversity, and ecosystem diversity.

Harm or threat may arise if the research measures weaken the characteristics or structure of the threatened habitat type or cultural environment, reduce the population size or extent of the occurrence of the endangered species, or weaken or destroy the breeding or resting places of species.

Research may pose a threat to organisms or habitats if the research involves a risk of invasive alien species, a new species or cultivars, microbes or virus spreading into nature. If the study spreads a pathogen (virus) into an environment where it is not known to have occurred before, the study is always subject to ethical review.

Research may also cause harm or threat due to undesirable effects of the study, failure of the experiment or outside the actual test area. For example, measures along streams or elsewhere in the catchment area may affect water quality and thus weaken the habitat of species.

Ethical review is conducted in situations where legislation requires a special or research permit for the research. It is recommended that the review be carried out before applying for such a permit.

B) Research may cause harm or threat to animal health or welfare

All animals (mammals, fish, birds, and invertebrates) as well as production, hobby and wild animals are considered. Animals are used in research only when necessary for the study, using methods that cause the least possible harm to the health and welfare of the animal. If the experimental design requires a prior

[4] https://helda.helsinki.fi/items/2ec69a48-d943-488c-927f-19bbf9f92cb5
[5] Luontotyyppien punaisen kirjan verkkopalvelu. 2018. https://luontotyyppienuhanalaisuus.ymparisto.fi/lutu/#/
[6] https://www.kyppi.fi

authorisation from the Project Authorisation Board, the research does not need to be reviewed from the perspective of animal health and welfare.

Research may cause harm or threat by impairing the fulfilment of behavioural needs essential for animal welfare or cause pain, suffering or even death to the animal. Significant deterioration of the species' typical habitat may also impair animals' well-being.

The welfare requirements of fish and especially invertebrate animals are limitedly understood[7], and research methods often involve the capture of animals. For this reason, research involving fish and invertebrate animals is subject to prior evaluation only if it employs capture methods or efforts that deviate from the standard practices of the field, or handling of animals that increases the risk of mortality or suffering

For Luke's research projects, logging or other measures disturbing bird nesting are not carried out in Luke's research forests or plots during the nesting season of birds without ethical review. Review may be omitted if the significance of the habitat type as a nesting area is known to be minor.

Ethical review is not affected by whether the research is carried out in Luke's research infrastructures, natural environment, or private farms. Experimental research related to fur farming is always reviewed (research related to fur farming is only carried out as customer-funded activities).

Research may pose a risk to animal health or welfare or to the introduction of bred species/subspecies/breeds into the wild due to undesirable effects of the study or failure of the experiment. For example, by-catches in fish research, research on various animal repellents or deterrents, or crossbreeding research on fish could cause these risks.

Luke does not plant or release wild species outside their natural distribution range without ethical review.

Animals are tagged for research purposes only when no other research methods are available. Research plans containing animal tagging need to are reviewed unless they need a prior authorisation from the Project Authorisation Board. In this case, the research plan does not need to be reviewed due to significant adverse effects or risks caused by tagging.

In ethical review, animal rights[8] are not addressed; instead, the focus is on evaluating the benefits of the research in relation to its impact on animal health and welfare, with the aim of minimizing pain and suffering for the animals.

C) Research may significantly degrade or pollute the environment, in particular the state of water bodies or soil, or pose a risk of significant emissions into water, air, or soil

Tillage carried out during research, changes in land use, measures taken in the aquatic environment or substances released into the environment may cause significant discharges into water, soil, or air, or significantly deteriorate the condition of water bodies or soil.

For example, if water flows or movements are permanently altered through drainage, stream restoration or habitat restoration, significant discharges may occur to water bodies.

Significant emissions are emissions significantly higher than normal concentrations and situations where elevated emissions persist for a long time, possibly even after the end of the research.
In ethical review, the adequacy of emission prevention measures, such as water protection measures, are also weighed.

[7] www.elaintieto.fi/blogi/hyonteisten-hyvinvointi-huomioitava-kasvatuksessa-ja-kaytossa/. Katsottu 7.11.2024.
[8] Moral or legal rights granted to animals, typically based on their cognitive, emotional, and social abilities, or their capacity to experience physical or emotional pain or pleasure. Wise, S.M. (2023) Animal rights. Encyclopaedia Britannica. Dated 19.12.2023. https://www.britannica.com/topic/animal-rights

Ethical review is also carried out when Luke does not take any measures itself but has planned them or research arrangements. In the case of studies monitoring the effects of measures that are planned and carried out by others, no prior review is required.

D) The conduct of research may pose a threat to the safety or health of the researcher or their family members, or the experiment may pose risks to third parties or their property

Travelling and working in high-risk countries or research topics or methods that arouse strong emotions or opinions, such as illegal hunting, wolf collaring, GMOs, and gene editing, may pose a threat to the safety or physical or mental health of researchers or their close associates (so-called targeted harassment risk).

Research measures, such as restoration burn tests or ditch blocking, may pose risks to bystanders or those moving around the test site. In this case, the planned measures to mitigate the risks will also be reviewed. Correspondingly, research may pose risks to land or forest assets, such as the spread of pathogens in pest control research and waterlogging of areas outside the test areas caused by restoration.