



ASF Minimum Impact Code of Ethics for Scientific Investigation in Caves and Karst (Science MIC)

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1 Introduction

ASF supports scientific activities undertaken in caves and karst areas, in both surface and underground environments. The need for the Minimal Impact Code for Scientific Investigation (Science MIC) has developed over time as the diverse and varied impact that scientists have had on caves and their contents has been realised. This code is to alert scientists, especially those who have not previously had exposure to the ASF codes, to measures that are necessary to reduce their impact on caves. ASF's existing codes cover behaviour by ASF members and others, but they do not focus on issues involving sampling for scientific research.

The ASF does not want to develop a Code in isolation from cave and karst scientists, including those who are not ASF members. This Code may be of use to management agencies but should not substitute for their need to examine research requests and issue Scientific Research permits.

It is important that scientists understand that a Science MIC is necessary because scientists working and researching in caves are one of the sources of damage to caves and their contents. Some of this damage is unavoidable, but the aim is to **minimise** it. This Code should be used in conjunction with the other appropriate ASF Codes such as the **Code of Ethics** and **Minimum Impact Caving Code**, and these will be cross-referenced below rather than repeated. This Code outlines **principles** and is not intended to be prescriptive. It should not substitute for the land manager or owner to require specific detail of proposed studies before issuing a Research Permit or permission to proceed but it should assist managers and owners focus on the issues involved.

The International Union of Speleology (UIS) in 2009 (<http://www.uis-speleo.org/>) is proposing a more general framework for scientific studies by the addition of a Section on Scientific Sampling to its Code of Ethics. In particular, this was developed to avoid excessive sampling; to deter the trading and sale of cave specimens such as speleothems and fossils. A particular concern expressed was the vulnerability and fragility of cave ecosystems to disturbance and collecting. Similarly scientists should be very conservative in speleothem sampling due to their irreplaceability. It is also stressed that the scientists should take only the specimens necessary themselves and not rely on others for samples.

2 General

This code aims to assist scientists to have a minimal impact on the cave they are visiting. The following practices may be modified depending on the type of cave being visited. These practices are generally intended to apply in caves where scientists are likely to have a detrimental impact on the cave either by merely entering the cave or by the sampling and scientific activities required for research. Specific practices may not apply in all cases, as impacts of particular activities may be small, compared to natural processes occurring in the cave. This Code has been prepared with the principle objective of fostering minimal impact cave science and responsible sample and specimen taking consistent with obtaining a valuable scientific outcome.

This Code has been developed taking into account the “precautionary principle” in the belief that both the scientific output and the impact of the scientific research on the cave and karst itself will be minimised by such an approach.

In-cave marking refers to the use of a variety of materials used to define tracks, routes and barricades in a cave. These measures should be taken to protect sensitive areas, confine foot damage, or make visitors aware that a sensitive area exists.

This code applies to all scientific work in caves and includes all cave visitors whether they are surveyors, photographers, scientists, explorers or managers. The code is particularly directed at respecting all cave values despite the scientific intent of the visitor e.g. to collect biota for study or to sample a speleothem for climatological research. Particular care should be paid to publishing locations as this has resulted in vandalism of sites in the past.

3 Code

3.1 That appropriate scientific design is developed prior to sampling. A list of appropriate questions is provided in section 4 to assist scientists to manage their cave research but is not intended to be prescriptive. Other questions may need to be used.

3.2 That the sampling is done in a **conservative** and responsible manner to minimise impact.

3.3 That appropriate scientific permits are in place **before** scientific work, especially if sampling occurs.

3.3 That the other ASF Codes (e.g Minimum Impact Caving, Safety, Risk Management, Ethics, Cave naming and Cave numbering) are followed. These cover aspects of working in caves.

3.4 That results are published in a responsible manner.

3.5 Researchers should not publish precise site locations except in circumstances where the site is part of an intensively managed reserve.

3.6 This code applies to surface as well as underground scientific work.

3.7 That samples are stored properly upon completion of studies and that they be appropriately lodged with a state institution upon completion of studies. That samples are available for re-use or further study where appropriate.

4 Ethical guidelines for cave and karst scientific activities

Each scientific proposal requiring cave studies and samples should follow ethical guidelines and be subject to scrutiny. Planning assists in minimising impact on sites. Questions to be addressed should include:

Study design

1. What are the objectives of the study?
2. What is needed to answer the objectives?
3. What research design do I need to conduct the research?
4. What previous or other studies suggest the objectives of this study are warranted and will build on existing knowledge?

Sampling

5. What sampling is needed for these studies?
6. Could samples already taken be re-used for the study in question?
7. Could the proposed samples be analysed for other parameters to enhance the scientific output?
8. Is the sampling/excavation conservative? Modern instrumentation requires smaller samples. Is the method proposed for sampling consistent with the use of the minimum necessary sample size?
9. Will there be adequate in situ material for subsequent researchers who may have new methodologies to further elucidate the context of the research?
10. What impact will the sampling have on the site and how will this impact be kept to a minimum? If the site needs repeated visiting for monitoring or further sample collection how is it to be protected between visits?
11. Can the sampling be done in stages to ensure the samples that are to be analysed
can provide satisfactory answers?
12. Where are the residual samples and specimens to be lodged?
13. What access to the residual samples is available for subsequent researchers?
How can people find out this information?
14. For biological sampling, will the collecting affect the population or genetic diversity of the collected species?

Site management

15. What type of sites and how many need study to provide the answers?
16. How are the sample sites to be marked and recorded for later or repeat visiting? How is the site(s) to be protected during and between research visits?
17. How is the site(s) to be restored, protected or otherwise at the conclusion of research?

Skills and facilities

18. Do the studies proposed have adequate supervision and funding support and access to the facilities needed to comprehensively analyse the samples taken?

19. Does the researcher have sufficient skills and support to conduct the sampling according to the proposed study design and sampling procedures?
20. How is it proposed to report on the results of the research? The results of research studies should be published in a timely manner.
21. Is it proposed that interpretive materials be provided to the manager or owner of the site and other stakeholders of the results of the research and if not, why not?
22. Only personnel necessary to the conduct of the field research should participate in underground trips.
23. Do I have the requisite equipment, caving skills to undertake the work safely and with minimum impact? Should I be undertaking the field work with the assistance of a recognised caving group to ensure the safety of the field work and that there is minimal impact on the cave sites?