SOME IMPORTANT CONSIDERATIONS FOR MANAGING CAVES

– Jay Anderson*

L to R: Jay Anderson, Arthur Clarke, Dale Calnin and Anne Wood – ACKMA AGM 'Week" at Mulu 2010.

Recently I was involved in discussions with a number of cave managers and several colleagues in the environmental management field – considering the complexities and challenges of tourism development in caves, and how to provide guidance to colleagues in another country. Of course, the key document in our discussions was the 'IUCN Guidelines for Cave and Karst Protection' (Watson et al 1997) – in particular IUCN Guideline 8:

> *'the development of caves for tourism purposes demands careful planning, including consideration of sustainability. Where appropriate, restoration of damaged caves should be undertaken, rather than opening new caves for tourism'.*

The challenge we all have, is that there are differing definitions and interpretations – and unfortunately in some cases, the existence of guidelines, standards or evidence of International best practice still doesn't lead to the best outcomes. Caves and karst systems are 'dear' to all of us in some way – whether for personal or professional reasons and we are all familiar with how the values we appreciate can so easily be damaged.

Hence the development of codes of ethics to guide our behaviour, or 'guidelines' to assist in the protection of specialised environments such as karst systems. Aside from the aforementioned IUCN Guidelines, there are different levels of documentation and many good examples from other countries.

While at the International Congress of Speleology (15th ICS), organised by the International Union of Speleology, in USA during mid 2009, one presentation that I attended was by Arrigo Cigna (Chairman of the ISCA Scientific and Technical Committee) on *Management Guidelines for Show Caves*.

I've continued to correspond with Arrigo and can now provide ACKMA members with the latest draft of the ISCA *Management Guidelines for Show Caves*.

I am aware that the document has come through many years of development and is not yet officially endorsed by ISCA. This document will be presented to the General Assembly of ISCA in October in Slovakia.

The draft ISCA Guidelines consider and address a number of management challenges, as will be noted below. I encourage ACKMA members to thoroughly read through this important document.

If you have any comments or feedback in relation to the ISCA draft guidelines, then please contact Arrigo Cigna directly on <arrigocigna@tiscali.it>.

You can also usefully give your thoughts to any of the three members of the ACKMA Committee who will be attending the ISCA Congress, namely Andy Spate, Dan Cove and Kent Henderson.

While considering *Guidelines*, I also want to mention that there is a revised UIS Code of Ethics in the pipeline - that covers:

a) general caving in your own country;
b) caving expeditions to foreign countries;
c) future development of show caves;
d) adventure and geo- and eco- tourism;
e) competitive caving; and
f) scientific sampling.

If you'd like a copy of this, or wish to discuss any of the documents mentioned here – please contact me on <caveskarst.iucn@gmail.com>.

- Chair/Leader – IUCN-WCPA Caves and Karst Specialist Group.

A view of the Baradla Cave Visitor's Centre – Hungary.

International Show Caves Association

DRAFT MANAGEMENT GUIDELINES FOR SHOW CAVES

– Arrigo A. Cigna *

INTRODUCTION

These management guidelines are the result of wide cooperation between the International Show Caves Association (ISCA), the Union Internationale de Spéléologie (UIS) and the International Union for Conservation of Nature and Natural Resources (IUCN). These guidelines are intended to set minimum standards, while recognizing that many existing show caves may not initially be able to comply with the specified guidelines. The intention is to create commonly accepted guidelines that all ISCA member show caves can work towards, taking into account both the protection of the environment and socio-economical constraints.

Hotel Jama at Postojna Cave, Slovenia.

The concept of establishing guidelines that the members of ISCA could use as general parameters for good show cave management, originated during informal discussions between members of the Association at the time of the inaugural meeting of ISCA in Genga, Italy, in November 1990. These discussions continued over time and were first drafted for consideration at an ISCA meeting held on 17th September 2004 during the 30th Anniversary of the opening of Frasassi Cave, in Italy, to the public. The idea of creating guidelines, such as the ISCA Management Guidelines, received strong recommendations from the UIS Department of Protection and Management at the 14th International Congress of Speleology held in Kalamos, Greece, in August 2005.

These guidelines are intended to be a living on-going work. For this reason the guidelines themselves do not comprise a part of the constitution of ISCA although provision for the guidelines is made under section 2 (iii) of the Constitution of ISCA.

1. DEVELOPMENT OF A WILD CAVE INTO A SHOW CAVE

The development of a show cave can be seen as a positive financial benefit to not only itself, but also the area surrounding the cave. The pursuit of these anticipated benefits can sometimes cause pressure to be applied to hasten the development of the cave.

Before a proposal to develop a wild cave into a show cave becomes a physical project, it is necessary to carry out a careful and detailed study to evaluate the benefits and risks, by taking into account all pertinent factors such as the access, the synergy and possible conflict with other tourism related activities in the surrounding area, the availability of funds and many other related factors.

The conversion should only take place if the results of the studies are positive. A wild cave that is developed into a show cave, and is subsequently abandoned, will inevitably become unprotected and be subject to vandalism in a very short time. A well managed show cave assures the protection of the cave itself, is a source of income for the local economy and also may contribute to a number of scientific researches.

1.1 A careful study of the suitability of the cave for development, taking into account all factors influencing it, must be carried out, and must be carefully evaluated, before physical development work commences.

2. ACCESS AND PATHWAYS WITHIN THE CAVE

In many caves it has been found to be desirable to provide an easier access into the cave for visitors through a tunnel, or a new entrance, excavated into the cave. Such an artificial entrance could change the air circulation in the cave causing a disruption of the ecosystem. To avoid this, an air lock should be installed in any new entrance into a cave. On the other hand it must be mentioned that in some very exceptional cases a change in the air circulation could revitalize the growth of formations. A decision not to install an air lock must be only taken after a special study.

2.1 Any new access into a cave must be fitted with an efficient air lock system, such as a double set of doors, to avoid creating changes in the air circulation within the cave. Caves are natural databases, wherein an incredible amount of information about the characteristics of the environment, and the climate of the cave, are stored. Therefore any intervention in the cave must be carried out with great care to avoid the destruction of these natural databases.

2.2 Any development work carried out inside the cave should avoid disturbing the structure, the deposits and the formations of the cave, as much as possible.

When a wild cave is developed into a show cave, pathways and other features must be installed. This invariably requires materials to be brought into the

cave. These materials should have the least possible impact on both the aesthetics of the cave and its underground environment. Concrete is generally the closest substance to the rock that the cave is formed in, but once concrete is cast it is extremely expensive and difficult to modify or decommission. Stainless steel has the distinct advantage that it lasts for a long time and requires little, to no, maintenance but it is expensive and requires special techniques to assemble and install. Some recently developed plastic materials have the advantage of a very long life, are easy to install and are relatively easy to modify.

2.3 Only materials that are compatible with the cave, and have the least impact on the cave, should be used in a cave. Cement, concrete, stainless steel and plastics are examples of such materials.

The environment of a cave is usually isolated from the outside and therefore the introduction of energy from the outside will change the equilibrium balance of the cave. Such changes can be caused by the release of heat from the lighting system and the visitors and also by the decay of organic material brought into the cave, which introduces other substances into the food chain of the cave ecosystem. In ice caves, the environmental characteristics are compatible with wood, which is frequently used for the construction of pathways, as it is not slippery.

2.4 Organic material, such as wood, should never be used in a cave unless it is an ice cave where, if necessary, it can be used for pathways.

3. LIGHTING

The energy balance of a cave should not be modified beyond its natural variations. Electric lighting releases both light and heat inside the cave. Therefore high efficiency lamps are preferred. Discharge lamps are efficient, as most of the energy is transformed into light, but only cold cathode lamps can be frequently switched on and off without inconvenience. Light-emitting diode (LED) lighting is also very promising. As far as possible, the electric network of a cave should be divided into zones to enable only the parts that visitors are in to be lit. Where possible a non-interruptible power supply should be provided to avoid problems for the visitors in the event of a failure of an external power supply.

3.1 Electric lighting should be provided in safe, well-balanced networks. The power supply should preferably be non-interruptible.

It is essential to ensure the safety of the visitors in the cave, particularly in the event of a failure of the main power supply. Emergency lighting should always be available whether it is a complete non-interruptible power supply or an emergency lighting system with an independent power supply. Local code requirements may be applicable and these may permit battery lamps or a network of LEDs or similar devices.

3.2 Adequate emergency lighting should be available in the event of a power outage.

Lampenflora is a fairly common consequence of the introduction of an artificial light supply into a cave. Many kinds of algae, and other superior plants, may develop as a result of the introduction of artificial light. An important method to avoid the growth of green plant life is to use lamps that do not release a light spectrum that can be absorbed by chlorophyll.

3.3 Lighting should have an emission spectrum with the lowest contribution to the absorption spectrum of chlorophyll (around 440 nm and around 650 nm).

Another way to prevent the growth of *lampenflora* is the reduction of the energy reaching any surface where the plants may live. The safe distance between the lamp and the cave surface depends on the intensity of the lamp. As a rough indication, a distance of one meter should be safe. Special care should also be paid to avoid heating the formations and any rock paintings that may exist.

3.4 Lighting sources should be installed at a distance from any component of the cave to prevent the growth of *lampenflora* and damaging the formations and any rock paintings.

The lighting system should be installed in such a way that only the portions of the cave occupied by visitors are switched on, leaving the lighting in the portions of the cave that are not occupied switched off. This is important from the aspects of reducing the heating of the cave environment and preventing the growth of *lampenflora*, as well as decreasing the amount of energy required and its financial cost.

3.5 Lighting should be installed in a manner to enable only the portions of the cave, that are occupied by visitors, to be illuminated.

4. FREQUENCY OF VISITS AND NUMBER OF VISITORS

The energy balance of a cave environment can be modified by the release of heat by visitors. A human being, moving in a cave, releases about 150 watts – approximately the same as a good incandescent lamp. Consequently, there is also a limit on the number of visitors that can be brought into a cave without causing an irreversible effect on the climate of the cave.

4.1 A cave visitor capacity, per a defined time period, should be determined and this capacity should not be exceeded. Visitor capacity is defined as the number of visitors to a given cave over a given time period, which does not permanently change the environmental parameters beyond their natural fluctuation range. A continuous tour, utilizing an entrance and another exit, can reduce the time that visitors spend in a cave, compared to the use of a single entrance/exit.

In addition to the normal tours for visitors, many show caves have special activities, sometimes called 'adventure tours', where visitors are provided with speleological equipment for use in wild sections of the cave. If such a practice is not properly planned, it may cause serious damage to the cave.

4.2 When visits to wild parts of a cave are arranged, they must be carefully planned. In addition to providing the participants with the necessary speleological safety equipment, the visitors must always be guided by a guide with good experience in wild caves. The pathway, where visitors are to travel along, must be clearly defined, for example with red and white tape, and the visitors should not be allowed to walk beyond this pathway. Special care must be taken to avoid any damage to the cave environment, and the parts beyond the pathway must be maintained in a clean condition.

5. PRESERVATION OF THE SURFACE ECOSYSTEM WHEN DEVELOPING BUILDINGS, PARKING, REMOVAL OF SURFACE VEGETATION AND WASTE RECOVERY

It is important that the siting of the above ground facilities, such as the buildings, parking and waste recovery, be well planned. There is a natural tendency to try and place these development features as close as possible to the cave entrance. Sometimes these features are built over the cave itself, or relevant parts of it. The hydrogeology above the cave must not be modified by any intervention such as the watertight surface of a parking area. Any change in the rainwater seepage into a cave can have a negative influence on the cave and the growth of its formations. Care should be exercised also when making any change to the land above the cave, including the removal of the vegetation and disturbance of the soils above the bedrock.

5.1 Any siting of buildings, parking areas, and any other intervention directly above the cave, must be avoided in order to keep the natural seepage of rainwater from the surface in its original condition.

6. MONITORING

After the environmental impact evaluation of the development, including any other study of the cave environment, it is necessary to monitor the relevant parameters to ensure that there is no deviation outside acceptable limits. Show caves should maintain a monitoring network of the cave environment to ensure that it remains within acceptable limits.

6.1 Monitoring of the cave climate should be undertaken. The air temperature, carbon dioxide, humidity, radon (if its concentration is close to or above the level prescribed by the law) and water temperature (if applicable) should be monitored. Airflow in and out of the cave could also be monitored.

When selecting scientists to undertake studies in a cave, it is very important that only scientists who have good experience with cave environments be engaged for cave related matters. Many, otherwise competent scientists, may not be fully aware of cave environments. If incorrect advice is given to the cave management, then this could result in endangerment of the cave environment. Cave science is a highly specialized field.

6.2 Specialized cave scientists should be consulted when there is a situation that warrants research in a cave.

7. CAVE MANAGERS

The managers of a show cave must never forget that the cave itself is 'the golden goose' and that it must be preserved with great care. It is necessary that persons involved in the management of a show cave receive a suitable education, not only in the economic management of a show cave, but also about the environmental issues concerning the protection of the environment at large.

7.1 Cave managers should be competent in both the management of the economics of the show cave and its environmental protection.

8. TRAINING OF THE GUIDES

The guides in a show cave have a very important role, as they are the 'connection' between the cave and the visitor. Unfortunately, in many instances the guides have not been trained properly and, not withstanding that they are doing their best, the overall result will not be very good. It is very important that the guides receive proper instructions about the environmental aspects of the cave as well as dealing with the public. It is important that guides are skilled in tactfully avoiding entering into discussions, which can have a detrimental effect on the overall tour. The guides are the guardians of the cave and they must be ready to stop any misbehaviour by the visitors, which could endanger the cave environment.

8.1 Cave guides should be trained to correctly inform the visitors about the cave and its environment.

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