CAVE MANAGEMENT PRESCRIPTIONS - AN ALTERNATIVE TO CAVE CLASSIFICATION SYSTEMS

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ABSTRACT

Cave Classification systems have been shown to be basically flawed in that they do not focus on the conservation of caves but rather on providing users access to the cave resource. Cave Management Prescriptions have been developed as an alternative to classification systems. A simple methodology is described for the development of Cave Management Prescriptions. The modification of the methodology for the karst area to which it is being applied is also discussed. The use of Cave Management Prescriptions are discussed with respect to the caves of Christmas Island where they have been recommended.

CAVE CLASSIFICATION SYSTEMS

A number of cave classification systems have been developed and used in Australia and New Zealand (Davey et al. 1982, Davey 1987, White 1987). These systems have been used for a number of years and during that time many practical difficulties in their application have been identified. These difficulties were initially identified during the Cave Management Study on Christmas Island by Spate and Webb (1998). These difficulties included:

- caves are placed in "pigeon holes" that, once selected, managers appear to have difficulty in altering as circumstances change e.g. if the cave is being damaged through excessive visitation.
- caves do not fit in "pigeon holes" and hence they are "forced" into classifications that are inappropriate.
- most karst regions do not present a "normal distribution" of cave types and thus there is pressure on all caves in a region. Rather the distribution is skewed toward larger and more spectacular caves and these are the ones that visitors wish to use.
- the caves that managers most want to protect are usually the ones that most visitors want to utilise.

In 1993 Larkin argued that:-

"The management product produced by the Classification Systems is flawed. A system which does not have as its first priority the conservation of the caves will not achieve conservation of the caves in an effective manner"

Larkin also suggests that future cave management systems :-

".. should be built on monitoring human effects on caves, so that the future permitted usage patterns are determined by the effects measured. In this way the management system has built into its structure mechanisms for change as our knowledge of the resource increases and (hopefully) our impacts upon it are minimised."

To date no alternative to standard cave classification systems have been devised that focus primarily on the conservation of caves as their primary objective. Larkin (1993) clearly enunciates the shortcomings of cave classification systems. With the evidence of impacts on caves increasing, due to the rigid structure of classification systems, an alternative is required.

A system of cave management that focuses primarily on conservation but with the flexibility to apply different management practises to specific sections of cave within a single cave system is needed. Using a top down approach of starting from the ultimate goal of cave conservation a process was devised to create cave management prescriptions that would consider the unique features of each cave and conserve them.

CAVE MANAGEMENT PRESCRIPTIONS

Cave management prescriptions are made up of a number of requirements, determined and altered by management, that place restrictions on activities undertaken in caves and on the karst that surrounds them. The prescription for each cave will almost certainly differ due to the differences between individual caves. The important factor that separates cave classification systems from cave management prescriptions is the focus on conservation.

The general factors identified by Spate & Webb (1998) that should be considered in the development of the prescription are:

1. the long term conservation needs of the cave.
2. the long term conservation needs of the cave flora and fauna.
3. the safety of the visitors.

With these three general factors as the overall goal then the cave management prescription can be developed by examining more specific cave features that contribute to these three general factors. The more specific sub factors will vary quite dramatically between karst regions.

On Christmas Island, Spate & Webb (1998) identified a number of specific sub factors that would ensure that a cave or section of cave should have a cave management prescription. These sub factors included:

- the cave contains delicate areas of speleothems (both crystalline and unconsolidated).
- the cave contains cave flora or fauna that requires protection.

- the cave is known to have high levels of CO_2.
- the cave has an entrance that is subject to tides and swell.
- the cave contains known areas that are subject to tidal sumping.
- the cave contains a cave dive.
- the safety of the caver is threatened by rockfall or other natural phenomena.

These sub factors will vary greatly between karst regions. Cave entrances and passages that are affected by tides and swell are relatively rare in the major karsts of Australasia but on Christmas Island two of the larger cave systems are heavily affected by tides and swell and this significant safety factor must be considered in their cave management prescription. A major factor that was not taken into consideration on Christmas Island was the impact of large numbers of visitors on the cave as these numbers are low on the Island.

Some of the other sub factors that will require consideration in other karst areas include:-

- the visitor numbers to the cave are high.
- the cave is known to be subject to flooding.
- the cave is subject to deliberate vandalism.
- the cave is subject to significant research activities.
- the cave may be impacted by adjacent land users.

THE METHODOLOGY FOR DEVISING A CAVE MANAGEMENT PRESCRIPTION

In selecting which caves should have management prescriptions the specific sub factors outlined above are applied to each cave and those caves that have one or more of these sub factors pertaining to them are selected.

If a cave has none of these significant sub factors then it may initially fall into a grouping of caves that have no specific management prescription. Cave managers should then apply a general approach that when cavers wish to visit a cave that has no cave management prescription that they encourage them to collect information about the cave during their visit. If the cave has little or no documentation then managers should ask the cavers to provide a written report highlighting the features of the cave as they see them. If the visitors have any specific knowledge or skills relating to caves such as the ability to identify cave fauna, bone material, etc then this additional information should be added to the report.

In this manner features of a cave that may otherwise be missed will eventually be identified. This may result in the application of a management prescription to the cave. For example, a management prescription may be applied to conserve newly identified bone material in one section of a cave.

In order to devise the actual prescription, the areas of concern are listed for each cave and then methods for minimising caver impacts and/or safety are written into the prescription. If it is considered that cavers are such a threat to a specific cave or area of cave then they should be excluded. If the cave or section of cave is considered such a threat to visitor safety that it should not be visited then that cave or section should be prescribed as closed. These are the two extreme examples with the majority of cave management prescriptions providing access to caves with only minor restrictions applying.

Two examples of cave management prescriptions devised for Christmas Island caves by Spate & Webb (1998) are outlined below for The Grotto and Smiths Cave.

THE GROTTO (CI-1) - MANAGEMENT PRESCRIPTION

Establish sub factors:

- the cave contains delicate areas of speleothems - NO
- the cave contains cave flora or fauna that requires protection - NO
- the cave is known to have high levels of CO_{2-} - NO
- the cave has an entrance that is subject to tides and swell - NO
- the cave contains known areas that are subject to tidal sumping - YES
- the cave contains a cave dive – YES (a penetration dive)
- the safety of the caver is threatened by rockfall- NO

Detail the exact nature of the sub factors for this cave:

Caver Safety

The Grotto contains a tidal sump that may surge strongly depending on the swell. Attempts to free dive the sump to the ocean may prove life threatening. Attempts to dive to the ocean using breathing apparatus may prove life threatening depending on the swell.

Propose restrictions that will reduce the risk to cavers visiting the cave:

Proposed restrictions:

- a sign should be placed at the entrance to The Grotto indicating that diving to the ocean without breathing apparatus is not permitted and that diving with breathing apparatus requires a permit from the Christmas Island administration.

Smiths Cave (CI-9) - Management Prescription

Establish sub factors:

- the cave contains delicate areas of speleothems - YES
- the cave contains cave flora or fauna that requires protection - NO
- the cave is known to have high levels of CO_{2-} - NO

- the cave has an entrance that is subject to tides and swell - NO
- the cave contains known areas that are subject to tidal sumping - NO
- the cave contains a cave dive - NO
- the safety of the caver is threatened by rockfall- NO

Detail the exact nature of the sub factors for this cave:

CAVE CONSERVATION

Smiths Cave contains considerable areas of delicate speleothem development. These areas are not particularly vulnerable to damage by cavers using Minimal Impact Caving (MIC) techniques but careless use could seriously damage the site. This cave should only be visited by experienced cavers.

In order to ensure that damage is minimised some areas of the cave:

- entrance to first lake
- areas of flowstone

require route or track marking.

Proposed restrictions:

- visitors should be members of a recognised caving club.
- route and track marking should be established and adhered to.
- cavers should report any damage to the cave and should rectify the loss or removal of any track or route marking.

This type of prescription should be concise and focus on the known sub factors that may impact the cave environment. Taking ALL of the sub factors into consideration the prescription should always ensure that the three general factors are its overriding goal.

Once the prescription has been established it should **NOT** be considered as a static or final prescription. The cave management prescription should be an ongoing document that focuses on ensuring that the three general factors are its constant goal. It should be modified on a regular basis as new information is obtained or as sub factors alter.

Finally it should also be stated that management prescriptions can also be applied to karst features as well as caves. Many a doline has suffered horribly at the hands of humans dumping rubbish in them. Apply management prescriptions to karst features as well as caves.

CONCLUSION

No man made system that attempts to control human access to natural features will ever be "perfect" or even considered acceptable by some members of the community. However for those of us who have been involved with the management of caves and karst for any reasonable period of time will know – ensuring that caves and karst are even considered as environmentally sensitive by many government agencies and private companies can be a mind numbing and sometimes frustrating experience.

The use of cave management prescriptions is one tool that has the potential to be used to focus everyone's attention on the significant and diverse nature of the cave environment. If the general and sub factors are constantly examined in the management prescription for each cave, then the conservation of the cave resource should be foremost in everyone's thoughts.

If as managers you can see that by developing individual cave management prescriptions, using the methodology described here, you will be constantly focusing on the conservation of our cave resources, as well as visitor safety, then I strongly urge you to use this concept. Develop management prescriptions and apply them to caves so that everyone can see the importance of cave resource and it's incredible fragility.

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