



IRELAND



**Leave No Trace Skills and Ethics
Caving**

In partnership with



**Speleological
UNION OF IRELAND**

What is Leave No Trace?

Leave No Trace is an Outdoor Ethics Education Programme designed to promote and inspire responsible outdoor recreation through education, research and partnerships.

As increasing numbers of people seek the beauty and exhilaration of outdoor travel and recreation, our collective mark on the environment and its natural processes increases. Litter, water pollution, disturbance of vegetation, wildlife, livestock and other people are all indicators of the need to develop a national ethic that protects both natural and cultural heritage. Techniques designed to minimise the environmental and social impacts in these areas are incorporated in and promoted by the national Leave No Trace education programme as the following seven principles:

Principles of Leave No Trace

1. Plan Ahead and Prepare
2. Be Considerate of Others
3. Respect Farm Animals and Wildlife
4. Travel and Camp on Durable Surfaces
5. Leave What You Find
6. Dispose of Waste Properly
7. Minimise the Effects of Fire

Practising a Leave No Trace ethic is very simple – make it hard for others to see or hear you and LEAVE NO TRACE of your visit.

Front Cover Image: Courtesy of Tim & Pam Fogg

Outdoor Skills and Ethics



"Take only pictures, leave only carefully placed footsteps, kill nothing but time."
(The Caver's Creed)

The principles and practices discussed in this booklet are based on an abiding respect for and appreciation of caves and their inhabitants. They are meant to be practised with understanding and to complement the ethic and practice of cave conservation.

Cavers have advocated cave conservation for decades. Caves are full of beauty and mystery found nowhere else. They are also fragile. The impact of cavers grows proportionally to the increase in numbers seeking adventure underground. In order to protect caves for future generations, we need to encourage a collective commitment to minimum-impact caving techniques and cave conservation. Caves generally do not recover from human impact, so most of our impacts are permanent. Over the years we have learned more about the incredible natural diversity in caves and how human presence alters cave environments. Our caving practices have changed accordingly. It is imperative that we learn ways to move through caves leaving the smallest possible impact. Towards this goal, caving-specific techniques are incorporated in this booklet. These techniques have been developed through the collaborative efforts of cavers, land managers and the national Leave No Trace education programme.



For novice cavers it is recommended that they cave with an experienced, conservation-minded caver or with a representative of the Speleological Union of Ireland (SUI). Informed, experienced cavers can help beginners to understand underground environments and develop the judgment needed to reduce their impact. Experienced cavers should make an effort to remain current in evolving minimum-impact methods and to share their understanding with others.

We can continue to seek beauty, wonder and adventure underground, but in order to ensure the preservation of caves, we must take the responsibility to educate ourselves and become equipped with skills that enable us to Leave No Trace.

The information for each of the seven principles is recommended as a guide to minimise the impact of our visits.

Leave No Trace depends more on attitude and awareness than on rules and regulations. Minimum impact travel and outdoor recreation practices must be flexible and tempered by judgement and experience. Techniques are continually evolving and improving. The general rule is to consider the variables of each area in terms of culture, wildlife, vegetation, soil, climate and use that it receives. Then, use this information to determine which recommended practices to apply.

This respect, coupled with good judgement and awareness, will allow us to apply the principles to our own unique circumstances. We can respect and protect the places and wildlife that inspire us in Ireland and beyond.

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“Prior planning prevents poor performance.” (Anonymous)

“Good planning is living the experience in advance.” (Sir Edmund Hillary)

Many common impacts to caves can be avoided by carefully preparing in advance and by caving safely. For example, without suitable clothes, a caver may become hypothermic, clumsy and more likely to damage features; lack of co-ordination may cause an accident, requiring extrication from the cave and the rescue could lead to further damage. A prepared, warm and well-fed caver will be better able to move carefully and react to hazards. Many things can be done in advance that will help to minimise the impact inside the cave.

Ask Permission before Entering a Cave

Check with private landowners, National Parks and Wildlife Service, Forest Service or check www.cavingireland.com for local access agreements before visiting a cave. Good relationships between cavers and private landowners or public cave managers enable us to work together to protect caves. Most cave entrances are located on private property. When asked beforehand, most landowners will allow cavers to pass through their property to gain access. However, cavers should not assume they would always have access. Most land owners are farmers. During lambing season for example, they will not want livestock disturbed and may decline permission for cavers to use their property. Most landowners or cave managers do not charge entry fees, but many require liability waivers or permits. Respect gates and seek entry by obtaining a permit and getting keys or combinations to locked gates. Also, respect periods of closure. Caves are sometimes closed for part of the year to protect bat nurseries or hibernating bat colonies, for conservation projects or because of flooding danger. Ask if

there are areas within the cave that are restricted for restoration or preservation purposes. For up-to-date information on these subjects, please check www.cavingireland.org.

Car Parking

When travelling to a cave. Take into account the area you need to park at. Ask yourself: Can I reduce the amount of cars needed? And is there enough room to park safely and avoid blocking entrances or pathways? Also consider other user's who might also like to park in the same area. If appropriate, consider visiting landowners, letting them know where and what your doing. A simple request for an appropriate parking spot may lead to a sharing of experiences and a greater understanding for all.

Educate Yourself

Before entering a cave for the first time, learn about it from landowners, managers or other cavers. Cave environments vary tremendously, and every cave presents its own unique set of challenges and hazards. Find out the temperature, trip length, known hazards and impact concerns in the cave. Research the nature of necessary vertical work. By investigating this information prior to leaving home, you can be better prepared in your expectations and equipment choices. One good option is to cave with someone who has previously been to the cave and knows of delicate, restricted or hazardous areas. Unexplored passages should be left to experienced cavers who have the knowledge and experience to judge which are safe and durable enough to travel through. All cavers, whether on survey, restoration, exploration or recreational trips benefit from preparation.

When Crossing Farmland

Remember that farms are working environments. Follow bio security codes/ notices when in place. Keep a safe distance from any work and watch for signs that tell you dangerous activities (such as tree felling or crop spraying) are being carried out. Avoid all livestock because of possible danger to yourself and/or distress it can cause to animals. Only bring dogs onto farmland with the landowner's permission. Leave gates as you find them (open or shut) and use stiles whenever possible. To minimise strain on the gate when climbing, do so at the hinge end, one at a time. Prevent damage to crops by using paths, tracks or the edges of fields, or by going over ground that hasn't been planted. Be careful not to disturb the equipment of farmers, anglers, foresters, beekeepers and others who derive their income from the land.

Plan for a Group

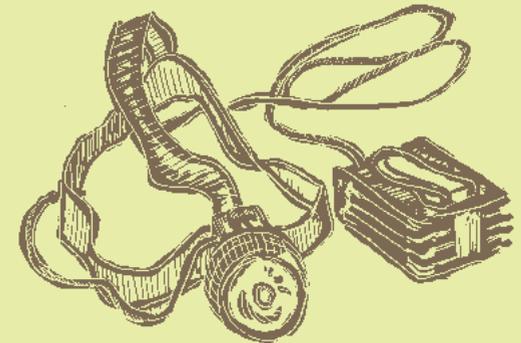
Select a cave or caving objective that is appropriate for the group. Consider the skills (including technical skills) and experience level of the group. What is the appropriate group size for the trip? In the event of an accident, a minimum group size of 4 allows for 1 person to stay with the patient and 2 to go for help, so no one is caving alone. More than 6 people can become difficult to manage and can lead to increased impact in and around the cave. Check group size recommendations before entering any cave with a group.

Use Proper Gear

Proper equipment and clothing help you Leave No Trace and cave safely. Equipment needs and impact concerns vary in different caves. For instance, a wet suit is a valuable piece of clothing for long, cold and wet cave trips; but in a hot, dry and highly decorated cave, the same wet suit will be a hindrance. Keeping your equipment to a

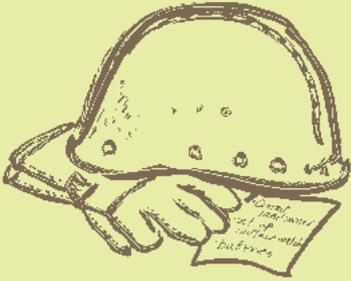
minimum in any cave (without compromising safety) will help you move smoothly and carefully through delicate areas.

- **Cave Lights:** Every caver should carry at least 2 light sources. Use reliable and efficient lights. Your primary light source should be mounted on your helmet so you can use your hands to move smoothly and deliberately. Your back-up light sources should allow you to move carefully as well, and provide enough light so you can exit the cave safely with minimal impact. The varieties of LED lights that exist are more useful than candles and glow sticks. Carry enough batteries for the length of your trip and bring replacement bulbs. Environmental concerns associated with electric lights are due to battery production and disposal creating significant ecological impacts. Lessen these impacts by using rechargeable batteries and efficient lamps. You can also recycle rechargeable and non-rechargeable batteries in some places. Batteries are corrosive and toxic and should never be left in any cave. Although carbide can be a great source of light and heat, it is not permitted in all caves because of the potential for leaving soot marks on the walls. If using a carbide light, be careful not to spill the carbide, and remove all spent charges. When using any kind of cave light, maintain it well. Lights that are functioning efficiently use less energy thus giving more time for caving and less for repairing equipment.



Plan Ahead and Prepare

- **Helmets:** Prevent a head injury and a possible cave rescue by always wearing a well-fitted helmet with a chinstrap.



- **Clothing:** To prevent the introduction of foreign material into the cave, wear clean clothes that are in good condition. Clothes that are threadbare leave shreds of fabric behind, adding unnatural substances to the biological system of the cave. Lint can cause deterioration of cave formations and feed introduced micro organisms, harming the microbial balance within the cave. Synthetic fibres are preferred because, unlike cotton, they don't feed microbes, don't shred as easily and provide insulation when wet.

Brushing clothes before entering the cave avoids introducing any seeds, plant material or insects that might have attached themselves on the journey to the cave. These may disrupt the fragile ecosystem inside the cave. Wear gloves to prevent oils from your skin touching the cave walls and to protect your hands. Long trousers and long sleeves also minimise oils and organic material left from skin. Research shows cavers can introduce bacteria from one cave to another. Washing caving gear between trips in different caves or regions minimises the concern of spreading Invasive Species.

- **Pads:** Kneepads and elbow pads can help increase the comfort of travelling through many cave environments. Soft-faced kneepads are

suitable for wearing under cave clothes. Hard-faced kneepads are also comfortable, although they tend to shred your trousers if worn underneath and if worn on the outside, they can leave plastic scrapings in the cave.

- **Footwear:** Sturdy, lightweight boots or wellies can support your ankles and provide good traction, yet allowing enough flexibility for precise footing. Wearing non-marking boots prevents black scuffmarks on cave floors. If in doubt about your soles, scuff your boots on a light surface like concrete to test them. In some areas it is necessary to change into a clean pair of shoes or aqua socks to prevent tracking muddy boot prints over clean flowstone.

- **Vertical Gear:** Make sure you have the appropriate vertical gear for the trip you're planning. This includes the right rope lengths, rigging material and personal ascending and descending equipment. Each caver should have their own vertical gear, which should be checked for functionality and excessive wear or damage before entering the cave.

- **Other Items:** A small cave bag will be required to keep your gear together, as well as a first aid kit, a large bivi (survival) bag to use as an emergency shelter, water and food. Bring extra plastic bags or containers to remove litter and spent carbide. Consider bringing foods that don't leave crumbs behind. Depending on cave conditions, it may be useful to bring a warm hat or an extra dry layer of clothing. Do not underestimate the detrimental effects of dehydration, hypothermia and fatigue on caver's impact and safety. Bringing the proper gear helps reduce the risk of accidents or injury leading to rescue.

Plan Ahead and Prepare

"We simply need wild country available to us, even if we never do more than drive to its edge and look in... For it can be a means of reassuring ourselves of our sanity as creatures, as part of a geography of hope." (Wallace Stegner)

Move Deliberately

Learn how to move smoothly, deliberately and slowly in caves in order to avoid delicate formations and creatures. Be aware of your entire body, including your head, helmet and cave bag. Remember your head is much bigger with a helmet on! Consciously choose hand and foot placements. Avoid touching walls and features if it is not necessary, this avoids covering the walls in mud. Don't move carelessly in a way that can inadvertently damage the cave. Create a culture in which people help each other by spotting, lending a hand and pointing out where to be careful. Speak up when someone else's back or head may be getting too close to fragile surfaces or formations. This is especially important if caving with beginners who aren't familiar with moving in caves. Check the group regularly and assess fatigue levels. A tired caver doesn't have the awareness and co-ordination of a well-rested and more alert caver. To stay alert on a long trip, be proactive about taking breaks, eating snacks and drinking water before they are needed. Give ample time to exit the cave before you get tired.

Avoid Damaging Cave Features

Many caves contain features that can be easily broken or otherwise altered forever. For example, mud cracks can be preserved for hundreds of years in dry caves and can be obliterated if crawled on by a single caver. Cave formations (Speleothems) are deposited after a cave is formed when minerals dissolve out of rock and are redeposited on cave ceilings, walls or floors. Speleothems include stalagmites, stalactites, flowstone and other beautiful formations that

commonly take thousands of years to grow. Avoid touching or walking on speleothems. Often they are quite fragile and easily broken. This damage is considered permanent because re-growth, if it occurs at all, is very slow. A few cave decorations are so inconspicuous and delicate that they can be broken by the breeze of a passing caver (EXAMPLE). Oils and dirt from our hands can change the appearance of speleothems and can disrupt the way that water moves over them. This can alter or even stop their growth, so wear gloves and avoid getting mud and other dirt on speleothems. Some impact is caused by dust, kicked up and re-deposited on pristine formations. In especially dusty or pristine caves, move slowly and carefully to avoid creating dust clouds.

Photograph Carefully and Conservatively

While 'taking only pictures' is a good idea, getting a good photograph does not justify damage to the cave. Stay on the trail or on other previously impacted areas just as you would if not taking pictures. Keep your flash units on trails or durable surfaces as well. If the people in your photos are demonstrating good caving ethics it will encourage and educate others to do the same. A photo showing damaging practices will lend approval to that behavior and confuse novice cavers. Carry out all film and spent flashbulbs. If left behind, film can be especially toxic to the cave environment. Minimise your photography of bats because repeated flashing can disturb them. Do not photograph roosting or hibernating bats or maternity colonies.

Plan Ahead and Prepare

Minimise Vertical Caving Impacts

Choose a rigging setup and attachment points that will minimally impact the cave. Use rope pads if possible. Not only will this protect your rope from friction damage but also protect the surface from rope marks. Have the first person to abseil, lay out the rope as they go, to avoid damaging formations which can't be seen if you were to throw the rope down. Travel smoothly on rope to avoid impacts due to bouncing and metal gear scratching the cave (scratching is also a concern when you are horizontal caving while wearing your vertical gear). Be aware of impacts at the top and bottom of a rope section where cavers congregate while waiting for others on the rope. Placing bolts in a cave should be considered very carefully. If you think a bolt is needed to ensure the cavers safety, check with the SU1 about regulations for the cave. If it is legal to place bolts, make sure they are well placed and secure so the cave won't be impacted further with replacement bolts. Stainless steel bolts will last longer in the humid cave environment. If bolts are placed, notify the land manager/owner of when they were installed so that they can be replaced accordingly in the future.

Cave Responsibly

A cave rescue almost always damages the cave. Underground accidents present many challenges for rescuers and the time involved to complete a cave rescue can vary from hours to days. Rescues can require large equipment and large numbers of people. A victim's safe recovery becomes more important than protection of the cave. Prevent rescues by caving responsibly. Take responsibility for your own safety by practising self-awareness and good judgment. Keep your cave trip well within the training and experience of your group. Necessary training may include advanced first aid, rescue skills, vertical skills and vertical rescue skills.

On any trip, you should have a contingency plan for responding to accidents or illnesses. Be prepared to deal with accidents and administer first aid until you can get help or get your party out of the cave. Each caver in your party should know to remain in the same place and stay warm if he or she is separated from the group. You can reduce the need for major rescues if your group is self-sufficient and able to perform self-rescues.

Communicate clearly within your group about travel plans. Ensure that nobody is left behind and cave together as a group. Set up a surface watch, also known as leaving a 'Call Out'. Tell someone where you plan to go caving, when you plan to leave the cave and who to contact if you are not back by the determined time. Incidents like getting lost can become much more serious when a group is exposed to cold conditions, are hungry and dehydrated. Both the cave and the cavers will benefit from an early rescue. Many rescuers recount situations where it was possible to retrace a series of seemingly minor errors (e.g. improperly functioning lights, exhaustion or breakdown in communication) that caused a domino effect and led to an accident. It is important to stay alert to the potential hazards, know your personal limits and stay within the limitations of the group. To protect the cave environment from the damage of a rescue, be conservative and prepared. The further from the entrance you are and the more fragile the cave, the greater your responsibility to take extra precautions and to avoid accidents. For more information on the Irish Cave Rescue Organisation and Leadership Training Skills please check www.cavingireland.org.

Be Considerate of Others

*"The stark truth is, if we want wild animals, we have to make sacrifices."
(Colin Tudge, Wildlife Conservation)*

People go caving for many different reasons and in many different styles. It is important to interact with other cavers respectfully on the rare occasions when there is more than one group in the same location.

Keep a Low Profile

Maintain a calm level of conversation in a cave. Large, boisterous groups can negatively affect another caver's experience. Consider splitting large groups into several smaller groups so that each group may travel to different places in the cave at different times. This is especially important when there are tight crawls or rope work involved, as these areas are slow for moving and can create a blockage. Let your presence be known (in a respectful way) if other groups are encountered. Be sure and check local group size recommendations.

Work with Other Cavers

When possible, plan to visit different sections of a cave simultaneously so groups can be managed separately. Make a plan in particularly hazardous zones (e.g. areas of potential rock fall) to avoid being injured or injuring a caver in another group. Yielding to others and simple courtesies help everybody to have an enjoyable experience. When passing another group, do so in an appropriate, low-impact spot that will allow both groups to pass each other with adequate space. If you see another group's rope in a cave with vertical work, ask permission before using it.

Let Nature's Sounds Prevail

Avoid the use of mobile phones, radios, electronic games and other intrusive urban devices. If you must carry something that makes noise, carry earphones in order to keep the noise to yourself. To some, technology is a necessity even in remote places: to others, it is inappropriate. Avoid conflicts by making a conscious effort to allow everyone his or her own choice in experience. Try as much as possible, to reduce the noise, especially at night or reduce the noise in remote places. Wear headphones to listen to music. Keep voices low. Use mobile phones discreetly. Most of all, tune in to the sounds of nature.



Life in caves has evolved in subsurface habitats, and most inhabitants depend on specific environmental conditions and survive on very limited nutrients. Some cave creatures, like the cave salamander, are very sensitive and can be killed by a human touch. As cave populations are often small, individual deaths can affect the whole cave ecosystem. Many cave inhabitants are rare or endangered and it is possible that uninformed cavers could unknowingly kill off an entire species. The chances of harming underground organisms are greatly reduced when we take care to avoid and not handle them.

The cave environment can also contain many valuable biological resources for scientific research. For instance, cave actinomycetes, mould-like bacteria, have been studied as a possible source of antibiotics. Other subterranean micro-organisms have been studied as possible treatments for cancer. Stop and examine pools for creatures or sub-aqueous speleothems before plunging in. Avoid jumping into pools altogether unless they are the designated route through the cave. Isolated pools within unexplored passages may contain populations of invertebrates and microbes that have never been disturbed.

Bats

Some caves or areas within caves are closed seasonally to protect bat nurseries or hibernation colonies. Disturbing maternity roosts generally causes a higher infant mortality rate. Bats that are

disturbed while in hibernation lose much of their stored energy and might not have enough to survive through the hibernating months. During late autumn to spring, avoid disturbing all bats: do not stay in hibernation areas, talk quietly around bats and avoid shining or flashing lights directly on them when passing through. A useful website on bat conservation is www.batconservationireland.org.

Avoid Sensitive Times and Habitats (relates to sea caves)

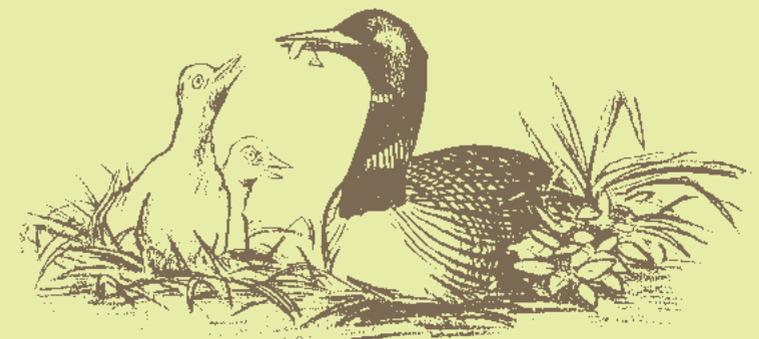
Consider the seasonal stresses that wildlife face. In some situations, avoid their habitats for your safety and the animals'. Birds, during breeding season, may leave their nests permanently or fail to incubate their eggs properly if they are disturbed too often. Marine animals are very vulnerable to human disturbances. Disturbances to breeding seal populations may cause them to abandon their efforts. Mussels, barnacles, urchins and starfish can easily be destroyed by a single footstep. In general, animals are sensitive to humans while pursuing or defending mates and territories, birthing, guarding young or nests and when food is scarce. The more you understand about a species, the more considerate you can be of the animal's needs and temperament, especially at critical times and in critical places.

"We shall not cease from exploration, and the end of all our exploring will be to arrive where we started and know the place for the first time." (T.S. Elliot)

"The notion that [outdoor] recreation has no environmental impacts is no longer tenable." (Curtis H. Flather and H. Ken Cordell)

Never Feed Animals

Feeding wildlife damages their health, alters natural behaviours and exposes them to predators and other dangers. Their reliance on human food is a detriment to their own well-being. Human foods and products are harmful to wildlife because animals and marine life would otherwise forage and eat a nutritious diet derived from their natural environment. Serious illness or death can occur when wildlife or livestock consume foil food wrappers, plastics and other "inedible bits." Wildlife are adept opportunists. When offered the temptations of an untidy camper's kitchen or a well-meaning handout, they can overcome their natural wariness of humans. Aggressive or destructive behaviour may follow, and in conflicts with humans, animals ultimately lose. Prospects of an easy meal also lure wildlife into hazardous areas such as campsites, picnic sites, car parks and roads where they can be chased by dogs or hit by vehicles. They may also congregate in unnatural numbers, increasing stress and the spread of disease within their populations.



(For those on expeditions or caving/camping trips)

Recognise Durable Surfaces

Learn to recognise which surfaces in a cave are more resistant to impact and which surfaces are easily impacted. Careless travel can cause a small footpath to slowly spread out and become a very large impacted area. Some impact is created, no matter how small, when we visit caves. Durable surfaces include bedrock and worn trails. Avoid fragile surfaces such as dried mud cracks and floors with cave formations. Minimise your impact while caving by recognising and avoiding features that are easily impacted and by staying as much as possible in areas that have already been impacted. If unsure, don't touch it. Learn from cavers who understand cave science, who can determine where it is appropriate to travel.

When they exist, use established trails to concentrate impact. Trails can be marked with flagging tape or lined with rocks. It is not always obvious why a particular spot may be flagged off - remain on trails even if you think it is durable off the trail. When trails do not exist, travel the route that minimises impact. Travel in single file and in the same footsteps. Make conscious decisions about where you and your group travel and constantly evaluate when it is appropriate to turn around. You are responsible for the protection of the cave!

Minimise Impacts at and around Cave Entrances
Cavers can create significant impacts in the areas surrounding cave entrances. Appropriate minimum-impact practices above ground differ, depending on the level of use the area receives. Some cave entrances have heavy repeated impact, wildlife and vegetation in entrance zones are adapted to this environment and can be ecologically rare and very sensitive. Some cave entrances receive heavy repeated impact. When you stand, sit, load and unload gear outside these caves, concentrate your movements in durable areas like rock or bare ground to avoid damaging vegetation. Avoid trampling places where impact is just beginning. Urinate well away from the entrance (30 metres) to avoid concentrating odours. To prevent polluting water sources and to distribute impact, walk at least 30 metres from entrance areas and water to defecate. Do not defecate directly uphill from cave entrances. (See Dispose of Waste Properly for appropriate disposal techniques).

When walking to a cave entrance, take time to seek out and walk on established routes. Stay on the path as much as possible and clean any mud and vegetation from your boots and clothes before entering the cave. Do not mark trails with flagging tape and if a path to a cave does not exist, do not inadvertently create one as it may draw unprepared people to the cave. To avoid creating new paths, travel on durable ground,



such as rock, gravel or dry grass. Avoid fragile vegetation and steep hillsides where possible. Spread out instead of travelling in single file. Fewer footfalls in any one place help prevent new trails from forming. In order to minimise impact, concentrate your use in popular areas and spread out your use in remote areas.

Avoid Camping Underground

Camping underground is generally not recommended and is illegal in some caves. A group of cavers spending a night in a cave concentrates tremendous impacts in that one area. Carrying in all the gear needed for an overnight trip also increases the potential impacts to the cave. Camping in caves is used for scientific and exploratory expeditions and is done only in extensive caves by experienced cavers. Check with local land management agencies in the area to determine if camping in caves is allowed and if not, ask about alternative camping in the area.

Selecting a Campsite

Select the most durable camping location possible - or keep travelling until one is found. In pristine areas, pre-existing camping spots, even those that are lightly used, should be left alone to recover. In popular areas it is better to use a site that is already impacted rather than creating new traces. Before unpacking your tent, look for obvious bird nesting activity and other signs of animals. Choose an area that is safe, free of wildlife and well suited to low-impact camping. Look for a large rock slab, a gravelled area or other equally durable space to locate your kitchen and sleeping area. Concentrate your activities on this surface whenever possible to protect more fragile areas. If necessary, reserve less durable ground for your sleeping area. Good campsites are found, not made. When breaking camp naturalise and disguise the site by replacing any rocks or sticks that may have been moved. Recover scuffed-up areas with leaf litter or other natural materials.



*"The earth, like the sun, like the air, belongs to everyone—and to no one."
(Edward Abbey)*

People come to caves to experience them in their natural state. Objects such as animal bones, skeletal remains or ancient artefacts in underground environments can remain intact for centuries if undisturbed. Cave features and living organisms grow slowly or may have stopped growing. Things taken from caves are irreplaceable. It is the responsibility of all cavers to preserve caves in their natural state so that future generations can learn and experience from them.

Leave Natural Features Undisturbed

Natural objects of beauty, including cave organisms, rocks, minerals and speleothems, should be left for others to discover and enjoy. Even broken cave formations should not be removed. Objects removed from a cave are out of context and lose the beauty bestowed by their original cave environment.

Preserve the Past

- Historical Artefacts: Since many caves have a stable environment with constant temperature and humidity and little physical disturbance, records of the past have been well preserved. By law, objects over 50 years old are considered historic and those 100 years archaeological. Let the landowner or land manager decide whether to remove historic or archaeological artefacts, even if they seem like litter to you. Many artefacts are very well preserved in the static climates of caves. In recent history, some early cave explorers left significant evidence of their exploration, which should not be removed. Historic signatures and equipment are now part of our history and the history of cave conservation ethics. If there is any question about the age of an object, leave it in place but note the location on your map and inform the landowner about it.

- Archaeological Material: Artefacts, human bones and burials, animal bones and all habitation debris related to people in the past are preserved in caves. Caves have been used for burial, ritual practices, habitation, storage and concealing people and objects. Caves form a fundamental resource in Irish archaeology. At present, approximately 200 caves are known to have been of cultural value. Under the 1930 National Monuments Act, and subsequent amendments, it is illegal to dig in a cave that is a known archaeological site (such caves have a specific Record of Monuments and Places number). It is also illegal to dig in any cave where the intention is to search for archaeological material. It is illegal to use a metal detector in a cave of archaeological significance, or in any cave where the intention is to search for archaeological objects. If archaeological material (artefacts, human bones or skeletons, habitation evidence etc.) is discovered in a cave, please report the discovery without delay to the Duty Officer in the National Museum (00353 (0) 1 6777444, dutyofficer@museum.ie) and the relevant county archaeologist from the Department of the Environment, Heritage and Local Government (00353 (0) 1 8883109, nationalmonuments@environ.ie). Archaeological material should not be disturbed or removed from a cave as this may result in the loss of important contextual information. Some caves are closed to protect archaeological resources. Please respect these closures.

- Geological / Palaeontological Material: The geological development and history of a cave is recorded in both its physical shape and sediments. To a trained eye, notches in the walls,

*"There is wildness everywhere, if only we stop in our tracks and look around us".
(Roger Deakin, Waterlog)*

the passage profile (shape and size), scalloping patterns, meanders and many other features illustrate the solutional development of the cave. The cobbles on the floor, the false floors eroded away, the speleothems of all sorts (calcite deposits such as stalactites, stalagmites, curtains, gour pools), mudbanks, boulder collapses and many other cave sediments tell detailed stories about the caves history. When integrated, especially in larger ancient caves, their geological features may reveal the landscape history of the land surface where no other evidence remains. When digging in caves or exploring new finds, care should be taken not to obliterate such geological features, and to minimise the impact of exploration through taping off areas, defining pathways through vulnerable sediments and informing specialists without delay in new finds to record to analyse the data available in the geomorphology of the cave. The least disturbance of a cave will yield the maximum scientific information.

- Bones: Caves can be natural traps for palaeontological material, especially for vertebrate remains, and may include sheep bones from last year along with Ice Age animal bones hundreds of thousands of years old. This is due to varied processes which emplace and preserve the bones in the cave. The Natural History Museum in Dublin (00353 (0) 1 6777444, naturalhistory@museum.ie) or the Ulster Museum in Belfast (xxxxxxx) should be contacted if a bones are discovered in a cave.

- Fossils: Normally any fossils in a cave will be those visible in the rock walls of the cave. However, if single loose fossils are located in clusters, they may be of archaeological significance, as a number of sites are known for containing fossils which were collected and left by humans as part of burials. These should be left untouched and treated as any other archaeological material.



Dispose of Waste Properly

Litter has no place in caves and can permanently alter underground environments. Discarded food crumbs, fibres from clothing or even flakes of skin can affect the underground nutrient balance and fragile, but important microbial populations. While it is impossible to pack out every micro-thread or flake of skin, commit to packing out all that you bring in. Litter left by others should always be removed when possible.

Pack It In, Pack It Out

Pack out all rubbish and dispose of it properly after returning to the surface. Materials such as food particles, wrappers and other litter are unsightly and can disrupt the natural balance of the cave. Avoid dropping food crumbs when eating. Eat in a place where you can easily pick up crumbs or put down a cloth on the ground to make cleaning up easier. Eat your sandwich straight out of (or over) the bag you packed it in. Better yet, carry foods like energy bars that tend not to produce crumbs. If you find it necessary to use flagging tape, reflective markers or rock cairns to aid in route finding, remove them as you exit the cave. "Biodegradable" flagging tape can be eaten by cave organisms and is also toxic. Pick up old flagging tape if it is obviously litter. If you are not sure, leave it in place and tell the cave manager. Be careful, sometimes flagging tape or other markers are used to mark permanent trails, delicate areas or survey stations. If you find other litter that someone else has left behind, pack it out as well.

Good Sanitation Practice

Human Waste: Pack out all human waste from caves. Packing out human waste is important to avoid the contamination of underground water sources and to preserve biological communities and provide an aesthetic experience for other cavers.

- **Urine:** Urine can disrupt aquatic ecosystems and microbial populations. In dry caves the odour from urine can be unpleasant. The easiest method for dealing with urine underground, both in wet and dry caves, is to carry an extra water bottle or similar storage container and carry urine out.

- **Faeces:** Several types of pre-packaged solid waste removal bags exist (one is called the 'WAG Bag', another is the 'Restop' which can work well for waste removal). Treat vomit the same as faeces. However dry passages will end up becoming unpleasant to travel in if vomit is allowed to remain. For information on WAG Bags and Restop please visit www.leavenotraceireland.org.

Consider the impact of human waste BEFORE entering any cave. When possible, dispose of human waste in advance of your caving excursion either at a facility such as an outhouse or at least 30 metres (70 adult paces) from cave entrances. The 4 objectives of proper human waste disposal are to:

- Avoid polluting water sources
- Eliminate contact with insects and animals
- Maximise decomposition
- Minimise the chances of social impacts



Dispose of Waste Properly

Improper disposal of human waste can lead to water pollution, the spread of illnesses such as Giardia and Hepatitis and can cause unpleasant experiences for those who follow. Wherever soils are thin or sparse, rainstorms can flush these wastes and other pollutants directly into water sources.

- **Facilities/ Outhouses:** Whenever possible, take time to locate and use bathrooms, outhouses and other developed sites for human waste disposal.

- **Cat Holes:** If no facilities are available, deposit solid human waste in "cat holes" dug 6-8 inches deep and at least 30 metres from tracks, water-bodies, camps and watercourses. To promote decomposition, choose a site in organic soil, rather than deep sandy mineral soil. Bring a trowel to dig the hole and gently remove a plug of sod containing roots and soil and carefully put it aside. After use and before replacing the plug of sod, mix some soil into the faeces to promote decomposition. Replace the plug and disguise the hole by lightly tramping down around the edges. Then "naturalise" the site by scattering leaf litter and disguise it well after use. The microbes found in soil will break down faeces and the pathogens they contain.

Human waste should not be deposited under rocks because it will decompose slowly and may wash into water sources after heavy rain. Good cat hole sites isolate waste from water sources such as lakes and streams. Whenever possible, use a remote location during the day's travel to help prevent high concentrations of cat holes near campsites or high use picnic areas/car parks.

"Natural" substances like smooth stones, grass, leaves and snow can be a surprisingly effective substitute for toilet paper and can be buried easily in the cat hole. If this solution is not possible then pack out used toilet paper in a plastic bag. This practice leaves the least impact on the area. Burning toilet paper at the site is rarely successful and not recommended. Always pack out feminine hygiene products because they decompose slowly and attract animals.



*"In gaining the lovely and the usable, we have given up the incomparable."
(Wallace Stegner)*

(Above ground on camping/caving trips or expeditions)

Building fires is unacceptable in caves and cave entrances and may be illegal in some caves. Fires blacken cave walls and ceilings, increase carbon dioxide levels and leave ashes and pieces of burned wood. As air moves through caves, smoke and fumes can be carried to other sections of the cave and affect cave life. The heat from fires can also alter the constant climate in a cave and kill biological organisms. Smoking in caves is a smaller version of building fires. Smokers leave behind ashes and toxic fumes, harming the fragile cave environment. Fire torches and candles are also harmful and should not be used to provide light in caves.

Minimise impact of campfires above ground. Along with the destructive nature of fire, the natural appearance of many recreation areas has been compromised by the careless use of campfires and the demand for firewood. Campfires are beautiful by night but the enormous rings of soot-scarred rocks – overflowing with ashes, partly burned logs, food and rubbish, are unsightly by day.

Many lasting impacts associated with campfires can be avoided by using lightweight stoves, fire pans, mound fires and other Leave No Trace techniques.

Check Local Regulations and Conditions
It may be prohibited to build a campfire in some areas. National Parks, protected areas and forestry plantations may have complete fire bans. Check with local land managers whether building a campfire is permitted.

Use a Stove

The safest way to prepare for all situations is to use a stove and carry a pot, matches and sufficient fuel to cook all meals. Build fires only when all conditions are right — the danger of fire is low, downed and dead wood is plentiful, there is sufficient time to prepare the fire site, burn all the wood to cold ash and clean up.

Fires are inappropriate in fragile environments and/or where plant growth is extremely slow. Sadly, wood that has taken years to grow has often been burnt for a few short minutes, just for the sake of entertainment.

Build a Minimum Impact Fire

Consider whether a fire makes good sense at your picnic or campsite.

If a campfire is important to you:

- First question yourself as to whether the wood to be used comes from a sustainable yield.
- Ask about pertinent regulations and campfire management techniques.
- Judge the wind, weather, location and wood availability. Decide whether it's safe and responsible to build a campfire.
- In places where there are no fire rings or grates, bring a fire pan or set aside time to build a mound fire.
- Have a trowel or small shovel and a container for saturating the ashes with water.

- **Use an Established Fire Ring:** If camping near an existing rock ring, use it instead of building a new one. The most inviting fire rings are of a reasonable size and free of excess ashes, half-burned wood and trash. Leave a fire ring that encourages others who want a fire to use it.

- **Mound or Pan Fires:** Fire pans are metal oil pans or aluminium roasting pans that make good containers for low-impact fires. Use a pan on a durable surface devoid of vegetation. Line it with a few inches of inorganic soil and elevate it with stones to prevent damage to vegetation and soils below. Drill two or three holes through the side of the pan to attach it to a pack with cord for transporting.

Mound fires are built on pedestals of sand, gravel or on soil with a low organic content. Try to disturb as little vegetation as possible when collecting this material. Haul it to a durable fire site using a stuff sack (it will require several loads). Construct a pedestal 25 cm thick and 75 cm in diameter on top of a heat resistant tarp or ground cloth. This helps facilitate cleanup. The cloth can be rolled up under the edge of the mound to prevent embers from singeing it. A thick enough mound insulates the ground and the tarp or ground cloth from the heat of the fire. Be sure to return the soil to its source when the fire is completely out.

Use Dead and Downed Wood

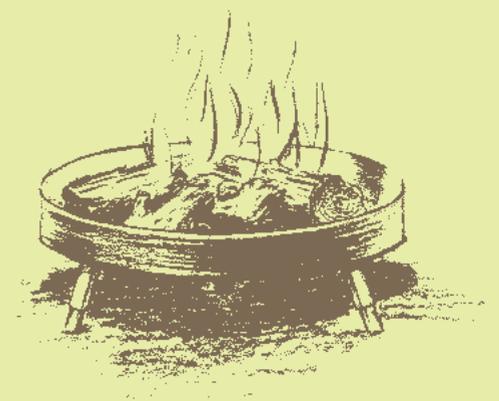
Smaller fires will have less impact. Don't snap branches off trees, either living or dead, because this scars them. Use only sticks from the ground that can be broken by hand. Larger pieces of downed wood play an important and unique role in nutrient recycling, water cycling and soil productivity. They provide shelter for wildlife and while decaying, germination sites for many plant species.

Smaller firewood and wood that breaks easily burn completely to ash, which makes the clean up easier. Half burned logs present a disposal problem—and often a disagreeable sight for the next visitor. The use of hatchets, axes or saws isn't necessary or desirable. In remote areas, gather firewood on the way to your camp so that there is less impact on a particular site and the area around your site retains a natural appearance.

Manage Your Campfire

No matter which campfire technique you employ:

- Never leave a fire unattended
- Don't try to burn foil-lined packets, leftover food or other rubbish that would have to be removed later
- Burn the wood completely to ash: Stop feeding the fire and leave 1 hour or more to add all the unburned stick ends
- Saturate the ash with water and stir the remains to make sure all the ash is exposed to water. Make sure it's cool to the touch and remove any rubbish
- Scatter all the ashes widely with a small shovel or pot lid
- Restore the appearance of the fire site



A Few Terms Defined

Established site:	A site heavily used by signs of an unvegetated ground or a 'barren core'.
Invasive species:	Plant or animal that is not native to this country and that can aggressively out-compete native species.
Pristine:	A place where signs of human impacts are absent or difficult to detect.
Flowstone:	Calcite deposited by flow of water in thin sheet.
Soda straws:	Long and thin stalactites, which look like straws forming from the ceilings.
Lint:	Fluff from cotton or other fabrics.
Habituated:	Animals that are comfortable in the presence of humans and have become accustomed to frequenting developed areas, campsites, trails or roadsides.
Speleothems:	Deposits of calcite and other minerals that may form in a cave environment.

Remember, caves are highly subject to the cumulative impacts from visitors. Let us each do our best to respect cave environments and cave life by caving responsibly and 'Leaving No Trace'. Caves are also threatened by water pollution, mining, overgrazing and other surface activities. For more information on caves, caving and how to be involved in cave conservation please contact:

The Speleological Union of Ireland (SUI)

Address :

Web Site: www.cavingireland.org

Email: info@caving.ie

Irish Cave Rescue Organisation

Secretary of ICRO

1 Sli MacNean,

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Email: icrosecretary@caving.ie



References

www.cavingireland.org
Leave No Trace American Skills and Ethics Booklet

Get Involved...

There are a number of ways to become involved with Leave No Trace:

Adopt the Principles - Start to incorporate some of the techniques mentioned in this booklet when caving.

Training- Participate in Leave No Trace Training. Leave No Trace is based on a tiered education programme, with three types of training. For more information on Leave No Trace training please visit the training section on www.leavenotraceireland.org.

Support- Support the organisation by becoming a member or partner of Leave No Trace Ireland. For more information please visit the support section on www.leavenotraceireland.org.

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"...the person who goes with reverent feet through the hills and valleys, accompanied by neither noise nor dust to scare away wild creatures, stopping often, watching closely, listening carefully. Only thus can they, at length, feel at one with what is, after all, their natural environment".

ROBERT LLOYD PRAEGER, 1937



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This booklet was developed from the seven Leave No Trace principles.

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