

Chapter 4: Environmental and sustainable development conditions specific to the various Olympic disciplines



4.7 Winter sports

4.7.1 General

Winter sports are those which require water in solid form, be it ice or snow, to be practised. Some, such as Alpine skiing, bobsleigh, skeleton and luge, also require a slope.

A distinction must be made between:

- snow sports (skiing and biathlon), which can be practised in the naturally cold conditions of countries at higher latitudes and mountain regions;
- ice sports (skating, hockey and curling), which can be practised on natural ice surfaces but which, for competition, require indoor or outdoor artificial rinks;
- ice track sports (bobsleigh, skeleton and luge), which are practised using equipment to slide on the ice and require specially built tracks.

4.7.1.1 Snow sports and cold ecosystems

Both competition and recreational snow sports are practised in the natural environment. In northern regions with very cold winters, they can be practised at low altitude, while in other regions they can be practised only at higher altitudes.

Northern ecosystems

The major ecosystems of the northern regions are the tundra, boreal coniferous and subboreal forests; these do not exist in the southern hemisphere.

- The tundra (Alaska, northern Canada, coast of Greenland and Iceland, northern Scandinavia and Russia) is characterised by very long winters and low precipitation. The ground is frozen all or part of the year. There is little diversity of flora with few trees, and there are few indigenous species among the fauna. It is a hostile ecosystem, but one which withstands quite well the presence of human activities, including snow sports, at all seasons.
- The boreal (taiga) and subboreal forests (Canada, Scandinavia and Siberia) are among the largest forest areas in the world. The boreal forests are chiefly coniferous, with a mixture of conifers and broad-leaved species in the subboreal forests. The latter are in decline, however, owing to atmospheric pollution and land clearing for agricultural and building purposes. During their short vegetation period (4 or 5 months), these ecosystems are environmentally rich in terms of fauna (from insects to mammals). They withstand the presence of human activities during the cold period, which is therefore suitable for snow sports.

We can see that the northern ecosystems are very suitable for snow sports during the cold season, provided that the facilities installed and the behaviour of the users respect the environmental integration criteria and the usual environment protection rules (treatment or recycling of waste water and rubbish, and lack of pollutants).

The mountain ecosystem

The mountain ecosystem is a complex one whose structure depends on its exposure to the sun, and which has a vertical succession of zones which, as one goes higher, have the characteristics of the major ecosystems around the world. The number of zones depends on the latitude of the mountain ecosystem.

For example, a mountain close to the equator will have:

- from sea level to 1,500m, the characteristics of the regions in the intertropical zone (equatorial and tropical forests);
- from 1,500 to 2,500m, the characteristics of steppes and deserts;

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- *from 2,500 to 3,000m*, the characteristics of the temperate regions of the world;
- *from 3,000 to 4,000m*, the characteristics of boreal and subboreal forests;
- *above 4,000m*, the characteristics of the tundra.

A mountain in a temperate region will have:

- *from sea level to 1,000m*, the characteristics of the temperate region where it is situated;
- *from 1,000 to 2,500m*, the characteristics of boreal and subboreal forests;
- *above 2,500m*, the characteristics of the tundra.

The boreal and subboreal forest zone of the mountain ecosystem is of particular importance, as it constitutes an ecological niche which is rich in flora and valuable for the fauna, but it also has a key function in protecting against avalanches and landslides.

This particularity of the mountain environment is what makes it so rich and attractive in terms of tourism, but is also the reason for its fragility. This environment is extremely sensitive to global warming, as changes of just a few degrees are sufficient to shift the level of the different zones. It is also very sensitive to human interference, as each of these ecosystems is relatively small, so their powers of self-regeneration are limited.



Figure 64: The mountain is a fragile ecosystem which is sensitive to climate change.

Mountain regions, which often suffer from difficult social and economic conditions, are therefore environmentally fragile, and human intervention must be carefully delimited and integrated. In particular, winter sports facilities should have the lowest possible impact on the physical and environmental characteristics of this environment (slope, length and insulating power of the snow cover, evacuation of water, protective function of the forest and lifecycle of the fauna). Some sports require heavy equipment for limited use. Priority should therefore be given to using existing or temporary facilities.



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Today, sports activities in mountain ecosystems need to be planned taking into account the change they are likely to face due to global warming. For this reason, the use of artificial snowmaking equipment is not a sustainable solution, but should rather be used chiefly to permit a gentle transition to an alternative use for mountain resorts which are likely to be affected by climate change.

4.7.2 Snow sports: skiing

4.7.2.1 General

Olympic skiing is composed of six disciplines:

- cross-country skiing, alpine skiing, freestyle skiing and snowboarding, which are practised both in the natural environment and in stadiums;
- ski jumping, which is practised in artificial stadiums;
- nordic combined, which includes ski jumping and cross-country skiing events.

Cross-country skiing and the disciplines in stadiums are practised in snow-covered regions, at suitable altitudes and on terrain of suitable profile. For its part, alpine skiing requires steep slopes, and is therefore practised at an altitude where the ecosystem conditions are extreme, making it more sensitive to disruption of the physical conditions of the environment. Ski jumping is generally practised using an artificial structure which needs to be integrated into its surroundings in the best possible manner. Cross-country skiing, nordic combined and ski jumping have been Olympic disciplines since the first Winter Games in 1924 in Chamonix. Alpine skiing joined the Olympic programme at the 1936 Winter Games in Garmisch-Partenkirchen. Freestyle skiing became an Olympic discipline at the 1992 Games in Albertville, and was joined by snowboarding in 1998 at the Games in Nagano.



Figure 65: Skiing is practised in parts of ecosystems similar to the tundra and boreal forest.

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Some facts

- There are more than 12,000 skilifts and cable cars in the European Alpine area.
- In mountain areas, avalanches are a deadly natural risk. They are the result of weather, snow type, temperature and landscape, but they are also caused by people skiing in avalanche zones and disregarding official warnings.
- One of the main environmental problems caused by winter tourism is the road traffic. Around 80% of skiers continue to travel by car.
- In certain conditions, snow-generating machines can supplement insufficient snow cover. For competitions they provide the same snow conditions for all competitors. However, the machines need large quantities of water and energy (around 2,000m³ of water and 15,000 - 20,000 kWh per hectare of ski run per season).

4.7.2.2 An environment-friendly approach to skiing

The snow in the mountains determines the cycle of vegetation and animal life, and also has a thermal and mechanical protection role enabling the various elements of the ecosystem to survive in spite of the adverse climate conditions. Any change in the type of snow can therefore have an effect on both these functions.

- New ski runs in forests increase the amount of direct sun to the forest edges, which can cause localised damage to the bark;
- Off-piste skiing in woods can hinder their regeneration, because the ski edges cut the small trees buried in the snow;
- Off-piste skiing in woods can be a cause of major stress for the fauna which, hindered by the snow cover, cannot run away from skiers;
- When there is little snow cover and in extreme situations (ridges or steep slopes), the edges of skis, and particularly snowboards, cause mechanical damage to the subsoil;
- Snow-generating machines change the structure of the snow: packing it can lead to the formation of ice, a deterioration of its thermal insulation, freezing of the ground and a lack of oxygen, which encourages the growth of mould;
- For the wild mountain fauna, the end of the winter season is the time of reproduction and feeding to compensate for the winter period. Off-piste skiing can seriously hinder these activities which are essential for the survival of the animals.

Rules of conduct for preserving the environment for skiing

- Gather information about different ski areas, and give preference to resorts which take care of the environment;
- Wherever possible, use public transport to travel to the mountains. In the resort, move around on foot or take a bus to the skilifts;
- When using a private car, try to travel in groups avoiding empty seats;
- Avoid using helicopters, snow scooters or any means of transport other than the public skilifts, skins or walking to get to the top of the runs;
- Be aware of snow conditions and adapt your skiing programme to them. Ask advice from the people in charge of the resort or the local inhabitants;
- Find out where the high-risk and environmentally important zones are and respect these strictly;
- Ski only on marked runs and in authorised off piste areas;
- Consider, when possible, the use of products that conform to environmental and sustainable development criteria;
- Maintain the heating where you are staying at a reasonable level and avoid wasting water;



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- Be respectful towards the local population, their way of living and customs. Take advantage of their knowledge to learn about the local environment;
- Do not leave behind any rubbish on ski runs;
- Collect and sort your rubbish for collection and recycling by the local services.

4.7.2.3 *The impact of skiing events and the facilities needed for these*

Depending on the type of event, attention needs to be paid to the various types of possible impact. For cross-country skiing, the presence of the public on a large area of the natural landscape will be a central element to consider. For Alpine skiing, it will be the route and maintenance of the runs and skilifts, while, for ski jumping, the focus will be on the construction aspects of the jumping hill and landing area.

Environmental protection for skiing events

Organisers' responsibility

- Plan events taking into account both environmental and sustainability issues in coordination with the sporting, cultural, economic and social interests;
- Put in place an environmental management system;
- Respect the legal rules on protecting the environment;
- Develop and build using ecological technology;
- In case of irreversible environmental impacts, plan compensation measures;
- Do not site any facilities in areas of particular environmental importance, and especially not in national parks;
- Inform and seek the acceptance of the local population;
- Seek cooperation with governmental authorities and NGOs to benefit from their expert knowledge;
- Restrict individual traffic in favour of public transport;
- Save energy. Use the appropriate technology and renewable energy sources;
- Make sparing use salt and dies for hardening and marking the snow;
- Keep the demand for water within the limit of the natural supply in the region and prevent any strain on the habitual use by the population;
- Avoid overloading the existing waste treatment systems;
- Minimise the amount of solid waste caused by the event. Oblige all parties present to collect and separate waste;
- Channel spectators along the cross-country or Alpine skiing run with clearly indicated routes which avoid dangerous or environmentally sensitive areas;
- Inform the public of the rules of conduct concerning safety, respect for the environment and waste management;
- Provide rubbish collection points all along the ski run;
- Raise media awareness of the need to: avoid damaging the ecosystem for their reporting needs, avoid creating pollution and leave nothing behind after the event.

Competitors' responsibility

- Set an example in terms of fair play and respect for the environment.

Advertisers' responsibility

- For the promotional objects distributed to the public, minimise packaging, avoid plastic packaging, and clearly indicate on the object or its packaging what to do to avoid causing pollution with the object and its packaging.

Spectators' responsibility

- Wherever possible, use public transport to get to and from the competition venue;

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- Do not take anything from the natural environment;
- When moving around the venue, keep to the paths provided by the organisers;
- Do not leave behind any packaging, rubbish or leftover food.

4.7.2.4 Special waste, toxic products and pollutants linked to skiing

In addition to snow-generating machines, the mineral salts (often agricultural fertilisers) used to harden the snow are another controversial issue. Mineral salts lower the melting point of the snow, which then freezes more easily and hardens the ski run for a short time. This technique must be used only to prepare competition runs. If used excessively, mineral salts increase the salinity of the ground and the subsurface water, leading to changes in the type of vegetation.

Skis are now made of a synthetic resin and carbon core, metal edges and metal and synthetic resin bindings. Skis which are no longer used should be treated according to the best practices: the metal parts must be recycled and the core must be destroyed, or reused, by a specialist company.

4.7.2.5 Other aspects of skiing linked to sustainable development



Figure 66: Skiing is a sport which enables people with disabilities to enjoy the special relationship between man and nature.

Skiing is a sport which involves a close relationship between people and the environment. It requires an intimate relationship with the natural elements of this environment, such as snow and forest. In this sense, it is an excellent way of learning about nature and learning to respect it.

Skiing, like other altitude sports (hiking and climbing), also represents an opportunity for naturally resource-poor regions. This should therefore be exploited, whilst respecting the environmental conditions which ensure the sustainability of the ecosystem, but also the living conditions needed for the people who live in the mountains.



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4.7.3 Snow sports: biathlon

4.7.3.1 General

Biathlon is a sport for men and women, practised individually or in teams (relay), which combines cross-country skiing with rifle shooting. There are 10 biathlon events in the Olympic Games. It is a sport which requires endurance, precision and self-control. Men's biathlon made its first Olympic appearance at the 1960 Games in Squaw Valley. Women's biathlon made its Olympic debut as a fully-fledged medal sport in Albertville, in 1992.

Some facts

- Biathlon is the combination of two activities indispensable to the survival of the people of northern Europe, who had to combine skiing and hunting in order to eat, and skiing and war to defend themselves.
- For each target left standing during the shooting competition, competitors must ski a 150-metre penalty lap for the sprint, pursuit, mass start and relay competitions.

4.7.3.2 An environment-friendly approach to biathlon

In view of the two disciplines involved, an environment-friendly approach to biathlon requires paying particular attention to avoiding accumulating the possible impacts of both skiing and shooting.

Rules of conduct for preserving the environment for practising biathlon

Environment-friendly biathlon requires respect for the rules of conduct specific to cross-country skiing and shooting sports.

4.7.3.3 Impact of biathlon competitions and the facilities needed

The environmental impact of biathlon competitions and the necessary facilities combines those of both the disciplines which make up biathlon, in addition to the problems which may be caused by having shooting ranges in the natural environment.

Responsibility of those involved in biathlon competitions

In addition to all the responsibilities of those involved (organisers, athletes and general public) during skiing and shooting events, the organisers have a particular responsibility to ensure that the shooting ranges are:

- located in areas where they cause no stress to the fauna;
- equipped with means to recover bullets.

The organisers must also ensure that temporary shooting ranges are returned to their original state after the shooting events.

4.7.3.4 Special waste, toxic products and pollutants linked to biathlon

Please refer to the chapters which correspond to the two disciplines of biathlon. Special attention should however be paid to recovering lead bullets, as lead is a toxic metal which accumulates fairly easily in living organisms and causes irreversible damage. Lead bullets left in the snow will lead to an accumulation of the metal in the soil and plants. In the spring, animals needing food after hibernation and being in their reproductive period eat large amounts. If the food is contaminated, this will lead to a concentration of lead which is quickly toxic for them and their offspring.

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Figure 67: An efficient system for recovering bullets from the biathlon shooting area is essential to avoid contaminating animals with lead.

4.7.3.5 Other aspects of biathlon linked to sustainable development

Biathlon combines the sustainable development aspects of the two disciplines of which it is composed.

4.7.4 Ice sports: skating

4.7.4.1 General

Ice sports almost always require ice-making technical equipment which uses large amounts of energy and may contain pollutant gases. For skating, controlling these two problems is the key element of an environmental approach which fosters sustainable development.

Olympic skating comprises three disciplines: figure skating and speed skating, present since the first Winter Games in 1924 in Chamonix, and short-track speed skating, which first joined the Olympic programme for the 1992 Winter Games in Albertville.

Some facts

- For prehistoric humans during the glacial periods, skating was a means of rapid locomotion which was particularly useful for hunting. The oldest type of skate known (a piece of bone attached to a sandal) dates from 20,000 BC.
- In Europe, during the 12th century, the Dutch used skates to facilitate communications by skating from one village to another on frozen canals.
- Numerous well-known figures enjoyed skating, including various kings of England, Marie-Antoinette, Napoleon I, the German poet Goethe and Napoleon III.



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4.7.4.2 An environment-friendly approach to skating

Skating can be practised with no damage or pollution provided that a number of simple rules are respected.

Rules of conduct for preserving the environment for skating

- Wherever possible, use public transport or a bicycle or travel on foot to and from the skating rink;
- Consider, when possible, the use of products that conform to environmental and sustainable development criteria;
- Never leave behind at or around the rink empty bottles, packaging or leftover food. Place these in the bins provided, or hold on to them and put them in the waste bin in the changing rooms or at home;
- Take old skates to a firm dealing in solid waste which will be able to recycle the metal.

4.7.4.3 The impact of skating competitions and the necessary facilities

The environmental impact of skating competitions may be considerable if artificial rinks are used, requiring ice-making equipment which consumes large amounts of energy and uses refrigerating gases which cause pollution.



Figure 68: The beauty of figure skating must go hand-in-hand with rinks that respect the environment.

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Responsibility of those involved in skating competitions

For the organisers

- For artificial rinks, use modern, energy-efficient refrigeration equipment without synthetic refrigerating gases (CFCs, HFCs or PFCs);
- Pay particular attention to the systems which produce and distribute the cold;
- For outdoor artificial rinks, locate the skating area to the north of tall structures (neighbouring buildings, stands, billboards, outside wall, etc.) to reduce heating of the ice by the sun as much as possible;
- For outdoor competitions, preference should be given to day-time competitions if renewable energy is not available for lighting;
- For indoor events, heat the arena as little as possible or not at all;
- Consider all possibilities for providing the energy needed to produce ice by using renewable energy sources (solar, wind, geothermal, small dams, etc.);
- Provide and encourage the use of a public transport system for getting to and from the event;
- In and around the rink, provide the public with an adequate number of well-maintained toilets and rubbish disposal facilities, to enable waste water to be treated and solid waste to be recycled or destroyed with no risk;
- Inform users of the rules of conduct to be followed: clean toilets, water saving and waste collection.

For the competitors and their entourage

- Set an example in terms of fair play and respect for the environment. In and around the rink, do not drop rubbish such as bottles, packaging or accessories.

For the public

- Wherever possible, use public transport or a bicycle or travel on foot to and from competitions;
- Respect the rules of conduct with regard to the use of toilet facilities and waste disposal, particularly for packaging and empty bottles.

4.7.4.4 *Special waste, toxic products and pollutants linked to skating*

Special waste linked to skating essentially concerns certain synthetic refrigerant gases used in ice-making equipment:

- chlorofluorocarbons (CFCs), which are synthetic gases responsible for destroying the ozone layer in the stratosphere which protects the surface of the earth from ultra-violet rays;
- hydrochlorofluorocarbons (HCFCs), which are synthetic gases stable in the air and, while damaging, do less harm to the ozone layer than CFCs;
- hydrofluorocarbons (HFCs), which are synthetic gases but do not harm the ozone layer, although they contribute to the greenhouse effect;
- ammoniac, an aggressive natural gas which irritates and suffocates, inhaling which may cause irreversible respiratory damage;
- hydrocarbons like propane and isobutane, which are natural gases and pollute less, but are highly inflammable and explosive, and can lead to the formation of smog.

Some high-performance refrigerating systems also use water, carbon dioxide (CO₂) or helium, which cause no problems because of the small concentrations involved in the event of leaks.

In old equipment which uses CFCs or ammoniac, these gases must not be allowed to escape into the air. A leak detection system with an alarm must be installed, and regular checking and maintenance performed. You should consider replacing this as soon as possible with modern equipment which uses HFCs or with a primary circuit using ammoniac in a confined area, cooling a secondary circuit using glycol under the ice. A specialist firm should be employed to destroy the polluting gases of the old equipment.



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4.7.4.5 Other aspects of skating linked to sustainable development

Skating is a sport which is also a natural method of transport in cold environments. Practised in these conditions, it is a particularly recreational way of learning about the environment of these regions.

4.7.5 Ice sports: ice hockey

4.7.5.1 General

Ice sports almost always require ice-making technical equipment which uses large amounts of energy and may contain pollutant gases. For ice hockey, controlling these two problems is the key element of an environmental approach which fosters sustainable development. Ice hockey has been an Olympic sport on the programme since 1920 for men, and since the 1998 Games in Nagano for women.

Some facts

- Ice hockey is the only current Olympic winter sport to have been included in the Olympic Games before the first edition of the Olympic Winter Games in 1924 in Chamonix. It was on the programme of the 1920 Games in Antwerp.
- The rules for ice hockey were drawn up in 1879 by a group of students from McGill University in Montreal.

4.7.5.2 An environment-friendly approach to hockey

Ice hockey players may practise their sport without causing damage or pollution provided they respect a number of simple rules.



Figure 69: Ice hockey players with or without disabilities can practise their sport without damaging or polluting the environment, provided they respect a number of simple rules.

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Rules of conduct for preserving the environment for playing ice hockey

- Wherever possible, use public transport or a bicycle or travel on foot to and from the hockey rink;
- Consider, when possible, the use of products that conform to environmental and sustainable development criteria;
- Never leave behind at or around the rink empty bottles, packaging or leftover food. Place these in the bins provided, or hold on to them and put them in the waste bin in the changing rooms or at home;
- Never leave at or around the rink worn-out or damaged equipment (pucks, sticks, helmets, skates, protective gear, etc.). Take these to a company which deals with, recovers or recycles solid waste;
- When building a new hockey rink, first consider the possibility of making use of derelict areas such as brownfield sites, industrial wasteland, disused fields, etc.;
- Get the club or team involved in social environmental protection activities, such as environment day, cleaning up the neighbourhood or town, planting trees, etc. Failing that, take the initiative of promoting such action.

4.7.5.3 Impact of ice hockey competitions and the necessary facilities

The environmental impact of ice hockey competitions may be considerable if artificial rinks are used, requiring ice-making equipment which consumes large amounts of energy and uses refrigerating gases which cause pollution.

Responsibility of those involved in ice hockey competitions

For the organisers

- For artificial rinks, use modern, energy-efficient refrigeration equipment without synthetic refrigerating gases (CFCs, HFCs or PFCs);
- Pay particular attention to the systems which produce and distribute the cold;
- For outdoor artificial rinks, locate the skating area to the north of tall structures (neighbouring buildings, stands, billboards, outside wall, etc.) to reduce heating of the ice by the sun as much as possible;
- For competitions outside, preference should be given to day-time competitions if renewable energy is not available for lighting;
- For indoor events, heat the arena as little as possible or not at all;
- Consider all possibilities for providing the energy needed to produce ice by using renewable energy sources (solar, wind, geothermal, small dams, etc.);
- Provide and encourage the use of a public transport system for getting to and from the event;
- In and around the rink, provide the public with an adequate number of well-maintained toilets and rubbish disposal facilities, to enable waste water to be treated and solid waste to be recycled or destroyed with no risk;
- Inform users of the rules of conduct to be followed: clean toilets, water saving and waste collection.

For the competitors and their entourage

- Set an example in terms of fair play and respect for the environment. In and around the rink, do not drop rubbish such as bottles, packaging or accessories);
- For top level players, coaches and club leaders, avoid aggressive, insulting or racist comments during the match or in media interviews.

For the public

- Whenever possible, use public transport or a bicycle or travel on foot to and from competitions;
- Respect the rules of conduct with regard to the use of toilet facilities and waste disposal, particularly for packaging and empty bottles.



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4.7.5.4 Special waste, toxic products and pollutants linked to ice hockey

The special waste linked to ice hockey essentially concerns certain synthetic refrigerant gases like CFCs or ammoniac used in ice-making equipment. In such equipment, these gases must never be allowed to escape into the air. A leak detection system with an alarm must be installed, and regular checking and maintenance performed. You should consider replacing this as soon as possible with modern equipment which uses HFCs, or with a primary circuit using ammoniac in a confined area, cooling a secondary circuit using glycol under the ice. A specialist firm should be employed to destroy the polluting gases of the old equipment.

The accessories made from synthetic materials such as helmets, elbow pads, leg protectors, pucks and sticks must be destroyed, or recycled, by a specialist firm. In no case should they be dumped in the natural environment, as they are made of material which does not degrade well, or burnt, as they may release toxic vapours. The metal in skates and aluminium sticks must also be recycled.

4.7.5.5 Other aspects of ice hockey linked to sustainable development

As in all team sports, the group dynamic can be used to develop environmental and social activities, the success of which is certain to have a positive effect on sports performance. Environmental protection activities undertaken jointly are a fun and useful way of helping to bond a group. Teams and clubs can also play a decisive sustainable development role by providing a place for disadvantaged or marginalised groups and areas to socialise and integrate.

4.7.6 Ice sports: curling

4.7.6.1 General

Ice sports almost always require ice-making technical equipment which uses large amounts of energy and may contain pollutant gases. For curling, controlling these two problems is the key element of an environmental approach which fosters sustainable development. Curling has been an Olympic sport for men and women since the 1998 Games in Nagano.

Some facts

- Two paintings by the 16th century Flemish artist Peter Bruegel the elder (1530–1569), entitled “Winter landscape” and “Hunters in the snow”, portray an activity similar to curling being played on frozen ponds.
- Most stones used for modern competitions are made from a rare and dense granite found on the Scottish island of Ailsa. Stones are polished and must weigh no more than 19.96kg.

4.7.6.2 An environment-friendly approach to curling

Curling enthusiasts can practise their sport with no damage or pollution provided that a number of simple rules are respected.

Rules of conduct for preserving the environment when practising curling

- Whenever possible, use public transport or a bicycle or travel on foot to and from the curling rink;
- Consider, when possible, the use of products that conform to environmental and sustainable development criteria;
- Never leave behind on or around the rink empty bottles, packaging, leftover food or worn-out or damaged equipment. Place these in the bins provided, or hold on to them and put them in the waste bin at the club at home. Metal objects must be recycled.

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Figure 70: Even if he is holding a broom, a curler must never leave rubbish on or around the rink!

4.7.6.3 Impact of curling competitions and the necessary facilities

The environmental impact of curling competitions may be considerable if artificial rinks are used, requiring ice-making equipment which consumes large amounts of energy and uses refrigerating gases which cause pollution.

Responsibility of those involved in curling competitions

For the organisers

- If possible, use multi-purpose ice halls used for other ice sports;
- For artificial rinks, use modern, energy-efficient refrigeration equipment without synthetic refrigerating gases (CFCs, HFCs or PFCs);
- Pay particular attention to the systems which produce and distribute the cold;
- For outdoor artificial rinks, locate the curling area to the north of tall structures (neighbouring buildings, stands, billboards, outside wall, etc.) to reduce heating of the ice by the sun as much as possible;
- For competitions outside, preference should be given to day-time competitions if renewable energy is not available for lighting;
- For indoor events, heat the arena as little as possible or not at all;
- Consider all possibilities for providing the energy needed to produce ice by using renewable energy sources (solar, wind, geothermal, small dams, etc.);
- Provide and encourage the use of a public transport system for getting to and from the event;
- In and around the rink, provide the public with an adequate number of well-maintained toilets and rubbish disposal facilities, to enable waste water to be treated and solid waste to be recycled or destroyed with no risk;
- Inform users of the rules of conduct to be followed: clean toilets, water saving and waste collection.



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For the competitors and their entourage

- Set an example in terms of fair play and respect for the environment. In and around the rink, do not drop rubbish such as bottles, packaging or accessories.

For the public

- Whenever possible, use public transport or a bicycle or travel on foot to and from competitions;
- Respect the rules of conduct regarding the use of toilet facilities and waste disposal, particularly for packaging and empty bottles.

4.7.6.4 Special waste, toxic products and pollutants linked to curling

The special waste linked to curling essentially concerns certain synthetic refrigerant gases like CFCs or ammoniac used in ice-making equipment. In such equipment, these gases must never be allowed to escape into the air. A leak detection system with an alarm must be installed, and regular checking and maintenance performed. You should consider replacing this as soon as possible with modern equipment which uses HFCs or with a primary circuit using ammoniac in a confined area, cooling a secondary circuit using glycol under the ice. A specialist firm should be employed to destroy the polluting gases of the old equipment.

Accessories made of synthetic materials should be destroyed, or recycled, by a specialist firm. In no case should they be dumped in the natural environment, as they are made of material which does not degrade well, nor burnt, as they may release toxic vapours. Any metal parts must also be recycled.

4.7.6.5 Other aspects of curling linked to sustainable development

As in all team sports, the group dynamic can be used to develop environmental and social activities, the success of which is certain to have a positive effect on sports performance. Environmental protection activities undertaken jointly are a fun and useful way of helping to bond a group. Teams and clubs can also play a decisive sustainable development role by providing a place for disadvantaged or marginalised groups and areas to socialise and integrate.

4.7.7 Ice track sports: bobsleigh and skeleton

4.7.7.1 General

Bobsleigh, a feature of the Olympic Games since the first Winter Games in Chamonix in 1924, consists of bobsleigh itself, with either two (men and women) or four (men) competitors in a streamlined sledge, and skeleton (men and women), contested individually on a sledge. Both these disciplines and luge use the same ice track.

Some facts

- Bobsleigh was born in eastern Switzerland in 1884. The first track was built by British and American tourists on the Klosters road in the neighbouring town of Davos. The winner's prize was a bottle of champagne.
- Skeleton, after having been an Olympic discipline on the programme of the 1928 and 1948 Olympic Games in St Moritz, returned to the Olympic programme in Salt Lake City after a break of 44 years.
- The adventure represented by the Jamaican bobsleigh team's participation in the Winter Games in Calgary was turned into a film by Jon Turteltaub entitled "Cool Runnings", which was a world-wide success in 1993.

4.7.7.2 An environment-friendly approach to bobsleigh and skeleton

Competition bobsleigh and skeleton requires the use of an ice track that is either naturally or artificially frozen. When new tracks, whether naturally or artificially frozen, are built, it is extremely important that they blend harmoniously into

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the landscape in order to reduce to the maximum their impact on the environment. Existing facilities should also be used whenever possible.

Rules of conduct for preserving the environment for practising bobsleigh and skeleton

- Transporting the equipment requires using motorised vehicles to access the tracks. Vehicles should be filled to the maximum rather than increasing their number;
- Consider, when possible, the use of products that conform to environmental and sustainable development criteria;
- Never leave behind at or around the track empty bottles, packaging or leftover food. Place these in the bins provided, or hold on to them and put them in the waste bins at the club or at home;
- Never dump worn-out or damaged equipment at or around the track.

4.7.7.3 Impact of bobsleigh and skeleton competitions and the necessary facilities

The impact of bobsleigh and skeleton competitions applies to artificial tracks which necessitate ice-making equipment using refrigerant fluids.



Figure 71: From an environmental point of view, natural tracks are preferable to artificial tracks.



Chapter 4: Environmental and sustainable development conditions specific to the various Olympic disciplines



Responsibility of those involved in bobsleigh and skeleton competitions

For the organisers

- Always use existing tracks wherever possible;
- When building a new track, locate it in the coldest possible place (on a north-facing slope) of little environmental interest and close to a water supply and means of communication;
- For refrigeration, use modern energy-efficient equipment with a double refrigeration circuit;
- Make particularly sure that old refrigeration systems using ammoniac are leakproof and properly insulated;
- Consider all possibilities for providing the energy needed to produce ice by using renewable energy sources (solar, wind, geothermal, small dams, etc.);
- Provide and encourage the use of a public transport system for getting to and from the event;
- Provide the public with an adequate number of well-maintained toilets and rubbish disposal facilities, to enable waste water to be treated and solid waste to be recycled or destroyed with no risk;
- Inform users of the rules of conduct to be followed: clean toilets, water saving and waste collection.

For the competitors and their entourage

- Set an example in terms of fair play and respect for the environment. Do not drop rubbish such as bottles, packaging or accessories on or around the track.

For the public

- Whenever possible, use public transport to get to and from the competition venue;
- Respect the rules of conduct with regard to the use of toilet facilities and waste disposal, particularly for packaging and empty bottles.

4.7.7.4 Special waste, toxic products and pollutants linked to bobsleigh and skeleton

The special waste linked to bobsleigh and skeleton consists essentially of the ammoniac used as a refrigerant gas in the ice-making equipment and old sledges that are no longer used.

In the event of an ammoniac leak (due for example to a natural disaster), its dispersion into the air would in all probability not cause any damage, nevertheless any possibility of a leak should be prevented. In particular, for new tracks, a system should be used which has a primary ammoniac circuit in a confined space which then cools a secondary circuit using glycol under the track, or equipment which uses HFCs.

Old sledges and helmets should be taken to a firm which deals with solid waste or vehicle demolition (for sleds), which can recycle the metal and re-use the synthetic materials.

4.7.7.5 Other aspects of bobsleigh and skeleton linked to sustainable development

The international bobsleigh and tobogganing (FIBT) and luge (FIL) federations have brought their requirements into line with regard to their respective sports so as to have a single type of track usable for their disciplines. For mountain regions, this measure results in lower environmental impact than if different tracks had to be built, while still allowing the holding of sports events, which are an important part of economic development. This measure is in line with the sustainable development of mountain regions.

4.7.8 Ice track sports: luge

4.7.8.1 General

Luge has been an Olympic sport since the 1964 Games in Innsbruck. The competitions consist of individual races for men and women and doubles for men.

Some facts

- The first track was built in Davos (Switzerland) in 1879. The first international competition was held four years later: the competitors had to race four kilometres down a frozen road between the villages of Davos and Klosters.
- Luge is one of the most dangerous sports, with competitors lying on their backs, legs outstretched, sliding down an ice track with no brakes at almost 140 km/h.



Figure 72: Luge is one of the most dangerous sports, with competitors sliding down the track with no brakes at almost 140 km/h.

4.7.8.2 An environment-friendly approach to luge

Competition luge requires the use of an ice track that is either naturally or artificially frozen. When new tracks, whether naturally or artificially frozen, are built, it is extremely important that they blend harmoniously into the landscape in order to reduce to the maximum their impact on the environment. Existing facilities should also be used whenever possible.



Chapter 4: Environmental and sustainable development conditions specific to the various Olympic disciplines



Rules of conduct for preserving the environment for practising luge

- Transporting the equipment requires using motorised vehicles to access the tracks. Vehicles should be filled to the maximum rather than increasing their number;
- Consider, when possible, the use of products that conform to environmental and sustainable development criteria;
- Never leave behind at or around the track empty bottles, packaging or leftover food. Place these in the bins provided, or hold on to them and put them in the waste bins at the club or at home;
- Never dump worn-out or damaged equipment at or around the track.

4.7.8.3 Impact of luge competitions and the necessary facilities

The impact of luge competitions applies to artificial tracks which necessitate ice-making equipment using refrigerant fluids.

Responsibility of those involved in luge competitions

For the organisers

- Always use existing tracks wherever possible;
- When building a new track, locate it in the coldest possible place (on a north-facing slope) of little environmental interest and close to a water supply and means of communication;
- For refrigeration, use modern energy-efficient equipment with a double refrigeration circuit;
- Make particularly sure that old refrigeration systems using ammoniac are leakproof and properly insulated;
- Consider all possibilities for providing the energy needed to produce ice by using renewable energy sources (solar, wind, geothermal, small dams, etc.);
- Provide and encourage the use of a public transport system for getting to and from the event;
- Provide the public with an adequate number of well-maintained toilets and rubbish disposal facilities, to enable waste water to be treated and solid waste to be recycled or destroyed with no risk;
- Inform users of the rules of conduct to be followed: clean toilets, water saving and waste collection.

For the competitors and their entourage

- Set an example in terms of fair play and respect for the environment. Do not drop rubbish such as bottles, packaging or accessories on or around the track.

For the public

- Whenever possible, use public transport to get to and from the competition venue;
- Respect the rules of conduct with regard to the use of toilet facilities and waste disposal, particularly for packaging and empty bottles.

4.7.8.4 Special waste, toxic products and pollutants linked to luge

The special waste linked to luge consists essentially of the ammoniac used as a refrigerant gas in the ice-making equipment and old sledges that are no longer used.

In the event of an ammoniac leak (due for example to a natural disaster), its dispersion into the air would in all probability not cause any damage, nevertheless any possibility of a leak should be prevented. In particular, for new tracks, a system should be used which has a primary ammoniac circuit in a confined space which then cools a secondary circuit using glycol under the track, or equipment which uses HFCs. Old sledges and helmets should be taken to a firm which deals with solid waste or vehicle demolition (for sledges), which can recycle the metal and re-use the synthetic materials.

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4.7.8.5 Other aspects of luge linked to sustainable development

The international luge (FIL) and bobsleigh and tobogganing (FIBT) federations have brought their requirements into line with regard to their respective sports so as to have a single type of track usable for their disciplines. For mountain regions, this measure results in lower environmental impact than if different tracks had to be built, while still allowing the holding of sports events, which are an important part of economic development. This measure is in line with the sustainable development of mountain regions.



