

Ursus arctos: ethology and anthropogenic disturbances

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INTRODUCTION

Brown bear (*Ursus arctos*) is a typically solitary mammal. Because of this and its elusiveness, its ethology is difficult to study and is not still completely understood. Brown bear's behavior is highly influenced by some of its reproductive characteristics and, increasingly, by anthropogenic disturbance. Thus, it is important to analyse the impact of anthropogenic disturbance on brown bear's ethology and to develop management strategies to minimize negative impacts.

Brown bear's characteristics	
Weight and size	70-700kg 140-280cm Males are larger than females.
Locomotion	Quadrupeds plantigrades, but they can stand erect easily.
Longevity	Can live up to 30 years in the wild.
Diet	Omnivorous.
Senses	Excellent sense of smell and good hearing, but undeveloped sight.



Modified from: Disney movies, (2014), Bears [ONLINE]. Available at: <http://nature.disney.com/bears-gallery#image/52f52ad00a172d5ba8006d2f> [Accessed 16 May 15].

Distribution and conservation status:



McLellan, B.N., Servheen, C. & Huber, D. (IUCN SSC Bear Specialist Group), (2014), *Ursus arctos*[ONLINE]. Available at: <http://maps.iucnredlist.org/map.html?id=41688> [Accessed 02 April 15].

Brown bear is the most widely distributed ursid. It occupy a great variety of habitats. Its conservation status is considered of least concern worldwide, but there are some small and isolated populations where it is severely threatened.

MATERIAL AND METHODS

The methodology used to carry out this project has been bibliographic research. The information and data used has been obtained from scientific articles, books, some websites and additional audio-visual material.

Adult brown bears are typically solitary and non-territorial. They are generally asocial; social affiliations are restricted to:

- Familiar groups: a mother with its cubs or siblings that remain together for a time.
- Brief relationships between males and females during the breeding season.
- Congregations due to the concentration of food resources.

The daily activity pattern of brown bear is similar in males and females.

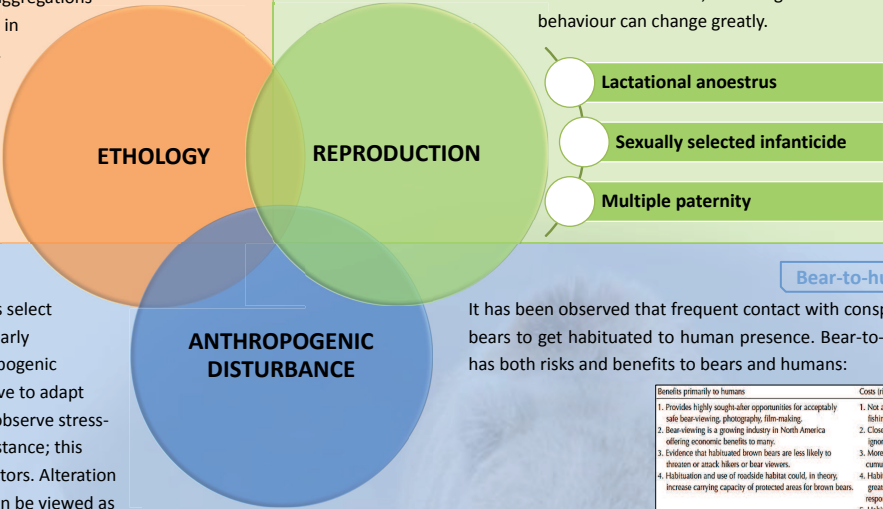
Social behaviour:

A relatively stable social organization is formed when there are aggregations of brown bears for long periods. As days pass, there are changes in the interactions between bears, generally to a greater tolerance. Brown bears adapt their behaviour relying on their experiences.

Aggressive behaviour and fights are the base of hierarchy. Large adult males are the most dominant ones and other bears clearly avoid them. Dominance relations are relative and can be inverted, and tolerance varies widely between individuals.

Brown bear is a polygamous specie. Female brown bears have seasonally polyoestrous cycles and this, added to the fact that they have delayed implantation of the embryo, makes possible that if the female copulates with several males before implantation the litter could have multiple paternity. While they are breastfeeding their cubs, females enter a lactational anoestrus period. This can explain the sexually selected infanticide: adult males can kill the cubs of a female to make her reenter oestrous and then fertilize her; males only will kill the litter of a female if they haven't mate with her, so multiple paternity reduces the probabilities of infanticide.

For females with cubs, avoiding adult males is vital. Mother's behaviour can change greatly.



Negative impacts

Human presence alters brown bear's ecology and behavior. Bears select preferentially habitats without human presence, and they are clearly more active when human activity is low. This implies that anthropogenic disturbance reduces the fitness of brown bears, because they have to adapt their foraging and mating activities to human presence. We can observe stress-related behaviors in bears when a human exceeds a threshold distance; this distance depends on environmental, human and bear-related factors. Alteration of daily activity patterns caused by anthropogenic disturbance can be viewed as an environmental stress factor.

Brown bear is naturally diurnal. Crepuscular habits are observed due to human disturbance.

Positive impacts

Presence of large adult males is very infrequent in habitats with a high anthropogenic disturbance. For this reason, areas with human activity can act as a shelter for females with cubs.

Bear-to-human habituation

It has been observed that frequent contact with conspecifics predisposes bears to get habituated to human presence. Bear-to-human habituation has both risks and benefits to bears and humans:

Benefits primarily to humans	Costs (risks) primarily to humans
1. Provides highly sought after opportunities for acceptably safe bear-viewing, photography, film-making. 2. Bear-viewing is a growing industry in North America offering economic benefits to many. 3. Evidence that habituated brown bears are less likely to threaten or attack hikers or bear viewers. 4. Habituation and use of roadside habitat could, in theory, increase carrying capacity of protected areas for brown bears.	1. Not appropriate in all contexts; may conflict with sport-fishing and hunting. 2. Close proximity of habituated bears may encourage ignorant, even illegal acts. 3. More interactions with habituated bears may increase cumulative odds of injury. 4. Habituated brown bears, especially sub-adults, have a greater tendency to approach people and people may respond inappropriately and dangerously. 5. Habituated bears in roaded areas may encourage traffic jams and serious collisions. 6. It costs money to manage habituated bears, especially if they become food-conditioned.
Benefits primarily to bears	Costs (risks) primarily to bears
1. Habituated bears are better able to access natural foods and other resources that exist near centers of human activity. 2. Some bears may use presence of humans to avoid encounters with other bears mothers caching cubs near observation stations. 3. Habituated bears promote bear-viewing which, in turn, may promote bear conservation.	1. Habituated bears near roadsides or railways are more likely to be injured or killed. 2. Habituated bears are more likely to be killed if outside of protected areas. 3. Habituated bears near roads are more likely to be fed by people or get people's food and become food-conditioned. 4. Despite regulations, habituated bears are more likely to be approached by people for better photographic or viewing, resulting in greater risk of human injury and bear harassment or removal.

Herrero, S. et al., (2005), *The potential benefits and risks (costs) of bear-to-human habituation*. Available at: *Wildlife Society Bulletin* 2005, 33(1):362-373

CONCLUSIONS

- Anthropic disturbance have a great influence on brown bear's behaviour: it alters its distribution, habitat use and activity.
 - Though, the responses to human disturbance are highly variable, due to the behavioural plasticity of these bears.
 - Bears habituated to human presence can maximize their fitness, but habituating have also several risks for the two species.
 - It seems that is easier for bears from dense populations than for those from small and isolated populations to habituate to humans.
- Therefore, negative impacts of anthropogenic disturbance would have greater influence upon already endangered populations.
- Due to the reproductive characteristics of brown bears, humanized areas can serve as a shelter for females with cubs.

REFERENCES

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- [3] Steyaert, S. M. J. G. et al. (2012). "The mating system of the brown bear *Ursus arctos*". *Mammal Review*.
- [4] Stonorov, D., & Stokes, A. W. (1972). "Social Behaviour of the Alaska Brown Bear". *Bears: Their Biology and Management*, 2, 232.

It is important to study the responses to anthropogenic disturbance of the different populations of brown bears to establish concrete protocols and regulations to minimize human impact upon bears, because this way it would improve the conservation of the specie and human security.

It would be important to restrict human activity in bears' habitat during some critical periods, and to establish a security distance. If human activity is more predictable for the bears, both species benefit. Structural development should be forbidden in some areas. In addition, environmental education is essential.