

Effects of climate change on the welfare of Arctic killer whales (*Orcinus orca*)

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Objectives

- Correlate the effects of climate change in the Arctic with the welfare of killer whales.
- Provide a foundation for deepening the understanding of killer whale welfare.
- Facilitate the development of effective strategies for conservation and proper management.

Domain 1: Possible changes in Nutritional Conditions due to climate change and their associated Domine 5 affects

Nutritional inadequacies:	Negative affects	Nutritional opportunities:	Positive affects
Restricted food intake by overfishing	→ Hunger, malaise of nutrition and weakness of stravation	Increase in food due to melting ice	→ Gastrointestinal comfort and pleasure of satiety
Limited food intake due to increased diatom	→ Hunger, malaise of nutrition and weakness of stravation		

Domain 2: Possible changes in Enviromental Conditions due to climate change and their associated Domine 5 affects

Unavoidable physical conditions:	Negative affects	Improved physical conditions:	Positive affects
Increased waves and storms	→ Exhaustion	Increase of water temperature	→ Thermal comfort
Loud and unpleasant noises due to ships	→ Reproductive frustration, communication difficulties, stress and desorientation		
Fishing nets	→ Pain and Stress		
Pollutans such as oil or gas	→ Respiratory tract irritation, discomfort and stress		

Domain 4: Possible Behavioural changes due to climate change and their associated Domine 5 affects

Presence of:	Negative affects	Presence of:	Positive affects
Fearful attitude caused by vessels	→ Chronic stress, hipervigilance and cowering	Desire to play because of rising	→ Excitation and playfulness
Limitation of rest caused	→ Exhaustion	Increased sexual activity	→ Sexual gratification
		Exploration and foraging	→ Stimulated and focused

Domain 3: Possible changes in Health Conditions due to climate change and their associated Domine 5 affects

Presence of:	Negative affects
Injuries caused by boats	→ Pain and physical weakness
Injuries cauded by fishing nets	→ Pain and stress
Oil poisoning	→ Immunosuppression
Bioacumulation of POPs	→ Diseases

Conclusions

The analysis based on Mellor's Five Domains model (2015) reveals that climate change can affect the welfare of killer whales, with negative effects being more prevalent than positive ones. This suggests that climate change would mainly harm the welfare of Arctic killer whales.

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