Longevity

The average life expectancy of penguins is probably 15 to 20 years. Some individuals live considerably longer.

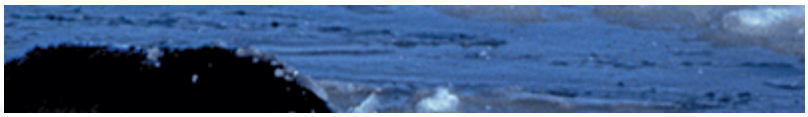
High mortality occurs among the young.

- Winter starvation may claim the lives of 50% of king penguin chicks.
- Emperor chicks may experience a 90% mortality within the first year of life.
- When mortality affects one chick in species producing two offspring of moderate size differences, it is usually the smaller chick that does not survive.

Predators

When in the water, penguins may be eaten by leopard seals, fur seals, sea lions, sharks, or killer whales.

On land, foxes, snakes, and introduced predators such as feral dogs, cats, and stoats (members of the weasel family) prey on eggs and chicks of some penguin species, including the yellow-eyed and Galápagos penguins.



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This leopard seal (Hydrurga leptonyx) *is one of the primary predators of penguins but poses more of a threat in the water than on land.*

Antarctic and subantarctic eggs and chicks are susceptible to predatory birds such as antarctic skuas, sheathbills, and giant petrels. These predators may prey on chicks that have strayed from the protection of the crèche or are sickly and too weak to defend themselves.

- Skuas may work in pairs to obtain their prey. One bird distracts the penguin on the nest, and the other swoops in to steal the egg or chick.
- Sheathbills intercept chinstrap regurgitation as penguin parents feed their offspring.

Antarctic skuas (Catharacta antarctica), *sheathbills* (Chionis alba), *and giant petrels* (Macronectes giganteus) *prey on penguin eggs and chicks.*

Gulls and ibises eat 40% of African penguin eggs.

Little penguins rely on burrows and a nocturnal lifestyle to avoid predators such as swamp harriers, peregrines, gulls, snakes, rats, and lizards.

During a nine-season study off Ross Island, home to a breeding colony of some 130,000 pairs of Adélie penguins, killer whales were observed harassing, chasing, herding, and surrounding Adélies in the water but never consuming them.

- The small Adélie may be regarded as an insignificant food source compared to the Weddell seals, leopard seals, emperor penguins and Antarctic toothfish (*Dissostichus mawsoni*) that killer whales are known to prey upon in this area.

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pod, without any attempt to eat the penguin. It's speculated that the Adelie served as a "training simulator" to younger whales on how to provide food for the rest of the pod.

Introduced predators including cats, ferrets, and stoats that eat chicks and eggs, and dogs that prey on adults pose the largest threat to yellow-eyed penguin populations.

Human Impact

Hunting

- Historians believe that indigenous peoples have hunted some species of penguins and taken eggs for centuries.
- Mass exploitation occurred when early explorers, sealers, whalers, and fishermen turned to penguin colonies as sources of fresh meat and eggs. Sometimes more than 300,000 eggs were taken in annual harvests from one African island. Explorers were known to kill and salt 3,000 penguins in a day for voyage provisions. Penguins were easy prey because of their inability to fly and their seeming lack of fear of humans. Although egg-collecting was banned in 1969, illegal harvesting continues today.
- During much of the 19th century, and into the 20th, penguin skins were used to make caps, slippers, and purses. Feathers were used for clothing decorations and as mattress stuffing.
- The extraction of oil from penguins' fat layers became economically important in the 1800s and early 1900s. Oil was used for lighting, tanning leather, and fuel. In the Falkland Islands alone, an estimated 2.5 million penguins were killed within a

16-year time span. The oil industry came to a halt in 1918 due to protests by the general public and because of cheaper and better quality chemical products.

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Guano harvesting

- Seabird guano has great commercial value as a nitrogen-rich fertilizer. Although the Incas used seabird guano to improve their crops as far back as 500 BC, they carefully managed the resource by extracting it at a slower rate than it was being produced. Guano became a major product of international trade in the 1800s, and in the early 1900s, guano deposits were in danger of being depleted. Although it negatively impacted Humboldt penguin and other ground-burrowing penguin populations in the past guano harvesting is better managed today in most regions.

Overfishing

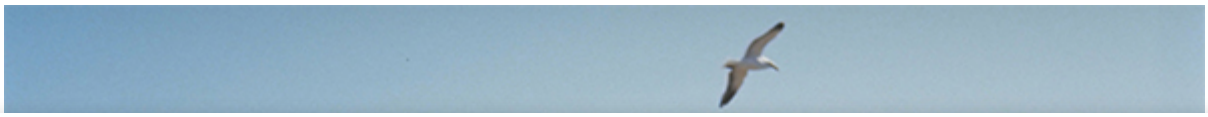
- Human competition for food sources can affect penguin populations.
- Overfishing of anchovetta (a small fish), the primary food source of the Humboldt penguin, has contributed to penguin population declines.
- Krill are commercially fished—mainly for human nutritional supplements and for aquaculture feed. Expansion of the krill fishery in the Southern Ocean can reduce krill populations and place nutritional stress upon penguins that specialize in krill such as Adélies and chinstraps.

The introduction of predators has had devastating effects in some areas. Rats, cats, dogs, pigs, and ferrets have been known to prey on chicks, eggs, and even adult penguins. Introduced herbivores, such as sheep and rabbits, cause serious deterioration of habitat.

Climate Change

Penguins require sea ice for nesting and feeding areas. Sea ice also provides shelter and food for many species that penguins prey on.

- Emperor penguins require expansive areas of very thick sea ice as a stable, flattened place to hatch their eggs and care for their chicks from April to December.
    - Sea ice in these areas is usually locked into place by glaciers or grounded icebergs.
    - In Pt. Géologie, which is the northernmost emperor penguin rookery, warmer temperatures from climate change are producing thinner sea ice which breaks up too early and the chicks are swept into the sea before they can survive on their own. This colony is declining as a result from about 6,000 breeding pairs in the 1970s to about 3,000 breeding pairs in 1998.
    - Other emperor penguin colonies are also likely to decline as global warming continues.



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Adélie penguins begin nesting in October (austral spring) on land in snow free areas with gently sloping beaches and with plenty of small rocks to use in constructing their nests. They also require loose pack ice or areas of open water within the pack ice that are relatively near the rookery as a place to find food while they care for their chicks.

- Sea ice break up from climate change is opening up some new rookery areas for Adélie penguins and populations at these areas are increasing or stable.
- Yet, in the more northern areas, such as the northern tip of the Antarctic Peninsula, where pack ice forms for a shorter time each year due to warming, Adélie populations are declining and moving to more southern locations such as the Ross Sea.
- Additionally, the warmer air in the Antarctic Peninsula holds more moisture and results in more frequent and stronger snowstorms which can make these areas unsuitable for Adélie nesting.
- As the climate continues to warm, the more southern locations for Adélie rookeries will also become less suitable for nesting.

During the Antarctic summer, Adélie and chinstrap penguins use ice floes as a

- Since 1970, krill populations have declined by 80% in the Southern Ocean around Antarctica due to reductions in sea ice from climate change.
- Sea ice provides a refuge for krill and also food in the form of algae that forms in the cracks and on the underside of the ice. The reduction of krill has very likely played a key role in the declines of many western Antarctic Peninsula and Scotia Sea populations of Adélie penguins and chinstrap penguins since both species rely on krill as a primary food source.
- The overall breeding population of chinstrap penguins has declined by more than 50%, and these penguins are more at risk from this threat since, unlike Adélies, chinstraps do not have rookeries in other areas of the Antarctic.
- Gentoo, king, macaroni, and southern rockhopper penguins are all species that do not rely on sea ice. As more areas become ice free in the Antarctic, these penguins should be able to extend their range south. Yet, warming oceans could shift prey availability or cause declines in prey such as krill and impact populations for these penguin species in the future.

Climate change can also negatively impact temperate penguin species.

- Recent declines in Humboldt and Galapagos penguin populations have been linked to an increase in the amount and severity of El Niño Southern Oscillation (ENSO) events, which many scientists believe are linked to climate change.
- Magellanic and other penguin species have to travel further to forage due to shifting prey populations, which has also been linked to ocean variability from climate change. These longer foraging trips make it more likely that fasting parents tending their nests will abandon their nests before their partners' return.

- Climate change is also associated with both shifts in nesting seasons and increases in rainfall. For Magellanic penguins, a later nesting season leads to younger chicks than normal coping with the rainy season. Additionally, an increase

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chick survival.

If the average global temperature rise is kept below 2°C (4°F), penguin colonies—particularly those in the Antarctic—could be sustained into the future.

Oil pollution

Oil fouls penguin feathers, reducing the waterproofing and insulating properties of their plumage. The birds become susceptible to hypothermia (chilling). Penguins also ingest the oil while trying to preen, which poisons them and causes internal organ damage.

In the 1980s and early 1990s, more than 40,000 Magellanic penguins were oiled each year in the Punta Tombo colony in Argentina. During this time, many oil tankers illegally dumped their ballast water, which was contaminated with petroleum. The number of oiled penguins has significantly decreased in the Punta Tombo colony with both reductions in the dumping of ballast water and a change in tanker shipping lanes. Large numbers of penguins that overwinter in the waters off northern Argentina, Uruguay, and southern Brazil are still oiled from oil-contaminated ballast water.

On June 23, 2000 the ore carrier *Treasure* caused an oil spill near Robben and Dassen islands off South Africa. The International Fund for Animal Welfare's (IFAW) International Oiled Wildlife Response Team, directed by the International Bird Rescue Research Center (IBRRC), was immediately mobilized to South Africa to help care for more than 20,000 oiled penguins, with 90% of these penguins successfully released following rehabilitation. Survival rates of oiled penguins that were cleaned, rehabilitated and returned to the wild were nearly the same as unoiled birds.

On Oct. 5, 2011 the container ship, the *CV Rena*, ran aground on Astrolabe Reef, in the Bay of Plenty, New Zealand spilling several hundred tons of fuel into the surrounding waters. Although about 2,000 seabirds died as a result of the spill, 383 little penguins returned to the wild after being cleaned and cared for. Researchers involved in monitoring the little penguin colonies found a normal nesting rate for rescued, de-oiled, and returned penguins.

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Members of SeaWorld's Aviculture Departments have helped clean and care for oiled penguins in the Treasure and Rena oil spills and also other penguin rescue efforts.

Animal Info

Oil-covered penguins from the Treasure *oil spill waiting to be cleaned.*

Traces of contaminants including brominated flame retardants and persistent organic pollutants (POPs) including dichlorodiphenyltrichloroethane (DDT), polychlorinated biphenyls (PCBs), and other pesticides (chlorinated hydrocarbons) have been found in the tissues of krill, penguins, and other types of Antarctic wildlife and ice algae.

- POPs and brominated flame retardants can be transported to the Antarctic via air and water currents and migratory animals.
- These contaminants can accumulate in an animal's tissues and biomagnify as they travel up the food chain.
- Scientists measuring DDT levels in Adélie penguins during the breeding season found that DDT concentrations remained relatively the same in some colonies even though DDT pesticide use been banned in the Northern Hemisphere and has

dramatically decreased in the Southern Hemisphere since 1980. A potential source for the persistence of DDT in Antarctic marine food webs is glacial meltwater.

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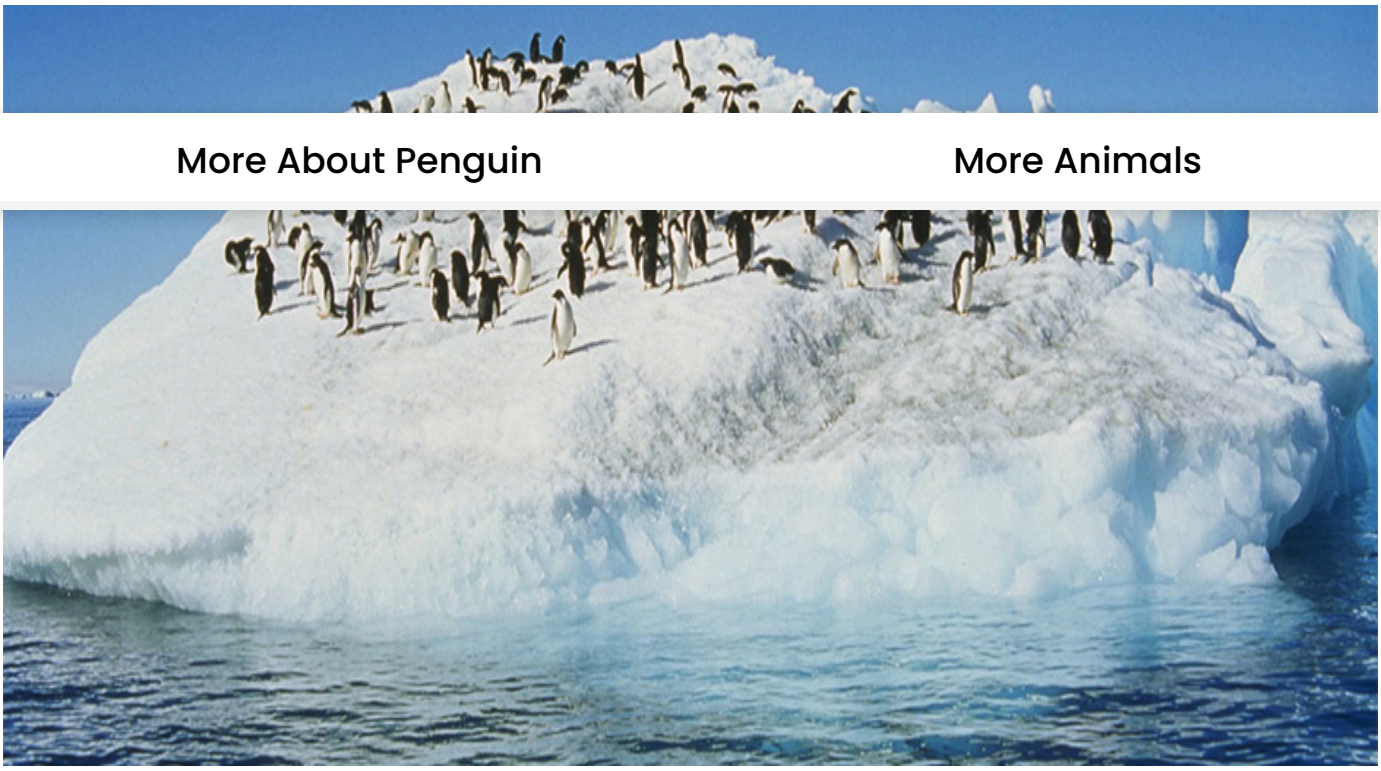
conditions and even cancer. A study on juvenile Magellanic penguins found a positive correlation between heptachlorobiphenyl (a type of POP) levels and cardiovascular failure.

The popularity of "ecotourism" is increasing with cruise ships frequenting antarctic waters. Enthusiastic sightseers must be careful not to interfere with normal penguin activity by staying back and keeping noise levels down.

El Niño

The El Niño Southern Oscillation (ENSO) is a natural phenomenon that involves a change in wind and ocean current patterns, which warms surface temperatures and reduces the upwelling of nutrient-rich water. A decrease in nutrients affects plankton, krill, and small fishes, which comprise the food supply for marine animals. The penguin species most affected are the Humboldt and Galápagos penguins.

- The 1982-1983 ENSO caused a 65% depletion of the Humboldt population off the coast of Peru. The population partially recovered, but once again plummeted during the 1997-1998 El Niño event.
- Up to 77% of the Galápagos penguin population was wiped out by the 1982-1983 ENSO, leaving only 463 total birds. A slow recovery began in 1985. However, a further decline of 66% of the population occurred during the 1997-1998 ENSO. The population appears to be once again in a recovery phase.



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