

Exploration, Exploitation, Science and Tourism.

*A review of how conservation of Antarctica has
changed since the 1900's.*

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INTRODUCTION

The Antarctic continent and Southern Ocean is often seen as the last great wilderness on earth today. Many organizations and conventions have been set up to ensure its protection. Conservation is a hot topic in current Antarctic work, research and meetings, but this has not always been the case. Early travellers in Antarctica were focused on exploration and discovery, they had little knowledge of the impact their travels would have on the pristine environment. Whalers and sealers were not aware of the intensity their activities were having on marine animal stocks within the Southern Ocean. Science is the primary activity currently occurring in Antarctica, and scientists often feel they have a minimal impact on the environment but this has not always been so. Tourist activities in the Antarctic are on the increase and with it bring new conservation concerns.

This review will attempt to discuss the ways Antarctic conservation and human perception of environmental issues in the Antarctic has changed since the early 20th century. Four main time periods will be focused on in this review. These are the ‘Heroic Era’ of early exploration of Antarctica, the periods of extensive sealing and whaling in the Southern Ocean, the current period of scientific research in Antarctica, and the present and future periods of increased Antarctic tourism. The reasons conservation is important in Antarctica and the risks Antarctica faces will also be discussed.

WHY ANTARCTICA

The Antarctic continent is one of a kind. There is no place like it on earth, and this draws people to Antarctica. It attracts scientists who want to explore and study the unique wildlife and scientists from many other disciplinarians. They are drawn to Antarctica for many different reasons and their results are often unique. For example, the scientists who study Antarctic ice cores can produce weather and atmospheric records from long before humans existed. It is not only scientists that are drawn to Antarctica, people from all nations want to experience Antarctica, and many are willing to pay a lot of money to have the opportunity. Human impacts on Antarctica are both direct and indirect. People, who land on Antarctica, impact the continent in a vast number of ways. Soil compaction, ice pollution, and wildlife disruption are just some examples of direct impacts. Indirect

impacts include the increase in non-native species introductions to Antarctica because of increased temperatures due to global warming. All these impacts can be devastating, and decreases the pristine environment that is Antarctica. Antarctica is also a focus of protection because it supports life in some of the harshest conditions on earth, for example the Dry Valleys (Ensminger et al 1999). The biological processes in these conditions occur very slowly, so when pollution or change occurs, the processes are very slow to revert to their original conditions (Ensminger et al 1999). Antarctica has been isolated from other continents for 35 million years and has been free of human presence for most of its existence. For these reason Antarctica is very sensitive to change and the organisms living there have adapted in isolation so have not adapted to change. This means any impact humans have on Antarctica is increased because of its isolation and lack of adaptation, this makes conservation all that more important in the Antarctic environment. Conservation efforts in Antarctica aim to reduce past human impacts, in ways such as old site clean ups, reduce current impacts made by scientists and tourists, and minimize future impacts to the Antarctic environment.

HEROIC ERA

During the early discovery and exploration of Antarctica, conservation was an unknown term. The men did not realise the full extent their impact they would have on the continent. Preservation of land for future use was not of importance at the time, their principal problems were access and survival (Schatz 1988). The impact these explorers left on Antarctica is still evident today. The huts they abandoned when leaving Antarctica contain many supplies, all of which are now preserved for historic reasons (IUCN 1990). During the heroic era (1897-1921) the abandoned huts were pollution, they were left by the explorers and often no attempt was made to clean up the areas. Historic restoration of the areas has meant that any future impact they will have on the environment now has been minimised. Before this restoration, oil spills and rubbish were left over the environment, these polluted the soils and affected wildlife by polluting nesting sites. Buried within the Antarctic ice sheet are the remains of many expeditions. When dogs and ponies died during these expeditions, their remains were left in the snow, to be later buried within the ice sheet. Animal and human faecal wastes were left where they were

deposited. All waste that wasn't removed from the ice sheet is preserved and is transported towards the coast (Ensminger et al 1999). Whilst little harm was seen in the dumping of trash on the ice (Schatz 1988), these actions are now forbidden in Antarctica and all waste must be removed from the continent.

The exploration achievements of these men are very heroic, yet the lack of attempts to minimise their impacts on the continent would be unjustified if they occurred today. It is not that the men acted in ignorance, it is just that conservation was not of a primary concern at the time as conservation was not the worldwide phenomenon it is now.

EXPLOITATION

The sealing, whaling and fishing industry in the Southern Ocean has been primarily boom and bust. One species is caught extensively until it is close to extinction, then the focus is turned to another species and that species is caught. Exploitation in Antarctic waters began in 1778, when elephant and Antarctic fur seals were caught in South Georgia and the South Shetland Islands. Elephant seals were almost extinct by 1823 (Baker 1990). Commercial whaling began in the Southern Ocean in 1904. A major whaling industry was supported in Antarctic waters for 60 years, and many species were over-exploited (Baker 1990). Over the four year period of 1927-1931, whale catches had quadrupled and in the 1930/31 season 40,201 whales were caught (Baker 1990).

Two conventions have been introduced under the Antarctic Treaty System to bring protection to Antarctic mammals and set limits on those species that can be commercially caught. In 1972 the Convention for the Conservation of Antarctic Seals (CCAS) was adopted. It entered in force in 1978. It was set up as a precaution when it seemed that Antarctic sealing might occur again (Waterhouse 2001). It provides protection for the Ross Seal, Southern Elephant Seal, and Southern Fur Seals, and sets regulations for the taking of Crab eater Seals, Leopard Seals and Weddell Seals (Lucas 1982).

An international agreement in 1930 limited the whaling season in the Southern Ocean to three months and it protected calves and females. It introduced what were then thought to be humane ways of killing the whales (Baker 1990). Catch quotas were set up in 1946 when the International Whaling Commission (IWC) was formed (Baker 1990). From 1979 onwards, the Minke whale was the only species allowed to be caught in Antarctic

waters under IWC regulations. Since 1986 there has been a total moratorium on commercial whaling in the Antarctic. “Scientific whaling” is currently undertaken by the Japanese but there is considerable opposition to this. Between 1904 and 1978, it is estimated that whalers caught 1.4 million whales from the Southern Ocean. They successively went through the Blue whale, Fin whale, Sei whale, Sperm whale and Minke whale stocks (Baker 1990). Whalers switched to the next species when the whale stocks were reduced because of over-exploitation and they became so rare that it was not economical to hunt them (Lucas 1982). During the times sealing and whaling activities were occurring in the Southern Ocean the impacts these actions were having on the animal stocks was not evident. When scientists became aware of the impacts, conventions were set up to provide protection to the species. As a result of these regulations, animal numbers are increasing in the Southern Ocean and the species are recovering from the exploitation, which is positive news for the conservation of the Antarctica and the Southern Ocean.

SCIENCE

Science in Antarctica began primarily during the 1957/58 International Geophysical Year (IGY) when scientists from all over the world went to Antarctica to try and get an understanding of the fragile nature of the Antarctic environment and its significance in climate regulation of the Southern Hemisphere (Lucas 1982). Antarctica has important environmental values in its roles in the planets geological, oceanic, atmospheric and climatic processes (Schatz 1988). Activities at this time were scientific purposes only, not legal so all conflicting claims were put to the side. After the IGY, it was decided a long term solution was needed to allow scientific cooperation and protection to occur. The Antarctic treaty achieved this and was signed in 1959 (Lucas 1982). The treaty dedicated Antarctica be used for peaceful purposes only, primarily scientific research and conservation of living resources. Specific measures were put in place to regulate human impact and protect resources (Lucas 1982). This was the first time conservation measures were introduced into the Antarctic system.

The Scientific Committee on Antarctic Research (SCAR) is an inter-disciplinary committee of the International Council for Science (ICSU) and provides independent

objective scientific advice at the Antarctica Treaty Consultative Meetings (Waterhouse 2001). It was established in 1958, and initiates, promotes and coordinates scientific research in Antarctica (Waterhouse 2001). SCAR provides scientific results for Antarctic environmental legislation, and it responds to most of the scientific advice requests from Treaty members (Walton 1994). After their establishment, SCAR began to recommend environmental safeguards adopted by the Antarctic Treaty Parties, litter and waste disposal were among their concerns, as was interference of wildlife (Schatz 1988). These are some of the conservation recommendations from SCAR: Wastewater treatment plants brought to the bases in Antarctica, scientists advised of distances to stay from wildlife, solar and wind power generation introduced, old bases and stations cleared and waste shipped back to home countries (Schatz 1988).

Until the mid 1980's it was normal for scientists and domestic staff in Antarctica to dump their solid waste onto the sea ice where it eventually melted and fell into the ocean. This included metal, rubber, plastic and food waste (Waterhouse 2001). Combustible wastes used to be burned on the sea ice, this was stopped in the 1990/91 season, and after this the wastes were burnt in incinerators (Waterhouse 2001). In 1994 all waste burning was phased out. Inland stations, such as Amundsen-Scott South Pole Station, buried their waste in the snow until 1991 (Waterhouse 2001). Waste fuels and chemicals are now removed from Antarctica. Coastal stations do still discharge their sewage and domestic liquid into the sea (Waterhouse 2001). Ships operating in the Southern Ocean have sewage treatment plants on board.

Area protection has been an important part of Antarctic conservation since the 1960's. Sites of importance in Antarctica can have two titles set to them. An Antarctic Specially Protected Area (ASP) is an area protected for its outstanding environmental, scientific, historic, aesthetic or wilderness values or planned scientific research. There is currently 67 ASP's (CEP 2006). An Antarctic Specially Managed Area (ASMA) is an area where activities of humans pose risks of interference or environmental impacts, they are also sites or monuments of historical value. There is currently four ASMA's (CEP 2006). Restrictions are in place for activities that occur in these sites and permits are required to enter some of them.

Protocol to the Antarctica Treaty on Environmental Protection (PROTOCOL) opened in 1991 and came into force 1998 (Waterhouse 2001). Its main purpose is to “provide comprehensive protection of the Antarctic environment and ecosystems” (Waterhouse 2001). Within PROTOCOL, Environmental Impact Assessments must be completed for all activities in Antarctica. These occur on three levels; Preliminary Assessment, Initial Environmental Evaluation and Comprehensive Environmental Evaluation (CEP 2006). The Committee for Environmental Protection (CEP) was established in 1998 to advise countries on the implementation of the PROTOCOL (Waterhouse 2001). Conservation within the Antarctic Treaty System has up till now been approached in a preservation manner, trying to keep things unchanged. Conservation needs to cope with change and recognize that ecosystems change (Walton 2006). Conservation is most successful when it is recognised that a species needs protection, and also when a species no longer needs protection (Walton 1998). The first sign of this happening is when the Committee for Environmental Protection (CEP) recently agreed that two fur seal populations no longer need to be recognized as specially protected species because numbers of these populations are increasing (Walton 2006).

Environmental monitoring has become an important part of the Antarctic Treaty System in the last 10 years. New Zealand field sites are subject to regular monitoring activities. For example, the impact Scott Base sewage discharge into the sea is regularly assessed (Waterhouse 2001).

The recent improvements in environmental monitoring and protection have been with the introduction of formal protocols, agreements and recommendations which are global policies, so all countries working in Antarctica abide by the same guidelines (Waterhouse 2001). Advances in environmental impact assessments, environmental monitoring and reporting, waste handling, storage and disposal of wastes and fuels, protected area management, training and educating visitors and human impact research are all examples of how current conservation efforts are improving all the time (Waterhouse 2001).

Since the introduction of the Antarctic Treaty, conservation in Antarctica has been increasing and more and more policies have been adopted to protect the environment.

With conservation becoming a more president issue since the 1980's and human activities

in Antarctica increasing, the introduction and modification of these legislations is very important.

TOURISM

Tourism is a matter of increasing concern in Antarctica. As the continent becomes more accessible, more people want to visit and experience the last great wilderness. Antarctica becomes more accessible because of increased ship traffic in the area and the use of large vessels which can accommodate more paying customers (Pfeiffer and Peter 2004).

Tourist numbers doubled between 1994 and 2004, and in the 2005/06 summer period 26,000 people visited Antarctica as tourists (IAATO 2006) and this number is expected to increase further. Although tourism in the Antarctic is generally conducted in a considerable way (Pfeiffer and Peter 2004), the impact on the environment is still more severe than other popular tourist sites around the world, because of the sensitivity of the Antarctic ecosystems. Humans want to visit the sites of Antarctica that are ice-free, this is because this is where the wildlife is. Only 2% of the continent is ice-free so the animal populations are dense in these areas. When humans make landings on the continent, they compete with the wildlife for the ice-free areas. Because of the complete darkness experienced during the Antarctic winter, tourist activity is concentrated during the summer period (November to March). This coincides with the most sensitive period for the Antarctic wildlife as this is when they are on shore breeding (Pfeiffer and Peter 2004). The negative effects humans have on the Antarctic animal ecosystems are: they disrupt the population dynamics, habitat structure and food chains of the colonies. Penguin populations in Antarctica have been the focus animal of many studies of human impacts on the Antarctic wildlife. When tourist numbers increase, breeding success is reduced, the distribution, behaviour and physiology of the animals are affected and the eggs and chicks are disturbed (Pfeiffer and Peter 2004). Tourists operations all go to the same areas so the impacts are high in a few popular spots (Waterhouse 2001). The ships and boats cause problems to the environment as well, anchors disrupt the benthic communities and the swimming wildlife such as penguins and seals and disturbed when boats go fast past them and when the sea ice is broken up (Waterhouse 2001). To reduce the impacts tourists have on the wildlife, guidelines are in place for tourists to follow.

They must stay certain distances from the birds and seals, and are taught how to avoid harassing the animals. The expedition leaders play key roles in insuring these guidelines are met (Pfeiffer and Peter 2004). Environmental impact assessments are completed by tourist operators to assess the environmental damage tourism has on Antarctica (Waterhouse 2001). The International Association of Antarctic Tour Operators (IAATO) was set up by seven private tour operators in 1991 (Waterhouse 2001), and it now includes 80 members. They aim to advocate, promote and practice safe and environmentally responsible private tourism in the Antarctic (IAATO 2006). With IAATO supporting and advising most tourism activities in Antarctica, impacts are minimised and conservation is recognised for its importance. Tourists are briefed on the possible impacts they can cause and are advised on suitable behaviour around the wildlife.

CONCLUSION

Human perceptions towards the importance of conservation and environmental issues in Antarctica have changed in a large way since the beginning of the 20th century. The Antarctic continent has gone from having no protection status, to now being devoted to science and preservation of wilderness. Activities that occurred during the heroic era and periods of whaling and sealing would not be allowed to occur in Antarctica and the Southern Ocean under current legislation. The actions during these periods were not always out of ignorance, human impacts had not been studied and conservation actions had not been developed. As human impacts were noticed, legislation was developed to minimise the impacts. Much legislation has been introduced to the Antarctic to deal with specific human impacts on the environment. As long as legislations are assessed, updated and new ones created as situations change then conservation in Antarctica should continue to be successful.

There is limited printed material on the impacts the heroic era had on the Antarctic continent. Information of these impacts can be found by reading the diaries of the men and taking note of the way they speak of the environment and the way they discuss their actions, making notes as to what they do with dead animals, litter and waste. An option for future research would be to analyse the personal diaries of these men and the photo

and video records of the journeys and create an account of the impacts their actions had on the Antarctic environment. This account could also include information on work that has been done to minimise future impacts of these heroic expeditions such as hut clean up and restoration. Information regarding the whaling and sealing periods in Antarctic history are found in scientific papers and books summarising research done on the impacts. There is significant work done on these impacts and information is readily available in marine journals and books. The official websites of the important committees in Antarctic issues, such as CEP, are excellent sources of up to date information. They give good overviews of the formation and workings of these organisations. Information regarding science and its impacts on Antarctica are readily available through these websites and scientific papers produced after research has been done on conservation issues. The environmental impact reports produced for bases and areas in Antarctica provide in-depth impact assessments, for example the Ross Island environmental report used in this review. Increasing tourism in Antarctica could be the largest threat to the environment currently and in the future. Tourists companies are aware of this threat and most companies are continually monitoring their impacts and developing new ways these impacts can be minimised. The IAATO is a good website which shows what has been done to reduce tourist impact and what is being proposed for the future.

In order for conservation to continue to protect the Antarctic environments, regulations and conventions must be regularly assessed and updated when situations change. Focus should be on preservation of species and areas at risk, but also on removing protection status on species and areas that have recovered. Regular monitoring and census work could be done on specific species and areas with a threatened status, so that records can show if conservation efforts are working or if more work needs to be done.

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