

Pressures on the Wilderness Values of the Antarctic Continent

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Wilderness and the Antarctic

Antarctica is governed internationally by the Antarctic Treaty System (ATS). Under the ATS, wilderness values are recognized by the Protocol on Environmental Protection to the Antarctic Treaty (the “Protocol”), which designates Antarctica as “a natural reserve, devoted to peace and science,” and stipulates that:

The protection of the Antarctic environment and dependent and associated ecosystems and the intrinsic value of Antarctica, including its wilderness and aesthetic values and its value as an area for the conduct of scientific research, in particular research essential to understanding the global environment, shall be fundamental considerations in the planning and conduct of all activities in the Antarctic Treaty area. (Article 3[1])

This article focuses on the obvious direct pressures of human presence on the wilderness values of Antarctica. The human presence on the Antarctic continent arises from the two dominant activities of science and tourism. We focus on the area covered by the Antarctic Treaty and the Protocol, the

continent and islands south of 60°S. Pressures on wilderness values in the Antarctic marine environment also exist, but they merit a detailed, stand-alone treatment.

There is no formal definition of wilderness or wilderness values in the Protocol or anywhere else in the ATS. Within the ATS, wilderness is used in two significantly different ways: (1) loosely, as an essentially political assertion about the state of the Antarctic environment as a whole; and (2) in a narrower technical sense as a value to be taken into consideration in environmental management under the Protocol. However, a review of discussions and documents under the ATS suggests a general understanding on the key attributes of wilderness as being remoteness and a relative absence of both people and indications of past and present human presence or activity (ASOC 2006).

As a result of its extreme isolation from human settlements, Antarctica has remained the last great continental wilderness. This isolation, however, has been progressively eroded over two centuries and has declined in the past few decades (Hemmings 2007). Antarctica had no indigenous population, and human presence on the continent began

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only in the 1820s with the first seal hunters. Since then, Antarctica has been the subject of successive waves of activity such as exploration, hunting of marine mammals, fishing, science, and tourism. Tensions over territorial claims and the legal status of the area were eventually addressed through the adoption of the 1959 Antarctic Treaty that established an international regime of governance.

Two hundred years of intermittent human presence has left physical evidence in the Antarctic landscape, marking the boundary of civilization and the encroachment upon the last great wilderness—conforming, in effect, to an Antarctic frontier (Roura 2008a).

The Significance of the Antarctic Wilderness

Nowhere else on Earth is there such a vast area with so little evidence of human presence. Antarctica, a wilderness continent managed internationally, and where peace, science, the environment, and the interest of humankind are primary declaratory concerns, is not only a unique feature on our planet, but can serve as a powerful symbol for the rest of the world. It offers a potential realization of a human ideal: living and working together in peace and collaboration, pursuing activities not just for personal or national profit but for the benefit of humankind. Diversity is celebrated in the collaboration of different peoples and through the fact that the human habitation of this seventh continent is predicated on different norms from habitation on the other six (Rolston 2002). Humans have the opportunity

to leave only light and transitory footprints, exercise humility, and refrain from molding the land into the image of what they think it should be (Cole 2005). The Antarctic wilderness is much more than just a symbol (Keeling 2007). It is an objective reality, with expanses of mountains, valleys, and an ice plateau where there may never have been any human presence, permanent or transitory, and home to many organisms found nowhere else in the world.

Despite its outstanding size and integrity, the Antarctic wilderness is not inviolable. The natural ramparts of Antarctic defense against human intrusion are being broken down by technology and the pressures of globalization (Hemmings 2007). Without a clear definition under the ATS, the concept of wilderness has often been considered as too complex or philosophical to be applied in practice (Bastmeijer 2007). Hence, the immense Antarctic wilderness is extremely vulnerable to creeping degradation where the effects of multiple small decisions over time accumulate to result in its penetration, fragmentation, and erosion (Landres et al. 2005).

At the beginning of the 21st century, the Antarctic wilderness is facing an ever-evolving set of pressures. Scientific research and its associated infrastructure and logistics have been the dominant human activity in Antarctica over the past five decades. They are giving way to tourism as the fastest-growing and most populous activity. Exploitation of living resources has extended from seals, whales, and fish to the search for commercially valuable chemical products and genetic

materials. This potentially lucrative business, referred to as bioprospecting, is likely to be a powerful factor for further human penetration of the Antarctic wilderness as it drives research into remote environments with interesting biology (Hemmings and Rogan-Finnemore 2008). Advances in technological capabilities, increased mobility, and wealth of people and changes in market conditions are making Antarctica more attractive and more accessible to the global population.

Science and Associated Logistics

Scientific research and its associated infrastructure and logistics are the source of most of the human-made features found in the Antarctic wilderness. These include research stations, roads, field huts, depots, airfields, waste dumps, and fuel-contaminated areas. There are currently 64 operating research stations providing a peak simultaneous capacity for approximately 4,000 people in the summer. Thirty-seven of these provide a simultaneous capacity of around 1,000 people year-round. These numbers reflect stations that are operational and do not include inactive stations or abandoned worksites. Although a few inactive facilities have been removed or cleaned up since the Protocol entered into force in 1998, many have not, and new stations are being built, albeit at a lower rate than in recent decades (ASOC 2004).

Ease of access has been an important determinant of station location. As a result, most stations are located on or near the coast, in order to facilitate resupply by ship, and half of them are on the Antarctic Peninsula, the part of the continent that is closest to another continent. Most stations are located on ice-free ground, which makes up less

than 0.34% of the surface area of the Antarctic continent (BAS 2004), and is important habitat for seals, seabirds, and terrestrial fauna and flora. Competition for limited ice-free ground in coastal areas creates significant pressure on the ecosystem and the wilderness values of the coastal margins.

In comparison, human and biological activity on the polar plateau is low. Algae, lichens, and bacteria exist on gravel soils, bare rock, and snow surfaces, or in fissures and crystal boundaries of rocks. For nearly 40 years, there were only two permanent research stations on the plateau. Since 1995, three new research stations have been built, with another being developed. As technology allows greater penetration of the continent, we move to a new phase of challenge for the Antarctic wilderness. Now the remotest places in Antarctica, and hence of the planet, are being reached by air and surface. Vehicles traveling over hundreds of kilometers of marked routes that sometimes require dynamiting and crevasse filling—de facto roads—provide access to remote inland stations. Infrastructure is established deeper into the Antarctic continent, becoming jump-off points for even deeper plateau penetration (ASOC 2006). In the next year or so, scientists may complete drilling through 4,000 meters (13,123 ft.) of glacier ice on the plateau, reaching lakes that have been isolated from the Earth's atmosphere for more than 1 million years (Schiermeier 2008). Because of the paucity of biota in the deep interior of Antarctica, and conventional norms around human interests and economic valuation, it is hard even to get recognition that wilderness is challenged, which in turn allows the world's largest contiguous wilderness to be fragmented and eroded as a result of a multitude of

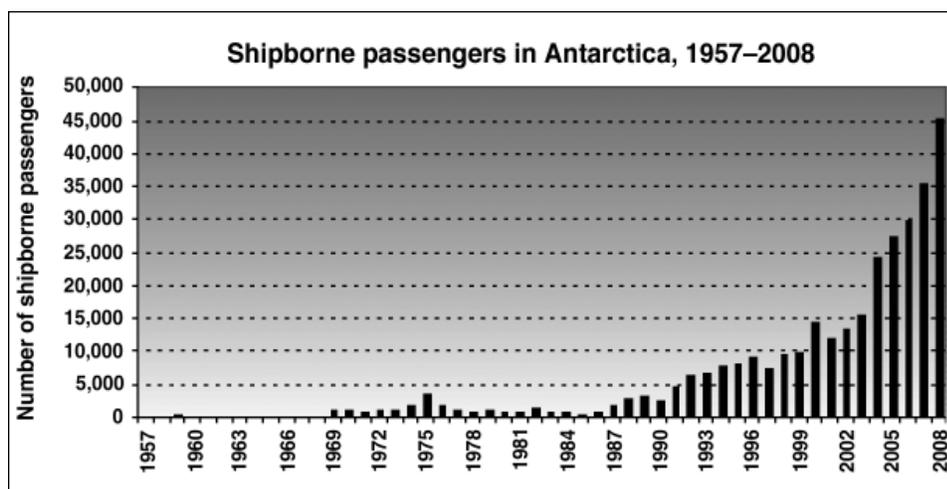


Figure 1—Number of seaborne tourists participating in commercial tourism operations. This includes passengers on large ships (>500 passengers), standard ships, and yachts, whether landing or not (Data Source: Tracey 2001 and IAATO 2008a).

uncoordinated development decisions.

As a result of the ongoing International Polar Year—an international research initiative that goes from March 2007 to March 2009—research and its associated logistics are expected to intensify around existing centers of research. A number of large-scale research activities have been planned in areas that have been hitherto seldom accessed, often as precursors to long-term programs and permanent infrastructure (Tin and Roura 2007). On the one hand, the widespread use of numerical modeling techniques and remote sensing platforms such as satellites to obtain data is likely to reduce the footprint of science and logistics in Antarctica in the modern age. On the other hand, increasing commercial interests in resources are likely to spur further scientific research. In addition, large-scale and prestigious scientific endeavors, where human ability to overcome natural obstacles is a matter of personal, institutional, or national pride, are not likely to disappear. Although attitudes and practices toward environmental protection have changed and improved in many ways over the past 50 years, future scientific pursuits, spurred on by commercial interests and

technological advances are likely to continue to penetrate deeper into the remotest places on Earth.

Rising Tourism

Following on from earlier activities, polar tourism represents a contemporary phase in the exploration and exploitation of the polar regions. Polar tourism has increased significantly over the past few decades and is characterized by growth, diversification, and geographic expansion (Roura 2008b).

In the 2007–2008 season, more than 30,000 tourists landed on the Antarctic continent (IAATO 2008). In the last 10 years, tourist numbers have increased by nearly fivefold. Projections suggest that the upward trend will continue (see figure 1). Tourism is now the largest Antarctic activity in terms of people involved. More than 95% of tourist visits and landings take place on the Antarctic Peninsula, with the 20 most popular sites experiencing more than 75% of all landings in Antarctica (IAATO 2008). Visited sites are often ice-free, usually biologically rich or otherwise have outstanding aesthetic, wilderness, historic, or scientific value, or a combination of values. Until the 1990s, ship-based tourism in



Figure 2—Expanding infrastructure in support of scientific research and rising tourism are the key direct pressures on the wilderness values of the Antarctic continent. The United States' McMurdo station is the largest research station and has a maximum capacity for 1,000 people (upper photo by Nadine Newton), and Pendulum Cove on Deception Island is one of the most popular tourist destinations (lower photo by Ricardo Roura).

Antarctica was conducted on small and medium-sized vessels, with a focus on wildlife, scenery, and cultural heritage (Bastmeijer and Roura 2004). This is now changing with larger vessels entering the market. The largest tourist vessel (indeed the largest vessel of any kind) to operate in Antarctic waters was introduced in the 2006–2007 season. The *Golden Princess* carried 3,700 persons, constituting the single largest human activity in Antarctica during the season (Hemmings 2006).

Up to 300 sites have been used for tourism purposes since records began,

and between 100 and 200 sites are visited every year. On any given day during the tourist season, 3,000 tourist landings may take place. Paths, cairns, interpretation signs, and tourism management or support infrastructure constitute lasting evidence of tourism activities (Roura 2008b). Frequent, organized tourism landings have effectively turned some sites into what can be described, in the Antarctic context, as mass tourism destinations. There, the sounds and sights of high ship traffic and simultaneous human presence, and the mediated characteristics of the expe-

rience, remove the possibility of solitude, a sense of the vast and unknown, and the feeling of a true wilderness.

Although most tourists currently travel to Antarctica by ship, there is an ongoing transition toward a greater component of air-supported tourism as well as land-based visitor accommodation ashore (Bastmeijer and Roura 2004). One-day trips to Antarctica are now available. The types of commercially available activities are diversifying: they include overflights, helicopter excursions, skiing expeditions, mountain climbing, snowboarding, kayaking, marathons, and scuba diving (Hemmings 1997). Activity-based use of destinations is becoming more important than the attractions of some frequently visited historic sites (Roura 2008b). Large cruise liners provide a wide range of activities onboard, encouraging a relatively new form of tourism in which Antarctica is no longer the main attraction of the voyage but serves as background for events and entertainment, such as weddings, casinos, and dining and sporting opportunities. Wilderness expeditions—self-sufficient and non-motorized—have long been part of the tradition of polar exploration. The South Pole itself has become a popular destination for specialized expeditions. A recent diversification has seen expeditions that aim to reach the South Pole by driving motor vehicles.

The developments in the Antarctic tourism industry are manifestations of a worldwide trend, where a wealthier and more mobile global population is searching for increasingly remote areas as vacation destinations. Tourism developments over the past decades and the worldwide trend suggest that the rate of increase of Antarctic tourism will not reduce, depending on global economic conditions.

Conclusions

Over the past decades, Antarctica has become more accessible to the global population, and the amount and variety of human activities have continued to rise. Technology has breached the ramparts of Antarctica's natural defenses. Scientists and their supporting logistics are penetrating further into areas that have been hitherto seldom accessed. An increasing number of tour operators, ships, and tourists visit the region to carry out an ever-increasing range of activities. The human footprint in Antarctica has been rapidly expanding, and all evidence suggests that the trend will continue and escalate.

As the most pristine continent left on Earth, human presence in Antarctica inevitably leads to some impacts on its wilderness values, whether transitorily or permanently. Loss of wilderness values is sometimes balanced by benefits to humanity, for example, through globally important research or the protection of cultural heritage. However, not all Antarctic science is significant, not all remains of past activities merit protection, and not all activities that take place justify their impacts on the Antarctic wilderness.

Compared to wilderness areas in other parts of the world, Antarctica is vast and isolated. Some may argue that the areas of human influence are of little or no consequence, and that human activities can continue to expand without significantly reducing the size or value of the Antarctic wilderness. However, we argue that the uniqueness of the Antarctic wilderness lies in its extreme vastness and isolation. Nowhere else on Earth is there such a large area that has been so isolated from the effects of civilization. The immensity and integrity of the Antarctic wilderness should not be used to justify its attrition. Instead,



Figure 3—Although Antarctica is home to abundant and unique wildlife such as the emperor penguin (upper photo by Frank S. Todd), more than 99% of the continent is permanently covered in snow and ice (lower photo courtesy of ASOC's collection) and has little biological activity, making it difficult to get recognition that wilderness is challenged.

these qualities should be maintained as a symbol of humanity's willingness to cohabit in peace, to work together in the interest of humankind, and to exercise "an intelligent humility towards its place in nature" (Leopold 1987). If humanity is willing, then nowhere will it be easier to demonstrate this than on the most remote continent still left on our planet. To preserve the world's last great wilderness requires concerted international collaborative efforts and a fundamental shift to accepting humanity as a fellow

member, and not the master, of nature's community. **IJW**

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