

# **Critical Review**

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## **The controversy around the proposal and formation of the South Pole Traverse**

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## Introduction

The South Pole Traverse is a 1650 Km overland (ice) route from the US McMurdo station on Ross Island to the Amundsen–Scott South Pole station. The route was formed to enable supplies and fuel to be transported overland by means of tractor trains and specialised sleds, which previously was completed by multiple flights using Hercules LC-130 aircraft (Anandakrishnan, 2001).

This paper aims to briefly outline the controversy around the proposal and formation of the South Pole Traverse. First a short overview of the construction and reasons behind the construction of the route will be presented. A search of the literature is next presented, with further analysis of the three key themes identified: environmental impact, wilderness impact and tourism. Discussion of the various themes is undertaken, concluding with suggestions for future research.

The primary reason the South Pole overland traverse was considered necessary was because of the efficiency savings sought, due to the high cost of flying fuel and materials to the South Pole Station. The main savings would be realised with respect to savings of fuel, as it is up to 40% more fuel efficient to transport overland than by air freight (National Science Foundation, 2004). Other advantages include the opportunity to conduct more science by freeing up planes that other wise would be used to re-supply the South Pole Station. Environmental impact would be also reduced by lowering the amount of fuel consumed, and larger load sizes are able to be hauled compared to flown.

Construction of the route started in the 2002-2003 summer season, and the route was operational four seasons later in the 2005-2006 summer season (The Antarctic Sun, 2006). The first operational traverse was completed during the 2008 – 09 season (The Antarctic Sun, 2009). The route traverses two crevasse fields, the McMurdo shear zone and the lower Leverett glacier. Crevasses in these areas were filled in using explosives and heavy snow moving machinery, allowing the safe passage of the tractor trains. As the areas of crevasse fields are constantly moving every season requires newly opened crevasses to be identified and filled. The remaining route is relatively flat with little attention needed. The entire route is marked by flags at regular intervals to indicate the way (The Antarctic Sun, 2009).

The route selected (figure 1) was not the most direct path to the South Pole. Rather it goes along the Ross Ice Shelf almost parallel to the Transantarctic Mountains, then

rises up the Leverett glacier to an altitude of 2400m gaining the polar plateau, turning south for the last 440Km to the Pole. The Leverett glacier was chosen as it has a low gradient, low katabatic wind component (Schwerdtfeger, 1984) and a relatively low number of crevasses compared to more direct routes. Early suggestions that the route would also supply an on ice cable for internet traffic (IT World, 2002), was never realised due to the movement of glacial ice flows.

It takes approximately 40 days to deliver a cargo load to the South Pole Station, and each load consists of 110 tonnes of cargo, equivalent of 11 re-supply flights of the LC 130 aircraft previously used (National Science Foundation, 2006). The return trip carrying waste and obsolete materials is significantly shorter (The Antarctic Sun, 2009). Limitations of load size are also negated by the use of tractor trains; large loads previously were constrained to the 3m by 3m door opening on the LC 130 aircraft. Severe weather conditions on the continent hinder many re-supply flights, were as the tractor trains are able to continue in all but the worst weather (Niiler, 2011). The South Pole Traverse does not intend to stop all flights to the South Pole Station, personnel, equipment and supplies are still being transported by aircraft, while large cargo and bulk fuel is going overland (Anandakrishnan, 2001).

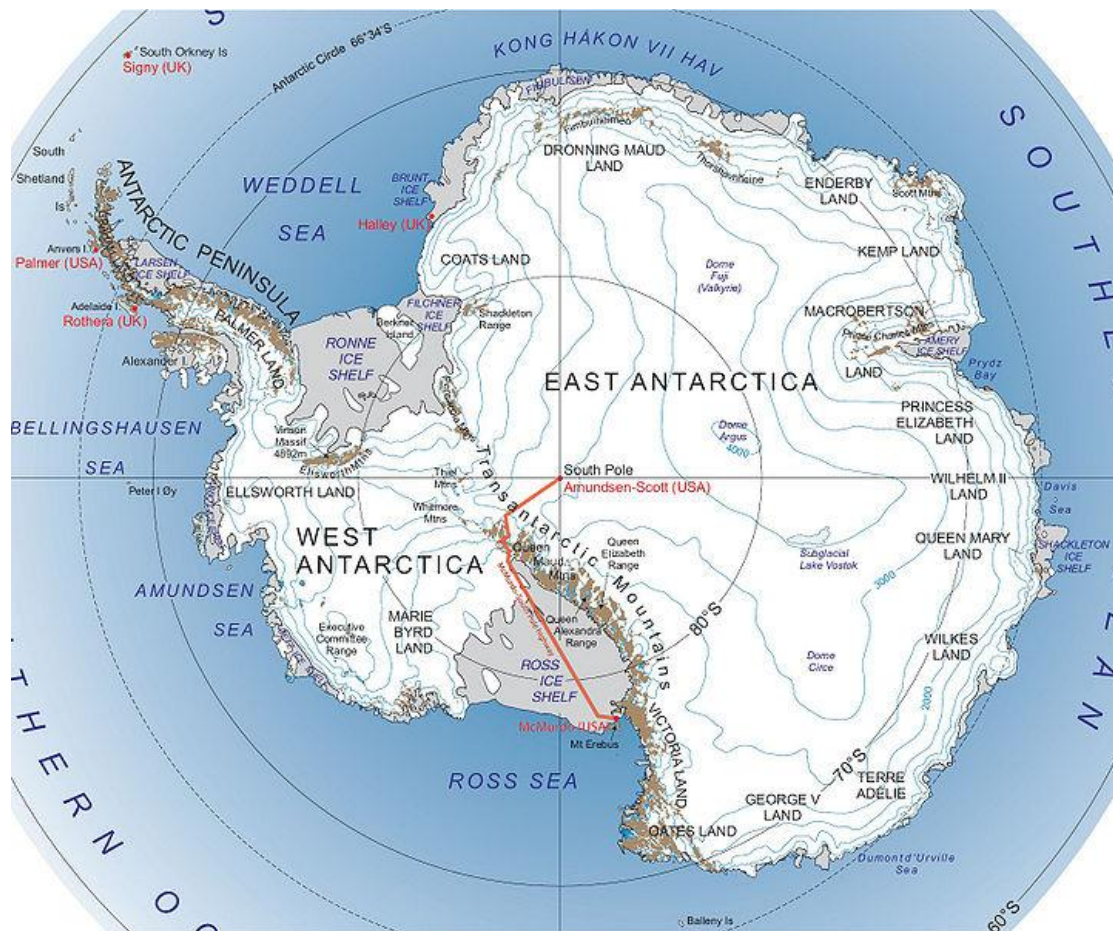


Figure 1. The South Pole Traverse (Wiki, 2011).

There are many names given to the overland route from McMurdo to the South Pole such as South Pole Traverse, South Pole Route, Ice Road, South Pole Highway and

Surface Traverse. In this paper different terms will be used with respect to different themes as discussed next.

## **Literature Themes**

Literature searches were conducted using a variety of search techniques, and key words. Results revealed a clustering of themes and specific terminology related to each theme. Four themes were uncovered during the search process; descriptive information, wilderness impacts, environmental impacts and tourism. The first area, descriptive information on the South Pole traverse was the most prevalent, searchers using online databases such as EBSCO, library databases, polar record, Google Scholar, and so forth revealed mostly articles produced by the US NSF who commissioned the Ice Road. Such database searches were no more effective in finding literature than a direct search on the NSF web site and publications such as the Antarctic Sun (published by the United States Antarctic Program). An important piece of literature about the South Pole Traverse was the CEE produced by the NSF, which proved to be a significant source of information. The predominant terminology used within this realm was 'South Pole Traverse'.

Next, Google proved to be the best source of literature with respect to controversial opinions of the South Pole traverse, using the terms "South Pole highway or ice road". Searches revealed that the "popular press" i.e. news paper articles, web sites and social media are the main vehicles for people voicing their concerns about the formation of the South Pole traverse. Articles such as "Road trip to South Pole raises concern" (MSNBC, 2007), "Hillary opposes U.S. South Pole 'highway'" (USA Today, 2004) raise concerns with respect to possible environmental and wilderness degradation. Tourism opportunities with respect to the Ice Road were also uncovered using Google and the terms 'Ice Road' or 'South Pole Highway'.

The term 'South Pole Route' revealed mainly historical literature on the early attempts to cross the continent, such as by Shackleton in 1915 and the first successful crossing by Fuchs in 1958. This was somewhat surprising, as the NSF is particular in stating that they have only constructed a flagged 'route' and not a road or highway from McMurdo station to the South Pole (Anandakrishnan, 2001).

Of the four themes, an out-line of the descriptive material has already been presented, next the three controversial themes of environmental impacts, wilderness impacts, and tourism are outlined.

### ***Environmental impact***

The Antarctic Treaty System (ATS) outlines the importance of protecting Antarctica's environmental and wilderness values:

"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]) (Antarctic Treaty System, 1991).

As with any argument there are two sides. Environmentalists have voiced concern over the possible negative effects on the environment due to pollutants being left on the route. For example, Sir Edmund Hillary said of the U.S road to the Pole: "I think it's terrible because it will degrade Antarctica's pristine environment" (USA Today, 2004). Other possible negative effects on the environment include the risk of fuel spillage, disposal of waste, and destruction of crevasses (Tin, 2008). While others reported that “Environmentalists appear relaxed about the scheme” (Pearce, 2003).

The National Science Foundation (NSF) states that the advances in technology have led to the introduction of surface travel to service scientific bases, which sometimes require dynamiting and crevasse filling, leading to the possible degradation of the wilderness. They also state that the effects are only minor or transitory due to the nature of the environment, and that there are no living organisms that will be effected along the chosen route (National Science Foundation, 2004).

Whenever fuel is transported there is a risk of spillage, NSF respond to this issue by the adoption of daily tank inspections, the use of secondary containment tanks and training staff to deal with a spill event (Wright, 2003). One big environmental advantage presented by the NSF is that significant reduction of fuel emissions by using the tractor trains rather than the aircraft previously being used to transport freight to the South Pole will be achieved (Wright, 2003). This has not received much attention in the literature out-side of the Comprehensive Environmental Evaluation (CEE) prepared for the South Pole Traverse.

USF also argue that the precedent of overland polar re-supply traverses is already established. The 1200Km traverse from DuMont d’Urville to Concordia at Dome C is used to re-supply the French and Italian Base as many as three times per season (Simion, 2004). The Russian Vostok station located in the area of inaccessibility, requires overland re-supply from Mirny 1400Km away (Russian Antarctic Expedition, 2004). Many Antarctic overland traverses have also been conducted for scientific purposes, in the course of a variety of research programmes, heavy machinery is used, in the same way it is deployed for the South Pole Traverse (National Science Foundation, 2007).

Public comments on the draft CEE, were limited to the Australian Antarctic Division, German Federal Environmental Agency, Antarctica New Zealand, the Antarctic and Southern Ocean Coalition and the Council on Environmental Protection (National Science Foundation, 2004). Comments on the draft overall were mostly requests for further information to be included in the final CEE. Comments such as not concentrating on the possible impacts to the environment by the Australians (National Science Foundation, 2004) are worded very carefully, as well as the NSF response:

*Comment: While the environmental analysis does seem sound, the focus on direct impacts tends to be more on the impacts on science and operations than the environment.*

*Response: Equal emphasis was given to identifying and evaluating the direct impacts of the proposed action on science, operations, as well as the environment. The results of this analysis indicated that there would be no nature conservation (biota) issues of concern, releases to the environment (wastewater, exhaust gas emissions) would be negligible, and even though the overall impact of the action would be more than minor or transitory, the net effect would not cause widespread adverse environmental effects (pp. 50).*

The fact that the CEE was being prepared years after the road was constructed is only briefly touched upon. The response by the National Science Foundation (NSF) that the initial work carried out is only a “Proof of Concept” and if the route proves to be viable then a CEE will be completed (National Science Foundation, 2004).

### **Wilderness impact**

Before concerns about the impacts on wilderness are revealed, the term ‘wilderness’ needs to be defined. There are many definitions used to describe wilderness and some say it is an un-definable abstract idea (Keeling, 2007). To state the definition of wilderness from the USA’s Wilderness Act of 1964, “an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain”(Neill, 2003). As the United States’ NSF is responsible for the formation of the traverse, the definition of wilderness that they use is “unmodified, wild, uninhabited, remote from human settlement and untamed” (Keys, 1999). Using this definition, some say that the road does modify the environment (see Figure 2), and that the completion of the South Pole Route renders it conquered by the internal combustion engine (Jenkins, 2003). Alan Hemmings, a senior fellow at Gateway Antarctica, said the road "is the greatest single footprint of activity we've seen in the Antarctic (Wired, 2004).



Figure 2. Cargo caravan on the ice highway early 2006 (Wiki, 2011).

The NSF response to the effects on the wilderness is that the route will “slightly diminish the intrinsic wilderness value... but will be localised along the route itself”

(National Science Foundation, 2004, p. 59). NSF further states in response to the Antarctic Southern Ocean Coalition's comments on the potential effect on the wilderness and aesthetic values: "Wilderness values are attributes, which are generally associated with land areas that are unmodified, wild, uninhabited, remote from human settlement and untamed and an antidote to modern urban pressures. Wilderness and aesthetic values are complex concepts comprised of values as yet not captured by language" (p. 65). An evaluation by the NSF calculated that the effects would be limited to 0.00001% of the Antarctic land mass, and the chance of seeing a traverse train is .04% during summer (National Science Foundation, 2004).

## ***Tourism***

Hemmings stated that the formation of the ice road will open up opportunities for more adventure tourists and tour operators to use the same route, with no power by the US to stop them (Wired, 2004). He appears to have predicted correctly as the group "drive around the world" have organised such a trip. Two Hummers have been converted to hybrid – electric power and are intending to use the established South Pole route to drive the 1600km route in order to raise awareness of the capabilities of batteries and biofuels (Zero South, 2010). The Antarctic Southern Ocean Coalition (ASOC) report that not only will the ice road diminish the wilderness aspect of Antarctica, but also point to the possibility of increased tourism opportunities both on the route and greater access to the interior to tour operators by the formation of the route (Antarctic Southern Ocean Coalition, 2006). Biking to the pole has now attracted more discussion with the completion of the ice route (Bikepacking, 2009), and perhaps it is only a matter of time before this is completed.

The German Federal Environmental Agency highlights in their comments on the NSF draft CEE that the route should not be made available for uncontrolled mass tourism or adventures (National Science Foundation, 2004). The likely hood of mass tourism is more likely to come from tourist operations in other regions of Antarctica, such as the peninsular, as access to the Ross dependency area will remain to be difficult, no matter what new incentives eventuate in the area. The NSF response to the Germans advises that "the U.S. will not support nor condone the use of any U.S. developed and maintained traverse routes or resources by any nongovernmental organizations in Antarctica" (National Science Foundation, 2004). This mirrors the United States Antarctic Program's stance on discouraging tourist operators and private individuals with in their operational area, logistical support or facilities, other than in emergency situations.

## **Conclusion**

Could the formation of the South Pole route, rather than increase the amount of adventure tourism, rather concentrate the inevitable urge adventurers have to travel to the South Pole, and therefore confine their foot print to one particular route? This is similar to the establishment of protected areas in Antarctica, the opportunity exists to say "hey if you are going to go to the South Pole, why not use this route?" Safety would be enhanced by having adventure tourists crossing the same area able to help out other adventurers and so forth. Concentrating adventure tourism to one route

could also reduce the environmental and wilderness impact they have to one particular area.

Another area that is not touched upon much in the literature, is the concern that supplying the South Pole station by overland traverse will not reduce the flight hours of the current re-supply LC 130s, as they will simply be re-directed to flight missions for other purposes. Therefore any reduction of fuel consumption will be off-set by the total increase in fuel consumption by those additional flights for other purposes (Antarctic Southern Ocean Coalition, 2004, 2006). Again little comment has been made by scientists; perhaps because they will be the ones directly benefiting from the additional flight support available to them, as pressure comes of flight re-supply to the South Pole station.

With the exception of Allan Hemmings, there does not appear to be many scientists who have voiced a concern about the formation of the South Pole traverse. Perhaps this could have something to do with not biting the hand that feeds you. The United States Antarctic Program is the dominant provider of logistical support to scientists going to Antarctica within the Ross Dependency, where the ice route is located. If scientists object to the ice route they could possibly find it more difficult to get back to Antarctica for future research efforts. Now that the traverse is fully operational perhaps it is time for some independent peer reviewed literature to be completed, to justify comments currently mainly confined to the popular press.

Concluding remarks from NSF on the environmental impact: “It is expected that the physical benefits derived from the use of traverse resources by the USAP for scientific research and operational support will far exceed any diminishment of the pristine character of the environment” (National Science Foundation, 2004).

Suggestions for future research would be to monitor the effects of the South Pole traverse; this could be undertaken by a researcher accompanying a traverse, to measure the actual impact on the environment and wilderness over the route. Only time will tell if tourist operators or adventurers take up the opportunity now provided to them by the formation of the ice road. The old movie quote comes to mind ‘if you build it they will come’.

The Antarctic Treaty Systems protocol on environmental protection objective is to preserve the environment and conduct science (Antarctic Treaty System, 1991). Perhaps it is time for some science to be conducted on the environmental impacts of doing such science, on the Antarctic.

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