Trends in Antarctic Tourism: 2003 - 2020

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Introduction

Tourism to the Antarctic Peninsula (AP) has increased three-fold in the last decade, and visitation is expected to continue to grow as more companies begin exploring itineraries to this remote region. This increase in human presence poses significant threats for wildlife in the area. The International Association for Antarctic Tour Operators (IAATO) is an organization comprised of all major companies operating in the region, who work together to self-regulate the local tour industry with a stated goal of having "no more than a transient or minor impact" on the region's nature.

Antarctic tourism is almost exclusively ship-based, and IAATO has set forth a set of guidelines for ships of different size classes to follow during their time on the AP. Tourists are landed by small boat on both the Antarctic continent and its surrounding islands and guided ashore so as to disturb wildlife as little as possible. Companies work together to stagger their landings before the start of each season in an effort to both deter overcrowding and to provide guests with an isolated "wilderness experience".

Research Question

An increase in Antarctic ecotourism is well-documented in existing literature, and data shows clear signs of continued growth. However, distribution of that growth throughout the region has not been previously visualized. This project set out to discover the rate at which tourist activity is increasing throughout different regions of the AP. Particular attention was paid to changes in more "desirable" landing sites; these sites often include sensitive wildlife habitat (ie: penguin colonies, seabird nesting sites, seal haulouts, etc) and are at higher risk of disruption.

Methods

Tourist data were downloaded from IAATO's website. IAATO maintains a definitive list of all landing sites throughout the AP, and companies self-report number of guests landed at each site to IAATO at the ending of each season. Each season is defined based on the year it starts and the year it ends (eg: "2020-2021" is a single season), and tourist activity is greatest during the austral summer—roughly October through March. Raw data include the site names, site coordinates, and number of individual tourists that visited each specific site. Once data were formatted efficiently in Google Sheets, they were imported into ArcGIS and the XY data were displayed for each site in a point feature class. A South Pole azithumal equidistant projection was chosen to minimize distortion to the study area. Data were further analyzed to ensure that no sites were displaying erroneous data or showing up in the wrong location. Feature classes for each individual season's data were displayed with a "graduated color" symbology, standardized based on a set of 5 classes. Feature classes for two seasons were then chosen to showcase growth in Antarctic tourism over the past 14 seasons **(Fig. 1 & Fig. 2)**. Visitor numbers for each site were compared between these two seasons, and symbolized in a new layer based on their change in growth **(Fig. 3)**.

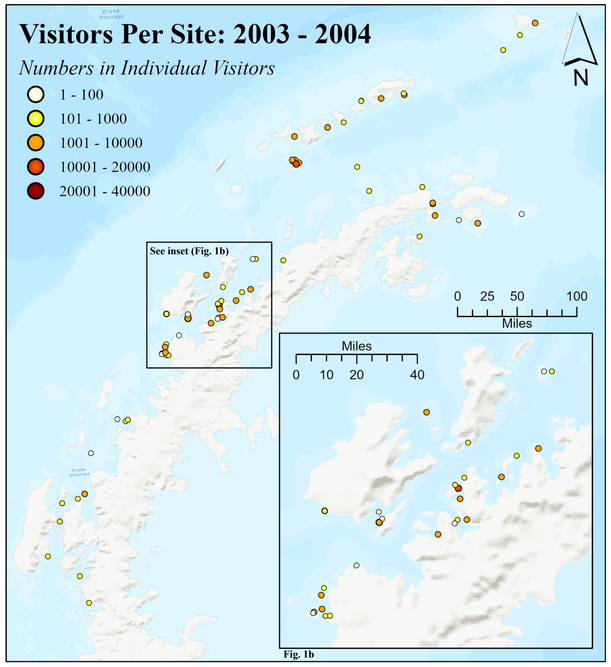
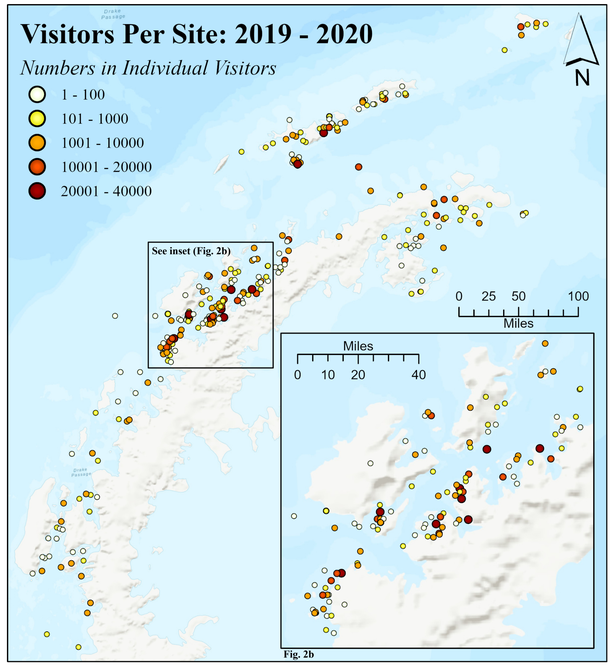


Fig. 1



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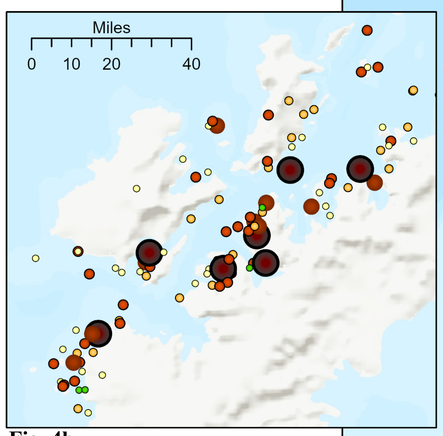

Fig. 4b

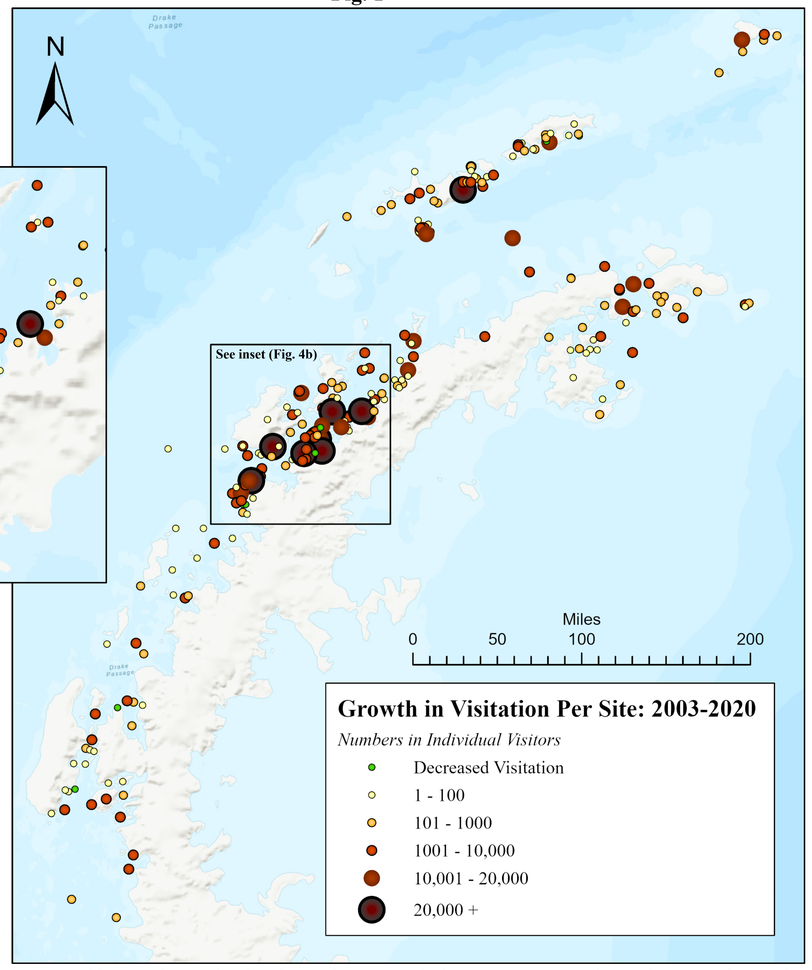

Fig. 4 Changes in tourist density — larger symbols represent more dramatic rates of growth.

Reference

Information in this poster was obtained from the International Association of Antarctic Tour Operators (IAATO) and displayed using ArcGIS. Place name information provided by the National Science Foundation and the United States Antarctic Program (USAP). Anecdotal information provided was through author's personal experience.

IAATO: *www.iaato.org*
ArcGIS: *www.esri.com*
USAP: *www.usap.gov*

Results

Results show an immediate and striking growth in tourism to almost all regions between the 2003-2004 season and the 2019-2020 season. Several clear patterns can be observed or inferred based on the map data.

The most popular sites in the 2003-2004 season also tended to be the most popular sites in the 2019-2020 season, indicating that visitation is not randomly distributed among sites but instead becoming highly concentrated around sites deemed more desirable. In the 2003-2004 season, no individual site had more than 20,000 visitors, while in the 2019-2020 season seven sites broke this threshold. These sites are all (with the exception of one) clustered in the Gerlache Strait region, and each of the most heavily trafficked sites has developed a series of 'satellite sites'— likely, these are sites that are less desirable but close in proximity, allowing tour operators quick access to more desirable sites should they become available.

Results also show tourism encroachment both South along the Western coast of the AP, as well as into the Antarctic Sound and Weddell Sea regions. Both of these areas have become steadily more accessible to tourism as sea ice maximums diminish due to climate change.

Also of interest are a series of sites where visitation has decreased over the last 14 seasons; most of these correspond to scientific bases or areas which have since been declared Antarctic Specially Managed Areas (ASMAs), where tourism is restricted.

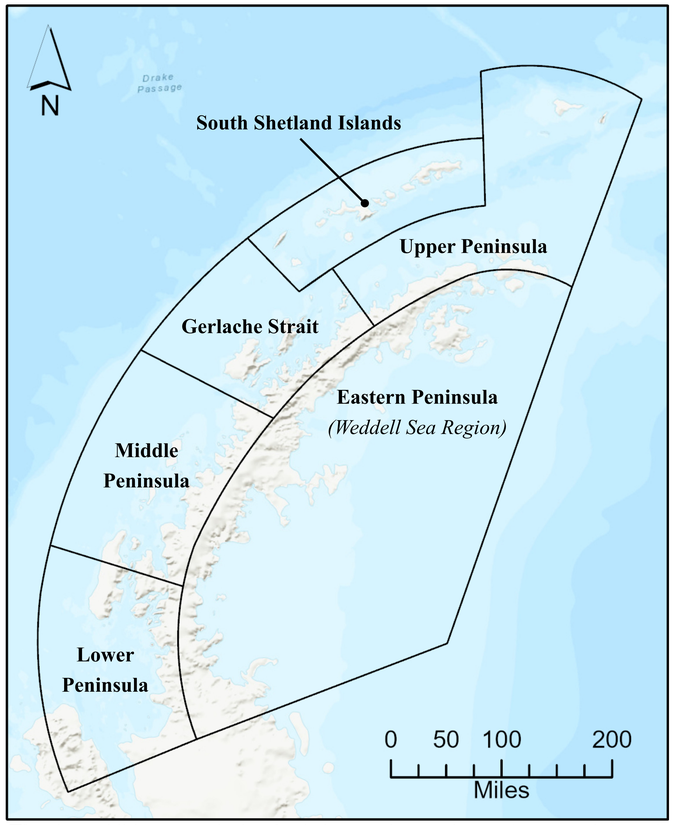

Fig. 4 In addition to analysis of existing tourist trends, ArcGIS was also used to draft a map identifying regions where distinct patterns in tourism are occurring. Regions were drawn based on distinct geographical features as well as by trends in tourism. By defining specific regions in which distinct trends in visitation occur, management plans can be developed that are tailored to a region's particular needs. Proper management can be used to avoid "bottlenecking" in high-demand regions with sensitive wildlife habitat.