

Aquatic ecosystems in Byers Peninsula, Livingston Island An Antarctic Noah's Ark in a changing world

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Byers Peninsula, located at the western end of Livingston Island (South Shetland Islands, Maritime Antarctica) (Fig. 1) is the home of one of the greatest diversity of plants and animals in Antarctica. In 2002, Byers Peninsula was designed as an Antarctic Specially Protected Area (ASP A No. 126) under the Antarctic Treaty System, and during the last International Polar Year (2007-2008) was established as an “International Antarctic Reference Site for Terrestrial, Freshwater and Coastal Ecosystems” (Quesada *et al.*, 2009). It is considered one of the richest limnological areas of Antarctic Peninsula, where numerous lakes, ponds and streams, ice free during two or three months in the Austral summer, show a wide range of different environmental conditions and provide shelter to a high diversity of biological communities (Toro *et al.*, 2007). Central Plateau of Byers Peninsula was deglaciated at circa 8300 cal yr BP, and the presence of mosses, subfossil algae and aquatic fauna remains close to the lowermost and oldest lacustrine sediments in some of the lakes (eg. Limnopolar and Escondido), suggests a very quick colonization just following the deglaciation during the early Holocene climate optimum, and a close source of moss and other species propagules (Toro *et al.*, 2013; Oliva *et al.*, submitted). This points to the existence of possible past glacial refuges in this area of the Antarctic Peninsula. Aquatic ecosystems in Byers Peninsula act as a hotspot of diversity, like an Antarctic Noah's Ark, with the occurrence of the most significant Antarctic non-marine aquatic species, such as the midges *Parochlus steinenii* and *Belgica antarctica*, the macrozooplanktonic *Boeckella poppei*, *Branchinecta gainii* and the necto-benthic *Macrothrix ciliata*, the benthic moss carpets of *Drepanocladus longifolius*, numerous endemic diatom species and a high variety of microbial mats (Toro *et al.*, 2007; Pla-Rabes *et al.*, 2013; Rochera *et al.*, 2013). All of them are involved in some of the most complex foodwebs of Antarctic aquatic ecosystems with interesting biotic interactions such as predation, providing a unique opportunity to monitoring and understand the response of these ecosystems as sentinels of environmental changes (Camacho *et al.*, 2012). Furthermore, limnological and palaeolimnological studies in Byers Peninsula offers an excellent chance to progress on one of the current challenges in Antarctic science: to understand how environmental heterogeneity and spatial structure drive biodiversity, species distribution and dispersion and colonization processes, helping to advance on the development of biogeographical models (Convey *et al.*, 2014). In Lake Limnopolar, the use of recent techniques such as genomic in the discovering of one of the highest diversities of viral communities in aquatic ecosystems in the world (López-Bueno *et al.*, 2009) has showed us an example and a promising way of how to research the role of species in the processes and functioning of Antarctic aquatic ecosystems, and their evolution in a changing world.

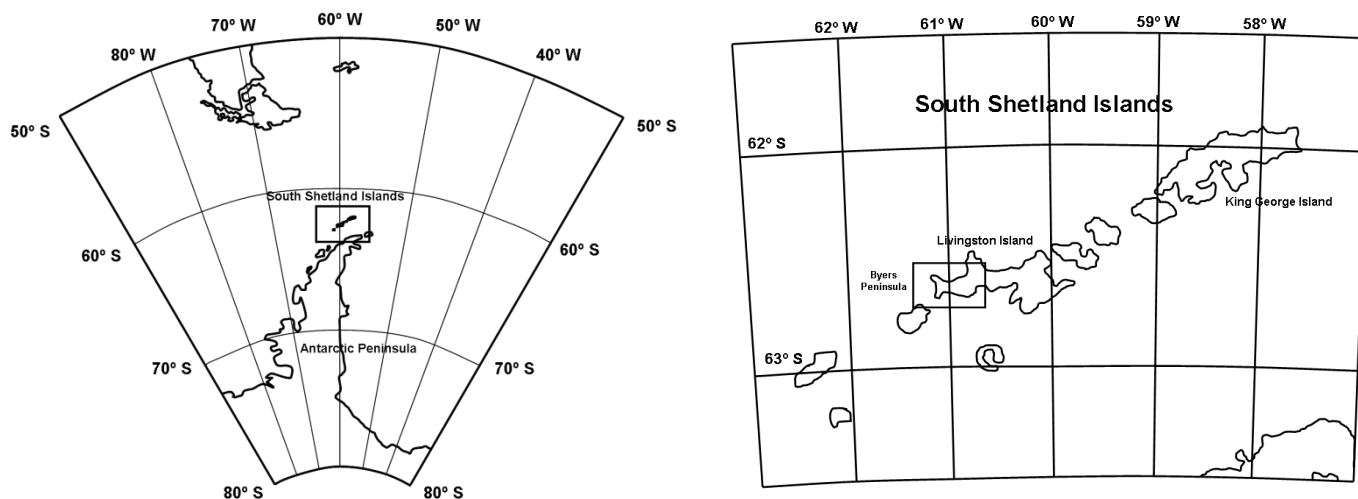


Figure 1. Location of Byers Peninsula (Livingston Island) in the Antarctic Peninsula area.

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