

Impacts of coastal dynamics on the socio-economic component of the Yukon coast, western Canadian Arctic

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Abstract:

The Yukon coast has a vivid history reaching back to the pre-historic time of the Thule Inuit. It also archives the diverse story of the Inuvialuit and their traditional and modern lifestyle, and the influences of western cultures. These cultural sites, as well as infrastructure and boating routes, which are nowadays used by the local population, are particularly vulnerable to coastal erosion. To assess this threat, shoreline change dynamics were analyzed along a 210 km long stretch of the Yukon coast by means of geo-coded aerial imagery from the 1950s, 1970s and 1990s, as well as Geo Eye 1 and World View 2 satellite images from 2011. The calculated rates of shoreline change were used to create a conservative (S1) and a dynamic (S2) scenario for possible shoreline positions for the year 2100. The future shoreline positions were then compared to locations of cultural features obtained from a Parks Canada database, the Yukon Archaeological Program and derived from existing literature, as well as from aerial photographs and videos. In total 168 features were mapped, 26 % have been already lost due to coastal erosion and further 20 % (S1) to 26 % (S2) are expected to get lost due to future shoreline retreat, summing up to a total of 46 % (S1) to 52 % (S2) of lost cultural features by 2100. Under both scenarios, the sparse infrastructure in the form of two landing strips will be severely damaged by 2100, considerably restricting its usage. Expected higher sedimentation rates will likely lead to increasing difficulties in navigating the Workboat Passage, which is an important boating route for local travelers. Thus, expected future coastal erosion and sedimentation processes will lead to the disappearance of various cultural sites and impede travelling along the Yukon coast.