

Impacts of reopening the Naransevstei Border Port and Road Development on Ecosystem Services in the Great Gobi

Roads are essential for economic development, yet linear infrastructure is among the main drivers of ecosystem degradation, particularly when planned without ecological assessment. This is especially true for arid ecosystems, due to their perceived 'emptiness', ecological impact assessments are rarely factored into linear infrastructure planning. More broadly, ecosystem service valuation in arid biomes remains understudied and systematically underestimated, although deserts cover roughly one-third of the earth's surface. This work explores potential impacts of a reopened border port and a new 400 km road on two ecosystem services, habitat quality and carbon sequestration, in the Great Gobi SPA A, Mongolia. The Great Gobi A, protected since 1975 and designated as a UNESCO Biosphere Reserve, is one of the world's most intact desert ecosystems and provides habitat for critically endangered species such as the Gobi bear (*Ursus arctos gobiensis*) and the wild Bactrian camel (*Camelus ferus*). To estimate potential landscape impacts of the construction, I applied a mixed-methods approach combining a targeted literature review, local expert consultations, and remote-sensing data. The inputs were used to identify the most relevant ecosystem services in the study area and to develop three realistic future scenarios, representing increasing levels of disturbance. The scenarios capture increasing disturbance, beginning with the planned infrastructure and extending to additional informal roads and a potential mining site. Scenario maps were generated from Copernicus land-cover data and processed in QGIS. Their ecological impacts were quantified using the InVEST Habitat Quality and Carbon Storage model. Exploring the spatial impact of the construction reveals a habitat degradation of 1779 km² in my area of interest as well as a severe habitat fragmentation for the intermediate and extreme scenario. Carbon losses for the most severe scenario are estimated at 79 933.01 Mg. This corresponds to a loss of roughly 533 ha of boreal forest, assuming a mean carbon density of 150 MgC/ha.

Although the absolute outputs appear relatively small, they represent ecosystem service declines within an extremely fragile and otherwise intact desert landscape. The results underline the importance of incorporating ecosystem service assessments into spatial planning for infrastructure development in arid regions.

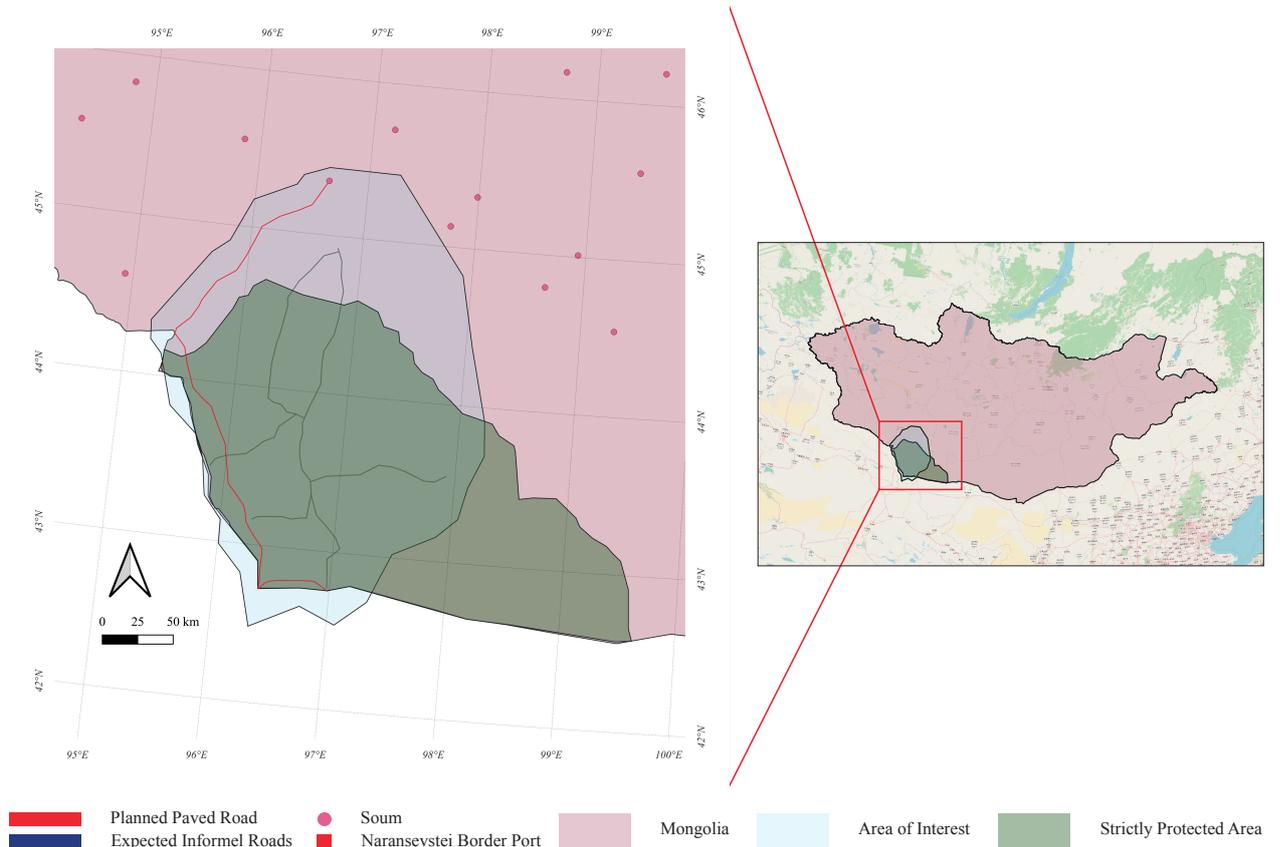


Figure 1: Study Area



Figure 2: Mazaalai (Gobi Bear), Source: BBC