

Impacts of In-stream Sand Mining on the River Geometry in Aleto Eleme, Rivers State

Jereimiah Uriah and Chima Ogba (Nigeria)

Key words: Coastal Zone Management; Land distribution; Land management; Land readjustment; Mine surveying; Mining, Land Readjustment, Land Distribution and Marine Cadastre.

SUMMARY

Abstract

Sand is a free gift of nature. It is available in wetlands, rivers, creeks, streams and dry land. It demands is constantly on the increase and the search for sand also increased. They are used for the construction of roads, buildings, bridges, land reclamation etc. In-stream sand mining modifies the natural geometry of the river. The modifications may be on both length and width which can be study using remote sensing and GIS techniques. In this study, NDWI was utilized to study changes in river geometry due to sand mining in Aleto Eleme River. The study was carried out using six epochs (2000, 2005, 2013, 2015, 2018 and 2021) of Landsat imageries. The selected Landsat image was the L1 which has been corrected for geometric distortions. Landsat data was converted from grey value to radiance image using the algorithms specified in the Landsat metadata. Green and near infrared bands of each epochs were used to compute NDWI. The results of the analysis revealed that NDWI of water bodies are 0.20 – 0.35, 0.20 – 0.32, 0.24 – 0.41, 0.22 – 0.35, 0.22 – 0.37 and 0.27 – 0.36 for the year 2000, 2005, 2013, 2015, 2018 and 2021 respectively. It is water if $NDWI > 0.20$ and non-water if < 0.20 . Also, there is general increased in water body due to sand mining. In 2000 the width of the river was 122m in the west but increased to 146m in the year 2013. The width increased to 152m in the west and 309m in the east in 2015. Also, it increases in width to 360m in the west and 515m eastward in 2021. The length of the river also increased from 1071m in 2000 to 3337m in 2021. NDWI is an effective remote sensing and GIS tool in mapping changes in water geometry. Further study should compare manual extraction of river boundary using high spatial resolution satellite image with the results of NDWI.

Impacts of In-stream Sand Mining on the River Geometry in Aleto Eleme, Rivers State (11350)
Jereimiah Uriah and Chima Ogba (Nigeria)

FIG Congress 2022

Volunteering for the future - Geospatial excellence for a better living
Warsaw, Poland, 11–15 September 2022