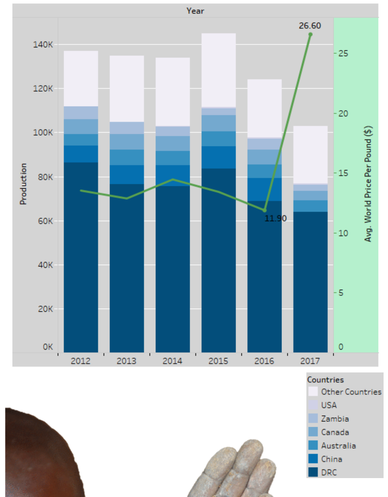
Congolese Cobalt Conflict

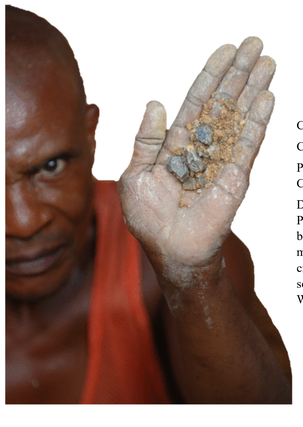
Cobalt Mine Accessibility and Security in the Democratic Republic of the Congo

Introduction

The raw materials for life's modern necessities—smart-phones, computers, tablets, LCD screens are produced through global production chains. Nations and global conglomerates engage in fierce competition to secure the natural resources to fuel their modern economies. The current global dispute is over Cobalt, a mineral necessary for the production of lithium-ion batteries that power most electronic devices. The anticipated increase in demand for electric vehicles has led large advanced battery producers scrambling to secure cheap cobalt supplies. The resulting commodity glut has not only made cobalt prices skyrocket but has also refocused attention on a decades long civil war in the heart of Africa. The Democratic Republic of Congo (DRC) possess 75% of known global deposits, producing 60% of world supply. However, cobalt extraction in the DRC is limited by instability and violence.

Cobalt Production and Price





Cartographer: Steven Goldbaum

Class: DHP—P207

Projection: Africa Alberts Equal Area Conic

Data Sources: DRC Mining Cadastre Portal, ACLED, Ministry of Sustainable Development, of Forest, Economy, and Environment of the Democratic Republic of Congo, World Resources Institute, GADM, ESRI, World Food program

Methodology

The goal of the project was to identify which mines are optimal for cobalt production and extraction. Two main aspect were analyzed

1.) Security Risk

2.) Accessibility

Mine Security Risk

Violent event data was plotted by location and used to create a fatality density rating quantified by number of events and fatalities. The resulting ranked conflict zones were then weighted by two factors: their distance from the capital and their proximity to borders.

1. *Distance from Capital*

Based on previous studies, the duration of civil conflict has a significant correlation with its distance from a capital, the greater distance the more intractable the conflict. Distance from Capital was combined with Conflict Density, weighted 0.05,

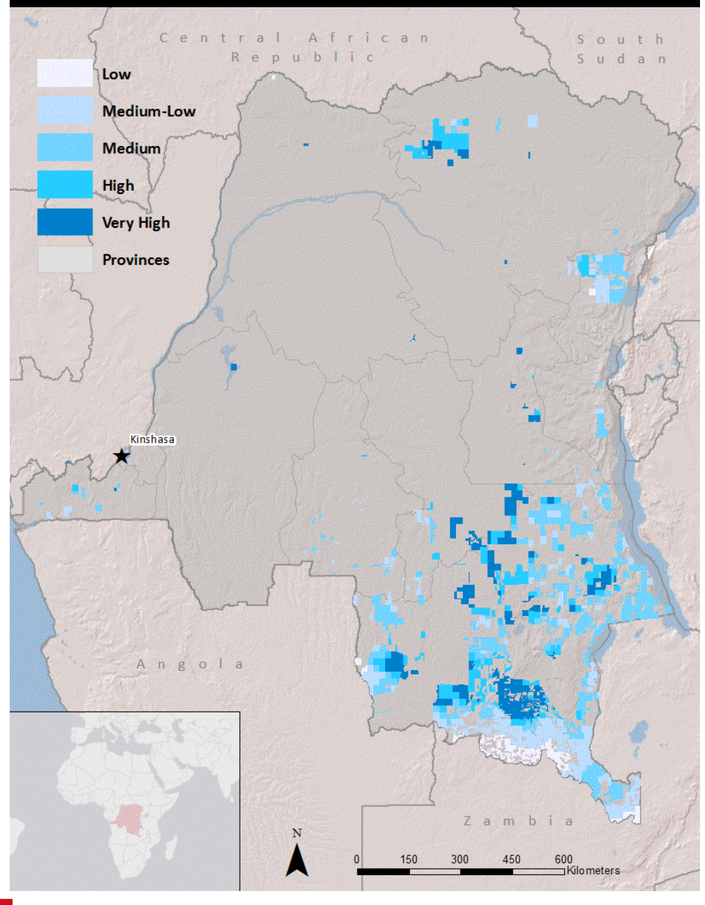
2. *Distance from Border*

Distance from an international border also has a strong correlation with conflict duration. Armed groups gain numerous advantages operating from safe havens in neighboring countries. Borders with high levels of militant activity and refugee flows were selected and combined with Conflict Density, weighted 0.15.

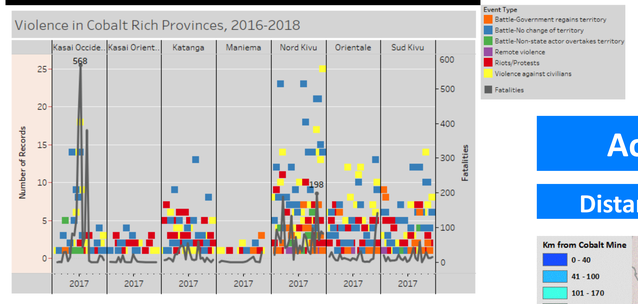
Accessibility

Accessibility was determined by combining distance from cobalt (weighted 0.75) and distance from major roads (weighted 0.25). These two factors were combined to create an overall Accessibility rating.

Cobalt Mine Extraction Suitability
High Access/Low Conflict



Violence In Cobalt-Rich Regions



Results

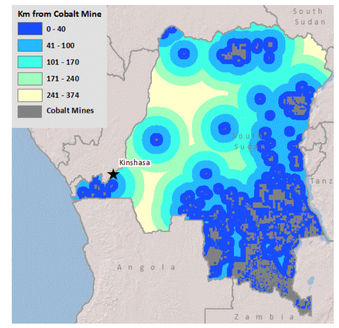
Cobalt Mines	Total Mines	Total Area (Sq Km)	Percent
High Access/Low Conflict	435	835,511	35
High Access/High Conflict	572	68,919	29
High Security Risk Rating	746	77,642	32
Total	1,613	240,277	100

This GIS analysis can be applied in multiple ways. Investment decisions could be guided by the identification of mines most suitable for extraction. Additionally, greater resources could be dedicated to mitigating risk for mines with high access but high security risk. As mining permits are attached to company names, analysis can shed light on risk exposure to specific industry members.

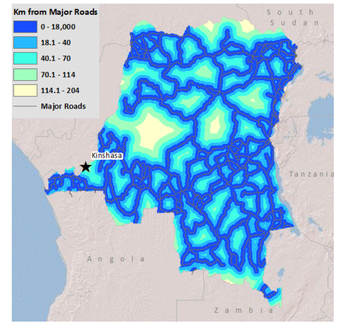
Limitations: This analysis would be strengthened by mine production capacity or cobalt ore reserve estimates. While this information was not available, it would produce a more actionable analysis for both investment and resource deployment.

Accessibility

Distance From Cobalt

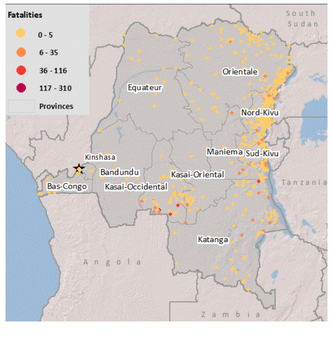


Distance From Major Roads

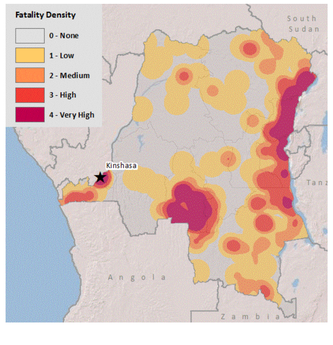


Security

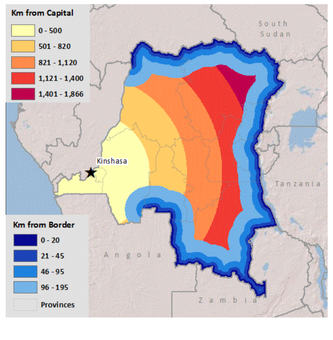
Violent Event Location



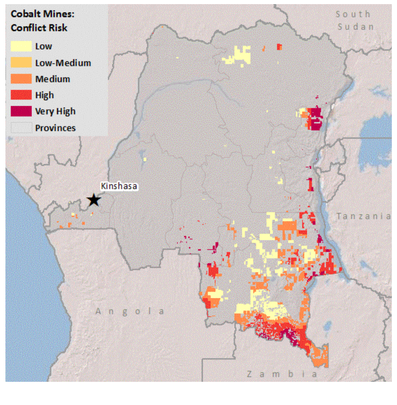
Fatality and Event Density



Distance: Capital & Borders



Mine Security Risk Rating



Accessibility Rating