

The Ebola Virus Disease Outbreak and the Mineral Sectors of Guinea, Liberia, and Sierra Leone

On March 23, 2014, the World Health Organization (WHO) made the first announcement of what would become the largest Ebola virus disease (EVD) outbreak since the discovery of the disease in West Africa in 1976. At the forefront of world news regarding the deadly virus were Guinea, Liberia, and Sierra Leone, the three countries most affected by the EVD outbreak (World Health Organization, 2014). Projected economic growth for these three countries in 2014 and 2015 had hinged on the expected development of their respective mineral sectors, which play a significant role in the

economy of all three countries in terms of the contribution to the gross domestic product (GDP) and to export revenues. The mineral sector, in particular the iron ore industry, has played a significant role in the economic growth experienced by Liberia and Sierra Leone in recent years. Uncertainty regarding the status of mining and mineral exploration operations in the three countries following the onset of the EVD outbreak and changes in mineral market conditions raised questions regarding the prospects for such growth and future foreign direct investment in the region (World Bank Group, 2014). Figure 1

shows the total number of reported EVD cases as of yearend 2014, and the geographic location of active mining operations and mineral facilities in Guinea, Liberia, and Sierra Leone.

This fact sheet provides data and information about (1) the mineral sectors of Guinea, Liberia, and Sierra Leone and the importance of the sector to the economy of each country; (2) the distribution of mines and mineral facilities, projects in development, and reported EVD cases; and (3) potential risks of the outbreak to investment in and development of new mines, processing facilities, and related mineral industry infrastructure.

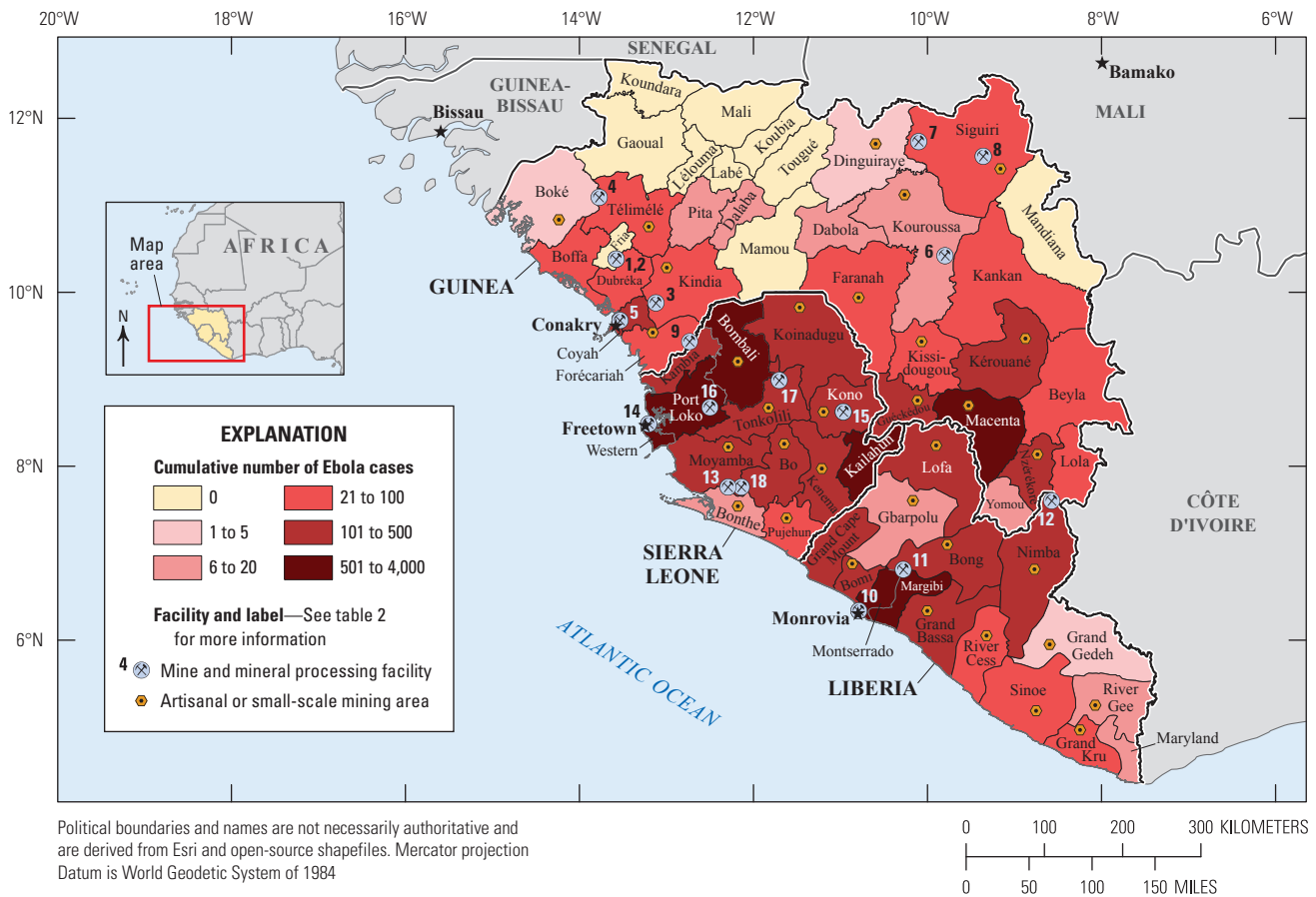


Figure 1. Active mining operations and mineral processing facilities in Guinea, Liberia, and Sierra Leone and reported cases of Ebola as of yearend 2014. Numbered facility labels correspond to entries in table 2. District-level Ebola virus disease data derived from World Health Organization (2014, 2015) data as of December 2014.

Background

Guinea, Liberia, and Sierra Leone's shared histories of civil unrest and related economic disruptions have served as deterrents to the development of the mineral sector in each of these countries. Coups d'état and prolonged periods of civil war heavily damaged infrastructure including government buildings, roads, bridges, ports, and railways, which are central to the development of the mineral sector. Since 2011, progress has been made in the rehabilitation of infrastructure in all three countries; however, much of it is still in need of repair. Poor infrastructure and inadequate electric power continue to be a major deterrent to foreign direct investment in mining (Pushak and Foster, 2011, p. 1–10; World Bank, 2013, p. 1–5; 2014).

Table 1 shows Guinea's, Liberia's, and Sierra Leone's mineral production by commodity and each country's mineral sector contribution to GDP and export earnings in 2012. Guinea was among the world's leading producers of bauxite in 2012, accounting for about 6 percent of world bauxite output. The country was also a significant world producer of rough diamond. Production of bauxite was from the Friguia, Debele, and Sangaredi Mines (table 2, nos. 2–4).

Liberia produces cement, rough diamond, small amounts of gold, and iron ore. For many years, Liberia's economy had relied heavily on production and exports of iron ore, which came to a halt in 1990 following the onset of civil war in Liberia. Diamond proceeds were used to a large extent to finance the civil war,

which resulted in the United Nations Security Council imposing rough-diamond export sanctions on Liberia in 2001. Diamond sanctions were eventually lifted in April 2007 and production of iron ore resumed in 2011 (United Nations Security Council, 2007, p. 3, 7–8).

Sierra Leone produces cement, rough diamond, small amounts of gold, iron ore, and mineral sands (ilmenite and rutile). Bauxite and mineral sands production came to a standstill in 1994 owing to civil war in Sierra Leone. Because diamonds were also used to finance the civil war, diamond export sanctions were also imposed on the country. The civil war ended in 2002 and diamond sanctions were lifted in 2003. Production of bauxite from the Sierra Minerals Mine (table 2, no. 13) and mineral sands from the Sierra Rutile Mine (table 2, no. 18) resumed in 2006. Sierra Leone began producing iron

ore again in 2011 with the reopening of the Marampa Mine (table 2, no. 16) and the opening of the Tonkolili Mine (table 2, no. 17). Sierra Leone's production of rutile (94,493 metric tons [t]) accounted for more than 11 percent of world rutile output in 2012.

Figure 2 shows the mineral sector share of GDP for Guinea, Liberia, and Sierra Leone. Guinea's mineral sector share of GDP fluctuated between 14 and 15 percent from 2004 to 2011 (fig. 2). The sector accounted for about 14 percent of the country's GDP in 2012 and for about 90 percent of export earnings. Guinea's sector share of GDP was estimated to have decreased to 12.5 percent in 2013 owing partly to a decrease in the production of alumina caused by the temporary closure of the country's alumina plant as a result of a trade union strike.

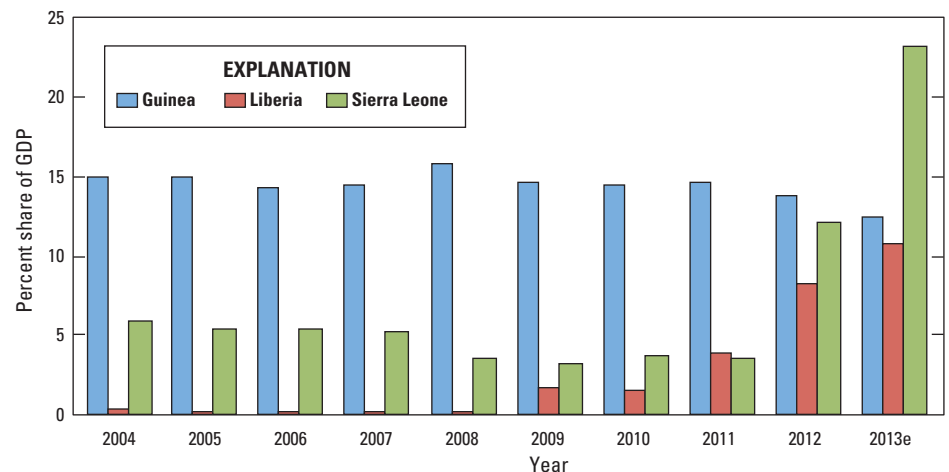


Figure 2. Mineral sector share of gross domestic product (GDP). Sources of data include the Central Bank of Liberia (2015), Bank of Sierra Leone (2015), Guinea Institut National de la Statistique (2014), and International Monetary Fund (2014). e, estimated.

Table 1. Mineral production and mineral sector contribution to gross domestic product (GDP) in 2012.

[Mineral production reported in thousands of metric tons unless otherwise specified. Abbreviations used: kg, kilogram; t, metric ton; NA, not applicable]

Location	Alumina	Bauxite	Cement	Diamond (carats)	Gold (kg)	Iron ore (metal content)	Mineral sands (ilmenite and rutile) (t)	Percentage mineral sector contribution to GDP	Percentage of export earnings
World	¹ 97,000	² 259,000	³ 3,830,000	³ 128,000,000	⁴ 2,710,000	⁵ 1,390,000	⁶ 8,610,000	NA	NA
Guinea ⁷	150	16,041	317	³ 266,800	14,790	Not disclosed	NA	^{8,9} 14	^{8,9} 90
Liberia ¹⁰	NA	NA	122	³ 41,985	641	1,980	NA	¹¹ 8	¹¹ 35
Sierra Leone ¹²	NA	776	335	³ 541,166	¹³ 145	3,600	117,083	¹⁴ 12	¹⁴ 70

¹E. Lee Bray, U.S. Geological Survey, unpub. data.

²van Oss, 2015.

³Kimberley Process Rough Diamond Statistics, 2013.

⁴Micheal W. George, U.S. Geological Survey, unpub. data.

⁵Tuck, 2014.

⁶Bedinger, 2014.

⁷Bermúdez-Lugo, 2014a.

⁸Guinea Institut National de la Statistique, 2014.

⁹International Monetary Fund, 2014.

¹⁰Bermúdez-Lugo, 2014b.

¹¹Central Bank of Liberia.

¹²Bermúdez-Lugo, 2014c.

¹³Omayra Bermúdez-Lugo, U.S. Geological Survey, unpub. data.

¹⁴Bank of Sierra Leone, 2014.

In Liberia, prior to 1990, the contribution of the mineral sector to GDP stood at an average of about 25 percent, mostly driven by diamond and iron ore production. The contribution of Liberia's mineral sector to GDP began to increase in 2007 as the embargo on diamond exports was lifted. Figure 2 shows the increase in the share of GDP accounted for by minerals, which was about 8 percent in 2012.

Sierra Leone's mineral sector accounted for about 12 percent of GDP in 2012 and for about 70 percent of export earnings. Prior to the civil war, the sector's share of GDP averaged about 15 percent, mostly driven by the production of bauxite, cement, diamond, and mineral sands. For 2013, the estimated contribution of the mineral sector to GDP in Guinea, Liberia, and Sierra Leone was about 13, 11, and 23 percent, respectively.

The Ebola Virus Disease Outbreak Crisis

The first laboratory-confirmed case of the EVD was reported by the Ministry of Health in Guinea on March 21, 2014. By early June, wide transmission of the EVD was confirmed in Liberia and Sierra Leone. The number of EVD cases peaked in late October and early November and by yearend had affected more than 20,000 people. As of January 18, 2015, the rate of infection had decreased significantly; however, transmission of the EVD continued in all three countries, with the total number of cumulative cases reported to be 21,797 (fig. 3) (Centers for Disease Control and Prevention, 2015a,b).

Changing Mineral Market Conditions in 2014

Coincidentally, the emergence of the EVD crisis was accompanied by changes in market conditions, which were likely to affect Government revenues from the mineral sector, as iron ore was expected to become an increasingly significant source of future export earnings for all three countries and bauxite accounts for the majority of Guinea's export earnings. These changes in market conditions included (1) a decrease in aluminum and bauxite prices following the recession of 2009, which affected world consumption of bauxite; combined with (2) a ban

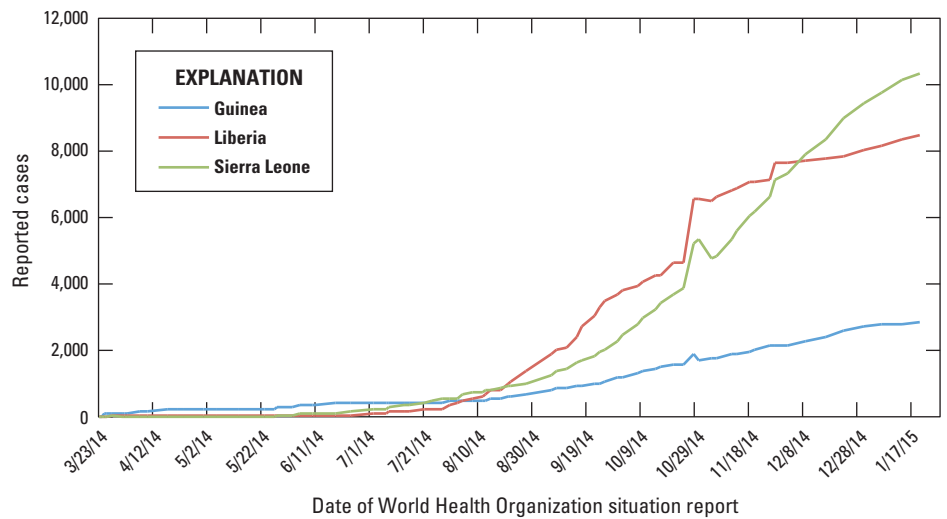


Figure 3. Cumulative reported cases of the Ebola virus disease as of January 18, 2015 (Centers for Disease Control and Prevention, 2015b). Data reported by the Centers for Disease Control and Prevention are based on World Health Organization (WHO) situation reports and correspond to the total number of reported suspected, probable, and confirmed cases of the Ebola virus disease for the period of March 23, 2014, to January 18, 2015.

imposed by Indonesia—one of the leading sources of global exports of bauxite—on the export of unprocessed minerals including bauxite; and (3) a decrease in the global price of iron ore from \$130 per metric ton in early 2014 to \$68 per metric ton at yearend (Gleeson, 2014).

Operating Status of Mines and Mineral Facilities

The names and locations of existing mining operations in Guinea, Liberia, and Sierra Leone and the names of major equity owners are listed in table 2. Most of the mining companies operating in these three countries reported that mining had continued mostly uninterrupted in 2014. Several mines were placed on care-and-maintenance status for reasons other than the EVD outbreak.

In Guinea, mining operations that continued mostly uninterrupted during 2014 included that of the Debele and Sangaredi bauxite mines (table 2, nos. 3, and 4); the Kiniero, Lefa, and Siguiri gold mines (table 2, nos. 6, 7, and 8); and the Ciments de Guinée cement plant (table 2, no. 5). In Liberia, mining operations continued at the Bong and Western Range Project iron ore mines (table 2, nos. 11 and 12) and the Cemenco cement plant (table 2, no. 10). In Sierra Leone, the Sierra Minerals bauxite mine (table 2, no. 13) was active as of June 30. Mining companies reported anticipating a reduction in

bauxite production owing to operational issues resulting not only from the EVD outbreak, but also from adverse weather conditions and social tensions in the country. The Sierra Rutile mineral sands mine (table 2, no. 18) continued to operate throughout the year although annual production was lower than expected, largely owing to challenges presented by the EVD outbreak (Sierra Rutile Ltd., 2015). Two workers from the Koidu Kimberlite Mine (table 2, no. 15), in the Kono District, contracted the EVD in early December. Two significant mine closures in Sierra Leone occurred during the year: that of the Marampa iron ore mine (table 2, no. 16) and the Tonkolili Mine (table 2, no. 17). The closure of these mines was related to the decrease in global iron ore prices and to issues related with offtake agreements and company debt (Armitage, 2014; Greve, 2015; Riseborough, 2014).

Status of Mineral Development Projects

Mineral development projects were the underpinnings for the World Bank's forecasts of GDP increases in Guinea, Liberia, and Sierra Leone through 2017. In 2012, it was estimated that for Guinea the development of these projects had the potential to double the country's real GDP by 2015 and to greatly enhance the prospects for future GDP growth through 2017 (World Bank, 2012, p. 2–3).

Table 2. Mining operations in Guinea, Liberia, and Sierra Leone and their reported operating status in 2014.

[Location and distance information is based on publicly available information and may be approximate for some sites. Abbreviation used: km, kilometer]

Label in figure 1	Country	Mineral commodity	Mine or mineral facility	Location	Major operating companies and major equity owners	Operating status in 2014
1	Guinea	Alumina	Friguia alumina refinery	Fria	Alumina Company of Guinea (United Company RUSAL plc, 100%)	Shut down in April 2012. Remained closed in 2014. ¹
2	Guinea	Bauxite	Friguia bauxite mine	Fria	Alumina Company of Guinea (United Company RUSAL plc, 100%)	Shut down in April 2012. Remained closed in 2014. ¹
3	Guinea	Bauxite	Debele (Kindia) Mine	Kamsar	Compagnie des Bauxites de Kindia (United Company RUSAL plc, 100%)	Active as of December 31, 2014. ¹
4	Guinea	Bauxite	Sangaredi Mine	175 km north of Conakry	Compagnie des Bauxites de Guinée [Halco Mining Inc. (Alcoa Inc., 45%; Rio Tinto Alcan Inc., 45%; Dadco Group, 10%), 51%; Government of Guinea, 49%]	Active as of November 28, 2014. ²
5	Guinea	Cement	Grinding plant	35 km from Conakry	Ciments de Guinée, S.A. (Holcim Ltd., 60%; Government of Guinea, 40%)	Active as of October 9, 2014. ³
6	Guinea	Gold	Kiniero Mine	650 km east of Conakry	New Dawn Mining Corp., 85% (Formerly owned by SEMAFO Inc.; Kiniero Mine was sold to New Dawn on May 28, 2014)	Active as of September 30, 2014. ^{4,5} Status unknown as of yearend 2014.
7	Guinea	Gold	Lefa Mine	700 km northeast of Conakry	Nord Gold N.V.	Active as of November 20, 2014. ⁶
8	Guinea	Gold	Siguiro Mine	850 km northeast of Conakry	AngloGold Ashanti Limited	Active as of September 30, 2014. ⁷
9	Guinea	Iron ore	Forécariah Mine	100 km east of Conakry	Forécariah Guinea Mining S.A. (Bellzone Mining plc, 50%; China International Fund Ltd., 50%)	Active as of June 2014. Status unknown as of yearend 2014. ^{8,9}
10	Liberia	Cement	Cemenco cement plant	Monrovia	Liberia Cement Corp. Ltd. (Heidelberg Cement AG)	Active as of November 6, 2014. ¹⁰
11	Liberia	Iron ore	Bong Mine	Bong County, western Liberia	China Union Investment Co. [Wuhan Iron and Steel (Group) Corporation]	Active as of October 29, 2014. ¹¹
12	Liberia	Iron ore	Western Range Project	300 km northeast of Monrovia	ArcelorMittal	Active as of yearend 2014. ^{12,13,14,15}
13	Sierra Leone	Bauxite	Sierra Minerals Mine	150 km southeast of Freetown	Sierra Mineral Holdings 1 Ltd. (Vimetco N.V., 100%)	Active as of June 30, 2014. ¹⁶
14	Sierra Leone	Cement	Leocem cement plant	Freetown	Sierra Leone Cement Corp. Ltd. (HeidelbergCement AG)	Active as of November 6, 2014. ¹⁰
15	Sierra Leone	Diamond	Koidu Kimberlite Mine	360 km east of Freetown	Octéa Diamond Group (BSG Resources Ltd., 100%)	Active as of December 12, 2014. ^{17,18}
16	Sierra Leone	Iron ore	Marampa Mine	150 km northeast of Freetown	Timis Corporation Ltd. (Marampa Mine was formerly owned by London Mining plc and was acquired by Timis Corp. in October 2014)	Temporary shutdown (placed on care-and-maintenance status). ^{19,20,21}
17	Sierra Leone	Iron ore	Tonkolili Mine	190 km northeast of Freetown	Tonkolili Iron Ore (Sierra Leone) Ltd. (African Minerals Ltd., 75%; Shandong Iron and Steel Group Co. Ltd., 25%)	Temporary shutdown (placed on care-and-maintenance status as of December 1, 2014). ²²
18	Sierra Leone	Mineral sands (ilmenite, rutile, zircon)	Sierra Rutile Mine	130 km southeast of Freetown	Sierra Rutile Ltd.	Active as of yearend. ²³

¹United Company RUSAL plc, 2015a.⁵SEMAFO Inc., 2014.¹⁰HeidelbergCement AG, 2014a.¹⁴ArcelorMittal, 2014d.¹⁹Riseborough, 2014.²Rio Tinto plc, 2014a.⁶Nord Gold N.V., 2014.¹¹Wuhan Iron and Steel (Group) Corp., 2014.¹⁵ArcelorMittal, 2014c.²⁰Wilson, 2014.³de Beaupuy, 2014.⁷AngloGold Ashanti Ltd., 2014.¹²ArcelorMittal, 2014b.¹⁶Vimetco N.V., 2014.²¹Armitage, 2014.⁴New Dawn Mining Corp., 2014. No reports on the status of the Kiniero Mine were publicly available as of yearend 2014.⁸Bellzone Mining plc, 2014a.¹³ArcelorMittal, 2014a.¹⁷Green, 2014.²²African Minerals Ltd., 2014.⁹Bellzone Mining plc, 2014b.¹⁸Biesheuvel, 2014.²³Sierra Rutile Ltd., 2015.

Figure 4 shows the total number of EVD cases as of yearend 2014 and the geographic location of mineral development and exploration projects.

Liberia and Sierra Leone began to show significant signs of economic recovery in the mineral sector with the ramping up of existing mining operations and the resumption of iron ore mining in Liberia in 2010 and in Sierra Leone in 2011. The large number of companies prospecting and exploring for minerals, together with the increasing number of bauxite, diamond, gold, and, in particular, iron ore projects at an advanced stage of development, signaled prospects for continued growth. Many of those mineral projects had significant capital investments committed; total capital investments committed for the development of bauxite and alumina projects in Guinea alone were estimated to be in excess of \$17 billion (Bates, 2012; Guinea Alumina Corp., 2014; Helmer, 2011; Lyall, 2015; Minesite, 2014; Torchia, 2014). Investments in associated infrastructure projects represented a significant portion of the cost.

Capital expenditures committed for the development of iron ore resources in Guinea were estimated to be in excess of \$10 billion (Bellzone Mining plc, 2013; BSG Resources Ltd., 2014; Rio Tinto SIMFER S.A., 2014; Sable Mining Africa, Ltd., 2015), a significant amount for a country whose GDP based on purchasing power parity (PPP) was estimated to be about \$14 billion in 2012. In Liberia, the Putu Range iron ore project alone had committed capital expenditures of \$3 to \$4 billion (PAO Severstal, 2012). Liberia's GDP based on PPP in 2012 was estimated to be about \$3 billion. Committed capital expenditures in advanced development projects in Sierra Leone were about \$200 million; the country's GDP based on PPP was estimated to be about \$10 billion in 2012 (Amara Mining plc, 2013; Stellar Diamonds plc, 2010, 2014).

Conclusions

Mineral production at the industrial scale was to a large extent maintained during 2014 (exceptions

are noted in table 2). The activities of mining companies with projects under development or at an early exploration stage, with several exceptions, also continued mostly uninterrupted throughout the year. Quick, coordinated actions on the part of mining companies operating in all three countries helped surrounding communities and national health organizations in their effort to contain the virus. These efforts included (1) securing the perimeter of mining operations, (2) providing training to staff to ensure safety in and around mining facilities and adjacent communities, and (3) establishing health screening and preventative operating protocols to avoid the spread of the EVD. A group of mining companies created an advocacy group to coordinate efforts to address the EVD outbreak and, encouraged by the United Nations, pledged to continue to operate their businesses, to honor financial commitments, and to pay and train staff (ArcelorMittal, 2014b,c; United Nations Global Compact, 2015). Many mining companies also donated funds and medical equipment and

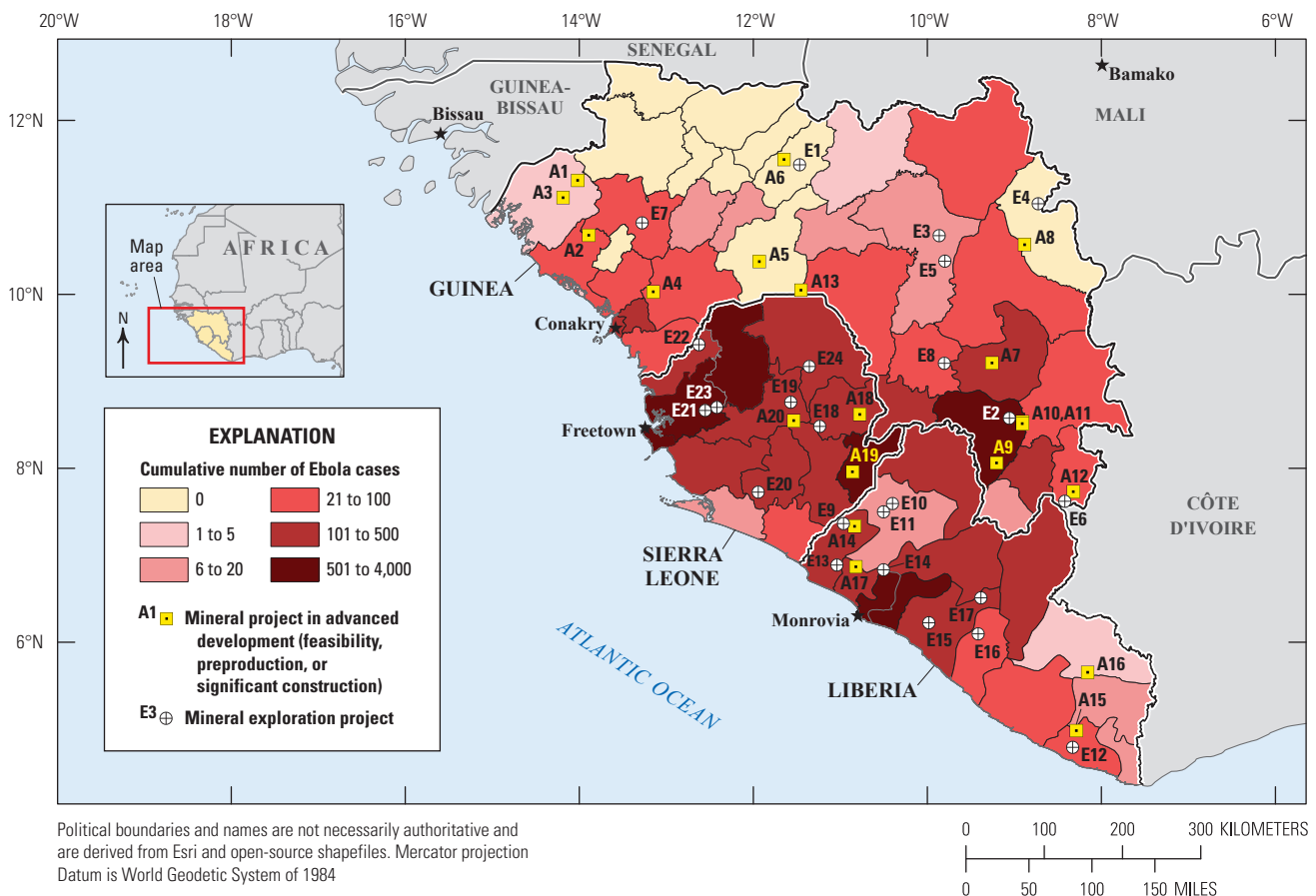


Figure 4. Mineral development and exploration projects in Guinea, Liberia, and Sierra Leone as of yearend 2014. Mineral project locations from Omayra Bermúdez-Lugo (U.S. Geological Survey, unpub. data).

supplies, among other essential items, to local governments and international organizations (United Company RUSAL plc, 2015b). The transportation of mineral goods to export points also functioned to a significant extent, although the outbreak caused delays in sea freight deliveries at some ports (Sierra Rutile Ltd., 2015). Some commercial flights to and from Guinea, Liberia, and Sierra Leone were cancelled and the limited availability of flights affected business travel for mining companies (Air France, 2014; British Airways, 2014; Emirates, 2014; International Civil Aviation Organization, 2014).

Uncertainty remains as to when, if at all, the Marampa and Tonkolili Mines will resume operation and whether individual iron ore development projects will proceed to production. The prospects for economic growth in Guinea, Liberia, and Sierra Leone hinge on the short-term development of these and other projects. The cancellation or significant delay of these projects would be a major setback for Guinea, Liberia, and Sierra Leone.

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