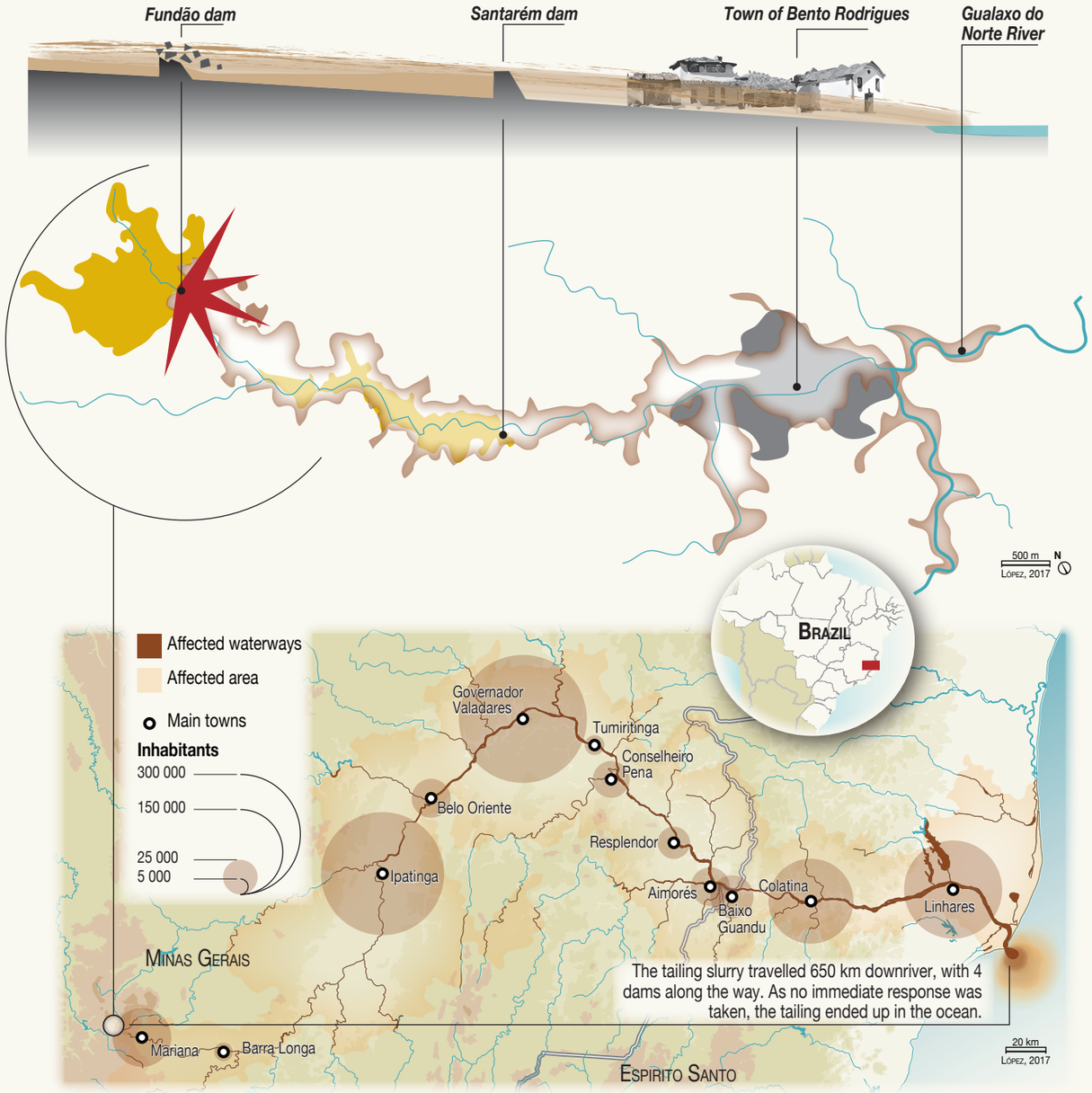
Germano mine storage facility failure

The **Fundão** dam, one of the tailings dams at Germano mine, broke on the afternoon of 5 November 2015. The breach discharged 33 million m^3 of iron ore tailings slurry.

Initially it was believed that the **Santarém** dam had also broken, but later it was verified that the mud from the Fundão dam had covered it, causing it to overflow as well.

The mud devastated the sub-district of **Bento Rodrigues**, pulling vehicles downstream and destroying hundreds of houses, following the **Gualaxo** and **Doce** rivers affecting the municipalities of Minas Gerais and Espírito Santo before reaching the Atlantic Ocean.



The tailing slurry travelled 650 km downriver, with 4 dams along the way. As no immediate response was taken, the tailing ended up in the ocean.

GRID ARENDAL

Direct impacts

PEOPLE
19 people died, 600 families were displaced and at least 400 000 people had their water supply disrupted.

FAUNA
Entire fish populations- at least 11 tons- were killed immediately when the slurry buried them or clogged their gills.

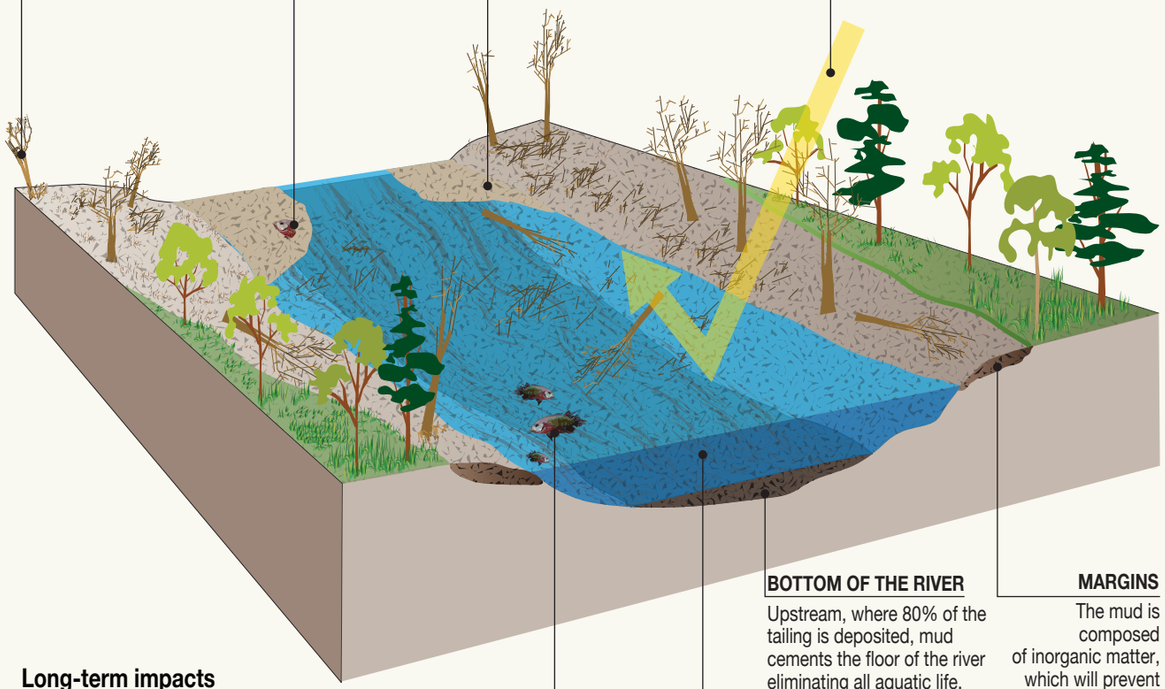
HERITAGE
Numerous colonial monuments dating back to the 1700s were destroyed.

INFRASTRUCTURE
The slurry filled 650 km of hydrologic networks.

VEGETATION
The force of the mudflow destroyed 1 469 hectares of riparian forest.

SILTING
The riverbed became shallow and even dried out in some areas.

LIGHT
The turbidity of the water prevents light from passing through it, preventing photosynthesis from occurring.



BOTTOM OF THE RIVER
Upstream, where 80% of the tailing is deposited, mud cements the floor of the river eliminating all aquatic life.

MARGINS
The mud is composed of inorganic matter, which will prevent plants from growing where it has settled.

Long-term impacts

PEOPLE
The destruction of riparian, freshwater and marine ecosystems eliminated irreplaceable natural resources and ecological processes that support traditional livelihoods, disrupting fisheries, agriculture, tourism and freshwater resources. The interruption of the mining activity will severely affect the local economies of 37 villages and cities. Fishing and agriculture are banned across affected areas for an indefinite period and misguided future use and restoration designs may increase human exposure to heavy metals.

pH AND TEMPERATURE
The sediment altered the acidity and the temperature of the water, killing aquatic life.

TURBIDITY
Downstream and close to the river mouth, when the river level rises after the rainy season, turbidity increases and metal levels in the water column return to the same level as in November 2015.

Sources: *Geraque E. et al, 2015, Rastro de lama, Folha de São Paulo; Costa C., 2015, O que já se sabe sobre impacto da lama de Mariana?, BBC Brasil; Fernandes, G.W. et al, 2016, Deep into the mud: ecological and socio-economic impacts of the dam breach in Mariana Brazil, Natureza & Conservação, n. 14, pp. 35-45; IBGE, 2017, Cidades. População, ibge.gov.br; Alex Bastos Universidade Federal do Espírito Santo, Brazil.*