



Fig. 1. Census tracts in the City of Barcelona according to water supply area.

Table 2

Drinking water, total, and reference median trihalomethane (THM) exposures in 2016 by water supply area and drinking water consumption source.

Drinking water source by water supply area	THM concentration in drinking water ( $\mu\text{g/L}$ )	Total THM exposure ( $\mu\text{g/L}$ ) <sup>c</sup>	THM exposure through skin contact and inhalation ( $\mu\text{g/L}$ ) (reference)
<b>Llobregat</b>			
Tap water	31.1	31.1	12.5
Tap filtered <sup>a</sup> water	3.4	14.6	12.5
Bottled <sup>b</sup> water	0.3	12.7	12.5
<b>Llobregat + Ter</b>			
Tap water	46.3	46.3	18.6
Tap filtered <sup>a</sup> water	5.1	21.7	18.6
Bottled <sup>b</sup> water	0.3	18.8	18.6
<b>Ter</b>			
Tap water	40.1	40.1	16.1
Tap filtered <sup>a</sup> water	4.4	18.7	16.1
Bottled <sup>b</sup> water	0.3	16.3	16.1

<sup>a</sup> Filtered water THMs concentrations are assumed to be 89% lower than the corresponding tap water exposures (Carrasco-Turigas et al., 2013).

<sup>b</sup> Bottled water THMs concentrations are assumed to be 0.3  $\mu\text{g/L}$  for all areas (Font-Ribera et al., 2010).

<sup>c</sup> Total exposure estimates assume 59.8% of total exposure occurs via ingestion and 40.2% via dermal contact and inhalation of tap water (Jo et al., 1990).

in  $\mu\text{g/L}$  (Evlampidou et al., 2020). We scaled the ORs for the THM level corresponding to each drinking water consumption scenario compared to the reference exposure, in which there is no THM exposure due to ingestion. We then estimated the population attributable fractions (PAFs), i.e. the proportion of disease in the population that would be attributable to a certain exposure, using standard formulas for burden of disease analyses (WHO, 2014):

$$\text{PAF}\% = ((\text{OR} - 1) / \text{OR}) * 100 \quad (1)$$

With these PAFs, we estimated the YLLs, YLDs, and DALYs attributable to THM levels in the study area for S1–S4 compared to the reference exposure by using this formula:

$$\text{Attributable DALYs} = \text{annual DALYs} * \text{PAF} \quad (2)$$

## 2.5. Life cycle assessment

LCA is a systematic tool for identifying, quantifying, and assessing environmental impacts through the whole life cycle of a product, process or activity (ISO, 2006). It includes energy and material uses and releases to the environment from cradle to grave (e.g. raw materials extraction, production, use and final disposal). According to the ISO 14040, there are four main stages in an LCA: i) goal and scope definition,