1 Resilience index

1.1 New criteria calculation: complaints per capita

The complaints per capita, for each censusblock j, are given by

$$\bar{y}_{1j} = \frac{y_{1j}}{y_{2j}} \tag{1}$$

where y_{1j} are the complaints ($resident_reports_potable_water_failure_count_per_year$) and y_{2j} the population ($resident_count$).

1.2 General index definition

The resilience index r for each census block j is obtained as a linear combination in the form

$$r_j = \sum_{i=1}^{N} w_{ij} x_{ij} \tag{2}$$

where w is the weight and x is the value function of the state of criteria i for the $N = 2$ criteria considered in the phenomena description. In particular, the considered criteria are:

- the complaints per capita ($resident_reports_potable_water_failure_count_per_year_pc$)
- the infrastructure deficiency ($household_potable_system_lacking_percent$)

1.3 Value function for the complaints per capita

The value function is obtained with

$$x_{1j} = 1 - \frac{e^{\left(\gamma\left(100 - \frac{100\bar{y}_{1j}}{\max \bar{y}_{1j}}\right)\right)} - 1}{e^{(\gamma 100)} - 1} \tag{3}$$

where $\bar{y}_{1j}$ are the complaints percapita for censusblock j with $\gamma = 0.1525$.

1.4 Value function for the infrastructure deficiency

The value function for the deficiency state is given by

$$x_{2j} = 1 - \frac{e^{(\gamma 100 y_{2j})} - 1}{e^{(\gamma 100)} - 1} \tag{4}$$

where y_{2j} is the value of the infrastructure deficiency for censusblock j, with $\gamma = 0.01975$.