



Natura 2000 parks exposure to industrial pollution

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CSRD - 50K companies

New rules on corporate sustainability reporting: The Corporate Sustainability Reporting Directive

On 5 January 2023, the [Corporate Sustainability Reporting Directive \(CSRD\)](#) ^{EN} entered into force. This new directive modernises and strengthens the rules concerning the social and environmental information that companies have to report. A broader set of large companies, as well as listed SMEs, will now be required to report on sustainability – approximately 50 000 companies in total.



“75 % of euro area bank loans is dependent on ecosystem services”

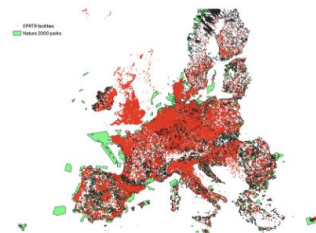
Agenda

1. Motivation



5. Recommendations

4. Results



2. Our approach

3. Data and
methods



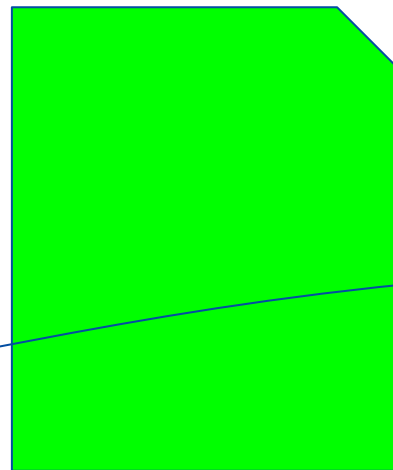
‘Our goal is to reconcile the economy with our planet’



data
&
evidence

Our approach

NATURA 2000 park X

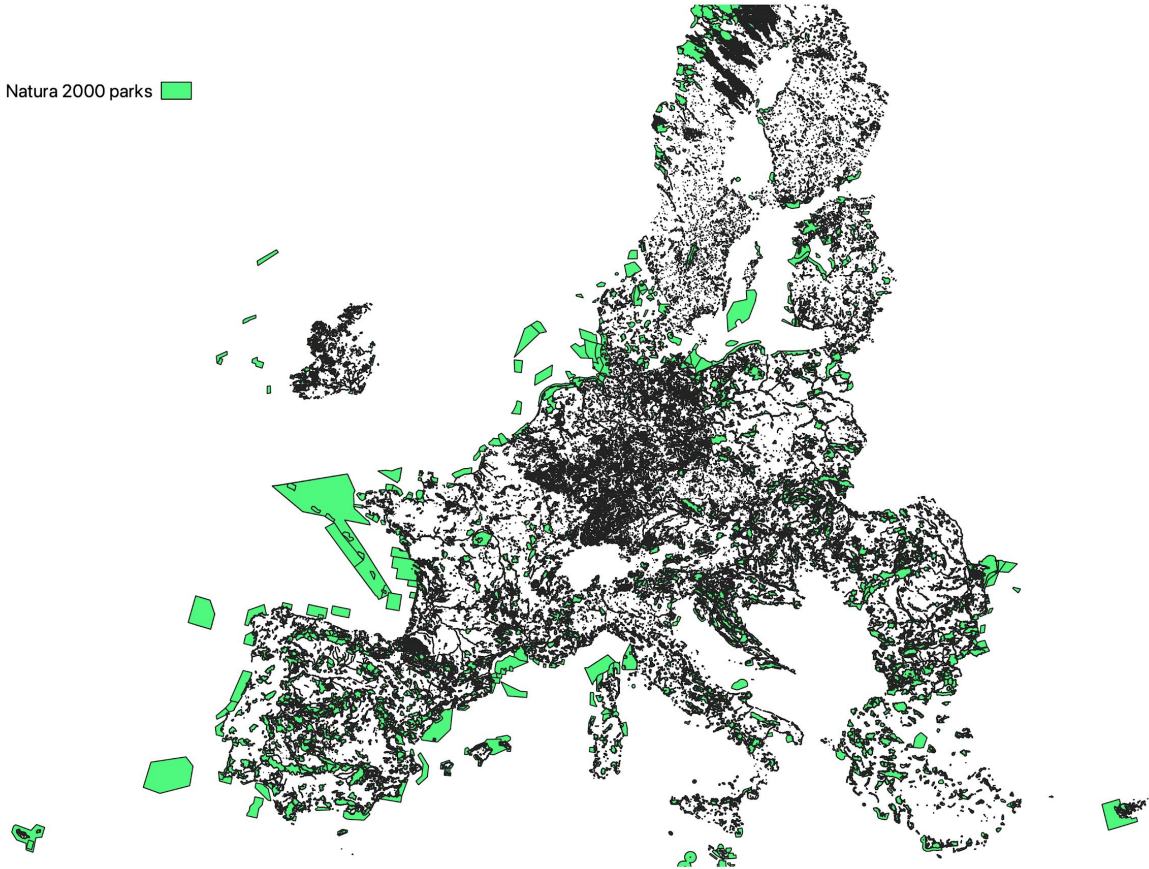


Company A

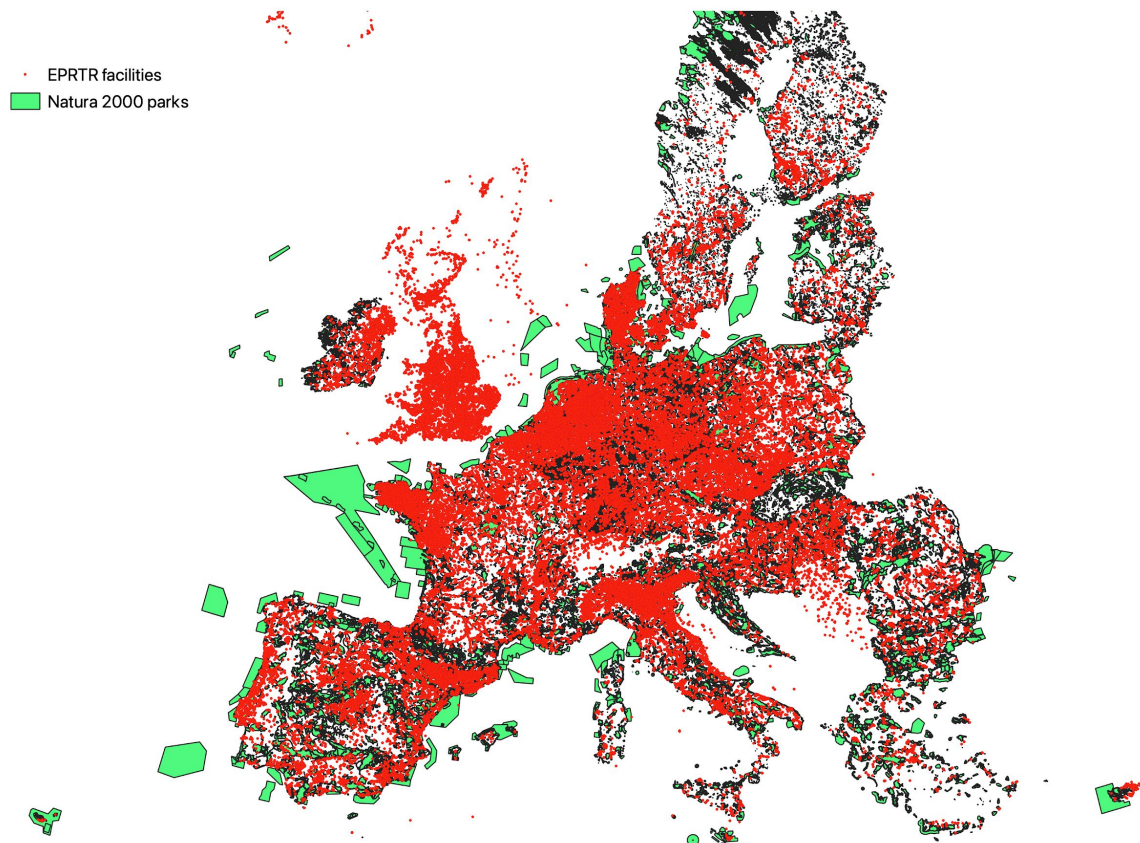


Natura 2000 parks

Natura 2000 parks



Overlay of industrial facilities and Natura 2000 parks



Data

&

Methods

Data (pollutant release)

E-PRTR database as stipulated by EU regulation

- company name
- 90 + pollutants
- AIR/WATER/SOIL
- x,y
- 30K companies
- 2001 - 2017
- NACE industries

source> **EEA**, European Environmental Agency

Protected areas

NATURA 2000 database

- park name
- x,y
- country
- species
- area
-
- ...

source> **EEA**, European Environmental Agency

Environmental Footprint

EF 3.1 database

- pollutants,
- footprint categories,
- AIR/WATER/SOIL
- characterization factors
- ...

source> **Joint Research Centre**

Descriptive statistics

ISO	A. Area (km ²)	B. N2000 area (km ²)	C. = B / A	D. Nr of protected species	E. EPRTTR sites close to foreign Natura2000 parks (%)	F. Nr of EPRTTR facilities in the country
HR	56594	33527	59%	188	2%	504
SI	20273	11706	58%	167	4%	349
BG	110996	56164	51%	272	8%	676
SK	49035	19067	39%	132	na	63
GR	131694	48449	37%	134	0%	565
ES	498502	168748	34%	384	0%	8669
LU	2595	835	32%	83	9%	72
HU	93012	26275	28%	216	4%	1262
PT	89103	24418	27%	288	0%	1161
RO	238398	65209	27%	298	1%	1662
CY	9253	2383	26%	141	0%	206
PL	311929	79305	25%	237	1%	4329
IT	302073	72796	24%	359	1%	8093
EE	45336	10363	23%	122	0%	176
NL	37377	8313	22%	109	14%	7152
DE	357569	72408	20%	218	2%	12006
CZ	78871	14991	19%	120	4%	3745
AT	83878	15294	18%	257	8%	724
LT	65284	11796	18%	117	1%	313
DK	42925	7569	18%	112	2%	2817
FR	549060	93807	17%	288	3%	15130
MT	316	52	16%	19	2%	41
IE	69947	11252	16%	88	0%	1679
BE	30666	4478	15%	123	2%	2356
SE	447424	58428	13%	164	0%	1140
FI	338411	43109	13%	124	0%	998
LV	64586	7448	12%	139	1%	149
EU	4125107	968190	23%	887	3%	76037

Descriptive facts

• Natura 2000 parks

- key instrument to protect biodiversity in the EU.
- an ecological network of protected areas,
- set up to ensure the survival of Europe's most valuable species and habitats, based on the 1979 Birds Directive and the 1992 Habitats Directive.
- 1m km²
- about 900 protected species

• EPRTTR

- 76k facilities
- NACE sectors except agri

Biodiversity risk calculation steps

3. Aggregation by **NATURA**
park (d<500)



4. Aggregation by **facility**
(d<500)

2. Distance (● **company** and closest **NATURA** )

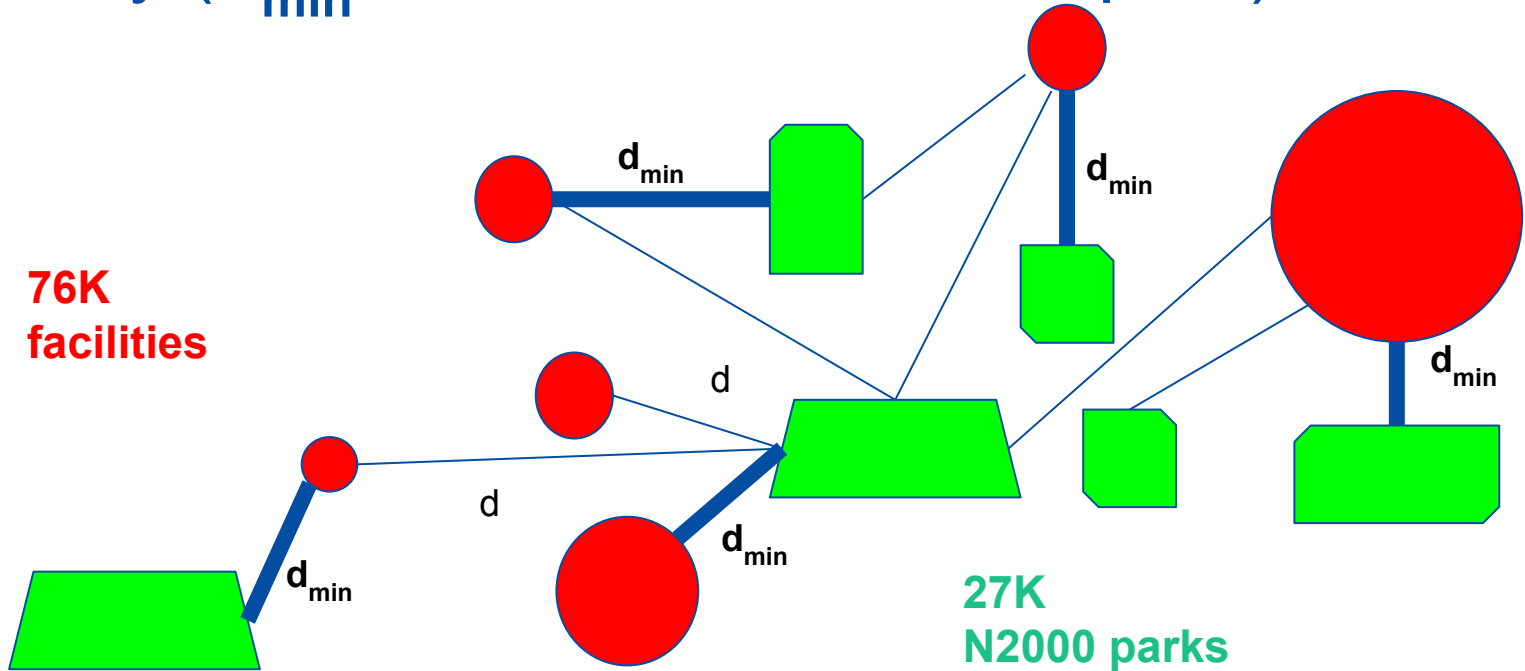


European
Commission

1. Eutrophication &
Ecotoxicity eq



Pairing parks and polluters for calculating proximity (d_{\min} = distance to closest park)



— d (distance)

$$\text{Environmental footprint (EF)} = E_{ij} \times CF_{ij}$$

j - facility

CAED/000000101.Facility
CAED/000000101.Facility
CAED/000000101.Facility
CAED/000000101.Facility
CAED/000000101.Facility
CAED/000000103.Facility

i - substance

Copper and compounds (as Cu)
Total nitrogen
Chromium and compounds (as Cr)
Nickel and compounds (as Ni)
Total phosphorus
Mercury and compounds (as Hg)

media

WATER
WATER
WATER
WATER
WATER
WATER

E_{ij} - emission weight (kg)

440.00000
62100.000
44.000000
88.000000
5180.0000
0.3590000

EPTR - EEA

i - substance

CF_{ij} - characterization factor

media

```
1 • SELECT * FROM EF.LCIAMethods_CF where LCIAMethod_name = 'Ecotoxicity, freshwater'
2 and FLOW_class1 = "Emissions to water"
3
```

160% 5:2
Result Grid Filter Rows: Search Export: Fetch rows:

FLOW_uuid	FLOW_name	LCIAMethod_name	CF EF3.1	LCIAMethod_locati...	FLOW_class0	FLOW_class1
1185a8ab-ace4-44bc-821f-365a14085063	butene, homopolymer (products derived from ethylene)	Ecotoxicity, freshwater	624.17		Emissions	Emissions to water
fe0acd60-3ddc-11dd-aaa0-0050c2490048	adsorbable organic halogen compounds	Ecotoxicity, freshwater	3689.2		Emissions	Emissions to water
86b68911-a27c-43d5-a009-372bcb342030	aldehydes, unspecified	Ecotoxicity, freshwater	697.39		Emissions	Emissions to water
69ceb77-b50a-469f-9678-e08d8ae83fd7	c12-14 fatty alcohol	Ecotoxicity, freshwater	2313.2		Emissions	Emissions to water

EF - JRC

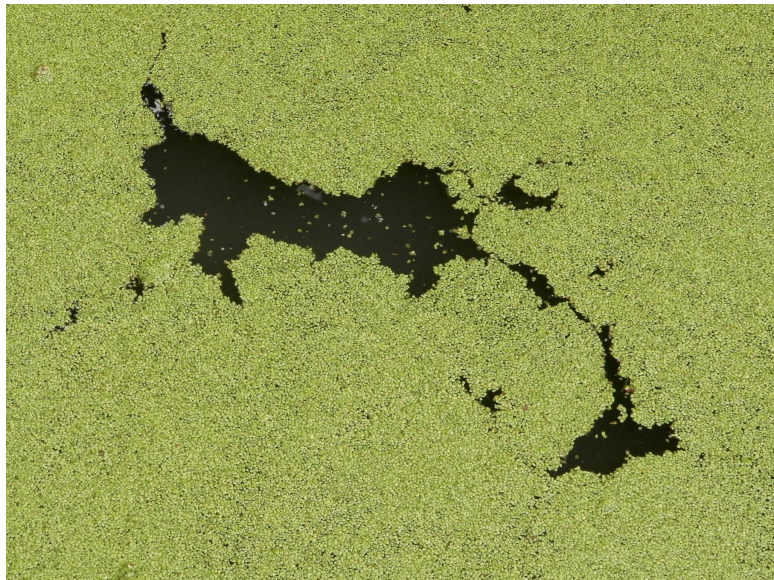
Biodiversity risk metrics 1



ECOTOXICITY

- result of a variety of different toxicological mechanisms
- in comparative toxic units (CTUe)

Biodiversity risk metrics

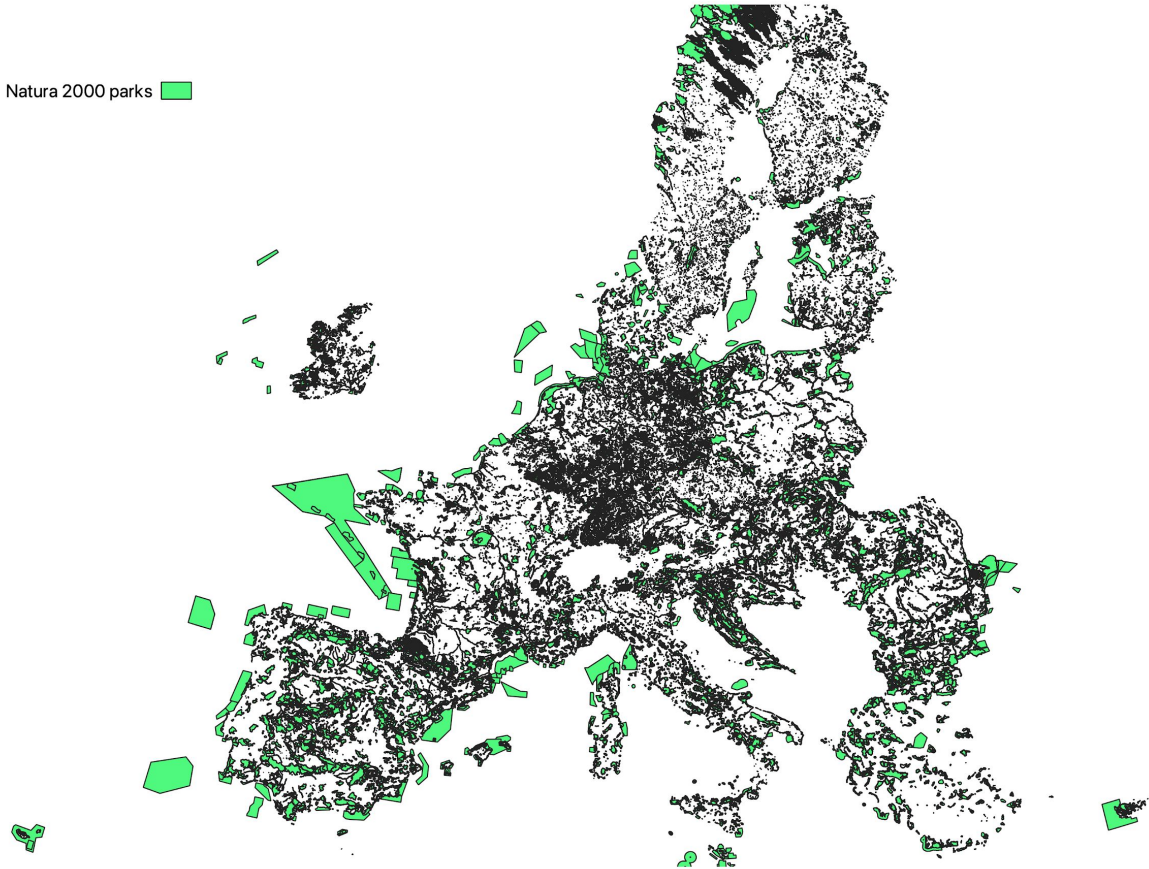


EUTROPHICATION

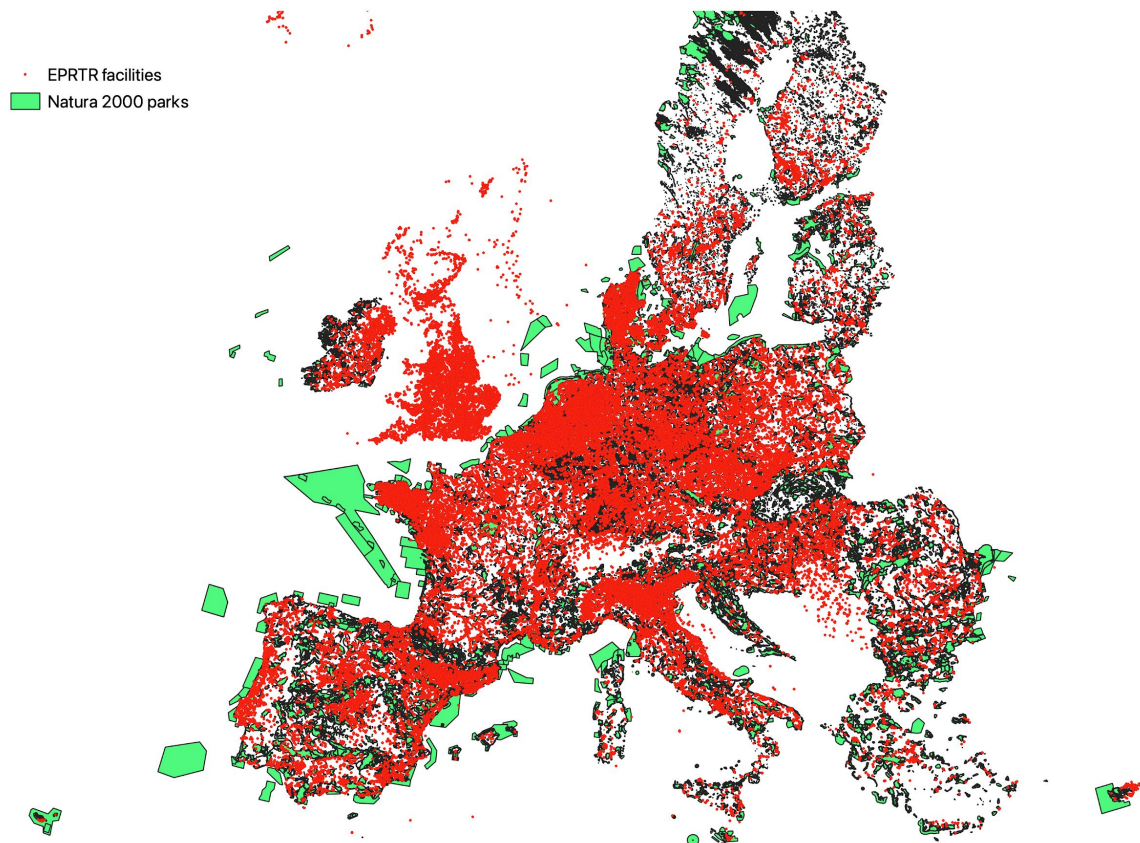
- accelerates the growth of algae (alghi)
- degradation of organic material consumes oxygen resulting in oxygen deficiency and, in some cases, fish death
- P_{eq}

Natura 2000 parks

Natura 2000 parks

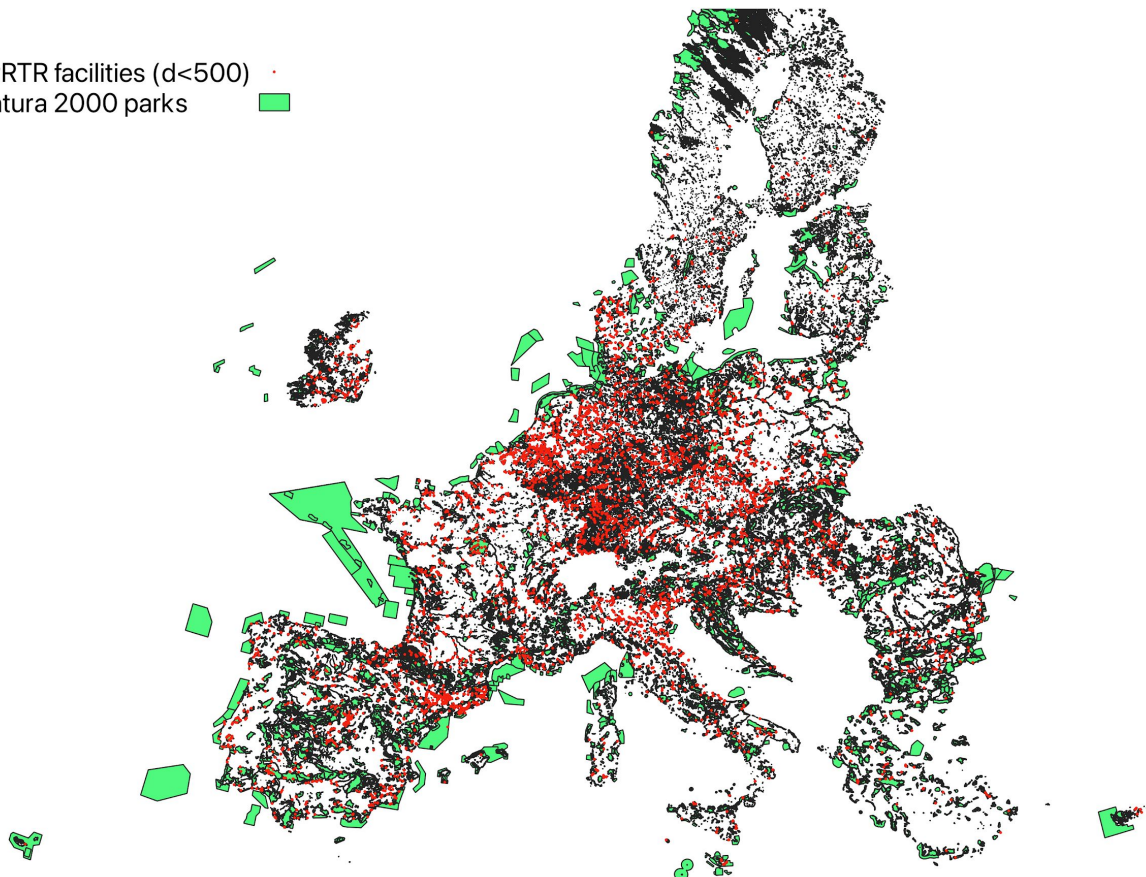


Overlay of industrial facilities and Natura 2000 parks

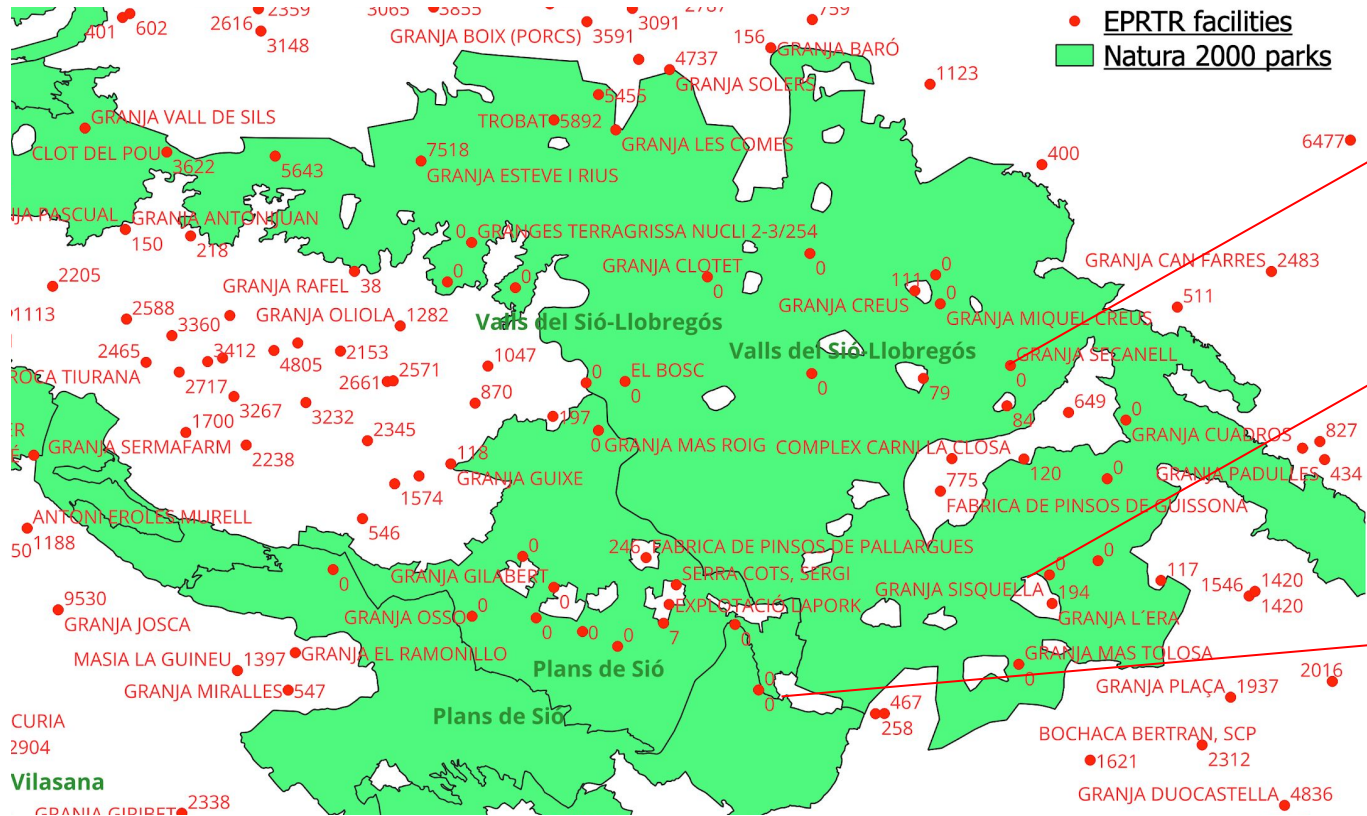


Industrial facilities in the proximity of Natura 2000 parks (d< 500m)

EPRT facilities (d<500) ·
Natura 2000 parks ■



Zoom-in on industrial facilities in Natura 2000 parks (facility d_{\min} in meters)



**derogation
zone?**

in the
park
($d_{\min} = 0\text{m}$)

**'No facility
name'
reported
(confidential
ity)**

Confidentiality reasons by sector: Intensive rearing of poultry, pigs

parentCompanyName, mainActivityName, count(*)

'CONFIDENTIAL', 'Installations for the intensive rearing of poultry with 40,000 places for poultry', '524'

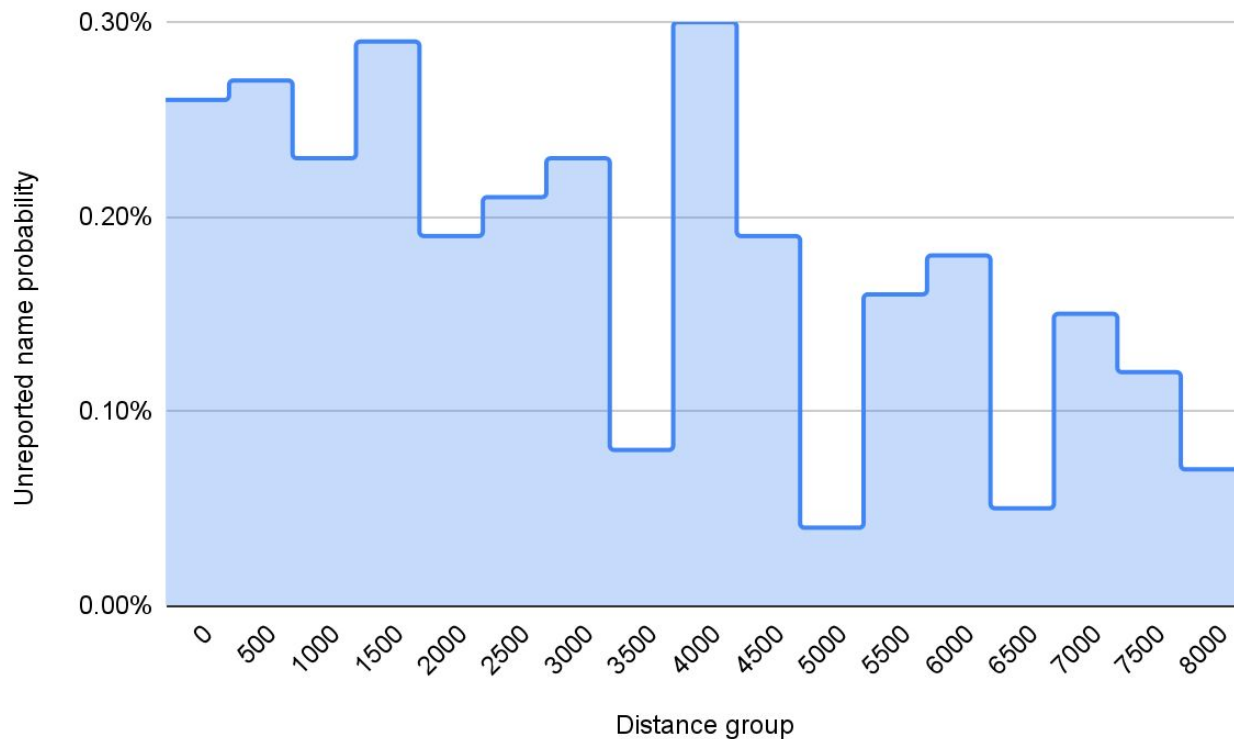
'CONFIDENTIAL', 'Installations for the intensive rearing of pigs with 2,000 places for production pigs (over 30 kg)', '432'

NULL, 'Installations for the intensive rearing of pigs with 2,000 places for production pigs (over 30 kg)', '88'

'CONFIDENTIAL', 'Installations for the intensive rearing of pigs with 750 places for sows', '49'



% of facilities **NOT** reporting facility name vs. distance to Natura 2000 parks

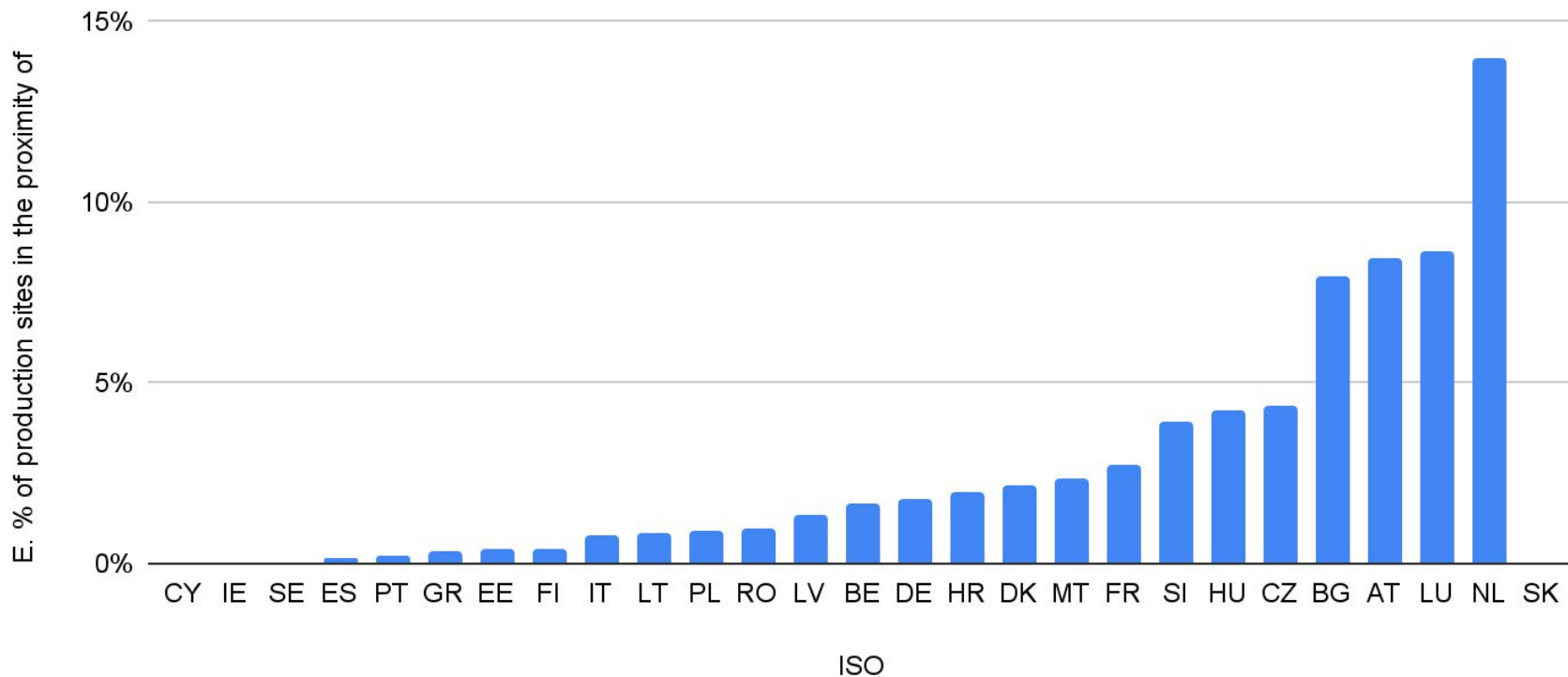


Facilities with the largest calculated ecotoxicity footprint (ecotoxicity, CTUe)

Nr	Facility name	Country	NACE	Ecotoxicity (2019, CTUe)
1	Ringsend - Irish Water.	IE	Sewerage	1.25E+11
2	EDAR EL PRAT DE LLOBREGAT - Barcelona	ES	Sewerage	3.39E+10
3	Impianto di depurazione di Treviso	IT	Sewerage	2.39E+10
4	EYATH S.A. - SIN- DOS WASTEWATER TREATMENT PLANT	GR	Sewerage	2.17E+10
5	SOLVAY CHIMICA ITALIA S.P.A. ROSIG- NANO	IT	Manuf. in- organic basic chem.	6.08E+09
6	Publiacqua S.p. A. - sito San Colombano	IT	Sewerage	5.42E+09
7	RAYONIER A.M. TAR- TAS	FR	Manuf. of pulp	4.86E+09

% of sites in the proximity of foreign parks

E. % of production sites in the proximity of foreign parks vs. ISO



Conclusions and recommendations

Companies

- **CSRD** European Sustainability Reporting Standards
- **Erhart-Menyhért-Erhart** Methodology for biodiversity risk assessment
- **2% in the park** - risk management?

Regulators

- **supranational management** of the biodiversity risks
- **conflicts of interest - derogation zones**
- **reconsideration of confidentiality claims** and derogation zones

Thank you

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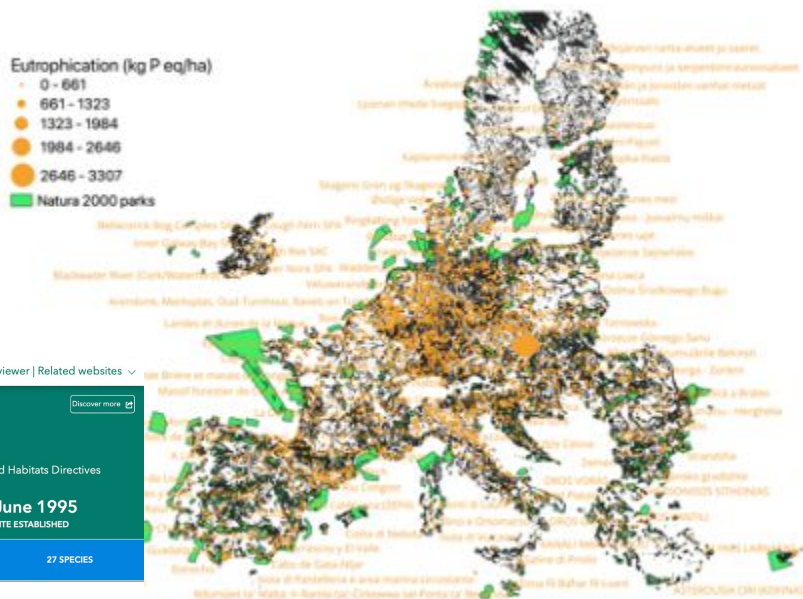
Footprint metrics

Ecotoxicity refers to impacts on the ecosystem, particularly the damage to individual species and the function of the ecosystem Fantke et al. (2015). Ecotoxicity is the result of a variety of different toxicological mechanisms caused by the release of substances with a direct effect on the health of the ecosystem. The characterization factor for aquatic ecotoxicity impacts is expressed at mid-point level (ecotoxicitypotential) in comparative toxic units (CTUe) and provides an estimate of the potentially affected fraction of species (PAF) integrated over time and volume per unit mass of a chemical emitted. Its unit: CTUe per kg emitted = $[PAF \text{ m}^3 \text{ d per kg emitted}]$.

Eutrophication occurs when nutrients (mainly nitrogen and phosphorus) are released, which accelerates the growth of algae and other vegetation in water, Zampori, 2019. The degradation of organic material consumes oxygen resulting in oxygen deficiency and, in some cases, fish death. Eutrophication translates the quantity of substances emitted into a common measure expressed as the oxygen required for the degradation of dead biomass. Its unit: Phosphor equivalents per kg emitted = $[P \text{ eq per kg emitted}]$.

Most affected Natura 2000 parks

(b) Eutrophication per area (P eq/ha)



SITENAME	ISO	P eq/ha
Modřické ram	CZ	3307
Río Guadalma	ES	677
Ljubljanska - G.	SI	674
Delta del Llob.	ES	348
S-Dublin Bay	IE	301
Inghiaie	IT	259
Nedre Møll.1	DK	190
Río Fuengir.	ES	149

IT3120038)

Inghiaie