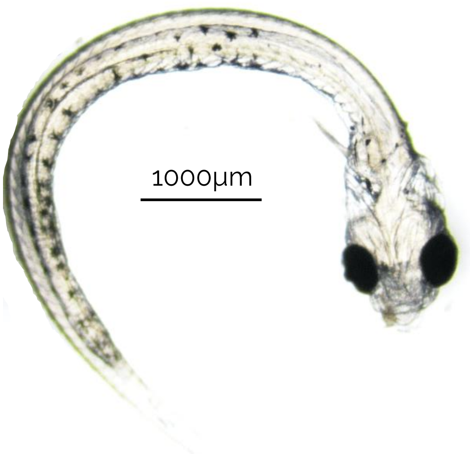
Report of the internship of Master 2 in "Gestion de l'Environnement et Écologie Littorale" of "Sciences pour l'Environnement"

2022-2023

Study of chemical contamination pressures in allis shad (*Alosa alosa*) spawning grounds in the Gironde-Garonne-Dordogne catchment



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« There's nothing more satisfying than working hard at something you're passionate about. »

Yukimura Sanada (2007)

i. Acknowledgements

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ii. Glossary

The numbers correspond to the pages where the abbreviation appears for the first time.

Ci = Concnetration of a chemical compound, 15
EC10 = Effect Concentration on 10% of individuals, 14
EC50 = Effect Concentration on 50% of individuals, 14
ECx = Effect Concentration on x% of individuals, 14
GGD = Gironde-Garonne-Dordogne, 4
HC50 = Hazardous Concentration on 50% of individuals, 15
$HC50_F$ = Hazardous Concentration on 50% of individuals for the fish taxon, 18
$HC50_{SE}$ = Hazardous Concentration on 50% of individuals for each life stage of fish taxon, 18
HCPs = Hygiene and Care Products, 10
LOD = Limits Of Detection, 13
LOEC = Lowest Observed Effect Concentration, 14
LOQ = Limits Of Quantification, 13
msPAF = Potentially Affected Fraction of species by chemical mixtures, 15
$msPAF_{F\text{-}AM}$ = average annual msPAF representing the fish taxon, 18
$msPAF_{F\text{-}T}$ = periodic average of msPAF representing the fish taxon, 18
$msPAF_{SE\text{-}T}$ = periodic average of msPAF representing each life stage of the fish taxon, 19
NOEC = No Observed Effect Concentration, 14
OIPs = Other Industrial Pollutants, 10
PAF = Potentially Affected Fraction of species, 13
PAFi = Potentially Affected Fraction of species by one chemical compound, 15
PAH = Polycyclic Aromatic Hydrocarbon, 6
PBDE = PolyBrominated Diphenyl Ether, 6
PCB = PolyChlorinated Biphenyl, 6
PFASs = Per- and polyFluoroAlkyl Substances, 10
SIE = "Systèmes d'Informations sur l'Eau", 8
SIEAG = "Système d'Informations sur l'Eau" Adour-Garonne, 8
SSD = Species Sensitivity Distribution, 13
$Th_{5\%}$ = Threshold of 5% potentially affected fraction of species, 15
WFD = Water Framework Directive, 7

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The raw files, code and figures/tables can be found in the pcloud link below:

➔ https://e.pcloud.link/publink/show?code=kZz4X2ZeeTVwtba0i4LUK3Q5qAm9HDAE2Ey

v. Summary

1. Presentation of the host structure

Ecology is a scientific discipline that studies interactions between organisms and their environment. Taking into account that our actions have a significant effect on both terrestrial and marine ecosystems, this discipline is essential to understand, evaluate and characterize the consequences of our actions. In this context, I joined the "Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement" (INRAE) in the Cestas-Gazinet center to do my Master 2 internship. INRAE is a national research institute working on three different main areas: agriculture, food and environment. More generally, it covers subjects such as the protection of biodiversity and the fight against global warming. Within INRAE, I was part of the "Écosystèmes Aquatiques et Changements Globaux" (EABX) unit and more particulary the "Fonctionnement et Restauration des Ecosystèmes Estuariens et des populations de Migrateurs Amphihalins" (FREEMA) team that focuses, as its name suggests, on diadromous migratory fish populations and estuarine ecosystems.

My supervisors for this internship were Sarah Bancel, realizing her thesis about "*ex-situ*" experiments to evaluate and understand the response of early fish stages to environmental conditions" and Bertrand Villeneuve, ecologist and coordinator of the FREEMA team. They brought me their expertise and experience throughout this internship. Sarah was able to teach me a lot about ecotoxicology and Bertrand about concepts related to water management. These two complementary profiles gave me a lot to learn during this internship.

This internship aimed to provide knowledge on the dynamics of the presence of contaminants present in the water at the level of allis shad spawning grounds in Gironde-Garonne-Dordogne catchment. In this way, I was able to put into practice the theoretical knowledge acquired during my academic studies through bibliographical research, database management, field manipulation, data analysis, *etc.* This work gave me the opportunity to see how research and management were really correlated in the world of work. I was able to contribute to uniting these two scientific axes and to see just how essential multidisciplinarity is in a context of ecological crisis.

2. Introduction

A. The allis shad, Alosa alosa

The allis shad (*Alosa alosa*) is mostly a diadromous fish (*i.e.*; migrating between marine and freshwater environments), anadromous (*i.e.*; going up the rivers to spawn) and semelparous (*i.e.*; reproducing only once in their lifetime) species of the *Clupeidae* family (Mota and Antunes, 2012; Rougier *et al.*, 2012). As a result, this species evolves in several salinity ranges during its life (Lochet, 2006). The marine phase (**Fig. 1**) lasts from three to seven years and ends with the return to rivers (April to May) of sexually mature adults (Mennesson-Boisneau, 1990; Baglinière et al., 2003). The freshwater phase (**Fig. 1**) lasts just a few months (April to October) with a breeding period estimated from May to July (Mennesson-Boisneau, 1990; Baglinière et al., 2003). This reproduction is nocturnal and characterized by a particular noise corresponding to the impact of the caudal fins of organisms against the surface in a circular movement (Boisneau et al., 1990). The whirlpool of water caused by this behavior leads to the expulsion of the genital products, followed by fertilization (Boisneau et al., 1990). Fertilized eggs are released into the water column, settling preferably on a pebble substrate where they are better embedded (Belaud et al., 2001). They hatch five at six days after fertilization, the time required for embryonic development at 20°C (Blaya et al., 2022). Larvae are then guided downstream in slower-moving water, using first the superficial zones of the water column then a significant part of the water column for twenty-three days onwards (Jatteau et al., 2002; Véron et al., 2003). Following larval development, juveniles begin their migration to the marine environment (August to October) spending around thirteen days in estuarine environment (Taverny et al., 2000; Lochet, 2006; Dambrine, 2017). Much remains unknown about the ecology of these early stages (Baumann, 2021).

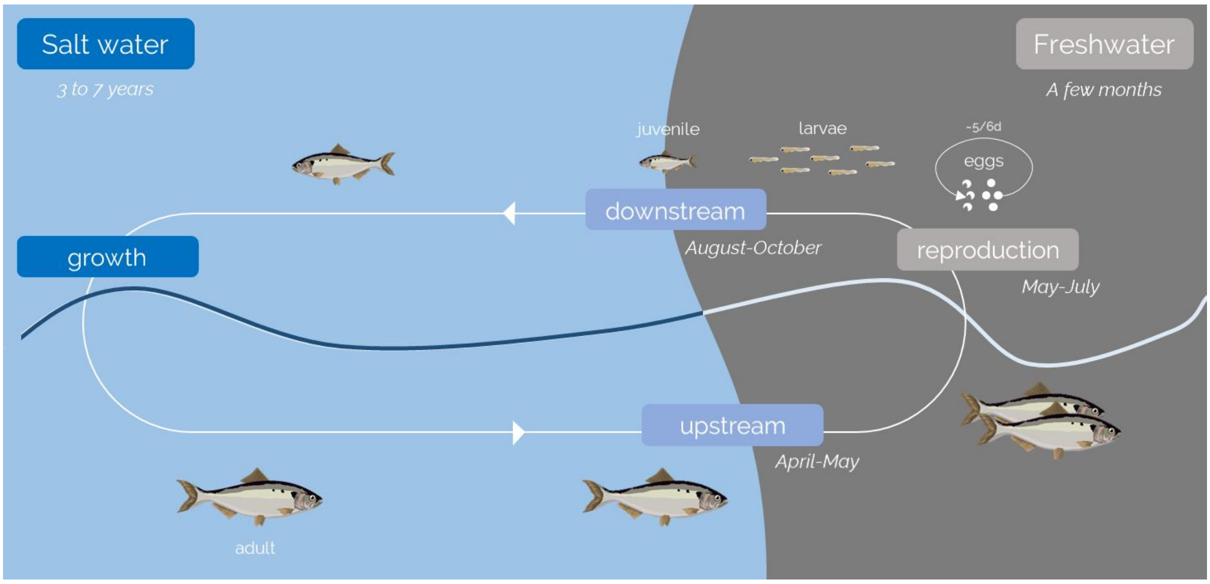

Figure 1. Simplified diagram of the allis shad life cycle with the approximate period of each phase (inspired by Gaillagot and Carry, 2014).

B. Population crash of allis shad in the Gironde-Garonne-Dordogne catchment

In the past, allis shad had a distribution along the Atlantic coast from Norway to Morocco and in France the Gironde-Garonne-Dordogne (GGD, **Fig. 2**) catchment had the most important population (Martin-Vandembulcke, 1999; Baglinière and Elie, 2000). This heritage species was once considered a socio-economic asset, particularly in fisheries where landings could exceed 1 000 metric tons in the GGD catchment in the 1980's (Baglinière et al., 2003). However, in the early 2000's, a crash of the allis shad population has been mentioned at the European scale (Limburg and Waldman, 2009). Especially in the GGD catchment, a decrease in the estimated number of juveniles and potential spawners has been observed (Rougier et al., 2012). Indeed, potential spawners at Golfech (Garonne) and Tuilières (Dordogne) have fallen drastically (**Fig. 3**). The species was subjected to a fishing moratorium in the GGD catchment in 2008 in order to reduce the impact of fisheries but no sign of recovery has been demonstrated (Bouyssonnie and Filloux, 2021). As a result, this species is now on the "IUCN Red List" as "critically endangered" at the French level (UICN Comité français et al., 2019).

Rougier *et al.* (2012) discussed theories on the collapse of allis shad population: overfishing, dam construction, degradation of water quality and deterioration of spawning grounds contributing to reproductive failure or early-stages mortality. As previously mentioned, despite the introduction of the moratorium the level of spawner stock is still low. Consequently, fishing does not appear to be the main pressure on the population. In the past, spawning grounds of allis shad in the Garonne-Gironde-Dordogne catchment have shifted further downstream (Acolas et al., 2006; Bardonnet and Jatteau, 2008). Currently, migratory barriers, particularly dams, don't seem to be main pressure on the population, as the main barriers are located relatively far upstream on the Garonne and Dordogne rivers (Paumier et al., 2019; Maire et al., 2023) (**Fig. 2**). Global change has recently been included in these hypotheses and several studies have been carried out to assess its potential impact on the GGD population (Baumann, 2021). However, it does not appear to impact the range of the GGD catchment population (Lassalle et al., 2009) and don't seem to have any short-term impact on early stages of allis shad (Jatteau et al., 2017). Nevertheless, to date, there is a lack of conclusive evidence regarding the theories related to trophic resources and water quality, especially concerning the early life stages (Baumann, 2021). Early life stages of fish are considered as the critical phase of development due to their high sensitivity to environmental stress (McKim, 1977; Von Westernhagen, 1988; Hutchinson et al., 1998). Therefore, a number of recent studies have focused on these life stages in allis shad in order to close the knowledge gap with adult stage. In particular, these studies have investigated the thermal preferences (Paumier et al., 2019), thermal tolerances (Jatteau et al., 2017), ecological preferenda and pressures (Baumann, 2021) of early stages. Also, the study from Blaya *et al.* (2022) investigated embryonic development and reported a potential link between water contamination and embryonic survival.

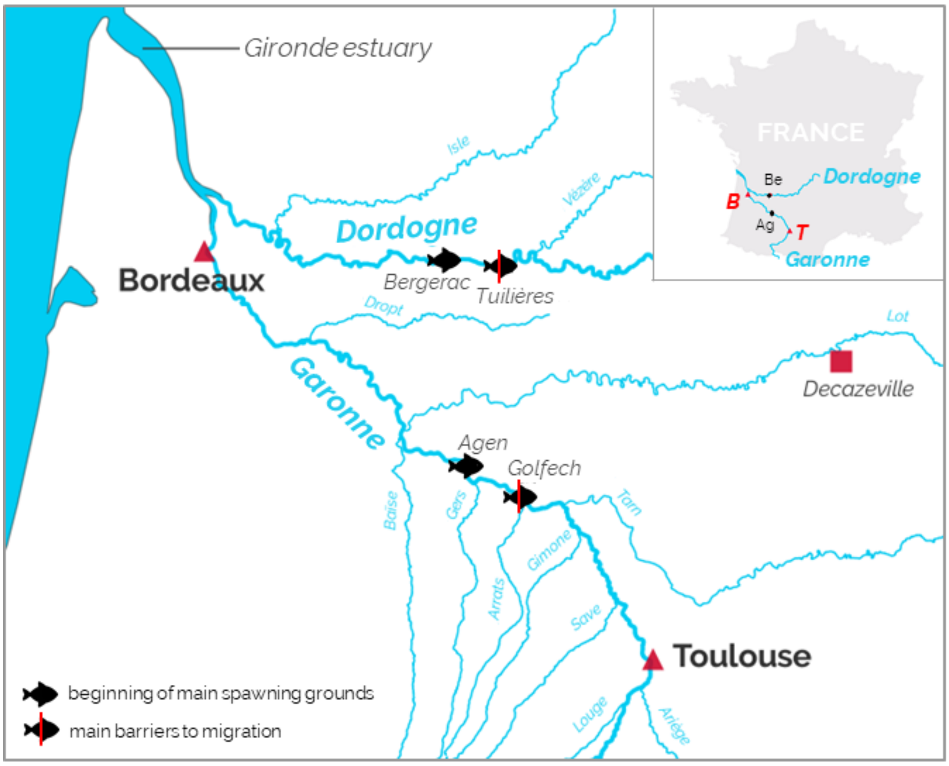

Figure 2. Map of the GGD catchment, where the main current allis shad spawning grounds are located between ~Bergerac and ~Tuilières (Dordogne) and ~Agen and ~Golfech (Garonne).

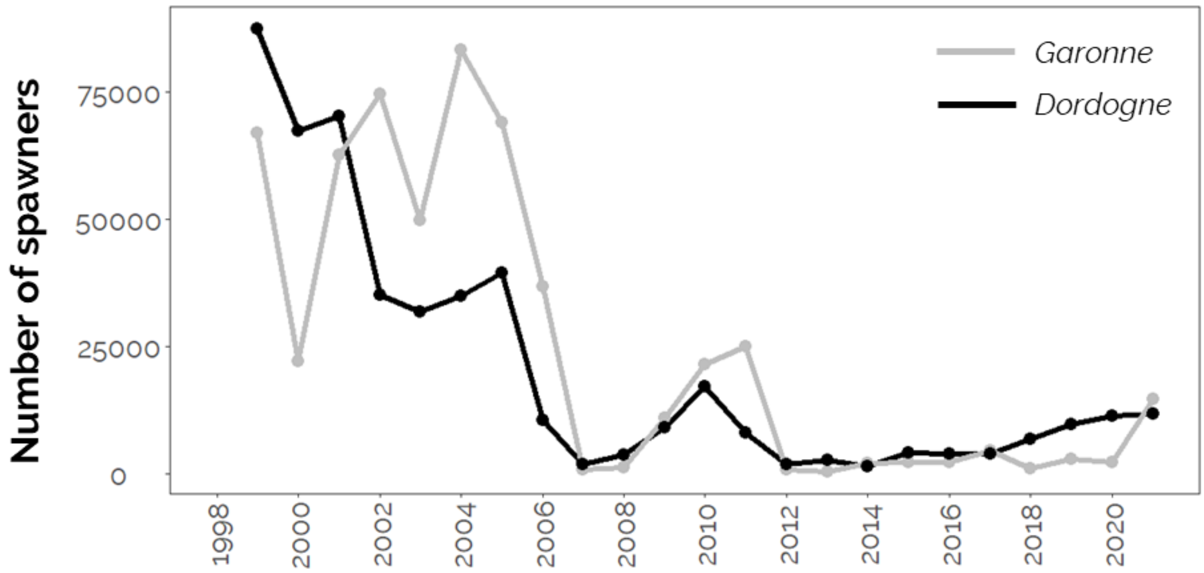

Figure 3. Number of estimated spawners in Garonne (Golfech) and Dordogne (Tuilières) spawning grounds between 1999 and 2021 (data from MIGADO, n.d.).

C. The historical pollution of GGD catchment

Despite the fact that GGD catchment was considered as an ecological reference in the past (Lucas et al., 2021), numerous studies have demonstrated significant and diverse water pollution in the catchment (*e.g.* Budzinski *et al.*, 1997; Blanc *et al.*, 2006), which can impact the allis shad population. Historically, smelting and mining activities at the Decazeville site (near the Lot river, see **Fig. 2**) have generated metal pollution: lead, zinc, selenium and in particular cadmium which has been measured in high concentrations (Grousset et al., 1999; Blanc et al., 2006). The cadmium has been measured in the liver and kidneys of estuarine fish such as the European eel (*Anguilla anguilla*) and thinlip mullet (*Chelon ramada*) (Durrieu et al., 2005). The most recent presence of chromium and vanadium has been associated with the activities of electrolysis and tanneries near the Dordogne and Tarn rivers (Grousset et al., 1999). Other metals found in this catchment include arsenic in the Garonne, Dordogne and Isle rivers (Masson et al., 2007) and silver in the Gironde estuary (Lanceleur et al., 2011b). The silver contribution could be linked to various factors such as wastewater (Lanceleur et al., 2011a). The study by Masson *et al.* (2006) reports that the presence of certain metals (zinc, copper, *etc.*) is also linked to intensive agriculture in the GGD catchment.

Furthermore, in the catchment, the study by Acolas *et al.* (2020) demonstrated a close link between the transcription of certain genes useful for reproduction in European sturgeon (*Acipenser sturio*) and levels of organochlorine pesticide contamination. In addition, other pollutants of industrial sources have been found in this catchment. A study found high concentrations of polychlorinated biphenyls (PCBs) in European eel (*Anguilla anguilla*) muscle and European flounder (*Platichthys flesus*) liver in the Gironde estuary (Bodin *et al.*, 2014). Another study by Tapie *et al.* (2011) in the Gironde estuary revealed the presence of PCBs and polybrominated diphenyl ethers in European eels (*Anguilla anguilla*). One more study carried out in the Gironde estuary revealed the presence of polycyclic aromatic hydrocarbons (PAHs) in sediments of this estuary (Budzinski *et al.*, 1997). A recent study highlighted microplastic pollution in the Garonne and its tributaries, with a particular risk near urban areas and during the warm season (De Carvalho et al., 2021). Microplastics have been found in European sturgeon (*Acipenser sturio*) in the GGD catchment (Samson et al., in prep.).

However, even if the presence of all these compounds in the GGD catchment is documented, we know that the presence of these compounds does not allow us to draw conclusions in terms of toxicity and therefore potential effects (Faggiano, 2013; Geffard et al., 2019). Furthermore, to our knowledge no study has looked specifically at contamination in allis shad spawning grounds in this catchment. For this reason, comparison of environmental concentrations of compounds present in these spawning grounds with toxicity values is essential to deduce the historical and current impact of this contamination (Posthuma et al., 2002; Geffard et al., 2010).

D. Problematic and objectives

In this context, our study aims to address the following issue: what is the potential toxic risk associated with chemical contamination of allis shad spawning grounds in the GGD catchment for the allis shad?

To address this issue, we defined three objectives: **(1)** Examine the spatio-temporal variation of this potential toxic risk within these spawning grounds for the fish taxon; **(2)** Estimate the potential toxic risk associated with chemical contamination of the various life stages of the fish taxon species; and **(3)** Investigate, for early stages, the contribution of chemical compounds, individually or in mixture, to the estimation of this potential toxic risk.

To address these objectives, the types of chemical compounds quantified at least once since 2006 in the main spawning grounds of the allis shad within the GGD catchment was characterized and identified. To estimate the ecological impact of these compounds, a relationship between the environmental concentrations (annual averages) of these compounds and toxicity data was established to determine their potential toxic effects on organisms. The toxicity data were obtained from toxicity tests conducted on a species-contaminant pair (Ramade, 2007). However, no toxicity data were available for allis shad. Thus, we focused on toxicity data specific to the fish taxon obtained in freshwater environments, assuming that toxic effects were similar between the allis shad and the average species within the fish taxon.

Based on this, an indicator of potential toxicity (called Potentially Affected Fraction of species) specific to fish taxon and to different life stages of this taxon (embryo, larva, juvenile and adult) was calculated. Thanks to this indicator, the toxic risk within the allis shad spawning grounds of GGD catchment has been quantified for this taxon. First, the spatio-temporal variation in the values of this indicator representative of the fish taxon was visualized. Then, given that sensitivity to chemical compounds varies depending on fish life stages (McKim, 1977), the toxic risk was estimated for each life stage of this taxon. Lastly, as they are considered the most sensitive (Von Westernhagen, 1988; Hutchinson et al., 1998), the contribution of chemical compounds, individually or as a mixture, was studied for the early life stages of this taxon.

3. Materials & Methods

*A. Environmental data: context & use (summarized in **Tab. III** and **Fig. 9**).*

a. Context: Water Framework Directive to « Systèmes d'Informations sur l'Eau »

At the end of the 21st century, preserving water quality became a major concern and has been emphasized in various studies (*e.g.*, Norton et al., 1992; Reckhow, 1994; U.S. Environmental Protection Agency, 1998). To address this issue at the European scale, the Water Framework Directive (WFD) was introduced in 2000 (European Commission, 2000, see Ministère de la Transition écologique et solidaire (2019) for its objectives and functioning).

The WFD aims to harmonize regulations regarding water quality throughout Europe and imposes rigorous monitoring of the chemical and ecological status of water bodies. It aims to achieve a good ecological and chemical status of surface waters and groundwater.

Ecological status is divided into five classes: very good, good, moderate, poor and bad, depending on biological, hydromorphological, and physico-chemical factors. Thus, each water body is compared to a "reference" water body whose state is not (or minimally) influenced by human activities. For example, the fish species diversity in the Garonne or Dordogne rivers could be compared to that of a "reference" river, free from human activities. If any of the elements used to determine the ecological quality of a water body is classified as being in poor status, then the water body is classified as being in poor status. The chemical status, on the other hand, consists of two classes: poor or good, depending on the environmental concentration of 45 priority substances, of which 21 are considered "priority and hazardous". These substances are characterized by a long lifespan in the environment and toxicity at low concentrations (Posthuma et al., 2020). To ensure a good chemical status, environmental quality standards have been established, representing limit values not to be exceeded for these substances (Posthuma et al., 2019).

If both ecological and chemical statuses are classified as being in good status, then the water body is also considered to be in good status.

To achieve good ecological and chemical statuses, the WFD requires that the member states of the European Union develop management plans within the river catchments. In this context, various management measures have been implemented within the river catchments, including a state of play assessment, a monitoring program, a management plan and a program of measures (Petit and Michon, 2015). As part of these monitoring programs, "Water Information Systems" (in french, "Systèmes d'Informations sur l'Eau", called SIE) have been created with the objective of facilitating the collection, management and dissemination of public information related to water in the European Union member states (SIEAG, 2023). Within the data shared by the SIE of each river catchment, one can find environmental concentrations of a whole range of pollutants associated with a specific location and date, and monitored by different data collection devices. These pollutants are measured several times per year.

b. Use of « Systèmes d'Informations sur l'Eau » Adour-Garonne

Within the SIE of the Adour-Garonne catchment (SIEAG, https://adour-garonne.eaufrance.fr/), the relevant data about chemicals were present in the "physicochimie.csv" files for the 21 selected stations used in the study (**Fig. 4** and **Tab. I**). These stations were located within the current main spawning grounds (referred to as "spawning grounds" in the report) of allis shad in the Gironde-Garonne-Dordogne catchment (*i.e.* between Bergerac~Tuillières on the Dordogne, n = 10 and between Agen~Golfech on the Garonne, n = 11). A total of 221 739 raw data was available.

The environmental data were extracted from a Structured Query Language (SQL) database and then processed in RStudio (Ver. 4.2.2) for further data treatment. A significant effort was made to standardize, select, and sort the data. For example, physico-chemical (*e.g.*, pH) and biological (*e.g.* gammarids) data were removed to obtain a data set representing only chemical presence in the environment (water, sediment and suspended matter). The data covered the period from 2000 to 2021, but only years from 2006 were retained to ensure data homogeneity. Data before 2006 (~1.25% of the total data) consisted almost exclusively of metals and agrochemicals.

Finally, selected data comprised a total of 174 789 measures distributed across 539 chemical compounds, sampled either in water, sediments or suspended matter and distributed over 21 stations (**Tab. I**).

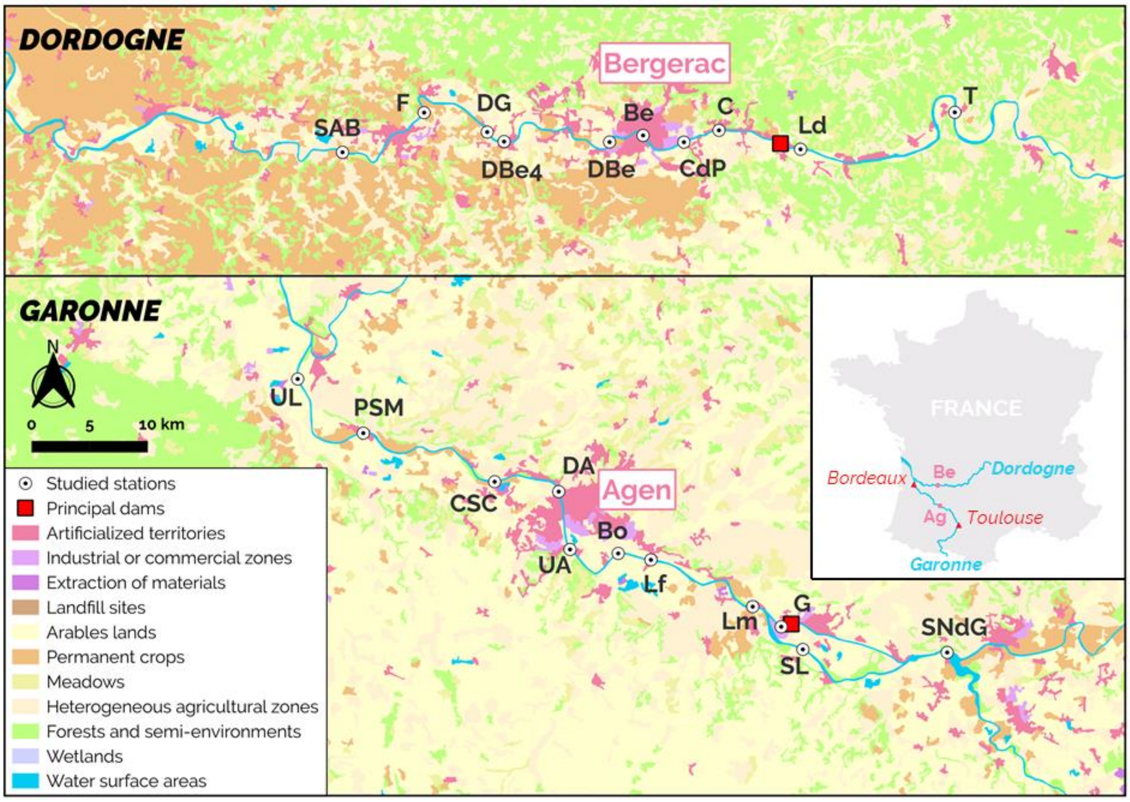

Figure 4. Map of the land use (Corin Land Cover in 2018, data from Union européenne, 2018) for the study area with studied stations in the current main allis shad spawning grounds of the Garonne and Dordogne. Station abbreviations are shown in **Table I**. Be = Bergerac and Ag = Agen.

Table I. Summary table of data used per station and river (data from SIEAG, 2023). The code used in the study, the period covered by the data, the coordinates (in Lambert 93), the data total before (Raw data) and after (Selected data) standardization, selection and sorting are indicated for each station. See **Figure 4** for station locations. For final data, a cross is indicated when stations have data for the entire study period (2006-2021).

Stations (upstream to downstream)	**ID_{SIEAG}**	**$Code_{study}$**	**X**	**Y**	**Raw data**	**Selected data**	**Entire period**
Garonne (11 stations)							
Saint-Nicolas de la Grave	05118950	SNDG	541608	6331383	31 959	29 102	X
Saint-Loup	05118880	SL	529701	6334780	570	35	
Golfech	05117110	G	528485	6336920	2 130	979	
Lamagistère	05117000	Lm	525386	6338460	39 659	34 696	X
Lafox	05116530	Lf	516621	6342490	1 355	71	
Boe	05115940	Bo	513805	6343040	8	7	
Upstream Agen	05113000	UA	509659	6343380	12 388	10 335	
Downstream Agen	05112000	DA	508685	6348360	2 709	77	
Colayrac Saint-Cirq	05111900	CSC	503168	6349210	1 737	129	
Port Sainte-Marie	05111500	PSM	491863	6353390	10 871	6 230	X
Upstream Lot	05104000	UL	486212	6358050	47 957	39 866	X
Dordogne (10 stations)							
Trémolat	05048210	T	528055	6421613	14 623	10 292	X
Lalinde	05047710	Ld	514731	6418510	1 175	42	
Creysse	05061138	C	507709	6420140	51	41	
Cours de Pile	05047600	CdP	504691	6419120	33 490	29 305	X
Bergerac	05047510	Be	501173	6419700	7 427	6 803	
Downstream Bergerac	05047100	DBe	498288	6419130	51	41	
Downstream Bergerac (D4)	05047000	DBe4	489203	6419170	11 469	6 511	X
Downstream Gardonne	05046900	DG	487753	6419990	51	41	
Fleix	05046740	F	482317	6421660	2 008	145	
Saint-Antoine de Breuilh	05046400	SAB	475291	6418250	51	41	

The chemical compounds were classified into seven major distinct classes (**Table II**), inspired by the review by Margot et al. (2015). The agrochemicals consisted of herbicides, fungicides, insecticides and other biocides (rodenticides, acaricides, molluscicides, nematicides, *etc.*). According to the periodic table of elements (see Stewart, 2007), the metals included certain alkaline earth metals (*e.g.*, calcium, beryllium), transition metals (*e.g.*, copper, silver, zinc), post-transition metals (*e.g.*, aluminum, lead), actinides (*e.g.*, uranium), metalloids (*e.g.*, arsenic, antimony) and some other non-metals (*e.g.*, selenium). The hygiene and care products (HCPs) category comprised pharmaceuticals (*e.g.*, ibuprofen, paracetamol, metformin), cosmetics and hygiene products (*e.g.*, musk xylene, butylparaben, octocrylene) and hormones (*e.g.*, estrone, norethindrone). Among the remaining industrial compounds, the PCBs, PAHs, and per- and polyfluoroalkyl substances (PFASs) were isolated due to their significant persistence and toxicity (O'Connor et al., 2022). Lastly, the other industrial pollutants (OIPs) category included various compounds used for different industrial purposes, such as flame retardants (*e.g.*, polybrominated diphenyl ethers), plasticizers (*e.g.*, phthalates, bisphenol A), solvents (*e.g.*, benzene, xylene) or other applications when industrial use was multiple (*e.g.*, chloralkanes, tributyltin). Industrial degradation products (*e.g.*, dioxins) have also been added to this category.

Table II. Summary table of chemical product categories with the color code used for the study.

Chemical categories	Abbreviations	Constitution	Color code
Agrochemicals	-	Herbicides, Fungicides, Insecticides and Other biocides	
Metals	-	Metals	
Hygiene and Care Products	HCPs	Pharmaceuticals, Cosmetics and hygiene products and Hormones	
PAHs	PAHs	PAHs	
PCBs	PCBs	PCBs	
PFASs	PFASs	PFASs	
Other Industrial Pollutants	OIPs	Flame retardants, Plasticiziers, Solvents, Degradation products and Others	

For these chemical compounds, only the concentrations in water were of interest for the study. In the SIEAG database, the data available for water consisted of two different fractions: raw water and the aqueous phase of water. The environmental concentrations of chemical compounds present in raw water corresponded to the concentrations found in water as it is in the environment. This fraction is schematically composed of the addition of the environmental concentrations of chemical compounds from both the aqueous phase of water and the particulate phase of water (**Fig. 5**). The environmental concentrations of chemical compounds present in the aqueous phase of water were obtained from the concentrations of the water fraction obtained after removing the particulate phase through filtration and centrifugation. Therefore, the data from this fraction were underestimated since the environmental concentrations of the particulate phase of water were not available in the database. Metals mostly represented this fraction (~99.7%). Moreover, for metals, data from this fraction represented ~80% of the data sampled in water. Thus, it is important to keep in mind that most of the environmental concentrations of metals have been underestimated. However, the data concerning metals in this fraction (*i.e.*, dissolved in the water) represent the bioavailable fraction for organisms (Billon et al., 2010). Thus, even if underestimated, the metal concentrations were environmentally relevant. Furthermore, data related to aluminum were removed from the analysis due to the disproportionate magnitude of quantified environmental concentrations. Some values exceeded 1 mg/L, whereas studies have shown that dissolved aluminum concentrations are generally below 0.1 mg/L (CEPA, 2010). Thus, the unrealistic aluminum concentrations could be attributed to errors during data entry, among others.

Furthermore, some lipophilic chemical compounds (*i.e.*, having an affinity for fatty supports such as sediments) can be found in the water due to resuspension phenomena (Bromilow et al., 2003). Moreover, since embryos of allis shad use these habitats, they may come into contact with these compounds, hence the relevance to add this data to the analysis (see Baglinière et al., 2003). Thus, to obtain potential environmental concentrations in the water for lipophilic compounds, a sediment-water partition coefficient (K) was calculated using the same method as Sarkis (2018). This method involved calculating a Ki for each year, each station, and each quantified chemical compound "i" in both water and sediments. Ki (in L/kg) represents the quotient of the average data concentration in sediment (called meanS in mg/kg) divided by the average concentration in the water (called meanW in mg/L):

$$(1) \qquad Ki = \frac{meanS}{meanW}$$

Next, by taking the average of all Ki values, we obtained a Kmean. Finally, using this Kmean (in L/kg), the concentrations in the water (called [water], in mg/L) for both quantified and unquantified values of lipophilic compounds was extrapolated, as follows:

$$(2) \qquad [water] = \frac{[sediment]}{Kmean}$$; [sediment] is the actual sediment concentration (in mg/kg)

Thus, an initially quantified or unquantified value in the sediment ended up being a quantified or unquantified value in the water after extrapolation (**Fig. 5**, black arrow). This extrapolation added data: 1% (HCPs), 3% (agrochemicals), 6% (PFASs), 8% (OIPs), 15% (metals), 17% (PAHs), and 48% (PCBs). Therefore, the environmental concentrations observed in the water were classified into three fractions (**Fig. 5**): raw water (~80.5%), aqueous phase of water (~12.5%) and values of raw water extrapolated from the sediments (~7%).

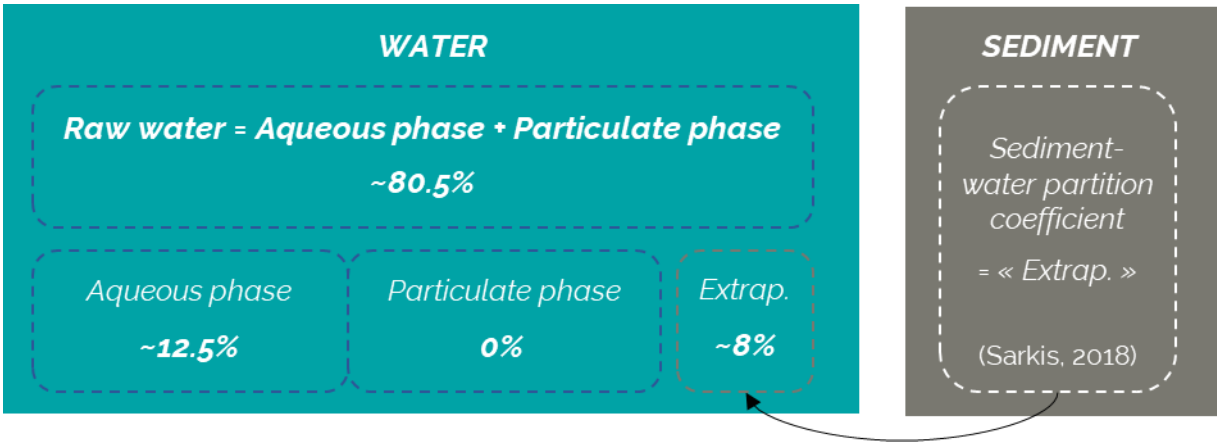

Figure 5. Schematic representation for enhanced comprehension of the origin of environmental water data; concepts of raw water, aqueous phase of water, particulate phase of water and sediment-water partition coefficient.

Next, only the chemical compounds that were quantified (*i.e.*, those exceeding the limit of quantification) at least once in the water between 2006 and 2021 and in at least one of the 21 studied stations, were retained for the study. For these chemical compounds, both the quantified concentrations (*i.e.*, exceeding the limit of quantification) and the concentrations below the limit of quantification but above the limit of detection were preserved. In other words, only the concentrations of chemicals detected, but not necessarily quantified, were considered (see the **Figure 6** to understand the concepts of limits of quantification and detection). Thus, 83 808 environmental data (representing 245 substances) were used, with 11 159 quantified data and 72 649 unquantified data. In the rest of the report, these data were used either using quantified data only (n = 11 159) or using both quantified and unquantified data (n = 83 808). Each year, there were between 1.29 and 3.69 times more substances when considering both quantified and unquantified data compared to quantified data only. Concentrations below the limit of quantification, they were extrapolated to half of the limit of quantification instead of using the limit of quantification or a value of 0, considered too extreme scenarios (**Fig. 6**, red lines) (EFSA et al., 2018). However, it is important to note that extrapolating environmental concentrations of unquantified chemical compounds to half of their limit of quantification could lead to an overestimation or underestimation of these concentrations, without certainty. Furthermore, it is important to consider that limits of quantification can vary within a station, from station to station and from year to year, due to different measurement methods used by laboratories to quantify the environmental concentration of a sample (**Fig. 6**, blue and gray).

Finally, average annual concentrations were calculated for each station and then for the spawning grounds of the Garonne and Dordogne rivers. Average annual concentrations for each spawning grounds are presented in **supplementary material #1** and **supplementary material #2** when environmental data are quantified and unquantified and when environmental data are quantified only, respectively. These two sets of environmental data (quantifed + unquantified or only quantified) were used as the basis for comparing the environmental data with the toxicity data, in order to take into account the bias associated with extrapolation to half the limit of quantification.

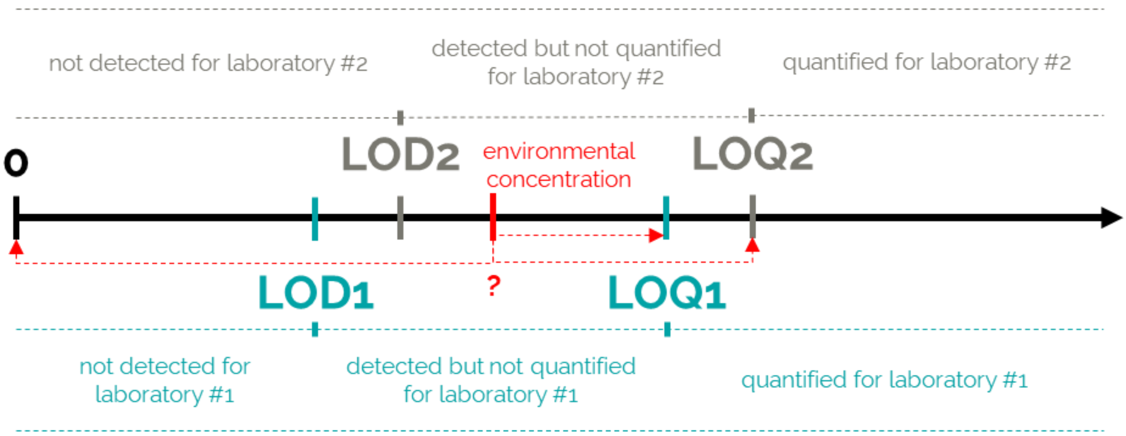

Figure 6. Principles of limits of detection (LOD) and quantification (LOQ) and extrapolation problems associated with data where the actual environmental concentration (red) is below the laboratory-specific LOQ (grey and blue) for the same substance.

*B. Toxicological data: (ms)PAF method and our case study (summarized in **Tab. III** and **Fig. 9**)*

a. Indicators used in the (ms)PAF method

To investigate the potential impact of chemical compounds present in allis shad spawning grounds in the GGD catchment, we employed a methodological approach called "Potentially Affected Fraction of species" (PAF). This method has been used as an indicator of potential toxicity in various previous studies (*e.g.* Klepper et al., 1998; Beaumelle et al., 2017; Rämö et al., 2018). It allows estimating the toxic pressure on the ecosystem, defined as the fraction of species (in %) that could potentially be affected by one or more substances actually present in the environment (Labouze, 2000; Carafa et al., 2011). It is based on the concept of "Species Sensitivity Distribution" (SSD) (Fox et al., 2021), defined as all models representing the variation in sensitivity of a species to a specific source of damage such as chemical exposure (EFSA, 2023). This concept is widely used in ecological risk assessment studies (Posthuma et al., 2002), which assess the probability that exposure to an environmental stressor (*e.g.*, chemicals exposure) will result in an environmental impact (EPA, 2023). The SSDs are constructed based on the general assumption that the differences in species sensitivities identified during toxicity tests (usually conducted in the laboratory) follow a statistical distribution, which allows prediction of the PAF in the field (Posthuma et al., 2002; de Zwart and Posthuma, 2005). However, this approach is highly dependent on the quantity and quality of the toxicity data that are used to construct the model (Wheeler et al., 2002).

These toxicity data are derived from toxicity tests, as explained in detail in the book by Ramade (2007). These tests are conducted to determine the impact of a chemical compound on a target species or a particular life stage of that target species. This is done by testing several individuals of the species. They are usually divided into two groups: a "control" group (exposed to a concentration of the test chemical equal to zero = not exposed) and a "test" group (exposed to a concentration of the test chemical not equal to zero = exposed). This "test" group is divided in different sub-groups, each exposed to a different concentration of the test chemical, in order to have an increasing gradient of concentrations tested. After a specified period, the responses of individuals from both groups exposed to the chemical compound are compared to quantify lethal toxicity (mortality effects) or sublethal toxicity (effects on reproduction, development, physiology, *etc.*). Essentially, this quantification allows expressing the degree of the effect related to the presence of the tested chemical on the tested species compared to a scenario where the chemical compound is absent.

However, there are different ways of expressing toxicity: ECx (Effect Concentration of x% of individuals), NOEC (No Observed Effect Concentration), LOEC (Low Observed Effect Concentration), the definitions of which are summarized in the **Table III** at the end of **Materials & Methods, Part D**. These data are called "endpoints" (Viau and Tardif, 2003). The ECx values are used to define a lethal or sublethal effect for x% of the organisms exposed to a chemical compound compared to organisms that are not exposed to this chemical compound. NOECs and LOECs are used to define the highest concentration showing no effect and the lowest concentration showing the presence of an effect, respectively, for organisms exposed to a chemical in comparison with non-exposed organisms. The **Figure 7** represents graphically the differences between these endpoints.

Then, SSDs can be constructed using this data. In this study, the selection of toxicity data focused on ECx with x equal to 50 (*i.e.*, EC50) for several reasons. Firstly, EC50 data are considered the most reliable for constructing an SSD (Haye et al., 2007). Secondly, they constitute the largest group of ECx in terms of available data quantity (Aurisano et al., 2019). Thirdly, they are more precise than other ECx values such as EC10 (Radix et al., 2000). Fourthly, the use of NOECs and LOECs is highly controversial in ecotoxicology (*e.g.* Laskowski, 1995; Warne and van Dam, 2008; Green et al., 2013). Indeed, they only consider two levels of effects; no observed effect for NOECs and observed effect for LOECs, which can lead to a loss of important information about the sensitivity of tested organisms to different levels of environmental stress (**Figure 7**, red lines) (Landis and Chapman, 2011; Iwasaki et al., 2015).

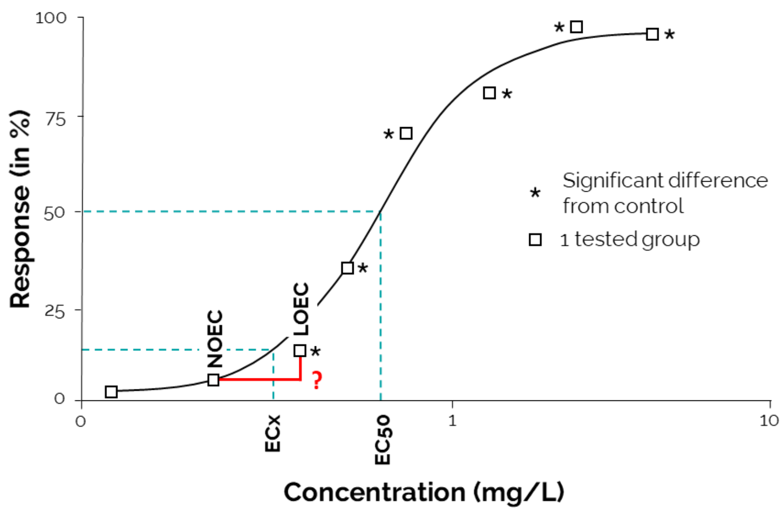

Figure 7. Classical concentration-response curve with differences between endpoints in ecotoxicology (inspired by Ghillebaert-Giuliani and Ghillebaert, 2017). The red lines represent the uncertainty around NOECs and LOECs. An example would be to study the effect (on reproduction, behavior, mortality, *etc.*) of glyphosate-containing agrochemical on adult zebrafish (*Danio rerio*).

Thus, from these EC50s, it is possible in many steps to estimate the concentration required to obtain 50% of potentially affected species among the total species studied (*i.e.* HC50, grey dotted line in **Figure 8**) specifically for each chemical compound (Payet, 2004; Plouffe et al., 2016; Sarkis, 2018). The first step is to consider the geometric mean of the EC50s for each species-substance pair. Next, we consider the geometric mean of these EC50s for each taxon-substance pair. Finally, the geometric mean of the EC50s representative of each taxon is calculated to obtain a HC50 specific to each substance and representative of the ecosystem. Then, this HC50 can be compared with an environmental concentration (average or maximum) of a chemical compound to estimate the PAF (dotted blue line in **Figure 8**). To sum up, by associating a relevant environmental concentration of a chemical compound with toxicity data, this method attempts to come as close as possible to an estimation of the toxic risk (*in fine*, ecological risk) potentially generated in reality by this compound.

Initially, this method was used to study the effects of individual chemical compounds (Klepper and van de Meent, 1997). However, aquatic organisms are constantly exposed to a large number of chemical compounds from various environmental and anthropogenic sources (Sumpter and Jobling, 1995; Brack et al., 2016; Escher et al., 2020). Therefore, since the early 2000s, due to the need to assess the impact of mixtures of potentially toxic substances, the method has been extended to mixtures (Goedkoop and Spriensma, 2000; de Zwart and Posthuma, 2005). Thus, the approach used in our study allows estimating, in addition to the fraction of species potentially affected by a single chemical compound (PAFi), the fraction affected by a mixture of substances (msPAF). When using the msPAF indicator, two additive models should be considered: the addition of concentrations and the addition of responses depending on the similarity of the toxic mode of action of the chemical compounds (Faggiano, 2013). In our case, we used a simplification of the msPAF indicator (see Pennington et al., 2004), which avoids discriminating the chemical compounds studied based on their toxic mode of action. The method, as applied, is based on the linearity theory of the SSD below the HC50 (**Figure 8**, red line). Considering this method, the (ms)PAF indicators (PAFi and msPAF) can be calculated using the following equations:

(3) For a unique substance: $\text{PAFi} = [\text{Ci}\ \frac{0{,}5}{\text{HC50i}}\ ] \times 100$

(4) For a mixture: $\text{msPAF} = [0{,}5 \sum_i \frac{\text{Ci}}{\text{HC50i}}\ ] \times 100$

The abbreviation Ci refers to the concentration (here, annual average) of a chemical compound.

This method has been widely used in ecological risk assessment studies (eg., Beaumelle et al., 2017; Rämö et al., 2018), where exceeding the threshold of 5% of PAF (PAFi or msPAF > 5%) characterises a potential ecological risk (Rico et al., 2022). This threshold (called $Th_{5\%}$, in this report) is a convention and is not based on scientific fact (Posthuma et al., 2002). Moreover, this threshold is much debated, given that 5% of species would not be considered (van Straalen, 2002). In summary, the (ms)PAF method can be used to estimate whether the presence of chemical compounds in an environment can, individually or in a mixture, give rise to an ecological risk (*i.e.* a potential effect on more than 5% of species of the community tested).

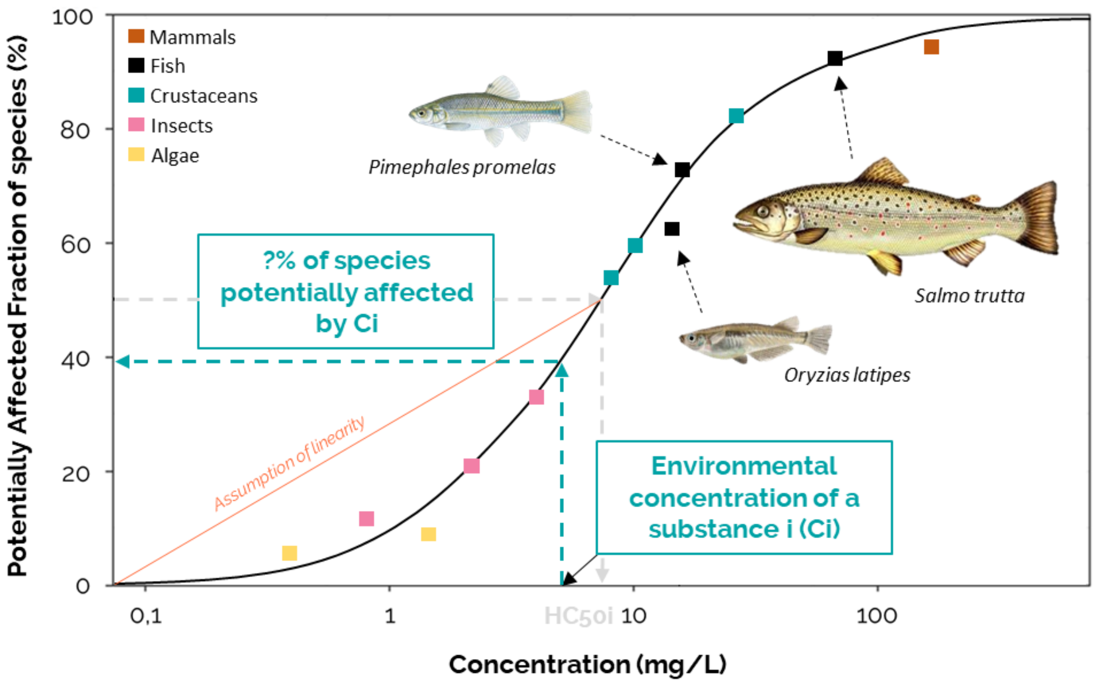

Figure 8. Example of SSD concept substance-specific (inspired by Posthuma and de Zwart, 2006). The square (□) represent compound-specific toxicity data for a set of species belonging to different taxa (in black EC50s for fish taxon). The dashed blue line represent the estimation of the percentage of species potentially affected by the environmental concentration of a substance "i" (Ci). The dashed gray line represents the hazardous concentration of a substance "i" affecting 50% of species (HC50i). The red line represents the assumption of linearity below the HC50.

b. Adaptation of the (ms)PAF method to the case of the allis shad

Initially, we wanted to use toxicity data obtained on species of the *Alosa* genus or migratory fish species present in the GGD catchment. However, after a preliminary literature review, no toxicity data were available for the *Alosa alosa* species, and only limited toxicity data were available for species in the same genus (*e.g.*, Zhang et al., 2015; Du et al., 2022). We therefore extended our search to any species belonging to the fish taxon with toxicity data (in our case EC50s) obtained in freshwater. Consequently, we assumed that the sensitivity of the allis shad was similar to the sensitivity of the average species of the fish taxon for each chemical compound studied.

By associating this toxicity data with the annual averages of measured environmental concentrations in the main spawning grounds of the allis shad in the GGD catchment, we were able to estimate the PAF for fish taxon in these areas. These spawning grounds are also where the early life stages of the allis shad (embryo and larvae) develop, considered as critical life stages particularly sensitive to environmental pressures (McKim, 1977; Von Westernhagen, 1988; Hutchinson et al., 1998). Therefore, it was interesting to estimate the potential toxic risk that early life stages may face, since they are poorly studied and have recently received special attention in the context of studies on the decline of the allis shad population in the GGD catchment (*e.g.*, Baumann, 2021; Blaya et al., 2022; Bancel, in prep.).

We therefore adapted the method presented above by adding the life stage of the fish species considered and the effect tested to the analysis.

c. Use of ECOTOX Knowledgebase

Our study involved significant research and selection of ecotoxicological databases. We initially used the 'Aquatic Indicator Impact DAtabase' to gather relevant data (Aiida, Version 3.0, https://aiida.tools4env.com/home). However, due to the lack of precision on the parameters of toxicity tests (stage life and effects) in Aiida, we decided to switch to another database that provided more information. Finally, we chose to use the "ECOTOX Knowledgebase" (Version 5.0, www.epa.gov/ecotox) from the U.S. Environmental Protection Agency (EPA), which is the largest database on the environmental toxicity of chemical substances in aquatic and terrestrial environments (Olker et al., 2022).

For each chemical included in our analysis, we extracted EC50s and NOECs from toxicity tests conducted in freshwater on different life stages of fish species and different toxicity effects. Although the use of NOECs is controversial (see **Materials and Methods, Part B.a.**), we decided to include them in the analysis. However, since EC50s are primarily used for lethal effects, while NOECs are more commonly used for sublethal effects. Thus, we deemed it appropriate to transform NOECs into EC50s to ensure a more balanced dataset between lethal and sublethal data. Out of 9 683 toxicity data obtained in total, we had 2 293 lethal EC50s, 212 sublethal EC50s, 573 lethal NOECs, and 6 605 sublethal NOECs.

Since, in reality, individuals are exposed to contaminants over a long period of time, the transformation of selectioned toxicity data into chronic EC50s (*i.e.* EC50s for a prolonged exposition of a chemical compound) was performed. We classified this data as acute or chronic based on the exposure duration: for fish, values equal to or greater than 7 days were considered chronic, while values less than 7 days were considered acute, following the classification of Payet (2014) and Aurisano et al. (2019). Out of 9 683 toxicity data obtained in total, we had 2 281 acute EC50s, 224 chronic EC50s, 3 436 acute NOECs and 3 742 chronic NOECs. To convert acute values to chronic values, we used extrapolation factors calculated in the study by Aurisano et al. (2019) specifically for the fish taxon. We divided acute NOECs were divided by 3.14 to become chronic NOECs. Then, we multiplied these chronic NOECs by 3.41 to be transformed into chronic EC50s. Finally, we divided acute EC50s by 1.71 to become chronic EC50s. By applying these transformations, all toxicity data were now considered as chronic EC50s.

In order to approximate the effects experienced by the different life stages of allis shad, we also recorded the life stage and species of the tested organisms, as well as the tested effect during the toxicity test for each toxicity data. We therefore had to classify the life stages of fish into four categories: embryo, larva, juvenile and adult (**supplementary material #3)** and the tested effects in four categories: development, physiology, behavior and mortality (**supplementary material #4**). Reproductive effects were not included in the study due to limited data availability. Thus, approximately 42.6% of the EC50s were related to early life stages of fish, with 3 029 values for embryos and 1 092 values for larvae. The remaining data corresponded to tests conducted on juveniles (3 175 data representing ~32.8% of EC50s) and adults (2 387 data representing ~24.7% of EC50s). Additionally, ~29.6%, ~16.2%, ~4.9% and ~49.3% of the toxicity tests showed an effect on mortality, development, behavior, and physiology, respectively.

Therefore, out of the 245 chemical compounds that were quantified in the spawning grounds of the allis shad during the study period, 133 (~54%) had toxicity data available for at least one effect and life stage of a fish species. These data have enabled us to study, in addition to the potential risks to the fish taxon in the GGD catchment, the various effects on the different fish life stages, thus providing valuable information on the potential risks to allis shad at different stages of development.

Firstly, we calculated a fish taxon-specific HC50 for each chemical compound independant of life stage and effect ($HC50_F$, see **supplementary materials #5**). Then, for each effect and life stage of the fish taxon, we calculated an HC50 for each chemical compound ($HC50_{SE}$, see **supplementary materials #6**). Some HC50 values were calculated with limited toxicity data (*i.e.*, few different species and tests). In total, 100 chemical compounds had an $HC50_{SE}$ associated with the embryonic stage, 73 with the larval stage, 93 with the juvenile stage, and 68 with the adult stage. Additionally, there were 125 compounds with an $HC50_{SE}$ for lethal effects and 111 for sublethal effects.

In the end, there were 4 959 toxicity data available for agrochemicals, 2 749 for OIPs, 723 for metals, 669 for PFASs, 420 for HCPs, 160 for PAHs and 3 for PCBs.

*C. PAFi & msPAF calculations (summarized in **Tab. III** and **Fig. 9**)*

Once all the necessary data was collected, we proceeded with the calculation of (ms)PAF, as presented in the equations of the **Materials and Methods, Part B.a**. Firstly, we based the PAFi calculations on $HC50_{SE}$.

Secondly, we used $HC50_F$ and environmental data (quantified and unquantified or only quantified) to calculate annual average of msPAF per station and category. Then, by averaging these values for each spawning ground (Garonne and Dordogne), we obtained the annual average of msPAF per category in the Garonne and Dordogne spawning grounds. Summing up these category-specific annual averages of msPAF, we obtained, for each spawning grounds, the annual average of msPAF with no distinction between categories ($msPAF_{F\text{-}AM}$). Meaning these $msPAF_{F\text{-}AM}$, we obtained a average of msPAF for the period ($msPAF_{F\text{-}T}$) for each spawning grounds.

Thirdly, we used $HC50_{SE}$ and environmental data (quantified and unquantified or only quantified) to calculate annual average of msPAF by station, effect, life stage and category. Then, by averaging these values for each spawning ground (Garonne and Dordogne), we obtained the annual average of msPAF by category, year, effect and life stage ($msPAF_{SE\text{-}AM}$). By averaging these $msPAF_{SE\text{-}AM}$, we were able to obtain a average of msPAF for the period for each spawning grounds, category, effect and life stage. Summing these period-average values, we obtained an average of msPAF for the period, each spawning grounds, effect and life stage ($msPAF_{SE\text{-}T}$).

D. Summary of the materials and methods

The complete method is summarized in **Figure 9** and the definitions of all the indicators (used and not used) are presented in the **Table III**. As a reminder, if the results indicated that more than 5% of the species were potentially affected, this signaled a potentially significant toxic pressure on the studied fish community, and therefore, a potential ecological risk (Carafa et al., 2011; Rico et al., 2022).

Table III. Summaries of the meanings of all (eco)toxicity indicators mentioned in the report (see Vaughan and Greenslade, 1998 and Posthuma *et al.*, 2002 for definitions).

Endpoints	**Definitions**
Environmental data useful for calculating (ms)PAF indicators	
Ci	Environmental concentration of a chemical called "i" (annual average in this study, whether quantified + unquantified data or only quantified data)
Toxicological data useful for estimating HC50s	
ECx	Effect concentration on x% of individuals
NOEC	No observed effect concentration
LOEC	Lowest observed effect concentration
Toxicological data useful for calculating (ms)PAF indicators	
HC50	Hazardous concentration on 50% of individuals
$HC50_{F}$	Hazardous concentration on 50% of individuals specific to fish taxon
$HC50_{SE}$	Hazardous concentration on 50% of individuals specific to each life stage of fish taxon for each effect
(ms)PAF indicators	
PAFi	Potentially Affected Fraction of species for a substance "i" ➔ Using Ci and $HC50_{SE}$
msPAF	Potentially Affected Fraction of species for a chemicals mixture "ms"
$msPAF_{F\text{-}AM}$	Annual average of msPAF for the fish taxon (without discriminating between categories) in each spawning grounds ➔ Using Ci and $HC50_{F}$
$msPAF_{F\text{-}T}$	Periodic average of msPAF for the fish taxon (without discriminating between categories) in each spawning grounds ➔ Using Ci and $HC50_{F}$
$msPAF_{SE\text{-}AM}$	Annual average of msPAF specific at each life stages of fish taxon for each effect and category in each spawning grounds ➔ Using Ci and $HC50_{SE}$
$msPAF_{SE\text{-}T}$	Periodic average of msPAF specific at each life stages of fish taxon for each effect (without discriminating between categories) in each spawning grounds ➔ Using Ci and $HC50_{SE}$
Reference threshold not to be exceeded by (ms)PAF indicators	
$Th_{5\%}$	Threshold above which a potential toxic risk / significant toxic pressure / potential ecological risk is generated by the presence of one or more chemical compounds in the environment, resulting in the potential loss of more than 5% of the species in the community studied.

1/ SPATIO-TEMPORAL DATA SELECTION

- **STATIONS**: spawning grounds GGD catchment (n = 21)
- **PERIOD**: 2006-2021

2/ ENVIRONMENTAL DATA TRANSFORMATION

- **SEDIMENT VALUES**: sediment-water partition coefficient (Sarkis, 2018)
- **ENV. CONCENTRATION < LIMIT OF QUANTIFICATION**: limit of quantification / 2

3/ CHEMICAL SELECTION: at least 1 env. concentration > limit of quantification

4/ CALCULATION: anual average by station (called Ci)

- **Quantified + unquantified**
- **Quantified only**

+

5/ TOXICITY DATA SELECTION: EC50s and NOECs (fish & fresh water)

- **Stage lifes**: embryo, larva, juvenile, adult
- **Effects**: developement, physiology, behavior, mortality

6/ TOXICITY DATA TRANSFORMATION: to obtain only EC50s (Aurisano *et al.*, 2019)

- NOECs acute to NOECs chronic: dividing by 3,14
- NOECs chronic to EC50s chronic: multiplying by 3,41
- EC50s acute to EC50s chronic: dividing by 1,71

6/ HC50 CALCULATIONS: geometric mean of EC50s

- $HC50_F$: representative of the fish taxon
- $HC50_{SE}$: representative of each life stage of fish taxon for each effect

=

7/ PAFi CALCULATIONS (using $\mathbf{HC50_{SE}}$)

8/ $\mathbf{msPAF_F}$ CALCULATIONS (using $\mathbf{HC50_F}$)

- $msPAF_{F\text{-}AM}$: annual average of msPAF representative of fish taxon
- $msPAF_{F\text{-}T}$: periodic average of msPAF representative of fish taxon

9/ $\mathbf{msPAF_{SE}}$ CALCULATIONS (using $\mathbf{HC50_{SE}}$)

- $msPAF_{SE\text{-}AM}$: annual average of msPAF representative of each life stage of fish taxon for each effect and category
- $msPAF_{SE\text{-}T}$: periodic average of msPAF representative of each life stage of fish taxon for each effect

Using **Ci**:

- either **quantified + unquantified**
- or **quantified only**

10/ POTENTIAL TOXIC (*i.e.*, ECOLOGICAL) RISK = EXCEEDING THRESHOLD OF 5% POTENTIALLY AFFECTED FRACTION OF SPECIES ($\mathbf{Th_{5\%}}$)

Figure 9. Summary diagram of the method used to obtain (ms)PAF values.

4. Results

A. Summary of data used for msPAF calculations

a. Presence and absence of quantified and unquantified environmental data

The availability of environmental data varies from one category to another and more data has been available since 2016 (**Fig. 10**). Agrochemicals and metals presented both quantified and unquantified data for each year studied in both spawning grounds (Garonne and Dordogne). In contrast, HCPs had data (unquantified and quantified) available in the water of both spawning grounds only from 2016, indicating a recent interest in monitoring these chemical compounds. With regard to PCBs, the years 2008, 2010 and 2011 showed no data in both spawning grounds. The other years had unquantified data and data were quantified only in 2009, 2012, 2013, 2016 and 2018 in the Garonne and only in 2012, 2014 to 2018 and 2020 in the Dordogne. For PAHs, no data was available in 2008 in the Garonne and 2006, 2008, 2010 and 2011 in the Dordogne. The other years of the study period had both quantified and unquantified data available. The PFASs presented no data from 2006 to 2009 in the Garonne and from 2006 to 2008, in 2010, 2011 and from 2013 to 2015 in the Dordogne. All other years had unquantified data and quantified data only in 2011 and 2016 in the Garonne and only in 2016 and 2018 in the Dordogne. Finally, the OIPs presented unquantified data from 2006 to 2021 in the Garonne and from 2007 to 2021 in the Dordogne. Quantified data were available from 2007 to 2021 in the Garonne and from 2008 to 2021 in the Dordogne. With regard to the presence of quantified and unquantified data, we observed few differences between the Garonne and Dordogne spawning grounds for agrochemicals, metals, OIPs and HCPs. On the other hand, there were visible differences for PCBs, PAHs and PFASs. The total number of substances quantified with at least one quantified value in the water of both spawning grounds over the period studied suggests comparable chemical contamination between the two spawning grounds studied for the chemical compounds monitored by SIEAG.

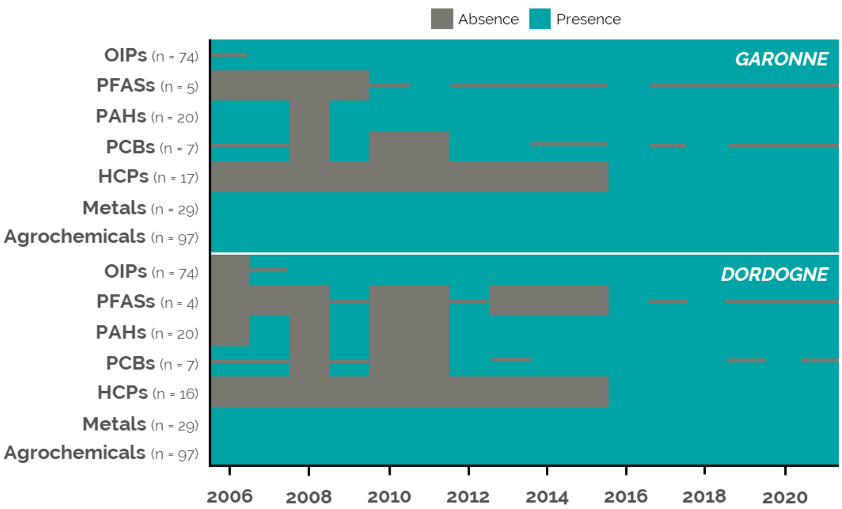

Figure 10. Absence and presence of environmental data for each category in Garonne and Dordogne spawning grounds. Blue rectangles represent the presence of quantified or unquantified data, grey rectangles represent the absence of quantified or unquantified data, and grey lines represent the absence of quantified data.

b. Toxicity data: life stages and effects

Toxicity data are not uniform for each life stage of fish taxon in terms of the diversity of species used and effect tested in toxicity tests (**Fig. 11**). In total, 135 species provided toxicity data, 39 of which had more than 20 toxicity data. *Danio rerio* had over 2000 toxicity tests, followed by *Oryzias latipes*, *Oncorhynchus mykiss* and *Pimephales promelas*, each with over 500. The juvenile stage was the life stage with the greatest diversity of species with toxicity data (85 species). Next came the larval stage (59 species), the adult stage (51 species) and, with less diversity, the embryonic stage (24 species).

For the embryonic stage, most toxicity data came from tests on *Danio rerio* (mainly for effects on physiology) and, to a lesser extent, on *Oryzias latipes* (mainly for effects on physiology), *Oncorhynchus mykiss* (mainly for effects on mortality), *Pimephales promelas* (mainly for effects on mortality and development) and *Salmo salar* (mainly for effects on physiology). Concerning the larval stage, most of the toxicity data available concerned the species *Pimephales promelas* (mainly for effects on mortality), *Oncorhynchus mykiss* (mainly for effects on mortality), *Oryzias latipes* (mainly for effects on physiology and mortality) and *Danio rerio* (mainly for effects on physiology). Toxicity data for the embryonic and larval stages came mainly from the same species (*Oncorhynchus mykiss*, *Oryzias latipes* and *Danio rerio*), although the diversity of species presenting toxicity data for the larval stage was greater. As for the juvenile stage, toxicity data came from a wide variety of species, most notably *Cyprinus carpio* (mainly for effects on physiology), *Prochilodus lineatus* (mainly for effects on physiology), *Labeo rohita* (mainly for effects on physiology), *Oncorhynchus mykiss* (mainly for effects on physiology and mortality) and *Pimephales promelas* (mainly for effects on mortality). Finally, for the adult stage, most of the toxicity data came from *Gobiocypris rarus* (mainly for effects on physiology), *Carassius auratus* (mainly for effects on physiology), *Danio rerio* (mainly for effects on physiology), *Pimephales promelas* (mainly for effects on physiology) and *Oryzias latipes* (mainly for effects on physiology).

The species that provided the most data for all life stages were: *Danio rerio*, *Pimephales promelas* and *Oryzias latipes*. It should be noted that of the species with the most toxicity data, only embryos and adults of the species *Danio rerio* provided toxicity data for behavioral effects.

The categories of chemical compounds are not studied in the same way in toxicity tests, in terms of the life stages studied and the type of effects tested (**Fig. 12**).

On one hand, we can see that PCBs only present toxicity data on the larva stage. PAHs, on the other hand, mainly present toxicity data associated with the juvenile, larva and embryonic stages, with few data on the adult stage. Metals present mainly data for juveniles and, to a lesser extent, also in the other three life stages. Agrochemicals, HCPs and OIPs have a lot of toxicity data associated with adults, juveniles and embryos, and few toxicity data associated with larvae. Finally, PFASs had a lot of toxicity data associated with the adult and embryonic stages and few toxicity data on the juvenile and larval stages.

PCBs mainly present toxicity data only related to mortality of the organisms tested. Agrochemicals, and OIPs, for their part, present a majority of toxicity data associated with mortality and physiology effects, and few toxicity data on development and behavior. HCPs and PFASs presented a lot of toxicity data associated with development and physiology, and few toxicity data associated with mortality and behavioral effects. Finally, PAHs and metals presented a lot of toxicity data associated with mortality effects and few on development, physiology and behavior.

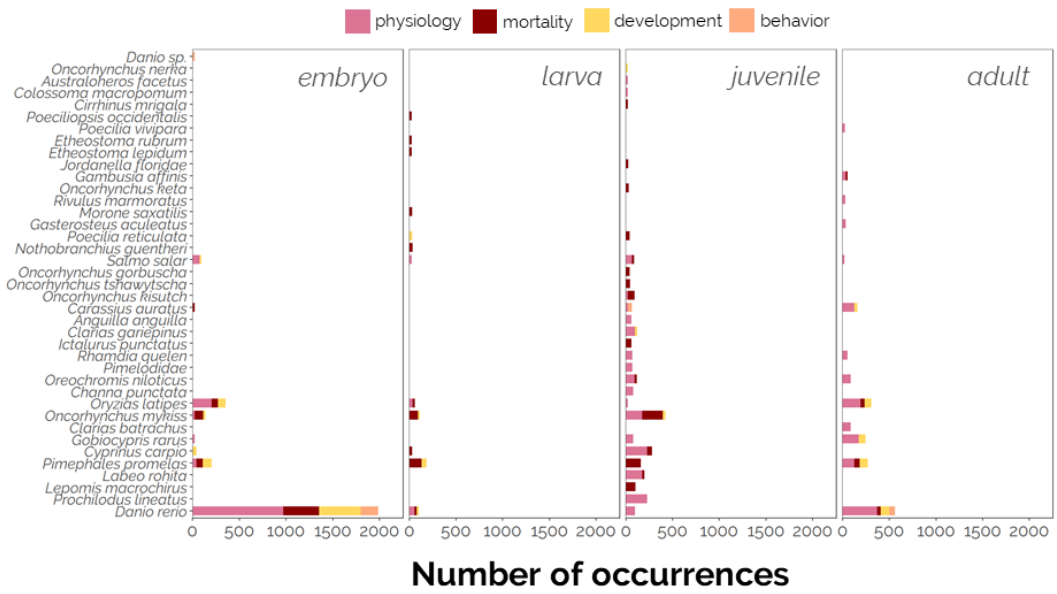

Figure 11. Number of toxicity tests (fish/freshwater) used to calculate HC50s by life stage of fish taxa and by effects tested (species with fewer than 20 tests are not represented here).

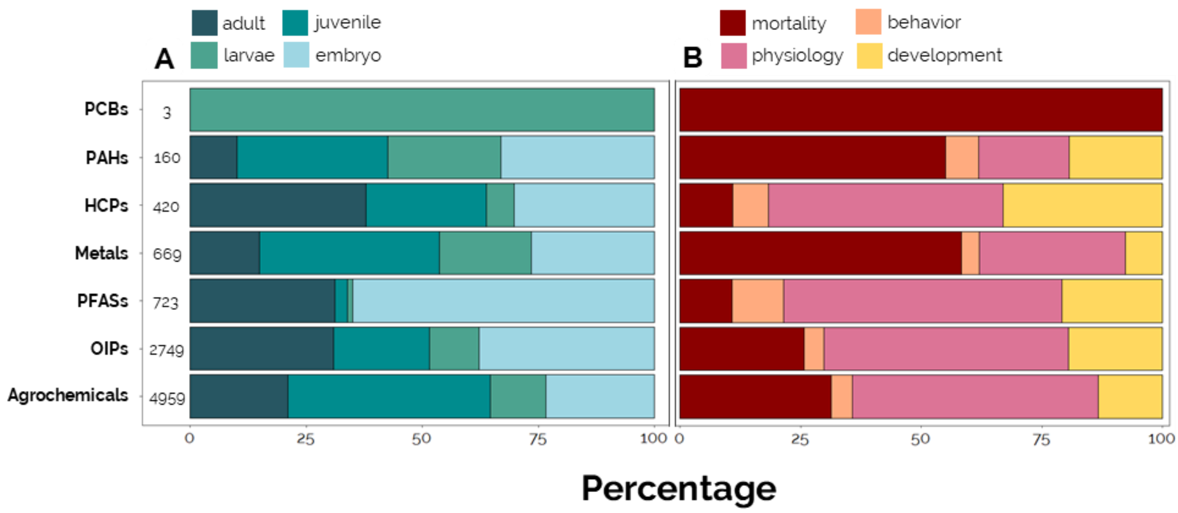

Figure 12. Percentage of (**A**) stage lifes of fish and (**B**) toxicity parameters used to calculate HC50s for each category of chemicals (the number corresponds to the total number of toxicity tests carried out on freshwater fish).

B. Contributions of quantified and unquantified data to msPAF results

The values of $msPAF_{F\text{-}AM}$ differ in space and time, and the values of $msPAF_{F\text{-}T}$ differ in space (**Fig. 13**). In both cases, the use of environmental data (quantified and unquantified or only quantified) has an impact on the values obtained.

In the Garonne spawning grounds, the $msPAF_{F\text{-}T}$ were above the $Th_{5\%}$, regardless of the environmental data used. Using only quantified environmental data, the $msPAF_{F\text{-}T}$ was 8.06%. Using both quantified and unquantified environmental data, the $msPAF_{F\text{-}T}$ was 11.02%. In the Dordogne spawning grounds, $msPAF_{F\text{-}T}$ values were above the $Th_{5\%}$ only when using both quantified and unquantified environmental data (5.92%). In the other case, the value was slightly below the $Th_{5\%}$ (4.14%).

Looking at the $msPAF_{F\text{-}AM}$, there are few visible differences considering only quantified environmental values or quantified and unquantified environmental values. The only significant differences are seen in 2007 and 2019 in the Dordogne, and in 2019, 2020 and 2021 in the Garonne, with higher values using both quantified and unquantified environmental data. In the Garonne spawning grounds, $msPAF_{F\text{-}AM}$ were above the $Th_{5\%}$, regardless of the environmental data used. In the Dordogne spawning grounds, this $Th_{5\%}$ was exceeded only from 2006 to 2008, in 2010, in 2011 and in 2019 using both quantified and unquantified data, and only from 2006 to 2008, in 2010, in 2011, in 2013 and in 2015 using only quantified data. However, all standard deviations exceeded the $Th_{5\%}$, which means that when considering individual stations, values may exceed this threshold.

Considering only quantified environmental data, visually higher $msPAF_{F\text{-}AM}$ were recorded in the Dordogne spawning grounds in 2006, 2008, 2010 and 2011, and in the Garonne spawning grounds in 2006, 2007, 2008, 2010 and 2011.

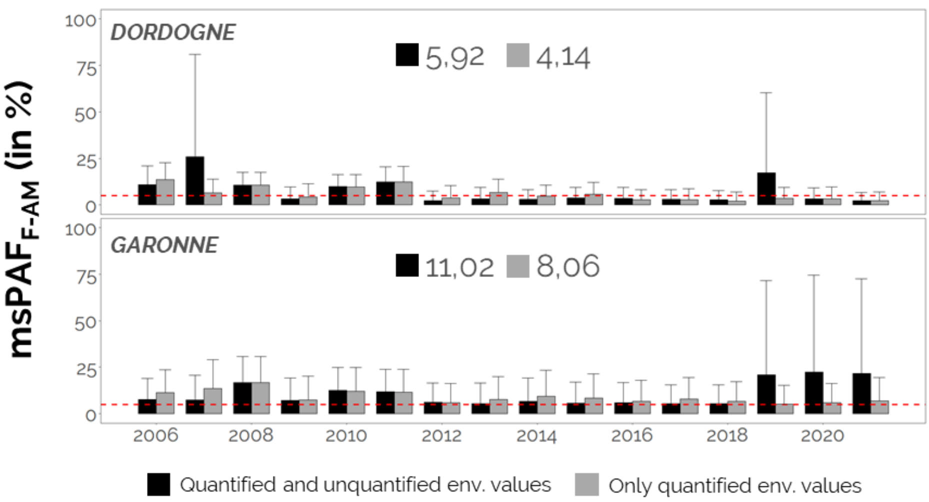

Figure 13. Spatio-temporal trends (Garonne-Dordogne and 2006-2021) in $msPAF_{F\text{-}AM}$ when considering quantified and unquantified environmental data (black) or only quantified environmental data (gray). The values shown at the top represent $msPAF_{F\text{-}T}$ values. The red line indicate the $Th_{5\%}$. As a reminder, $msPAF_{F\text{-}AM}$ and $msPAF_{F\text{-}T}$ represent, respectively, the average anual and average periodic msPAF, specific to the fish taxon in each spawning ground.

C. Differences in potential toxicity for different life stages of fish in the GGD catchment

Using $msPAF_{SE-T}$, we can see that the use of environmental data (quantified and unquantified or only quantified) has a strong impact on the values obtained (**Fig. 14**).

The top 4 boxes in **Figure 14**, show the $msPAF_{SE-T}$ value when using both quantified and unquantified environmental data. The $msPAF_{SE-T}$ showed a potential ecological risk (> $Th_{5\%}$) related to effects on larval development (9.42% in the Dordogne and 8.68% in the Garonne), larval physiology (5.26% in the Dordogne and 9. 74% in the Garonne), embryonic physiology (5.92% in the Dordogne and 10.02% in the Garonne), juvenile physiology (13.89% in the Dordogne and 24.98% in the Garonne), adult development (17.99% in the Dordogne) and adult physiology (6.26% in the Garonne). Where $msPAF_{SE-T}$ did not exceed the $Th_{5\%}$, standard deviations above this threshold were still observed. This shows that on some of the studied stations, significant $msPAF_{SE-T}$ was observed. This was the case for effects on embryonic mortality, embryonic development, embryonic behavior, larval mortality, larval behavior and adult behavior in Dordogne spawning grounds, and for effects on embryonic development, embryonic behavior, larval behavior and adult development in Garonne spawning grounds.

The bottom 4 boxes in **Figure 14** show the $msPAF_{SE-T}$ when using only quantified environmental data. The $msPAF_{SE-T}$ showed a potential ecological risk (> 5%) related to effects on larval physiology (7.31% in the Dordogne and 12.95% in the Garonne), larval development (11.43% in the Dordogne and 9.94% in the Garonne) and adult physiology (5.82% in the Garonne). Although below the $Th_{5\%}$, $msPAF_{SE-T}$ were quite high for effects on embryo physiology (3.81% in the Dordogne and 4.37% in the Garonne) and for effects on adult physiology (3.57% in the Dordogne). As in the previous case, when $msPAF_{SE-T}$ did not exceed the $Th_{5\%}$, standard deviations above this threshold were still observed. This was the case for effects on embryonic mortality, embryonic physiology, juvenile physiology, adult behavior and adult physiology in Dordogne spawning grounds, and for effects on embryonic physiology in Garonne spawning grounds.

The larval stage was considered the most at-risk life stage at quantified environmental concentrations ($msPAF_{SE-T}$ max. of 12.95% associated with the effect on physiology in the Garonne and $msPAF_{SE-T}$ max. of 11.43% associated with the effect on development in the Dordogne). The juvenile stage represented the least at-risk stage at quantified environmental concentrations, with $msPAF_{SE-T}$ reaching a maximum of 1.32% in the Garonne. The embryonic stage was the only life stage of fish taxon for which a value of $msPAF_{SE-T}$ associated with a mortality effect exceeded 1%, and this in both spawning grounds.

At quantified environmental values, only the $msPAF_{SE-T}$ associated with effects on larval development was higher in the Dordogne than in the Garonne. In all other cases, $msPAF_{SE-T}$ were similar into the two rivers, or higher in the Garonne.

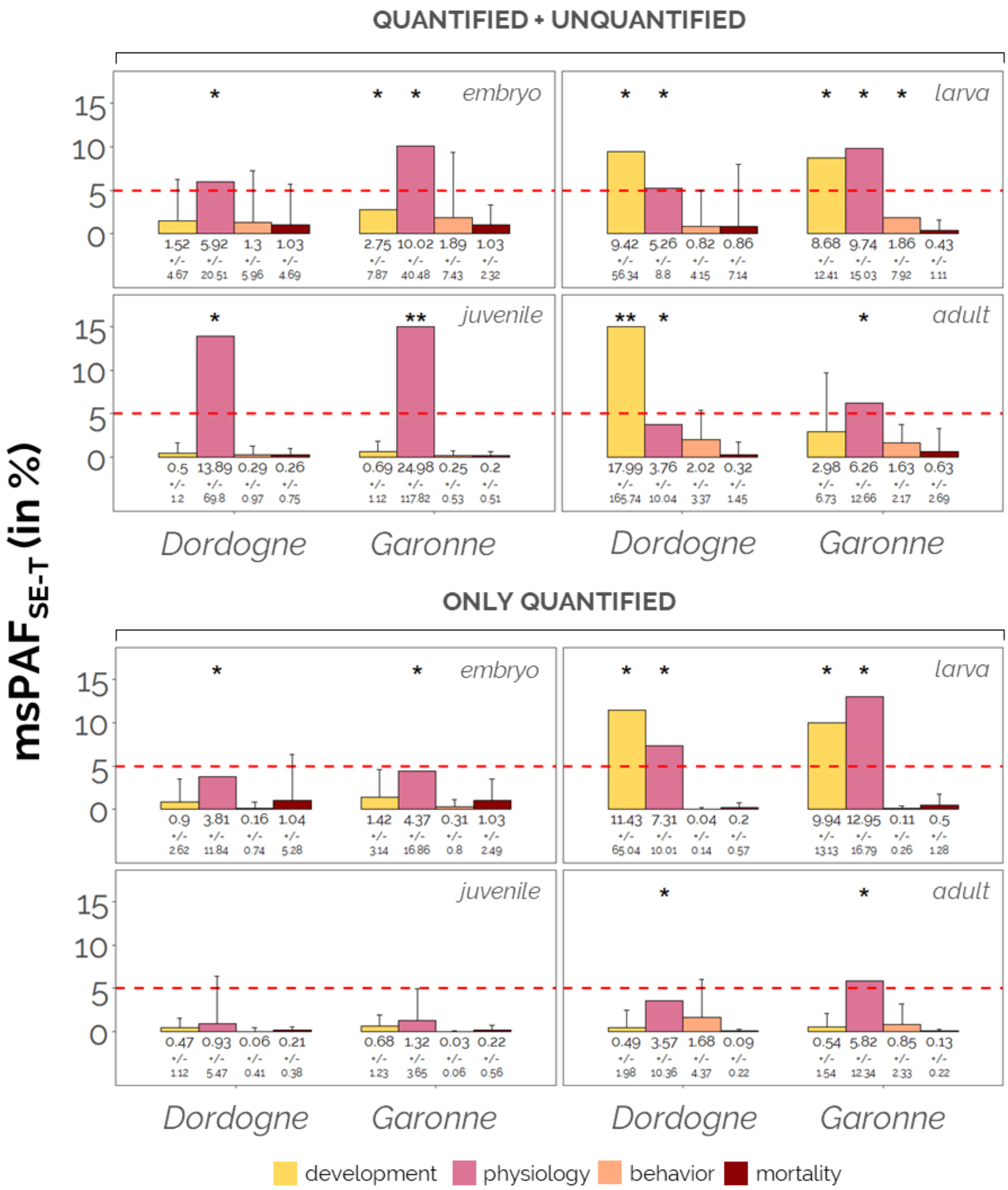

Figure 14. Values of $msPAF_{SE\text{-}T}$ (in %) with (**A**) quantified + unquantified environmental data and (**B**) only quantified environmental data for each lifestage and each effect in the Dordogne and Garonne spawning grounds (* : error standard > 15% ; ** : error standard and periodic average > 15%). The values of $msPAF_{SE\text{-}T}$ and their standard deviation are shown. The red line indicate the $Th_{5\%}$. As a reminder, $msPAF_{SE\text{-}T}$ represents the periodic average msPAF specific to each life stage of the fish taxon for each effect tested in each spawning ground.

D. Contribution of categories to (sub)lethal effects in early life stages of fish

For each category, the contribution to $msPAF_{SE\text{-}AM}$ differs according to the life stage studied, the sublethal effect tested, the spawning ground and the time (**Fig. 15**). For effects on larval development and larval physiology, the contribution of metals (■) is visually significant and constant over the entire study period in both spawning grounds. This contribution is moreover constant at a level exceeding the $Th_{5\%}$. For effects on embryonic development, metals contribute more variably, but still significantly, exceeding the $Th_{5\%}$, in particular in Garonne spawning grounds. This category of chemical compounds appears to make a small contribution to $msPAF_{SE\text{-}AM}$ for effects on embryo physiology, embryo behavior and larval behavior in both spawning grounds. For all the effects tested, a constant and low contribution from agrochemicals (■) was observed. In terms of effects on embryo physiology and larval physiology, these chemical compounds may exceed the $Th_{5\%}$ in both spawning grounds. Since they have been monitored (*i.e.* 2016), HCPs (■) have contributed strongly to $msPAF_{SE\text{-}AM}$ for all sublethal effects tested for embryos and for the behavioral effect for larvae at a level exceeding the $Th_{5\%}$. PCBs (■) and PFASs (■) make almost no contribution to $msPAF_{SE\text{-}AM}$. PAHs (■) made a significant contribution to $msPAF_{SE\text{-}AM}$ in the Dordogne in 2007, for effects on embryo development and embryo physiology. As for OIPs (■), a low and constant contribution was observed in both spawning grounds. In addition, in Dordogne spawning grounds, this category made a significant contribution to very strong and sudden $msPAF_{SE\text{-}AM}$ at a level exceeding the $Th_{5\%}$, for all sublethal effects tested and all life stages except for effects on larval behavior, where no extreme values were recorded.

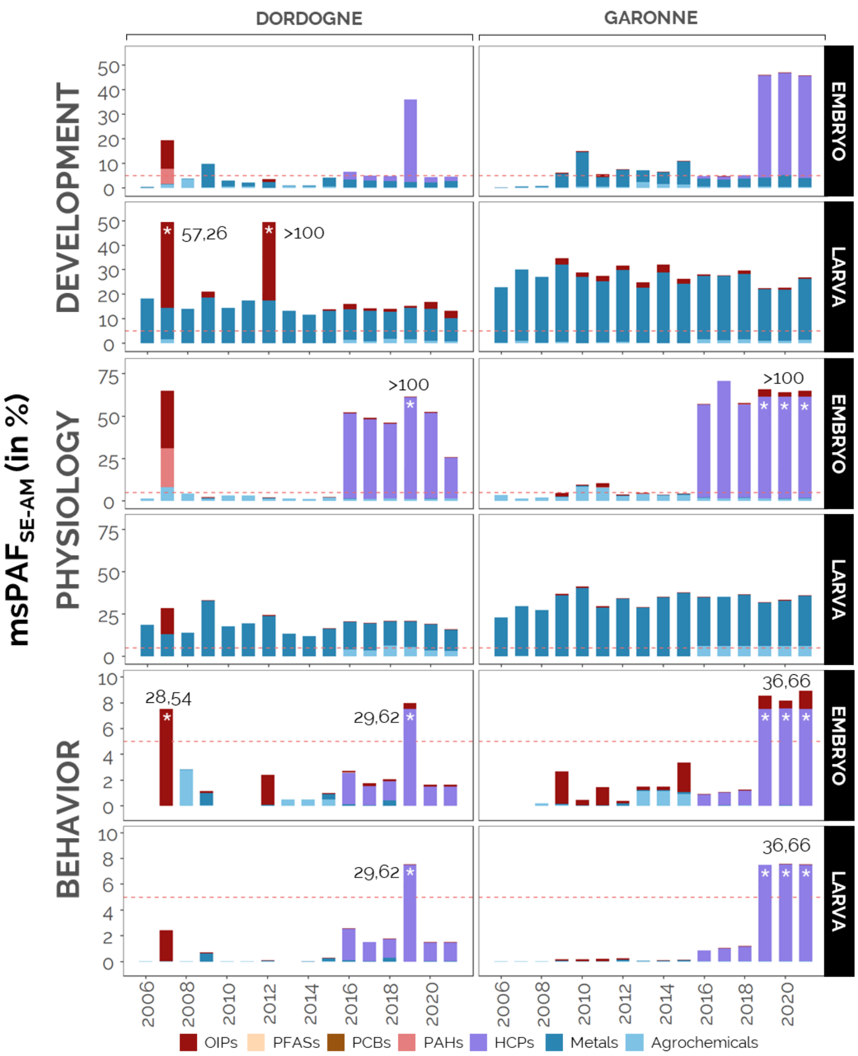

Figure 15. Trends of $msPAF_{SE\text{-}AM}$ using quantified + unquantified environmental data (in %) for the sublethal effects (development, physiology and behavior), for early stages (embryo and larva) and for each category of chemicals in Dodrogne and Garonne spawning grounds (* : averages exceeding the graph box; their values are shown next to the *). The red line indicate the $Th_{5\%}$. As a reminder, $msPAF_{SE\text{-}AM}$ represents the average annual msPAF specific to each life stage of the fish taxon for each effect tested and category studied in each spawning ground.

In the case of a mortality effect, for each category, the contribution to $msPAF_{SE-AM}$ differs according to the life stage studied, the spawning ground and the time (**Fig. 16**). Metals (■) made a significant and constant contribution throughout the period, particularly in embryos, where in some years a potential ecological risk was observed ($msPAF_{SE-AM}$ > 5%). Two significant values were recorded, for this category, with ~33% recorded in the Dordogne in 2009 and close to ~15% in the Garonne in 2009. The contribution of agrochemicals (■) to $msPAF_{SE-AM}$ was low in both spawning grounds for embryos and larvae. HCPs (■), PCBs (■) and PFASs (■) contributed very little to the $msPAF_{SE-AM}$. PAHs (■) made a significant contribution in 2007 in the Dordogne, particularly for larvae. The contribution of OIPs (■) to $msPAF_{SE-AM}$ was significant in both spawning grounds, particularly for larvae. For this category a value more than 55% was recorded in the Dordogne in 2007 and values above $Th_{5\%}$ were observed in the Garonne in 2009 and 2015. Thus, for a lethal effect, metals seem to affect embryos and OIPs seem to affect larvae.

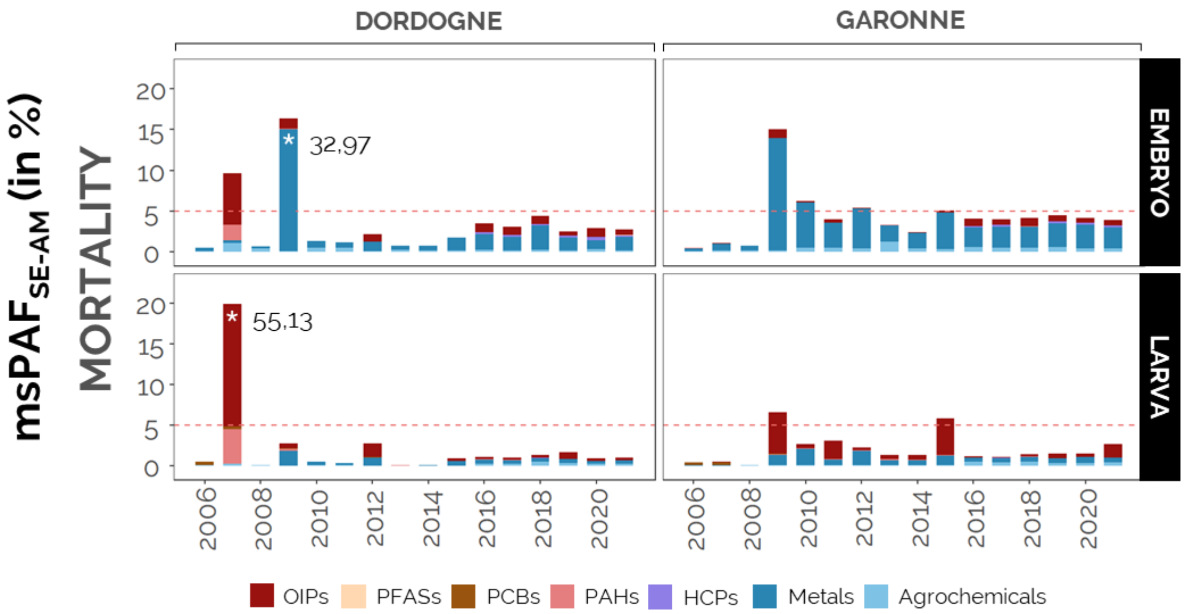

Figure 16. Trends of $msPAF_{SE-AM}$ using quantified + unquantified environmental data (in %) for the lethal effects (mortality), for early stages (embryo and larva) and for each category of chemicals in Dodrogne and Garonne spawning grounds (* : averages exceeding the graph box; their values are shown next to the *). The red line indicate the $Th_{5\%}$. As a reminder, $msPAF_{SE-AM}$ represents the average annual msPAF specific to each life stage of the fish taxon for each effect tested and category studied in each spawning ground.

E. Individual contributions from chemical compounds exceeding the $Th_{5\%}$

Some chemical compounds may contribute individually to toxic risk (PAFi > Th5%), but these and their number differ according to the effect tested, the year, the life stage studied and the spawning ground (**Tab. IV**).

a. Effects on the development of early life stages

Estrone (HCPs) had a significant PAFi associated with embryos between 2019 and 2021 in the Garonne (41%) and in 2019 in the Dordogne (33%). Among metals, calcium had a significant PAFi from 2006 to 2021 associated with larvae in both spawning grounds (from 10 to 18% in the Dordogne and from 22 to 29% in the Garonne). Copper also had a significant PAFi in 2009 (9%) and 2012 (6%) in the Dordogne, as well as in 2009 (5%), 2010 (14%), 2012 (7%) and 2015 (9%) in the Garonne, for embryos. Zinc had a significant PAFi in 2012 (6%) in the Garonne for larvae. In 2007, tributylstannane (9%, for embryos in the Dordogne), dioctyl phthalate (57%, for larvae in the Dordogne) and benzo[a]pyrene (6%, for embryos in the Dordogne) had a significant PAFi. In 2012, bisphenol A, had a significant PAFi for embryos (9%) and an extreme PAFi for larvae (798%), in the Dordogne. Bisphenol A in the Dordogne, zinc in the Garonne, copper and calcium in both spawning grounds contributed when using only quantified environmental data were used.

b. Effects on the behavior of early life stages

Estrone had a significant PAFi for embryos and larvae between 2019 and 2021 (37%) in the Garonne and in 2019 (30%) in the Dordogne. In the Dordogne, 4-tert-octyl phenol (25%, in 2007) and bisphenol A (7%, in 2012) also had a significant PAFi for embryos. For this effect, only bisphenol A in the Dordogne contributed above the $Th_{5\%}$ when only quantified environmental data were used.

c. Effects on the physiology of early life stages

Simazine had significant PAFi associated with embryos in 2007 (8%) in the Dordogne, as well as in 2010 (8%) and 2011 (7%) for embryos in the Garonne. Cypermethrin had significant PAFi associated with larvae in the Dordogne in 2018 and 2019 (6%) and in the Garonne in 2016 to 2021 (6%). Metformin (7 to 17%) and carbamazepine (12 to 98%) had significant PAFi for embryos from 2016 to 2021 in both spawning grounds. Estrone showed significant PAFi for embryos from 2019 to 2021 in the Garonne (135%) and from 2016 to 2021 in the Dordogne (5 to 109%). Among metals, calcium had a significant PAFi from 2006 to 2021 associated with larvae in both spawning grounds (from 10 to 18% in the Dordogne and from 22 to 29% in the Garonne). Copper had significant PAFi associated with larvae in the Garonne from 2009 to 2021 (7 to 29%) and in the Dordogne in 2009, in 2010, in 2012, from 2015 to 2018 and in 2021 (5 to 19%). Dioctyl phthalate (10% for embryos and 14% for larvae in the Dordogne), benzo[a]pyrene (15% for embryos in the Dordogne) and fluoranthene (8% for embryos in the Dordogne) had a high PAFi in 2007. Phenol, 4-nonyl-, branched had a significant PAFi in 2007 (18% in the Dordogne) and 2019 (6% in the Garonne) for embryos. Simazine and phenol, 4-nonyl-, branched in the Garonne, cypermethrin in the Dordogne, and metformin, carbamazepine, calcium and copper in both spawning grounds had significant PAFi, with values above the $Th_{5\%}$ using quantified environmental data.

d. Effects on the mortality of early life stages

In 2009, lead was associated with a high PAFi with embryos in the Garonne (10%) and in the Dordogne (29%). The 4-tert-octylphenol had a high PAFi for larvae in the Dordogne in 2007 (48%). The bisphenol A had a high PAFi for embryos in the Dordogne in 2012 (7%). Dioctyl phthalate had a high PAFi for larvae in the Dordogne larvae in 2007 (6%). Bisphenol A and 4-tert-octyl phenol in the Dordogne and lead in both spawning grounds exceeded the $Th_{5\%}$ using quantified environmental data.

Table IV. Values of PAFi above the $Th_{5\%}$ (representative of a potential ecological risk) for each effect, life stage, year and river studied when using unquantified and quantified environmental data. Substances above the $Th_{5\%}$ using only quantified environmental data are shown in bold. In dark gray, values about embryos and in light gray, larvae. As a reminder, PAFi represents the average annual individual PAF specific to each chemical compound and each life stage of the fish taxon for each effect tested in each spawning ground.

Chemicals (Categories)	Rivers	Life stages	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Development																		
Estrone (HCPs)	D	embryon														33		
Estrone (HCPs)	G	embryon														41	41	41
Calcium (Metals)	D	larva	18	13	14	14	13	16	15	13	11	12	14	14	12	14	15	10
Calcium (Metals)	G	larva	23	29	27	27	23	23	22	27	27	26	25	24	25	23	23	28
Copper (Metals)	D	embryon				9			6									
Copper (Metals)	G	embryon				5	14		7			9						
Zinc (Metals)	G	larva							6									
Tributylstannane (OIPs)	D	embryon		9														
Bisphenol A (OIPs)	D	larva				7			798									
Bisphenol A (OIPs)	D	embryon							9									
Dioctyl phthalate (OIPs)	D	larva		57														
Benzo[a]pyrene (PAHs)	D	embryon		6														
Behavior																		
Estrone (HCPs)	D	embryon														30		
Estrone (HCPs)	D	larva														30		
Estrone (HCPs)	G	embryon														37	37	37
Estrone (HCPs)	G	larva														37	37	37
4-tert-Octylphenol (OIPs)	D	embryon		25														
Bisphenol A (OIPs)	D	embryon							7									
Physiology																		
Simazine (Agroch.)	D	embryon		8														
Simazine (Agroch.)	G	embryon					8	7										
Cypermethrin (Agroch.)	D	larva													6	6		
Cypermethrin (Agroch.)	G	larva											6	6	6	6	6	6
Metformin (HCPs)	D	embryon											16	13	12	9	17	7
Metformin (HCPs)	G	embryon											12	14	8	12	12	12
Carbamazepine (HCPs)	D	embryon											30	33	31	31	28	12
Carbamazepine (HCPs)	G	embryon											46	58	48	98	64	46
Estrone (HCPs)	D	embryon											9	5	5	109	5	5
Estrone (HCPs)	G	embryon														135	135	135
Calcium (Metals)	D	larva	18	13	14	14	13	16	15	13	11	12	14	14	12	14	15	10
Calcium (Metals)	G	larva	23	29	27	27	23	23	22	27	27	26	25	24	25	23	23	28
Copper (Metals)	D	larva				19	5		12			7	7	6	5			5
Copper (Metals)	G	larva				11	29	8	14	9	10	19	6	6	7	7	10	7
Phenol, 4-nonyl-, branched (OIPs)	D	embryon		18														
Phenol, 4-nonyl-, branched (OIPs)	G	embryon														6		
Dioctyl phthalate (OIPs)	D	embryon		10														
Dioctyl phthalate (OIPs)	D	larva		14														
Benzo[a]pyrene (PAHs)	D	embryon		15														
Fluoranthene (PAHs)	D	embryon		8														
Mortality																		
Lead (Metals)	D	embryon				29												
Lead (Metals)	G	embryon				10												
4-tert-Octylphenol (OIPs)	D	larva		48														
Bisphenol A (OIPs)	D	embryon							7									
Dioctyl phthalate (OIPs)	D	larva		6														

5. Discussion

A. Summary of main results

Using only quantified environmental data, we have seen that there was a toxic risk for the fish taxon ($msPAF_{F\text{-}AM}$ > $Th_{5\%}$) in the Garonne spawning grounds for each year of the study period. In the Dordogne, this risk was only present for part of the period (2006, 2007, 2008, 2010, 2011, 2013 and 2015). Furthermore, at quantified environmental concentrations, $msPAF_{F\text{-}T}$ values were twice as high in the Garonne spawning grounds (~8% > $Th_{5\%}$) as in the Dordogne spawning grounds (~4% < $Th_{5\%}$). There was also a high degree of variability within spawning grounds each year (high standard deviations), with significant differences in $msPAF_{F-AM}$ values between stations in the same spawning ground. For these indicators ($msPAF_{F-AM}$ and $msPAF_{F-T}$), the use of quantified and unquantified environmental data overestimated the values obtained only in 2007 and 2019 in the Dordogne and from 2019 to 2021 in the Garonne.

In terms of life stage sensitivity, using quantified environmental data, only larval physiology and larval development in both spawning grounds, and adult physiology in Garonne spawning grounds had $msPAF_{SE-T}$ values indicating a potential toxic risk (> $Th_{5\%}$). Using quantified environmental data, the embryonic stage had $msPAF_{SE-T}$ values close to $Th_{5\%}$ (for effect on physiology) and the juvenile stage was the least impacted ($msPAF_{SE-T}$ max. of 1.32%). Using both quantified and unquantified data, all life stages showed values above $Th_{5\%}$, for at least one effect. Regardless of the environmental data used, only embryos showed $msPAF_{SE-T}$ values associated with mortality effects exceeding 1%.

Using quantified and unquantified environmental data, different categories of chemical compounds strongly contributed to $msPAF_{SE-AM}$ specific to early life stages of fish at values above $Th_{5\%}$. In both spawning grounds, metals (■) exceeded $Th_{5\%}$ for embryonic development, embryonic mortality, larval development and larval physiology. Although monitored from 2016, HCPs (■) exceeded $Th_{5\%}$ in both spawning grounds for embryonic behavior, embryonic physiology, embryonic development and larval behavior. Although generally presenting low contributions, agrochemicals (■) exceeded $Th_{5\%}$ for embryonic physiology and larval physiology in both spawning grounds. Only in a few years in the Dordogne did OIPs (■) contribute values above $Th_{5\%}$ for embryonic development, embryonic physiology, embryonic behavior, embryonic mortality, larval development, larval physiology and larval mortality. For PAHs (■), a contribution exceeding $Th_{5\%}$ was visible only in 2007 for embryonic development and embryonic physiology in the Dordogne. PCBs (■) and PFASs (■) did not show significant $msPAF_{SE-AM}$ values. For early life stages of fish, compounds individually exceeding $Th_{5\%}$ at quantified environmental values were : calcium (metals), copper (metals), zinc (metals), lead (metals), simazine (agrochemicals), cypermethrin (agrochemicals), metformin (HCPs), carbamazepine (HCPs), bisphenol A (OIPs), phenol, 4-nonyl-, branched (OIPs) and 4-tert-octylphenol (OIPs).

B. Toxic effects of individual substances contributing to PAF

For early life stages (embryos and larvae), the individual contribution of each substance was studied, and chemical compounds exceeding the $Th_{5\%}$ were identified, in particular for quantified environmental data.

a. Metals

The four metals (calcium, zinc, copper and lead) that exceeded the $Th_{5\%}$ also did so at quantified environmental values. These compounds had quantified concentrations ranging from 18.1 to 50.4 mg/L for calcium, from 2.71E-05 to 7.94E-03 mg/L for copper, from 3.16E-05 to 7.94E-03 mg/L for lead and from 2.12E-04 to 3.21E-02 mg/L for zinc.

For calcium, the $HC50_{SE}$ associated with larval development and larval physiology was both 87.1 mg/L, obtained with two tests carried out on the same species. For copper, the $HC50_{SE}$ associated with embryonic development was 1.09E-02 mg/L, obtained with only one test, and the $HC50_{SE}$ associated with larval physiology was 5.32E-03 mg/L, obtained with two tests conducted on the same species. For zinc, the $HC50_{SE}$ associated with larval development was 2.55E-01 mg/L, obtained with three tests performed on the same species. For lead, the $HC50_{SE}$ associated with embryonic mortality was 1.36E-02 mg/L, obtained using a single test.

Historically, anthropogenic contamination by metals (cadmium, zinc, copper and lead) in the Garonne has been associated with the Riou-Mort river, a watercourse flowing into the Garonne downstream of the allis shad spawning grounds (Audry et al., 2004). Other sources have also been identified. In the Dordogne and Tarn rivers (flowing into the Garonne upstream of the allis shad spawning grounds), metallic contamination has been recorded, but this only concerned vanadium and chromium (Grousset et al., 1999).

However, in the GGD catchment, where agricultural activity is high (Faggiano et al., 2010), metals can be used as fungicides in vineyards: copper in Bordeaux mixture (in French, "bouillie-bordelaise") and zinc (Bernard, 2018; Lucas et al., 2021). As a result, these metals used in agriculture can leach into watercourses and even sediment (Bonten et al., 2008). However, sediment mobilization, intense flooding and local human activities can remobilize metals and thus increase the metal ratio in rivers (Audry et al., 2004).

The literature describes the effects of these metals. Hua et al. (2014) demonstrated that copper could inhibit hatching, increase malformations and deregulate behavior in Japanese medaka (*Oryzias latipes*) embryos. Additionnally, Brungs (2011) revealed that zinc could induce premature hatching in fathead minnow (*Pimephales promelas*) embryos, potentially impacting larval fitness. As for lead, a study by Słominska (1998) showed that it could cause high embryo mortality in common carp (*Cyprinus carpio*).

Calcium has been particularly impactful during all the study period in both spawning grounds, but has been present at these concentrations in the GGD catchment historically (Ibarra et al., 2005), even before the decline of the allis shad population. Moreover, this calcium concentrations in limestone rivers (such as the Garonne and the Dordogne) may not be a cause for concern, as they can reduce the toxic effects of other compounds present in the water (Leynaud and Trocherie, 1980), and are even considered beneficial for freshwater fish (Arrignon, 1998). Furthermore, the toxicity values of the tests used for $HC50_{SE}$ calculation for calcium are derived from two studies mainly testing copper and secondarily calcium, in order to study the reduction in copper toxicity by the presence of calcium (Wu et al., 2007; Canli and Canli, 2015). These type of interactions between metals were not included in this study.

b. Agrochemicals

Simazine (for embryonic physiology in the Garonne) and cypermethrin (for larval physiology in the Dordogne) were the only two agrochemicals to exceed the $Th_{5\%}$. These compounds had quantified concentrations ranging from 8.13E-06 to 7.40E-05 mg/L for simazine in the Garonne and were 2.50E-05 mg/L for cypermethrin in the Dordogne. These chemicals had an $HC50_{SE}$ of 2.05E-04 mg/L for simazine and 8.25E-05 mg/L for cypermethrin. These data used one toxicity data and five toxicity data from two species, respectively.

Simazine is an herbicide used to control weeds in olive groves and vineyards (Oropesa et al., 2009). Devault et al. (2007) revealed that this herbicide was particularly present in the Garonne and its tributaries, and that this contamination could be linked to the chemical treatment of orchards ending up in the Tarn. This agrochemical was impacting in 2010 and 2011 in our study despite having been banned in 2003 in France (Guibal et al., 2018). The study by Velisek et al. (2012) demonstrated that simazine affected the growth and histology (especially the kidney) of early life stages of common carp (*Cyprinus carpio*) at environmentally relevant concentrations.

Cypermethrin is an insecticide used to control ticks and mites, which can therefore be used both in agriculture and in households (Farag et al., 2021). This substance is not banned, despite the damage it can cause. Indeed, the study by Carriquiriborde et al. (2009) revealed that this substance can affect larval growth in pejerrey (*Odontesthes bonariensis*).

c. Hygiene and Care Products (HCPs)

Estrone has been shown to be problematic for the development, physiology and behavior of embryos and the behavior of larvae. However, no values at quantified environmental concentrations exceeded the $Th_{5\%}$. Estrone is considered an endocrine disruptor and a threat to living organisms, even at low concentrations (1.00E-07 to 1.00E-06 mg/L) (Sami and Fatma, 2019). In this study, average annual quantified concentrations range from 5.75E-06 to 7.80E-06 mg/L in the Garonne, well above the low effect-inducing concentrations.

This hormone is synthesized naturally, notably during the menstrual period (Johnson and Williams, 2004) and can also come from the transformation of estradiol (present in pills) into estrone under certain conditions (Eaton, 2022). In the study by Destrieux (2018), estrone was one of the most problematic molecules downstream of the city of Toulouse's discharges, despite a removal efficiency by wastewater treatment plants of over 75%. The remaining 25% could correspond to what is not eliminated and therefore to the values quantified in the Garonne (generating in this study a PAFi max. of 4.2%). The high values quantified in our study may be related to its partial elimination during wastewater treatment processes (Racz and Goel, 2010; Manickum and John, 2014) or with strong transformation from estradiol under the conditions present in these wastewater treatment processes (Eaton, 2022).

Both metformin and carbamazepine affected embryo physiology at environmental values in the Garonne and Dordogne spawning grounds. These compounds had quantified concentrations ranging from 1.51E-04 to 3.68E-04 mg/L for metformin and from 6.17E-06 to 2.20E-05 mg/L for carbamazepine. The calculated $HC50_{SE}$ were 1.09E-03 mg/L (from 1 test) and 1.09E-05 mg/L (from 3 tests on the same species), respectively.

Metformin is the most widely used oral hypoglycemic agent for the treatment of diabetes (Juneja et al., 2022). In the study by Crago and Klaper (2018), at relevant environmental concentrations, metformin was found to have oestrogenic activities (*i.e.* mimicking or antagonizing the actions of natural estrogens), thus acting as an endocrine disruptor. Moreover, it may induce altered social and mating behavior in fish (Kallivretaki et al., 2007).

Carbamazepine is used to treat epilepsy, schizophrenia, bipolar disorder, among others (Pellock, 1987). In the study by Van Den Brandhof and Montforts (2010), embryos developed growth retardation and cardiac abnormalities. After elimination, these drugs must pass through wastewater treatment plants (Lévi, 2020). However, the study by Aminot (2013) showed an elimination efficiency of less than 10% for carbamazepine and close to 75% for metformin for the treatment plants present in the Garonne. This could explain the high concentrations found in our study.

d. Other industrial products (including PAHs, PFASs and PCBs)

Seven of the substances classified as industrial pollutants (OIPs, PAHs, PCBs, PFASs) stand out. These are tributylstannane (OIPs), dioctyl phthalate (OIPs), phenol, 4-nonyl-, branched (OIPs), 4-tert-octylphenol (OIPs), bisphenol A (OIPs), benzo[a]pyrene (PAHs) and fluoranthene (PAHs). At quantified environmental concentrations, bisphenol A (embryonic development, embryonic behavior, embryonic mortality and larval development in the Dordogne), 4-tert-octylphenol (larval mortality in the Dordogne) and phenol, 4-nonyl-, branched (embryonic physiology in the Garonne) exceeded the $Th_{5\%}$. These compounds had quantified concentrations ranging from 7.50E-05 to 1.19E-01 mg/L for bisphenol A, from 1.38E-05 to 2.88E-04 mg/L for 4-tert-octylphenol and from 4.02E-07 to 1.02E-03 mg/L for phenol, 4-nonyl-, branched. The resulting $HC50_{SE}$ were, respectively, 0.36, 0.896, 0.868 and 7.44E-03 mg/L for bisphenol A, 3.48E-03 mg/L for 4-tert-octylphenol and 9.10E-03 mg/L for phenol, 4-nonyl-, branched.

Tributylstannane (or tributyltin) is an endocrine disruptor commonly used as a biocide in antifouling boat paints but also for mucus control in paper mills and disinfection of industrial cooling water (Bushong et al., 1988; Antizar-Ladislao, 2008). The study by Ortiz-Villanueva et al. (2018) demonstrated that this substance caused metabolic alterations in zebrafish (*Danio rerio*) embryos. Dioctyl phthalate is the phthalate most commonly used as a plasticizer to make materials flexible (Rowdhwal and Chen, 2018). In the study by Chen et al. (2014), this endocrine disruptor induced various effects (death, tail curvature, necrosis, cardiac edema and lack of response to touch) in zebrafish (*Danio rerio*) embryos but also enhanced estrogenic activity in Japanese medaka (*Oryzias latipes*) embryos.

Phenol, 4-nonyl-, branched is an estrogenic compound (Jin et al., 2010). The study by Xu et al. (2013) revealed that this endocrine perturbator induced an increase in reactive oxygen species in zebrafish (*Danio rerio*) embryos. 4-tert-octylphenol is an endocrine disruptor used in detergents, paints, tanneries, *etc.* (Du et al., 2022). The study by Madsen et al. (2006) demonstrated that 4-tert octylphenol induced vitellogenin production and decreased gonad weight in European flounder (*Platichthys flesus*). Bisphenol A is an endocrine disruptor with estrogenic activities that was mainly used in the production of polycarbonate plastics (70%) and epoxy resins (20%) (Eladak et al., 2015). The study by Gao et al. (2022) demonstrated that this substance has effects on both embryos (spontaneous hatching, effects on behavior and heart rate) and larvae (yolk sac and pericardial edema and spinal deformation) of zebrafish (*Danio rerio*).

Benzo[a]pyrene and fluoranthene contamination is mainly the result of incomplete combustion in waste incineration processes, rubber tires manufacturing and agrochemicals production (Patel et al., 2020). PAHs are known to be endocrine disruptors and to have an impact on embryonic development (cleavage phase, heart development and other malformations), thus potentially impacting larval fitness (Honda and Suzuki, 2020).

With regard to PFASs and PCBs, no substance contributed particularly to msPAF. For PCBs, no values were available for embryos. The highest values (PAFi) were 0.005% of potentially affected species for PFASs and 0.320% of potentially affected species for PCBs.

C. Main results of other studies using the PAF method

a. GGD catchment

This work is the first, at the GGD catchment scale, to use the (ms)PAF method by specifically estimating toxic pressure for each life stage of a particular taxon (fish) with such a wide range of substances (n = 249) and over such a long period (16 years). However, other studies have used this method within the GGD catchment, but have only focused on agrochemicals (Faggiano et al., 2010; Shinn, 2010). This can be explained by the strong presence of agricultural activities in the GGD catchment, and therefore the problem of agrochemicals use (Devault et al., 2007, see Corin Land Cover on **Figure 4**).

The study by Faggiano et al. (2010), located in the Adour-Garonne catchment, used the maximum quantified environmental concentration of agrochemicals to estimate their worst-case risk. In addition, they differentiated agrochemicals according to their toxic modes of action, making it possible to refine the analysis by not considering the same mode of action for each substance. For instance, species sensitivity was compared for different groups of substances: inhibitors of acetylcholinesterase activity, seedling growth inhibitors, inhibitors of photosynthetic activity, plant growth regulators, among others. From May to December 2006, the maximum PAF value (3.7%) was attributed to carbofuran, with a maximum quantified value of 4.50E-03 mg/L. In our study, annual quantified carbofuran averages ranged from 1.75E-05 to 5.55E-05 mg/L between 2006 and 2008 in Garonne spawning grounds.

The study by Faggiano et al. (2010) was then extended to use the SOM (Self Organizing Map) method to classify sites according to the risk they represent on the basis of their contaminant composition (Wang et al., 2020). The results showed a low agrochemical contamination risk for aquatic organisms at 83% of the sites studied. However, in Lot-et-Garonne, with an average msPAF value of over 1%, the risk was high for primary producers, invertebrates and fish. In a later report on the same study by Faggiano (2013), the years 2007 and 2008 showed maximum values of less than 1 and 1.5% of potentially affected species, respectively. Thus, this study agrees with ours in that no significant agrochemical-associated msPAF values specific to fish taxon were observed. The maximum agrochemical-associated msPAF value specific to fish taxon being 1.64% in 2013 in the Garonne near its confluence with the Lot.

Similarly, in the Adour-Garonne catchment, the study by Shinn (2010) used the msPAF method, also differentiating agrochemicals according to their toxic modes of action. Here, the PAF method was used to confirm or reject the characterization of the study sites (poor, moderate and good quality) according to the toxic pressure generated by agrochemical contamination from 2006 to 2008. Sites classified as poor quality had msPAF values of almost 10%, while medium and high quality sites had msPAF values of less than 0.1%. Thus, based on the results of the previous study and the results of this work, using only quantified values, the allis shad spawning grounds of the Dordogne and Garonne rivers would not be characterized as moderate or good quality, but rather poor quality.

b. Europe

A number of European studies have been carried out using this method (*e.g.*, Carafa et al., 2011; Tuikka et al., 2011; Jesenska et al., 2013; Silva, 2015; Sarkis, 2018).

Carafa et al. (2011) studied 232 sites in Catalonia (Spain) between 2007 and 2008, using the PAF method and using the bioavailable fraction of 60 contaminants. They revealed that the risk of pollutant mixing exceeded 50% of potentially affected species at 10% of sites. In our study, the periodic average of msPAF exceeded 10% of potentially affected species for 60% of sites in the Dordogne and for 64% of sites in the Garonne, with 24% of sites exceeding 50%. In their study, 99% of water bodies were considered at risk (msPAF > 5%), compared with 62% in our case, based on quantified environmental data only. In addition, a higher ecological risk was observed near urban areas, mainly due to urban and industrial compounds (in particular metals and nonylphenol) and agrochemicals (in particular chlorpyrifos). Metals were a major contributor to msPAF in our study. Chlorpyrifos was monitored but not quantified in spawning grounds in the GGD catchment, and nonylphenol was quantified in the Garonne (2.50E-04 to 1.33E-03 mg/L) and in the Dordogne (4.02E-07 to 2.16E-04 mg/L) spawning grounds. This higher toxic risk near urban areas, combined with the lack of efficiency of water treatment plants, means that contamination of the Garonne is largely due to discharges of treated water (Aminot, 2013).

In another study, Jesenska et al. (2013) studied the toxic risk of seven herbicides from 1998 to 2009 in the Scheldt catchment (Belgium). Despite an estimated decreasing risk throughout the period, the risk associated with herbicides was close to 40% of potentially affected species in the primary producer community. Moreover, they observed a drop in simazine concentrations from 1998 to 2009. In our study, simazine had a concentration of 2.95E-05 mg/L in 2006 and 6.75E-05 mg/L in 2011 in the Garonne spawning grounds. After 2011, no more data were quantified for this chemical compound, but the average concentration of simazine increased to that date even though it has been banned in France since 2003.

Aditionnally, Silva (2015) studied the impact of agrochemical mixtures in the Mondego, Sado and Tejo catchments (Portugal) from 2002 to 2008. The msPAF values exceeded the $Th_{5\%}$ in all catchments. Endosulfan had a particularly strong impact on fish species. In our study, endosulfan was monitored but not quantified in allis shad spawning grounds in the GGD catchment.

Finally, the study by Sarkis (2018) compared the contribution of stable contaminants and radionuclides to toxic impact up and down the Rhône (France) from 2010 to 2014. The msPAF values exceeded 30% of potentially affected species and showed a strong contribution of metals (copper, zinc, silver and nickel) and a stronger ecological impact downstream (potential contributions from Lyon, Valence and Avignon). This is consistent with the high copper and zinc contribution found in our study.

Thus, studies using the msPAF methodology in Europe show that water bodies with chemical pollution pose a significant toxic risk, particularly those close to highly urbanized areas. The msPAF method is often used to assess and monitor agrochemical pollution (see on a global scale De Zwart, 2005; Henning-de Jong et al., 2008; Echeverría-Sáenz et al., 2021; Nagai et al., 2022 for example). Our results and those of the previously cited studies are in line with those of Rorije et al. (2022). Indeed, they reveal that over 39% of Europe's water bodies are insufficiently protected against individual and combined chemical risks, although south-west France is not included in their study.

D. Method limitations

Although useful, this method presented various biases, underestimating or overestimating the results. As indicated by Faggiano (2013), three classes of uncertainty surround this method: chemical exposure, toxic risk and ecological risk.

As far as chemical exposure is concerned, one of the main biases is the number of substances monitored. According to Posthuma et al. (2020), only ~0.2% of chemical compounds commercialized and potentially emitted into the environment are taken into account in water quality assessment and management in Europe. In addition, the renewal of these compounds is significant, since it is estimated that one organic molecule is created every 30 seconds (Pernet-Coudrier, 2008). According to the AEE (2019) report, ~100 000 chemical compounds are commercialized, so the toxic pressure studied in this report would represent only ~0.25% of what could potentially be present. However, it should be borne in mind that not all of these compounds are likely to be present in the same place at the same time. Furthemore, the small number of quantified values in the environment for the monitored substances means that we cannot always take into account substances that may have an impact at low concentrations. According to the study by Rorije et al. (2022), only ~10% of the chemicals monitored (~10,000) are detected above their limit of detection or quantification due to a lack of sensitivity in the measurement instruments. Thus, the sample of quantified chemical compounds used in this report is certainly only a small fraction of what is actually present in the environment. In addition, depending on the priority of the chemical compounds, they are not monitored in the same way, which may limit the number of data available for a given period. The use of annual or periodic averages rather than maximum values may have minimized the maximum potential risk to the community studied. In this study, all the months of the year were included in the calculation of the average even though allis shad are only present on the spawning grounds for part of the year (April to October), which may have underestimated or overestimated the risk associated with the presence of chemical contaminants. In the case of underestimation, for instance, since agrochemicals are used during a specific period, they may be more concentrated in the water during certain months of the year (Cruz, 2015; Bernard, 2018). Furthermore, the extrapolations made (half of the LQ, aqueous phase of water and sediment-water partition coefficient) can degrade data quality. In addition, as mentioned above in relation to aluminum, human errors during data entry (erroneous value, change of unit, technological problem, *etc.*) can also degrade data quality to the point of rendering it unusable.

Regarding toxic risk, as indicated in the method, the quantity and quality of toxicity data have a major impact on the results. Here, the quantity of data was high overall (11 153) with on average ~70 tests from ~6 species per chemical compound. However, 72 chemicals had less than three different species for the $HC50_F$ calculation, 28 between four and five, 13 between six and ten and 20 with more than ten. In addition, 20 chemicals had less than three toxicity data for the $HC50_F$ calculation, 6 between four and five, 14 between six and ten and 93 with more than ten. As a result, many chemicals present a high number of species and tests for the HC50 calculation, if we refer to European Commission (2003) recommendation (minimum of 10 toxicity data from 8 defined taxa for ecosystem-representative HC50s). Moreover, as we have seen, most of the individually problematic chemical compounds used few tests and species to calculate $HC50_{SE}$. However, the species most frequently used were mainly those used in laboratories and not found naturally in the GGD catchment (Williams et al., 2009). Furthermore, given that the method relies on an additive model, the more substances with toxicity data, the higher the msPAF values will be. Thus, some stations with fewer data than others may have underestimated the risk by calculating the average of all the stations on a spawning ground. However, toxicity data are not available for all substances. In our case, 133 of the 245 (~54%) substances included in the study had EC50 values. Hence, due to the lack of toxicity data, we lost information on ~46% of the substances quantified in the environment. Aditionnally, each chemical compound does not present toxicity values for all effects and for each life stage of each species, which limits comparison and restricts analysis of the results. Furthermore, in our study, the quality of toxicity data may have been impaired by the extrapolation of a significant proportion of data from acute to chronic toxicity and/or from NOEC to EC50. Moreover, as mentioned by Jesenska et al. (2013) the use of the toxicity data may also alter the results (use of the most sensitive EC50 or the geometric mean of the EC50s). In addition, physico-chemical parameters such as temperature can modify the toxicity of a chemical compound (Philibert et al., 2023), phenomena that are not included in this method. As observed with calcium and copper, interactions between substances must also be considered. In reality, interactions between substances are more complex, with different modes of toxic action that can generate synergistic effects (increasing additive effects) or antagonistic effects (reducing additive effects). However, at low levels of chemical exposure, these interactions are rare or sufficiently insignificant (Faust et al., 2000). This bias is therefore not considered to be the most important, but must be taken into account.

For ecological risk, using the $Th_{5\%}$ as a reference to protect 95% of species in the fish taxon may distort the analysis of results, as it may not be sufficient to protect the community (Faggiano et al., 2010). Moreover, Pereira et al. (2018) revealed that freshwater communities are influenced in the field by environmental factors and biotic interactions, in addition to the presence of chemical mixtures; this was not taken into account in the method used. Finally, it was not possible to compare the potential toxicity of spawning grounds prior to the decline of the allis shad population in spawning grounds in the GGD catchment due to the absence of data during this period.

6. Conclusion

The (ms)PAF method, despite its biases, is proving to be a solid tool for assessing and monitoring the quality of water bodies. It has enabled us to quantify toxic pressure and spatio-temporally assess the potential toxic risk to fish in allis shad spawning grounds of the GGD catchment. This approach filled a knowledge gap concerning the chemical contamination of water bodies in this catchment, highlighting a greater potential toxic risk to the spawning grounds of the Garonne, and a greater risk to the development and physiology of fish larvae. A potentially lethal toxic risk to embryos was also not to be overlooked. Thus, a significant potential toxic risk has been demonstrated, particularly for early life stages of fish in the spawning grounds of the Dordogne and Garonne.

The results of this study also corroborate additional work carried out during this internship as part of Sarah Bancel's current thesis, highlighting a high decrease in the probability of survival of allis shad embryos exposed to Garonne water (**Fig. 17**). However, it is important to note that other factors present in the water, such as parasites and infectious agents, must be taken into account to explain the high mortality observed.

Applying this method to a broader set of quantified environmental values would provide results that are more relevant. To do so, it would be necessary to monitor more chemical compounds and to lower the limits of quantification specific to each molecule. In addition, combining this method with others, such as the SOM (Self-Organizing Map), would enable us to refine the analysis to identify the areas most at risk.

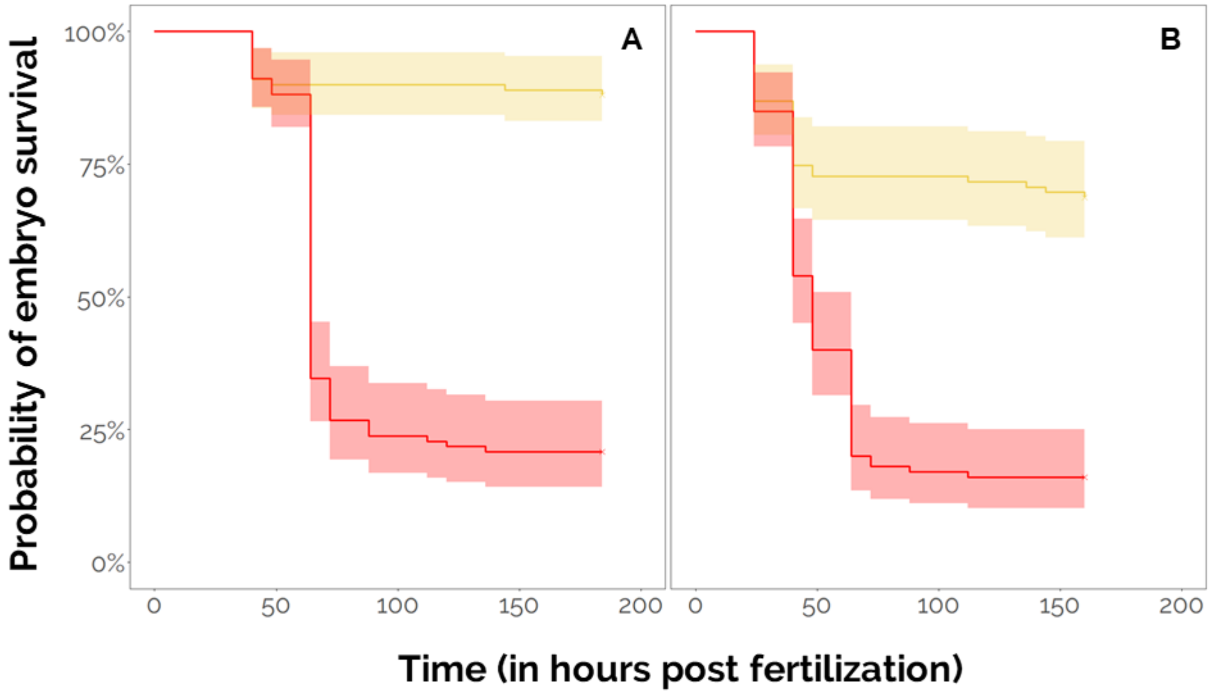

Figure 17. Probability of survival of allis shad embryos exposed to Garonne water (red) and tap water (yellow) for batch n°1 (A) and batch n°2 (B) (data from Bancel, in prep.).

This work could help researchers target a few compounds or groups of compounds (e.g. estrone or hormones) to specifically study the effect of these compounds on individuals of allis shad, in order to study the real impact at quantified concentrations in the environment. This would enable managers to take appropriate measures to avoid the potential impacts of such pollution. In addition, the (ms)PAF methodology could even complement the monitoring of water bodies carried out by the SIE by assessing the toxic risk to which species in a particular ecosystem or taxon are subject. In our case, we have assessed the toxic risk to fish in allis shad spawning grounds. However, this assessment could be extended to other spawning grounds to assess the toxic risk within each spawning ground of each diadromous fish species (twaite shad, river or sea lamprey, European sturgeon or Atlantic salmon) in the GGD catchment.

This method could therefore contribute to conservation biology and, in our case, to the conservation of diadromous fish species, potentially impacted by certain substances or mixtures of substances. By targeting one or more problematic chemical compounds, it would be possible to combine management and research to reduce the impact of chemical contaminants by identifying their dynamics (from source through impact to solution). This could also help safeguard ecosystem services threatened by this pollution and contribute to improving water quality in the GGD catchment.

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8. Supplementary materials

Supplementary materials #1. Annual average environmental values (quantified + unquantified) for each chemical compound in Garonne and Dordogne spawning grounds.

Chemicals	CAS	Categories	Rivers	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
(+)-Dichlorprop	15165670	Agrochemicals	D	NA	2,50E-05	1,38E-05	1,00E-05	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	NA	NA	NA	NA	NA	NA
(+)-Dichlorprop	15165670	Agrochemicals	G	NA	2,50E-05	1,00E-05	2,67E-05	NA	NA	NA	1,67E-05	1,00E-05	1,00E-05	NA	NA	NA	NA	NA	NA
2,4-D	94757	Agrochemicals	D	1,10E-05	5,00E-06	1,00E-05	2,78E-05	1,00E-05	1,00E-05	1,90E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
2,4-D	94757	Agrochemicals	G	1,68E-05	1,38E-05	1,00E-05	1,92E-05	1,53E-05	1,00E-05	2,53E-05	1,00E-05	1,00E-04	1,67E-05	6,90E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
2,4-Dichlorophenol	120832	Agrochemicals	D	NA	1,13E-08	NA	1,05E-04	NA	NA	1,80E-05	1,13E-07	1,13E-07	1,13E-07	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	120832	Agrochemicals	G	NA	1,13E-08	NA	3,27E-05	5,00E-05	5,00E-05	4,21E-05	2,15E-05	2,86E-05	2,86E-05	NA	NA	NA	NA	NA	NA
2,4-MCPA	94746	Agrochemicals	D	1,40E-05	5,00E-06	1,00E-05	7,78E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	6,00E-06	6,00E-06	5,75E-06	1,00E-05	1,00E-05	1,00E-05
2,4-MCPA	94746	Agrochemicals	G	1,31E-05	1,33E-05	1,00E-05	1,67E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	2,17E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
2,6-Diethylaniline	579668	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
2,6-Diethylaniline	579668	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	3,40E-05
3,4-Dichloroaniline	95761	Agrochemicals	D	NA	NA	NA	1,75E-05	NA	NA	NA	NA	NA	NA	1,42E-05	1,42E-05	1,42E-05	1,08E-05	5,83E-06	6,14E-06
3,4-Dichloroaniline	95761	Agrochemicals	G	NA	NA	NA	3,80E-05	NA	NA	NA	NA	NA	NA	8,13E-06	8,13E-06	9,54E-06	1,00E-05	1,00E-05	1,00E-05
AMPA	1066519	Agrochemicals	D	2,50E-05	2,50E-05	2,27E-04	9,00E-05	2,30E-04	1,17E-04	2,50E-05	1,72E-04	7,50E-05	9,33E-05	4,28E-05	7,10E-05	8,00E-05	7,62E-05	6,21E-05	4,62E-05
AMPA	1066519	Agrochemicals	G	2,57E-04	2,50E-05	1,57E-04	2,38E-04	3,33E-04	1,88E-04	1,54E-04	1,62E-04	1,68E-04	2,02E-04	1,70E-04	2,40E-04	1,69E-04	2,07E-04	1,74E-04	1,88E-04
Acetochlor	34256821	Agrochemicals	D	1,00E-05	3,58E-05	1,00E-05	8,34E-06	1,00E-05	1,00E-05	8,34E-06	2,89E-06	2,89E-06	2,89E-06	5,83E-06	6,25E-06	5,83E-06	7,55E-06	3,75E-06	4,21E-06
Acetochlor	34256821	Agrochemicals	G	1,53E-05	1,29E-04	3,67E-05	1,18E-04	1,00E-05	4,67E-05	1,14E-04	2,24E-05	1,18E-05	7,12E-06	8,13E-06	8,13E-06	1,06E-05	1,00E-05	1,00E-05	1,00E-05
Aclonifen	74070465	Agrochemicals	D	1,00E-05	8,33E-06	1,00E-05	8,34E-06	1,00E-05	1,00E-05	8,34E-06	1,43E-05	7,16E-06	7,16E-06	1,42E-05	1,42E-05	1,46E-05	1,08E-05	1,42E-05	1,46E-05
Aclonifen	74070465	Agrochemicals	G	1,06E-05	2,07E-05	1,38E-05	1,22E-05	1,00E-05	1,00E-05	8,06E-06	2,46E-05	3,28E-05	1,44E-05	2,90E-05	2,75E-05	2,26E-05	1,00E-05	2,28E-05	1,00E-05
Alachlor	15972608	Agrochemicals	D	1,00E-05	3,69E-05	1,00E-05	1,09E-05	1,00E-05	1,00E-05	5,82E-06	2,87E-06	2,87E-06	5,19E-06	5,83E-06	5,83E-06	5,44E-06	7,55E-06	5,83E-06	5,37E-06
Alachlor	15972608	Agrochemicals	G	1,67E-05	4,55E-05	1,00E-05	6,69E-06	1,00E-05	1,00E-05	9,28E-06	6,88E-06	7,24E-06	9,63E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,32E-05
Alachlor ESA	142363539	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Alachlor ESA	142363539	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	3,73E-05	2,50E-05
Aminotriazole	61825	Agrochemicals	D	2,50E-05	1,00E-05	5,00E-05	4,00E-05	5,00E-05	5,00E-05	5,00E-05	2,50E-05	2,50E-05	4,58E-05	3,00E-05	3,00E-05	2,88E-05	1,90E-05	1,50E-05	1,50E-05
Aminotriazole	61825	Agrochemicals	G	5,93E-05	1,00E-05	1,17E-04	1,10E-04	5,00E-05	5,00E-05	5,00E-05	4,58E-05	4,08E-05	4,72E-05	4,25E-05	4,25E-05	2,85E-05	1,93E-05	1,50E-05	1,50E-05
Anthraquinone	84651	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,01E-08	2,88E-06	4,67E-08	1,04E-07	1,64E-07	2,11E-06
Anthraquinone	84651	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,81E-06	7,72E-06	4,02E-06	3,76E-06	6,10E-06	5,45E-06
Atrazine	1912249	Agrochemicals	D	5,00E-06	3,23E-05	5,00E-06	4,68E-06	1,00E-05	1,00E-05	5,12E-06	2,87E-06	2,87E-06	5,19E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Atrazine	1912249	Agrochemicals	G	1,63E-05	1,32E-05	1,13E-05	7,59E-06	4,33E-05	1,00E-05	9,28E-06	6,88E-06	1,22E-05	9,63E-06	6,40E-06	5,00E-06	6,00E-06	5,00E-06	5,00E-06	6,40E-06
Azoxystrobin	131860338	Agrochemicals	D	2,50E-05	5,00E-06	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Azoxystrobin	131860338	Agrochemicals	G	2,50E-05	1,47E-05	6,67E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	2,33E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,30E-05
Bentazon	25057890	Agrochemicals	D	5,00E-06	5,00E-06	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	6,00E-06	6,00E-06	5,75E-06	1,00E-05	1,00E-05	1,00E-05
Bentazon	25057890	Agrochemicals	G	2,23E-05	3,50E-05	1,33E-05	2,16E-05	1,00E-05	3,33E-05	3,00E-05	2,67E-05	1,64E-04	3,67E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,97E-05
Biphenyl	92524	Agrochemicals	D	NA	2,08E-05	5,00E-05	2,67E-05	1,00E-05	1,00E-05	8,41E-06	7,15E-06	7,15E-06	7,15E-06	7,15E-06	7,15E-06	2,50E-05	5,38E-06	5,38E-06	5,23E-06
Biphenyl	92524	Agrochemicals	G	NA	2,50E-05	5,00E-05	2,36E-05	1,00E-05	1,00E-05	8,14E-06	1,35E-05	1,44E-05	1,44E-05	2,23E-05	1,93E-05	1,88E-05	1,78E-05	1,93E-05	1,78E-05
Boscalid	188425856	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Boscalid	188425856	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	2,70E-05	1,00E-05	1,00E-05	1,00E-05
Carbaryl	63252	Agrochemicals	D	1,00E-05	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Carbaryl	63252	Agrochemicals	G	1,00E-05	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	2,08E-05
Carbendazim	10605217	Agrochemicals	D	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,28E-06	7,61E-06	5,00E-06	4,18E-06	7,08E-06	3,07E-06
Carbendazim	10605217	Agrochemicals	G	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,33E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	7,38E-06	6,69E-06	1,51E-05	5,00E-06	5,00E-06	5,00E-06
Carbetamide	16118493	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Carbetamide	16118493	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	8,75E-06
Carbofuran	1563662	Agrochemicals	D	1,00E-05	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Carbofuran	1563662	Agrochemicals	G	1,57E-05	4,03E-05	9,17E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Chloridazon	1698608	Agrochemicals	D	NA	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Chloridazon	1698608	Agrochemicals	G	NA	1,00E-05	5,00E-06	6,67E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	8,50E-06	5,00E-06	5,00E-06	5,00E-06
Chlortoluron	15545489	Agrochemicals	D	5,00E-06	6,25E-06	5,00E-06	5,00E-06	1,00E-05	1,00E-05	5,49E-06	1,00E-05	1,00E-05	1,00E-05	6,00E-06	6,00E-06	5,75E-06	1,00E-05	1,00E-05	1,00E-05
Chlortoluron	15545489	Agrochemicals	G	4,70E-05	4,10E-05	1,00E-05	6,67E-06	1,00E-05	1,93E-05	7,00E-05	6,79E-05	3,52E-05	3,71E-05	1,43E-05	1,00E-05	1,00E-05	1,00E-05	3,55E-05	6,53E-05
Clopyralid	1702176	Agrochemicals	D	5,00E-06	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	1,00E-05	1,00E-05	1,00E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Clopyralid	1702176	Agrochemicals	G	8,67E-06	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	1,50E-05	1,50E-05	1,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Cyanazine	21725462	Agrochemicals	D	5,00E-06	5,00E-06	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Cyanazine	21725462	Agrochemicals	G	6,67E-06	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Cyazofamid	120116883	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Cyazofamid	120116883	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	7,50E-05	1,00E-05	1,00E-05	1,00E-05
Cypermethrin	52315078	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,91E-06	5,83E-06	1,04E-05	9,18E-06	5,83E-06	5,37E-06
Cypermethrin	52315078	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Deethylatrazine	6190654	Agrochemicals	D	5,00E-06	4,17E-06	6,00E-05	5,00E-06	1,00E-05	1,00E-05	7,78E-06	1,00E-05	5,00E-06	2,00E-05	7,50E-06	1,50E-05	8,00E-06	5,82E-06	5,00E-06	5,00E-06
Deethylatrazine	6190654	Agrochemicals	G	1,50E-05	5,00E-06	5,00E-06	1,58E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,75E-05	7,50E-06	5,00E-06	6,75E-06	6,50E-06	6,50E-06	5,00E-06	5,00E-06
Dicamba	1918009	Agrochemicals	D	5,00E-06	2,50E-05	2,50E-05	2,50E-05	1,00E-05	1,00E-05	1,00E-05	2,50E-05	1,00E-05	1,00E-05	1,60E-05	1,38E-05	1,25E-05	2,25E-05	2,08E-05	2,12E-05
Dicamba	1918009	Agrochemicals	G	5,00E-06	2,50E-05	2,50E-05	2,50E-05	1,00E-05	1,00E-05	1,00E-05	2,00E-05	2,00E-05	1,00E-05	3,13E-05	3,13E-05	3,44E-05	2,50E-05	2,50E-05	2,50E-05
Dichlorprop	120365	Agrochemicals	D	5,00E-06	8,33E-06	1,30E-05	7,00E-06	1,00E-05	1,00E-05	7,01E-06	2,89E-06	2,89E-06	2,89E-06	1,00E-05	5,30E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Dichlorprop	120365	Agrochemicals	G	6,67E-06	1,00E-05	1,00E-05	2,47E-05	1,00E-05	1,00E-05	8,94E-06	1,20E-05	7,13E-06	2,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Diflufenican	83164334	Agrochemicals	D	2,50E-05	3,50E-05	1,00E-05	8,34E-06	2,50E-05	2,50E-05	2,08E-05	2,89E-06	2,89E-06	2,89E-06	5,00E-06	5,00E-06	5,00E-06	1,09E-06	1,09E-06	1,06E-06
Diflufenican	83164334	Agrochemicals	G	2,50E-05	1,00E-05	1,00E-05	8,35E-06	2,50E-05	2,50E-05	1,39E-05	5,62E-06	5,98E-06	5,97E-06	5,00E-06	5,00E-06	5,00E-06	3,58E-06	3,86E-06	3,58E-06

Dimethenamid	87674688	Agrochemicals	D	2,50E-05	2,50E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,83E-06	6,11E-06	6,25E-06	7,55E-06	5,83E-06	6,14E-06
Dimethenamid	87674688	Agrochemicals	G	2,50E-05	1,80E-04	1,45E-05	5,67E-05	1,00E-05	1,00E-05	2,23E-05	2,00E-05	1,73E-04	1,00E-05	9,65E-05	1,63E-05	8,03E-05	1,00E-05	1,57E-04	3,88E-05
Dimethomorph	110488705	Agrochemicals	D	2,50E-05	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Dimethomorph	110488705	Agrochemicals	G	2,50E-05	1,53E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	6,25E-06	5,00E-06	5,00E-06	5,00E-06
Dinocap	39300453	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Dinocap	39300453	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	5,93E-05	2,50E-05
Dinoterb	1420071	Agrochemicals	D	1,00E-05	2,50E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Dinoterb	1420071	Agrochemicals	G	1,06E-05	2,50E-05	5,00E-06	8,83E-05	1,00E-05	2,07E-05	1,37E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Diuron	330541	Agrochemicals	D	2,00E-05	3,59E-05	1,00E-05	1,24E-05	1,00E-05	1,00E-05	5,12E-06	2,87E-06	2,87E-06	5,19E-06	5,83E-06	5,83E-06	5,52E-06	1,00E-05	1,00E-05	1,25E-05
Diuron	330541	Agrochemicals	G	2,87E-05	2,51E-05	1,00E-05	1,08E-05	1,00E-05	1,00E-05	9,28E-06	9,52E-06	7,24E-06	9,63E-06	7,71E-06	7,71E-06	7,67E-06	1,00E-05	1,00E-05	1,00E-05
Epoxiconazole	133855988	Agrochemicals	D	NA	8,33E-06	5,00E-06	4,19E-06	1,00E-05	1,00E-05	8,34E-06	2,89E-06	2,89E-06	2,89E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Epoxiconazole	133855988	Agrochemicals	G	NA	1,97E-05	5,00E-06	4,19E-06	1,00E-05	1,00E-05	8,06E-06	6,77E-06	7,13E-06	7,12E-06	1,00E-05	1,00E-05	1,60E-05	1,00E-05	1,00E-05	1,00E-05
Ethofumesate	26225796	Agrochemicals	D	NA	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Ethofumesate	26225796	Agrochemicals	G	NA	1,00E-05	5,00E-06	6,67E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,55E-05	1,00E-05	1,00E-05	1,00E-05
Fentin	668348	Agrochemicals	D	NA	NA	NA	1,00E-06	NA	NA	NA	6,78E-08	6,67E-08	6,67E-08	7,16E-06	7,16E-06	2,50E-05	5,38E-06	5,38E-06	5,23E-06
Fentin	668348	Agrochemicals	G	NA	NA	NA	1,50E-06	NA	NA	NA	1,07E-05	1,43E-05	1,43E-05	2,23E-05	1,93E-05	2,50E-05	1,78E-05	1,93E-05	1,78E-05
Flumioxazin	103361097	Agrochemicals	D	NA	NA	1,00E-05	1,00E-05	2,50E-05	2,50E-05	2,50E-05	1,00E-05	1,00E-05	1,00E-05	6,67E-06	6,67E-06	6,67E-06	1,01E-05	6,67E-06	7,92E-06
Flumioxazin	103361097	Agrochemicals	G	NA	NA	1,00E-05	1,00E-05	2,50E-05	2,50E-05	2,50E-05	1,50E-05	1,50E-05	1,50E-05	1,50E-05	1,50E-05	1,50E-05	1,90E-05	1,50E-05	1,50E-05
Flurochloridone	61213250	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,83E-06	5,83E-06	5,83E-06	9,18E-06	5,83E-06	6,14E-06
Flurochloridone	61213250	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,03E-05	1,00E-05	4,48E-05	1,00E-05	2,06E-05	1,00E-05
Fluroxypyr	69377817	Agrochemicals	D	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Fluroxypyr	69377817	Agrochemicals	G	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	1,50E-05	1,83E-05	1,50E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Fluroxypyr meptyl ester	81406373	Agrochemicals	D	NA	NA	NA	4,52E-08	NA	NA	2,26E-08	2,26E-08	2,26E-08	2,26E-08	NA	NA	NA	4,52E-08	4,52E-08	2,17E-07
Fluroxypyr meptyl ester	81406373	Agrochemicals	G	NA	NA	NA	1,13E-07	NA	NA	2,26E-08	2,26E-08	2,26E-08	1,25E-08	NA	NA	NA	6,39E-08	4,52E-08	4,13E-07
Flurtamone	96525234	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Flurtamone	96525234	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,63E-05	5,00E-06	1,53E-05	5,00E-06	5,00E-06	5,00E-06
Flusilazole	85509199	Agrochemicals	D	5,00E-06	8,33E-06	5,00E-06	4,17E-06	1,00E-05	1,00E-05	8,35E-06	2,89E-06	2,89E-06	2,89E-06	1,44E-06	1,44E-06	5,00E-06	1,11E-06	1,11E-06	1,08E-06
Flusilazole	85509199	Agrochemicals	G	5,00E-06	1,67E-05	5,00E-06	4,19E-06	1,00E-05	1,00E-05	8,07E-06	6,77E-06	7,13E-06	7,12E-06	4,47E-06	3,86E-06	5,00E-06	3,58E-06	3,87E-06	3,58E-06
Fosetyl aluminum	39148248	Agrochemicals	D	2,50E-05	2,50E-05	4,50E-05	5,00E-05	5,00E-05	4,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	1,92E-05	1,35E-05
Fosetyl aluminum	39148248	Agrochemicals	G	2,50E-05	2,50E-05	4,50E-05	5,00E-05	5,00E-05	3,58E-05	4,67E-05	6,25E-05	4,17E-05	4,17E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	1,48E-05	1,02E-03
Glufosinate	51276472	Agrochemicals	D	2,50E-05	2,50E-05	2,50E-05	2,50E-05	5,00E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	1,25E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	2,92E-05	2,50E-05
Glufosinate	51276472	Agrochemicals	G	2,50E-05	2,50E-05	2,50E-05	6,47E-05	5,00E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	3,71E-05	2,50E-05	2,50E-05	2,50E-05	5,00E-05	1,46E-05	1,25E-05
Hexachlorobenzene	118741	Agrochemicals	D	NA	3,33E-04	NA	4,64E-06	NA	NA	1,76E-06	2,26E-08	2,26E-08	4,62E-06	1,00E-06	1,00E-06	1,00E-06	1,40E-06	1,00E-06	1,00E-06
Hexachlorobenzene	118741	Agrochemicals	G	2,26E-08	2,26E-09	NA	2,56E-06	2,50E-06	2,50E-06	2,31E-06	1,17E-06	1,55E-06	2,39E-06	1,00E-05	1,00E-05	5,00E-06	1,50E-06	1,50E-06	1,50E-06
Hydroxyatrazine	2163680	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	1,00E-05	3,30E-05	1,00E-05
Hydroxyatrazine	2163680	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,29E-05	2,05E-05	1,00E-05	1,00E-05
Hydroxyterbuthylazine	66753079	Agrochemicals	D	NA	5,00E-06	5,00E-06	5,00E-06	2,50E-05	2,50E-05	2,50E-05	2,50E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Hydroxyterbuthylazine	66753079	Agrochemicals	G	NA	5,00E-06	5,00E-06	5,00E-06	2,50E-05	2,50E-05	2,50E-05	6,50E-05	1,17E-05	1,17E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Imazamox	114311329	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Imazamox	114311329	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	7,58E-06	7,25E-06	1,28E-05	3,88E-05
Imidacloprid	138261413	Agrochemicals	D	1,00E-05	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	5,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Imidacloprid	138261413	Agrochemicals	G	1,00E-05	1,00E-05	6,67E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	2,85E-05	1,43E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Isoproturon	34123596	Agrochemicals	D	5,00E-06	3,23E-05	5,00E-06	3,92E-05	1,00E-05	1,00E-05	5,12E-06	2,89E-06	2,89E-06	5,19E-06	5,83E-06	5,83E-06	5,42E-06	1,00E-05	1,00E-05	1,00E-05
Isoproturon	34123596	Agrochemicals	G	8,67E-06	2,44E-05	5,00E-06	3,48E-05	1,00E-05	1,70E-05	4,01E-05	6,90E-06	1,28E-05	3,69E-05	1,25E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Isoxaben	82558507	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Isoxaben	82558507	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	1,19E-05	5,00E-06	5,00E-06	5,00E-06
Lindane	58899	Agrochemicals	D	2,50E-06	3,01E-05	2,50E-06	2,54E-06	2,50E-06	2,50E-06	2,33E-06	7,21E-07	7,21E-07	2,33E-06	1,16E-06	1,16E-06	1,35E-06	1,00E-06	1,00E-06	1,00E-06
Lindane	58899	Agrochemicals	G	2,45E-06	2,36E-06	2,50E-06	2,63E-06	2,50E-06	2,50E-06	2,32E-06	1,72E-06	1,81E-06	2,41E-06	4,78E-06	3,95E-06	5,00E-06	1,00E-06	1,00E-06	1,80E-06
Linuron	330552	Agrochemicals	D	5,00E-06	4,87E-06	5,00E-06	4,51E-06	1,00E-05	1,00E-05	9,82E-06	2,89E-06	2,89E-06	2,89E-06	5,83E-06	5,83E-06	5,83E-06	1,00E-05	1,00E-05	1,00E-05
Linuron	330552	Agrochemicals	G	5,00E-06	2,85E-05	1,00E-05	2,23E-05	1,00E-05	1,00E-05	9,47E-06	6,77E-06	7,13E-06	7,12E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Mancozeb	8018017	Agrochemicals	D	5,00E-05	5,00E-05	5,00E-05	2,50E-05	NA	NA	NA	5,00E-04	5,00E-04	5,00E-04	NA	NA	NA	NA	NA	NA
Mancozeb	8018017	Agrochemicals	G	5,00E-05	5,00E-05	5,00E-05	2,50E-05	NA	NA	NA	5,00E-04	5,00E-04	5,00E-04	NA	NA	NA	NA	NA	NA
Mecoprop	93652	Agrochemicals	D	1,50E-05	5,00E-06	1,00E-05	7,78E-06	1,00E-05	1,00E-05	7,78E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Mecoprop	93652	Agrochemicals	G	1,97E-05	4,00E-05	1,00E-05	1,77E-05	1,00E-05	1,00E-05	1,00E-05	1,67E-05	1,00E-05	1,33E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Mesotrione	104206828	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Mesotrione	104206828	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	4,05E-05
Metalaxyl	57837191	Agrochemicals	D	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Metalaxyl	57837191	Agrochemicals	G	1,00E-05	1,90E-05	1,00E-05	1,33E-05	1,00E-05	1,00E-05	1,90E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	1,10E-05	5,00E-06	5,00E-06	5,00E-06
Metaldehyde	108623	Agrochemicals	D	5,00E-06	2,50E-05	4,15E-04	6,10E-04	2,50E-04	2,50E-04	2,50E-04	2,50E-05	1,00E-05	1,00E-05	2,50E-04	2,50E-04	2,50E-04	5,00E-05	5,00E-05	5,00E-05
Metaldehyde	108623	Agrochemicals	G	5,00E-06	2,50E-05	3,08E-04	6,10E-04	2,50E-04	2,50E-04	2,50E-04	1,00E-04	7,83E-05	6,67E-05	1,88E-04	5,00E-05	1,85E-04	9,75E-05	6,75E-05	7,50E-05
Metazachlor	67129082	Agrochemicals	D	1,00E-05	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Metazachlor	67129082	Agrochemicals	G	1,00E-05	4,08E-05	5,00E-06	1,00E-05	1,93E-05	1,43E-05	1,00E-05	2,00E-05	1,03E-04	2,67E-05	4,25E-06	6,00E-06	1,63E-05	6,67E-06	5,00E-06	4,62E-05
Metazachlor ESA	172960622	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Metazachlor ESA	172960622	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	3,75E-05	7,28E-05	2,50E-05	2,50E-05
Metazachlor OXA	1231244602	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Metazachlor OXA	1231244602	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	3,15E-05	6,20E-05	2,50E-05	2,50E-05
Metolachlor	51218452	Agrochemicals	D	1,00E-05	2,52E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-04	1,00E-05	2,31E-05	1,23E-05	2,07E-05	5,00E-06	1,43E-05	2,23E-05
Metolachlor	51218452	Agrochemicals	G	6,00E-05	1,94E-04	1,18E-04	5,51E-04	3,60E-05	1,91E-04	3,40E-04	1,23E-04	1,19E-04	6,04E-05	2,60E-04	1,18E-04	3,53E-04	6,08E-05	2,76E-04	1,31E-04
Metolachlor ESA	171118095	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,98E-05	2,83E-05	2,88E-05	3,00E-05	2,28E-05	2,95E-05
Metolachlor ESA	171118095	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,19E-04	1,68E-04	2,18E-04	2,37E-04	2,31E-04	2,10E-04
Metolachlor OXA	152019733	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,71E-06	1,67E-05	8,33E-06	1,67E-05	8,33E-06	2,00E-05
Metolachlor OXA	152019733	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,53E-04	8,68E-05	1,41E-04	2,38E-04	1,31E-04	1,32E-04
Myclobutanil	88671890	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05

Myclobutanil	88671890	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,20E-04	1,00E-05	1,00E-05	1,00E-05
Napropamide	15299997	Agrochemicals	D	NA	2,08E-05	5,00E-06	4,17E-06	1,00E-05	1,00E-05	8,34E-06	2,87E-06	2,87E-06	2,87E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Napropamide	15299997	Agrochemicals	G	NA	2,50E-05	5,00E-06	4,18E-06	1,00E-05	1,00E-05	8,06E-06	6,76E-06	7,12E-06	7,12E-06	1,00E-05	1,00E-05	3,75E-05	1,00E-05	1,00E-05	1,00E-05
Nicosulfuron	111991094	Agrochemicals	D	1,00E-05	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	6,58E-06	6,00E-06	5,75E-06	5,00E-06	5,42E-06	8,23E-06
Nicosulfuron	111991094	Agrochemicals	G	1,90E-05	1,00E-05	5,00E-06	6,67E-06	1,00E-05	2,67E-05	4,43E-05	7,00E-05	2,33E-05	3,23E-05	1,15E-05	8,50E-06	2,53E-05	6,00E-06	1,82E-05	1,08E-05
Oryzalin	19044883	Agrochemicals	D	1,00E-05	1,00E-05	1,00E-05	1,00E-05	2,50E-05	2,50E-05	2,50E-05	1,00E-05	1,00E-05	1,00E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Oryzalin	19044883	Agrochemicals	G	1,00E-05	1,50E-05	1,00E-05	1,00E-05	2,50E-05	2,50E-05	2,50E-05	1,50E-05	1,50E-05	1,50E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Oxadiazon	19666309	Agrochemicals	D	2,60E-05	8,33E-06	1,00E-05	8,34E-06	1,00E-05	1,00E-05	2,31E-05	2,89E-06	2,89E-06	2,89E-06	1,30E-05	1,00E-05	1,00E-05	8,00E-06	6,00E-06	5,70E-06
Oxadiazon	19666309	Agrochemicals	G	1,00E-05	1,33E-05	1,00E-05	8,35E-06	1,00E-05	1,00E-05	9,47E-06	5,62E-06	5,98E-06	5,97E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Pendimethalin	40487421	Agrochemicals	D	1,00E-05	8,33E-06	1,00E-05	8,34E-06	1,00E-05	1,00E-05	8,34E-06	2,89E-06	2,65E-06	2,89E-06	1,44E-06	1,44E-06	5,00E-06	1,09E-06	1,09E-06	1,06E-06
Pendimethalin	40487421	Agrochemicals	G	1,06E-05	8,89E-06	1,00E-05	8,34E-06	1,00E-05	1,00E-05	8,06E-06	6,77E-06	1,72E-05	7,12E-06	1,49E-05	3,86E-06	1,79E-05	2,73E-06	3,86E-06	3,58E-06
Pentachlorophenol	87865	Agrochemicals	D	NA	3,33E-04	NA	4,36E-05	NA	NA	8,23E-06	4,52E-08	4,52E-08	6,54E-06	8,05E-06	6,67E-06	5,00E-06	4,20E-05	1,00E-05	1,00E-05
Pentachlorophenol	87865	Agrochemicals	G	NA	2,26E-09	NA	3,52E-05	5,00E-05	5,00E-05	4,62E-05	2,31E-05	3,08E-05	4,77E-05	2,50E-05	2,50E-05	2,50E-05	5,00E-05	5,00E-05	5,00E-05
Permethrin	52645531	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,81E-08	4,67E-08	3,34E-07	1,13E-08	3,22E-08	5,92E-08
Permethrin	52645531	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,81E-08	1,81E-08	NA	1,13E-08	1,13E-08	1,13E-08
Piperonyl butoxide	51036	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,33E-05	1,13E-05	5,83E-06	8,36E-06	6,53E-06	6,14E-06
Piperonyl butoxide	51036	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Pirimicarb	23103982	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,83E-06	5,83E-06	2,46E-05	1,09E-05	9,72E-06	8,87E-06
Pirimicarb	23103982	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,75E-06	8,75E-06	8,13E-06	1,00E-05	9,48E-06	1,35E-05
Propyzamide	23950585	Agrochemicals	D	NA	8,33E-06	5,00E-06	4,17E-06	1,00E-05	1,00E-05	8,34E-06	2,89E-06	2,89E-06	2,89E-06	5,83E-06	5,83E-06	5,83E-06	8,36E-06	6,53E-06	6,14E-06
Propyzamide	23950585	Agrochemicals	G	NA	1,00E-05	5,00E-06	4,18E-06	1,00E-05	1,00E-05	8,06E-06	1,22E-05	7,13E-06	1,23E-05	1,44E-05	9,88E-06	1,45E-05	1,53E-05	7,93E-05	6,19E-05
Prosulfocarb	52888809	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Prosulfocarb	52888809	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	2,00E-05	1,28E-05	5,00E-06	8,75E-06	6,05E-05
Pyridate	55512339	Agrochemicals	D	1,00E-05	3,50E-05	2,50E-05	2,50E-05	1,00E-05	1,60E-05	1,90E-05	1,00E-05	1,00E-05	1,00E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Pyridate	55512339	Agrochemicals	G	1,00E-05	1,77E-05	2,50E-05	2,50E-05	1,00E-05	1,45E-05	1,43E-05	1,50E-05	1,50E-05	7,58E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Roundup	38641940	Agrochemicals	D	2,50E-05	2,50E-05	1,20E-04	6,00E-05	5,00E-05	2,50E-05	2,50E-05	2,50E-05	6,00E-05	2,70E-05	7,83E-05	4,90E-05	4,15E-05	1,75E-05	2,30E-05	1,47E-05
Roundup	38641940	Agrochemicals	G	2,50E-05	2,87E-04	6,55E-05	1,64E-04	5,00E-05	7,50E-05	7,00E-05	9,99E-05	1,01E-04	8,68E-05	8,38E-05	6,39E-05	9,73E-05	3,85E-05	7,60E-05	7,31E-05
Simazine	122349	Agrochemicals	D	5,00E-06	3,23E-05	5,00E-06	4,68E-06	1,00E-05	1,00E-05	5,12E-06	2,89E-06	2,65E-06	5,40E-06	5,00E-06	5,00E-06	5,18E-06	5,00E-06	5,00E-06	5,00E-06
Simazine	122349	Agrochemicals	G	1,32E-05	4,72E-06	6,67E-06	8,13E-06	3,13E-05	2,90E-05	9,28E-06	6,90E-06	7,18E-06	9,64E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Spiroxamine	118134308	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Spiroxamine	118134308	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,00E-05	1,00E-05	1,70E-05	1,00E-05	1,00E-05	1,00E-05
Sulcotrione	99105778	Agrochemicals	D	1,00E-05	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Sulcotrione	99105778	Agrochemicals	G	1,00E-05	1,00E-05	5,00E-06	5,00E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,67E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Sulfosate	81591813	Agrochemicals	D	2,50E-05	2,50E-05	1,20E-04	6,00E-05	NA	NA	NA	2,50E-05	6,00E-05	3,90E-05	NA	NA	NA	NA	NA	NA
Sulfosate	81591813	Agrochemicals	G	2,50E-05	2,50E-05	7,11E-05	1,64E-04	NA	NA	NA	9,11E-05	1,33E-04	1,05E-04	NA	NA	NA	NA	NA	NA
Tebuconazole	107534963	Agrochemicals	D	1,00E-05	2,08E-05	5,00E-06	4,19E-06	1,00E-05	1,00E-05	8,34E-06	2,89E-06	2,89E-06	2,89E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Tebuconazole	107534963	Agrochemicals	G	1,00E-05	7,33E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,96E-05	9,46E-06	1,48E-05	7,12E-06	2,10E-05	1,33E-05	5,10E-05	1,28E-05	1,00E-05	1,00E-05
Tebutam	35256850	Agrochemicals	D	1,00E-05	1,93E-05	1,00E-05	8,34E-06	1,00E-05	1,00E-05	8,34E-06	2,89E-06	2,89E-06	2,89E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Tebutam	35256850	Agrochemicals	G	1,06E-05	2,12E-05	1,00E-05	8,34E-06	1,43E-05	1,00E-05	8,06E-06	6,77E-06	1,71E-05	7,12E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,25E-05	1,00E-05
Terbuthylazine	5915413	Agrochemicals	D	5,00E-06	4,87E-06	5,00E-06	4,17E-06	1,00E-05	1,00E-05	8,35E-06	2,86E-06	2,86E-06	2,86E-06	5,83E-06	5,83E-06	5,83E-06	7,55E-06	5,83E-06	6,14E-06
Terbuthylazine	5915413	Agrochemicals	G	6,67E-06	4,91E-06	5,00E-06	4,19E-06	1,00E-05	1,00E-05	8,08E-06	6,76E-06	7,12E-06	7,12E-06	1,00E-05	1,00E-05	2,20E-05	1,00E-05	1,00E-05	2,00E-05
Terbutryn	886500	Agrochemicals	D	NA	NA	NA	1,13E-07	NA	NA	2,26E-08	2,26E-08	2,26E-08	2,26E-08	5,00E-06	5,00E-06	5,00E-06	7,00E-06	5,00E-06	5,00E-06
Terbutryn	886500	Agrochemicals	G	NA	NA	NA	5,27E-08	NA	NA	2,26E-08	2,26E-08	2,26E-08	1,25E-08	5,00E-06	5,00E-06	1,83E-05	1,00E-05	1,00E-05	1,00E-05
Tetraconazole	112281773	Agrochemicals	D	1,00E-05	2,08E-05	5,00E-06	4,19E-06	1,00E-05	1,00E-05	8,34E-06	2,94E-06	2,94E-06	2,94E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Tetraconazole	112281773	Agrochemicals	G	1,00E-05	2,50E-05	5,00E-06	4,19E-06	1,00E-05	1,00E-05	8,06E-06	6,80E-06	7,15E-06	7,13E-06	1,28E-05	5,00E-06	5,00E-06	5,00E-06	5,00E-06	5,00E-06
Triclopyr	55335063	Agrochemicals	D	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Triclopyr	55335063	Agrochemicals	G	2,37E-05	9,97E-06	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Triclosan	3380345	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,92E-04	5,00E-05	5,00E-05	3,00E-05	2,50E-05	2,50E-05
Triclosan	3380345	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	6,67E-06	2,50E-05	2,50E-05	2,50E-05
Triphenyltin chloride	639587	Agrochemicals	D	NA	2,26E-09	NA	2,50E-06	NA	NA	NA	NA	6,67E-08	6,67E-08	NA	NA	NA	NA	NA	NA
Triphenyltin chloride	639587	Agrochemicals	G	NA	3,60E-09	NA	NA	NA	NA	NA	NA	6,67E-08	3,70E-08	NA	NA	NA	NA	NA	NA
Ziram	137304	Agrochemicals	D	NA	NA	9,25E-04	2,50E-05	NA	NA	NA	5,00E-04	5,00E-04	5,00E-04	NA	NA	NA	NA	NA	NA
Ziram	137304	Agrochemicals	G	NA	NA	6,33E-05	4,00E-05	NA	NA	NA	5,00E-04	5,00E-04	5,00E-04	NA	NA	NA	NA	NA	NA
Zoxamide	156052685	Agrochemicals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
Zoxamide	156052685	Agrochemicals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	3,13E-05
α-Hexachlorocyclohexane	319846	Agrochemicals	D	5,00E-06	NA	NA	4,64E-06	NA	NA	4,62E-06	1,13E-08	1,13E-08	4,62E-06	1,16E-06	1,16E-06	1,35E-06	1,00E-06	1,00E-06	1,00E-06
α-Hexachlorocyclohexane	319846	Agrochemicals	G	5,00E-06	NA	NA	2,56E-06	2,50E-06	2,50E-06	2,31E-06	1,16E-06	1,54E-06	2,39E-06	4,41E-06	3,05E-06	3,50E-06	1,00E-06	1,25E-06	1,00E-06
Acetaminophen	103902	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,08E-04	5,02E-04	1,95E-04	7,17E-05	7,03E-05	5,24E-05
Acetaminophen	103902	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,92E-05	1,00E-04	5,35E-05	1,00E-04	1,00E-04	1,00E-04
Butylparaben	94268	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,69E-05	5,00E-06	1,17E-05	NA	NA	NA
Carbamazepine	298464	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,61E-06	7,17E-06	6,67E-06	6,67E-06	6,17E-06	2,50E-06
Carbamazepine	298464	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,91E-06	1,27E-05	1,04E-05	2,13E-05	1,40E-05	1,00E-05
Carbamazepine 10,11-epoxide	36507309	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,50E-06	8,50E-06	1,00E-05	1,03E-04	2,50E-06	2,50E-06
Carbamazepine 10,11-epoxide	36507309	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,04E-06	1,63E-06	2,00E-06	2,50E-04	2,50E-04	2,50E-04
Diclofenac	15307865	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,18E-05	1,35E-05	8,67E-06	7,00E-06	8,67E-06	5,00E-06
Diclofenac	15307865	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,50E-05	1,05E-05	2,40E-05	1,00E-05	1,00E-05	1,33E-05
Estrone	53167	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,67E-05	1,00E-05	1,00E-05	2,02E-04	1,00E-05	1,00E-05
Estrone	53167	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,75E-06	6,85E-06	7,80E-06	2,50E-04	2,50E-04	2,50E-04
Ethylparaben	120478	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,04E-04	4,33E-05	1,00E-05	3,00E-05	5,00E-06	5,00E-06
Ethylparaben	120478	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,45E-05	5,00E-06	1,22E-05	1,00E-05	1,00E-05	1,00E-05
Fenofibric acid	42017890	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,28E-06	1,45E-05	7,50E-06	6,00E-06	2,50E-06	2,50E-06
Fenofibric acid	42017890	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-06	2,50E-06	2,50E-06	1,00E-05	1,00E-05	1,00E-05
Ibuprofen	15687271	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,94E-05	8,83E-06	1,00E-05	1,06E-04	1,00E-05	1,00E-05

Ibuprofen	15687271	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	1,20E-05	5,00E-06	2,50E-04	2,50E-04	2,50E-04
Metformin	657249	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3,54E-04	2,75E-04	2,59E-04	1,88E-04	3,68E-04	1,51E-04
Metformin	657249	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,67E-04	3,00E-04	1,80E-04	2,50E-04	2,50E-04	2,50E-04
Methylparaben	99763	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,39E-04	1,36E-04	1,00E-05	7,33E-05	1,67E-05	1,00E-05
Methylparaben	99763	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,18E-05	1,49E-05	1,30E-04	1,00E-05	1,00E-05	1,00E-05
Niflumic acid	4394007	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,00E-05	1,00E-05	1,00E-05	1,40E-05	5,00E-06	5,00E-06
Niflumic acid	4394007	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,00E-06	8,00E-06	7,00E-06	2,50E-05	2,50E-05	2,50E-05
Octocrylene	6197304	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,26E-07	2,26E-07	7,41E-07	2,26E-07	2,26E-07	2,26E-07
Octocrylene	6197304	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,26E-07	2,26E-07	NA	2,26E-07	2,26E-07	2,26E-07
Ofloxacin	82419361	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,62E-06	1,17E-05	1,00E-05	4,93E-05	1,00E-05	1,67E-05
Ofloxacin	82419361	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-06	5,00E-06	5,00E-06	1,94E-04	2,50E-05	2,50E-05
Oxazepam	604751	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,49E-05	1,55E-05	1,78E-05	1,10E-05	1,25E-05	8,30E-06
Oxazepam	604751	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,39E-05	3,33E-05	2,03E-05	5,00E-05	5,00E-05	5,00E-05
Propylparaben	94133	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,40E-04	1,45E-04	3,33E-05	1,00E-05	5,00E-06	5,00E-06
Propylparaben	94133	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,71E-05	5,00E-06	1,17E-05	1,00E-05	1,00E-05	1,00E-05
Sulfamethoxazole	723466	HCPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,50E-06	7,75E-06	1,00E-05	7,00E-06	2,50E-06	2,50E-06
Sulfamethoxazole	723466	HCPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,21E-06	8,25E-06	8,83E-06	1,00E-05	1,00E-05	1,00E-05
Antimony	7440360	Metals	D	NA	3,12E-06	NA	1,04E-05	NA	NA	9,94E-06	5,42E-06	9,02E-06	9,04E-06	5,68E-05	7,61E-05	6,96E-05	7,52E-05	1,18E-04	1,02E-04
Antimony	7440360	Metals	G	NA	4,41E-06	NA	1,77E-04	2,00E-04	2,17E-04	1,99E-04	8,16E-05	9,76E-05	1,10E-04	8,29E-06	8,85E-05	6,77E-05	1,22E-04	1,47E-04	1,30E-04
Arsenic	7440382	Metals	D	4,75E-05	2,69E-05	1,51E-03	5,64E-04	8,76E-04	8,65E-04	1,08E-03	2,65E-05	4,68E-05	1,21E-03	7,92E-04	8,67E-04	9,50E-04	6,74E-04	7,60E-04	1,07E-03
Arsenic	7440382	Metals	G	3,12E-05	3,95E-05	4,33E-05	2,30E-03	8,90E-04	8,27E-04	1,80E-03	7,56E-04	1,00E-03	1,77E-03	1,27E-03	1,16E-03	1,37E-03	1,48E-03	1,78E-03	1,35E-03
Baryum	7440393	Metals	D	NA	2,46E-04	NA	1,86E-02	NA	NA	1,57E-02	2,07E-03	1,93E-03	2,11E-03	1,31E-02	1,24E-02	1,28E-02	1,18E-02	1,26E-02	8,82E-03
Baryum	7440393	Metals	G	NA	3,23E-04	NA	2,65E-02	2,93E-02	3,33E-02	3,62E-02	2,73E-02	3,63E-02	3,10E-02	2,13E-02	2,13E-02	2,48E-02	1,86E-02	2,25E-02	2,21E-02
Beryllium	7440417	Metals	D	NA	1,13E-06	NA	9,94E-06	NA	NA	5,42E-06	1,10E-05	1,01E-05	9,19E-06	1,01E-05	1,06E-05	1,44E-05	1,33E-05	1,83E-05	1,73E-05
Beryllium	7440417	Metals	G	NA	2,04E-06	NA	3,36E-04	2,50E-05	2,50E-05	4,37E-06	6,43E-06	7,38E-06	7,53E-06	1,02E-05	1,29E-05	1,16E-05	4,47E-06	1,44E-05	3,71E-06
Boron	7440428	Metals	D	3,85E-02	2,12E-03	1,00E-02	5,05E-03	2,50E-02	2,50E-02	3,76E-02	6,61E-05	1,02E-04	1,02E-04	NA	NA	NA	NA	NA	NA
Boron	7440428	Metals	G	2,50E-02	5,11E-03	2,50E-02	7,51E-03	1,29E-02	1,06E-02	1,77E-02	1,35E-02	1,19E-02	1,18E-02	NA	NA	NA	NA	NA	NA
Cadmium	7440439	Metals	D	1,13E-06	8,15E-07	4,52E-06	4,49E-04	7,83E-07	6,78E-07	3,23E-05	4,52E-07	7,53E-07	1,90E-04	5,92E-05	2,30E-05	1,97E-04	1,13E-06	1,41E-06	5,16E-06
Cadmium	7440439	Metals	G	1,36E-06	7,82E-07	1,31E-06	2,83E-05	1,04E-05	1,48E-05	8,07E-05	3,67E-05	3,81E-05	7,01E-05	1,81E-06	1,05E-05	7,94E-06	5,86E-06	2,07E-05	2,20E-06
Calcium	7440702	Metals	D	3,15E+01	2,20E+01	2,41E+01	2,36E+01	2,20E+01	2,82E+01	2,58E+01	2,30E+01	2,00E+01	2,11E+01	2,43E+01	2,44E+01	2,16E+01	2,48E+01	2,64E+01	1,81E+01
Calcium	7440702	Metals	G	3,96E+01	5,04E+01	4,62E+01	4,70E+01	4,05E+01	3,94E+01	3,90E+01	4,64E+01	4,79E+01	4,51E+01	4,36E+01	4,24E+01	4,34E+01	4,02E+01	3,93E+01	4,90E+01
Chromium	7440473	Metals	D	1,30E-04	8,39E-05	6,33E-05	8,59E-05	7,55E-05	8,74E-05	9,77E-05	1,28E-04	2,39E-04	2,93E-04	2,09E-04	3,14E-04	7,81E-04	8,00E-05	1,75E-04	8,99E-05
Chromium	7440473	Metals	G	1,10E-04	1,29E-04	1,49E-04	2,34E-04	1,04E-04	9,16E-05	1,55E-04	1,47E-04	2,67E-04	3,99E-04	3,60E-04	3,41E-04	2,90E-04	2,00E-04	3,47E-04	1,81E-04
Cobalt	7440484	Metals	D	NA	4,22E-05	NA	3,98E-05	NA	NA	7,15E-05	2,77E-05	3,71E-05	3,68E-05	4,75E-05	4,90E-05	4,77E-05	2,58E-05	2,75E-05	4,98E-05
Cobalt	7440484	Metals	G	NA	2,90E-05	NA	2,01E-04	4,00E-04	2,50E-04	2,89E-04	8,64E-05	6,35E-05	2,76E-05	5,36E-05	1,14E-04	9,46E-05	2,93E-05	2,66E-04	2,72E-05
Copper	7440508	Metals	D	7,08E-05	4,68E-05	2,71E-05	2,06E-03	5,47E-04	3,57E-04	1,28E-03	3,81E-05	6,66E-05	7,47E-04	7,12E-04	6,17E-04	5,77E-04	4,92E-04	4,29E-04	5,62E-04
Copper	7440508	Metals	G	4,56E-05	7,67E-05	9,27E-05	1,17E-03	3,05E-03	8,21E-04	1,51E-03	9,97E-04	1,03E-03	2,03E-03	6,74E-04	6,24E-04	7,01E-04	7,91E-04	1,03E-03	7,85E-04
Iron	7439896	Metals	D	9,07E-02	3,40E-01	2,88E-01	1,91E-01	8,25E-02	6,04E-02	1,14E-01	7,26E-02	9,12E-02	8,70E-02	7,13E-02	9,12E-02	6,57E-02	5,90E-02	6,89E-02	1,24E-01
Iron	7439896	Metals	G	NA	1,92E+00	1,85E-01	1,53E-01	6,53E-02	2,75E-02	5,15E-02	7,35E-02	9,21E-02	8,38E-02	8,24E-02	7,31E-02	7,55E-02	1,07E-01	6,33E-02	9,24E-02
Lead	7439921	Metals	D	7,91E-05	3,80E-05	3,16E-05	7,94E-03	3,57E-05	4,50E-05	2,94E-04	8,50E-05	1,02E-04	1,11E-04	1,49E-04	1,25E-04	2,34E-04	1,24E-04	1,10E-04	1,66E-04
Lead	7439921	Metals	G	8,14E-05	1,44E-04	1,07E-04	2,85E-03	4,63E-04	4,67E-04	3,69E-04	9,86E-05	1,57E-04	4,87E-04	3,82E-04	3,93E-04	3,46E-04	5,16E-04	4,17E-04	4,58E-04
Lithium	7439932	Metals	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,32E-04	8,95E-04	6,97E-04	7,33E-04	7,88E-04	5,24E-04
Lithium	7439932	Metals	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,02E-03	1,07E-03	1,11E-03	1,28E-04	2,55E-03	9,31E-05
Magnesium	7439954	Metals	D	3,17E+00	3,00E+00	2,93E+00	2,86E+00	2,80E+00	3,32E+00	3,23E+00	2,65E+00	2,70E+00	2,94E+00	2,74E+00	2,90E+00	2,90E+00	3,23E+00	3,15E+00	2,73E+00
Magnesium	7439954	Metals	G	6,18E+00	7,05E+00	7,45E+00	6,90E+00	6,89E+00	5,91E+00	5,77E+00	6,38E+00	6,65E+00	7,59E+00	7,21E+00	6,73E+00	6,73E+00	6,11E+00	5,85E+00	6,62E+00
Manganese	7439965	Metals	D	7,83E-03	1,58E-02	2,27E-02	1,50E-02	7,62E-03	6,70E-03	3,66E-03	1,51E-03	1,76E-03	1,51E-03	4,36E-03	5,28E-03	4,78E-03	6,02E-03	4,77E-03	5,46E-03
Manganese	7439965	Metals	G	NA	3,90E-02	2,32E-02	2,35E-02	6,67E-03	3,83E-03	6,17E-03	1,51E-03	2,69E-03	2,13E-03	6,59E-03	4,11E-03	2,91E-03	6,72E-03	5,67E-03	5,71E-03
Mercury	7439976	Metals	D	2,49E-07	1,73E-07	1,36E-07	7,18E-05	4,52E-08	6,03E-08	2,80E-05	1,51E-07	9,05E-08	4,68E-06	1,02E-07	2,15E-07	2,13E-06	2,67E-06	1,83E-07	3,96E-07
Mercury	7439976	Metals	G	1,13E-07	1,60E-07	1,81E-07	5,76E-05	2,41E-07	2,49E-07	3,05E-07	6,05E-06	2,42E-06	7,51E-06	2,46E-06	5,87E-06	8,29E-06	2,40E-07	3,87E-06	3,97E-06
Molybdenum	7439987	Metals	D	NA	1,13E-06	NA	2,71E-06	NA	NA	2,00E-04	1,51E-06	3,31E-06	5,12E-06	9,04E-05	2,05E-04	5,31E-06	1,90E-06	9,20E-07	2,15E-04
Molybdenum	7439987	Metals	G	NA	1,13E-06	NA	1,69E-04	1,00E-03	5,00E-04	2,86E-06	1,09E-04	4,07E-06	7,38E-06	5,12E-06	1,71E-04	1,28E-04	2,84E-06	2,51E-04	1,09E-04
Nickel	7440020	Metals	D	7,01E-05	4,64E-05	4,07E-05	1,23E-03	4,64E-05	4,77E-05	4,57E-04	5,06E-05	6,94E-05	2,21E-04	5,00E-04	3,79E-04	1,21E-03	4,05E-04	1,76E-04	3,46E-04
Nickel	7440020	Metals	G	5,24E-05	7,94E-05	9,87E-05	1,55E-03	3,93E-04	2,27E-04	1,28E-03	4,34E-04	9,27E-05	4,36E-04	1,42E-04	3,11E-04	2,08E-04	4,76E-04	4,13E-04	2,45E-04
Potassium	7440097	Metals	D	2,03E+00	1,60E+00	2,32E+00	1,71E+00	1,73E+00	1,93E+00	1,94E+00	1,53E+00	1,64E+00	1,86E+00	1,53E+00	1,86E+00	1,48E+00	1,54E+00	1,60E+00	1,58E+00
Potassium	7440097	Metals	G	2,18E+00	2,40E+00	2,15E+00	1,88E+00	2,15E+00	1,74E+00	1,91E+00	1,75E+00	1,73E+00	1,89E+00	1,95E+00	1,92E+00	1,94E+00	1,91E+00	1,70E+00	2,01E+00
Selenium	7782492	Metals	D	NA	1,13E-06	NA	3,62E-06	NA	NA	2,40E-06	2,26E-06	3,32E-06	7,23E-06	3,05E-06	7,57E-06	4,86E-06	8,82E-06	7,47E-06	6,46E-06
Selenium	7782492	Metals	G	NA	2,19E-06	NA	1,81E-04	5,00E-04	5,00E-04	5,12E-06	1,10E-04	3,62E-06	5,42E-06	6,18E-06	8,91E-05	1,85E-04	1,02E-05	2,53E-04	9,69E-06
Silicates	15593905	Metals	D	NA	NA	NA	NA	NA	NA	1,06E+01	8,31E+00	9,10E+00	1,10E+01	8,76E+00	8,69E+00	8,54E+00	8,77E+00	8,85E+00	9,46E+00
Silicates	15593905	Metals	G	NA	NA	NA	NA	NA	NA	NA	4,30E+00	4,66E+00	3,97E+00	4,86E+00	4,14E+00	5,06E+00	4,32E+00	4,32E+00	4,76E+00
Silver	7440224	Metals	D	NA	1,13E-06	NA	1,81E-06	NA	NA	2,00E-04	7,55E-07	4,52E-07	7,55E-07	5,03E-05	5,91E-05	1,13E-05	1,44E-04	3,22E-05	2,16E-05
Silver	7440224	Metals	G	NA	1,13E-06	NA	2,88E-04	5,00E-04	5,00E-04	2,88E-04	2,15E-04	2,86E-04	1,43E-04	1,21E-06	8,38E-05	2,51E-04	3,13E-04	3,57E-04	3,22E-04
Tellurium	13494809	Metals	D	NA	1,13E-06	NA	2,00E-03	NA	NA	2,00E-04	4,52E-07	4,52E-07	4,52E-07	NA	NA	NA	NA	NA	NA
Tellurium	13494809	Metals	G	NA	1,13E-06	NA	1,68E-03	1,00E-03	5,00E-04	3,01E-06	2,15E-04	2,86E-04	2,86E-04	NA	NA	NA	NA	NA	NA
Thallium	7440280	Metals	D	NA	1,13E-06	NA	3,16E-06	NA	NA	2,02E-05	1,81E-06	1,36E-06	2,41E-06	2,30E-05	1,46E-05	2,15E-06	1,74E-05	1,41E-05	1,29E-05
Thallium	7440280	Metals	G	NA	1,13E-06	NA	4,67E-04	5,00E-05	1,00E-04	4,22E-05	2,04E-06	1,81E-06	2,11E-06	2,86E-06	3,53E-05	4,38E-05	3,14E-05	3,58E-05	2,18E-05
Tin	7440315	Metals	D	NA	1,27E-05	NA	1,72E-03	NA	NA	1,31E-05	1,17E-05	1,55E-05	2,00E-05	2,54E-04	2,29E-05	2,41E-04	7,92E-06	7,83E-06	7,45E-06
Tin	7440315	Metals	G	NA	1,46E-05	NA	9,41E-05	5,00E-04	1,00E-03	6,78E-04	1,35E-04	3,55E-04	1,46E-05	2,20E-05	1,80E-04	1,39E-04	8,20E-06	2,54E-04	1,30E-04
Titanium	7440326	Metals	D	NA	5,42E-06	NA	1,28E-02	NA	NA	4,52E-03	1,29E-02	1,32E-02	1,33E-02	9,04E-03	9,84E-03	7,97E-03	2,91E-03	2,26E-03	3,07E-03
Titanium	7440326	Metals	G	NA	7,56E-04	NA	2,21E-03	2,00E-03	1,33E-03	2,18E-03	6,01E-03	8,08E-03	6,76E-03	1,01E-02	5,75E-03	6,08E-03	3,79E-03	6,24E-03	3,25E-03
Uranium	7440611	Metals	D	NA	6,91E-06	NA	1,18E-05	NA	NA	1,73E-04	6,48E-06	8,72E-06	9,34E-06	1,17E-04	1,23E-04	1,29E-04	1,30E-04	1,25E-04	9,17E-05
Uranium	7440611	Metals	G	NA	3,66E-06	NA	3,36E-04	1,16E-03	7,83E-04	6,20E-04	4,04E-04	4,84E-04	4,60E-04	4,55E-04	4,08E-04	5,46E-04	4,35E-04	5,66E-04	5,09E-04
Vanadium	7440622	Metals	D	NA	2,11E-04	NA	3,25E-04	NA	NA	5,18E-04	1,99E-04	2,33E-04	2,29E-04	3,10E-04	4,28E-04	4,43E-04	3,75E-04	4,13E-04	3,33E-04
Vanadium	7440622	Metals	G	NA	1,23E-04	NA	8,41E-04	1,30E-03	8,55E-04	7,96E-04	5,31E-04	5,75E-04	4,92E-04	6,23E-04	8,77E-04	8,95E-04	5,61E-04	6,86E-04	5,70E-04

Zinc	7440666	Metals	D	3,69E-04	2,41E-04	2,12E-04	1,00E-02	4,90E-03	2,84E-03	8,29E-03	2,71E-04	3,12E-04	4,32E-03	2,92E-03	3,39E-03	3,34E-03	6,21E-03	2,83E-03	2,14E-03
Zinc	7440666	Metals	G	2,35E-04	4,00E-04	4,90E-04	1,92E-02	7,92E-03	8,56E-03	3,21E-02	3,06E-04	3,90E-04	3,02E-04	1,85E-03	6,80E-03	5,81E-03	4,06E-03	3,95E-03	3,22E-03
1,1-Dichloroethane	75343	OIPs	D	NA	5,00E-04	NA	3,15E-04	NA	NA	2,50E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	75343	OIPs	G	NA	5,00E-04	NA	5,95E-04	2,50E-03	4,00E-04	1,00E-04	1,00E-04	1,00E-04	1,00E-04	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	120821	OIPs	D	NA	NA	NA	2,17E-04	NA	NA	1,92E-05	1,13E-08	1,13E-08	1,38E-05	1,50E-05	1,50E-05	1,50E-05	1,10E-05	1,50E-05	1,50E-05
1,2,4-Trichlorobenzene	120821	OIPs	G	NA	NA	NA	2,31E-05	1,00E-05	1,00E-05	1,39E-05	4,62E-06	6,16E-06	9,54E-06	5,00E-04	5,00E-04	5,00E-04	1,00E-05	1,00E-05	1,00E-05
1-Chloro-2-nitrobenzene	88733	OIPs	D	NA	2,50E-04	NA	1,31E-04	NA	NA	1,88E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Chloro-2-nitrobenzene	88733	OIPs	G	NA	2,50E-04	NA	3,71E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	NA	NA	NA	NA	NA	NA
1-Chloro-3-nitrobenzene	121733	OIPs	D	NA	2,50E-04	NA	1,31E-04	NA	NA	1,50E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Chloro-3-nitrobenzene	121733	OIPs	G	NA	2,50E-04	NA	1,88E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	NA	NA	NA	NA	NA	NA
1-Chloro-4-nitrobenzene	100005	OIPs	D	NA	2,50E-04	NA	1,34E-04	NA	NA	1,88E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Chloro-4-nitrobenzene	100005	OIPs	G	NA	2,50E-04	NA	2,96E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	NA	NA	NA	NA	NA	NA
2-Chloroaniline	95512	OIPs	D	NA	5,00E-05	NA	6,35E-05	NA	NA	1,50E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chloroaniline	95512	OIPs	G	NA	5,00E-05	NA	1,37E-04	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	NA	NA	NA	NA	NA	NA
2-Chlorophenol	95578	OIPs	D	NA	2,50E-04	NA	1,30E-04	NA	NA	2,00E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Chlorophenol	95578	OIPs	G	NA	2,50E-04	NA	3,71E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	NA	NA	NA	NA	NA	NA
2-Nitrotoluene	88722	OIPs	D	NA	NA	NA	7,35E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitrotoluene	88722	OIPs	G	NA	NA	NA	1,81E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Chloroaniline	108429	OIPs	D	NA	5,00E-05	NA	3,30E-05	NA	NA	3,00E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Chloroaniline	108429	OIPs	G	NA	5,00E-05	NA	1,82E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	NA	NA	NA	NA	NA	NA
3-Chlorophenol	108430	OIPs	D	NA	2,50E-04	NA	1,28E-04	NA	NA	2,00E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
3-Chlorophenol	108430	OIPs	G	NA	2,50E-04	NA	2,07E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	NA	NA	NA	NA	NA	NA
4-Chloro-2-nitroaniline	89634	OIPs	D	NA	NA	NA	1,50E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloro-2-nitroaniline	89634	OIPs	G	NA	NA	NA	1,48E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	106478	OIPs	D	NA	5,00E-05	NA	2,75E-05	NA	NA	3,00E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	106478	OIPs	G	NA	5,00E-05	NA	2,90E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	NA	NA	NA	NA	NA	NA
4-Chlorophenol	106489	OIPs	D	NA	2,50E-04	NA	1,31E-04	NA	NA	2,00E-05	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	2,20E-05	5,00E-06	5,00E-06
4-Chlorophenol	106489	OIPs	G	NA	2,50E-04	NA	1,93E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05	2,50E-05
4-Nonylphenol	104405	OIPs	D	NA	NA	NA	NA	NA	NA	1,79E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nonylphenol	104405	OIPs	G	NA	NA	NA	NA	1,00E-05	5,20E-04	1,00E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Octylphenol diethoxylate	2315619	OIPs	D	NA	NA	NA	2,38E-04	NA	NA	NA	NA	NA	5,42E-05	NA	NA	NA	NA	NA	NA
4-Octylphenol diethoxylate	2315619	OIPs	G	NA	NA	NA	1,95E-05	NA	NA	NA	5,00E-05	5,00E-05	5,00E-05	NA	NA	NA	NA	NA	NA
4-Octylphenol monoethoxylate	2315675	OIPs	D	NA	NA	NA	1,01E-04	NA	NA	NA	NA	NA	1,50E-05	NA	NA	NA	NA	NA	NA
4-Octylphenol monoethoxylate	2315675	OIPs	G	NA	NA	NA	2,98E-05	NA	NA	NA	5,00E-05	5,00E-05	5,00E-05	NA	NA	NA	NA	NA	NA
4-n-Octylphenol	1806264	OIPs	D	NA	3,33E-03	NA	1,41E-04	NA	NA	1,65E-05	2,26E-08	2,26E-08	1,38E-05	NA	NA	NA	NA	NA	NA
4-n-Octylphenol	1806264	OIPs	G	NA	2,26E-08	NA	2,53E-05	1,00E-05	1,00E-05	9,23E-06	4,63E-06	6,16E-06	9,54E-06	NA	NA	NA	NA	NA	NA
4-tert-Octylphenol	140669	OIPs	D	NA	3,33E-03	NA	4,62E-06	NA	NA	1,65E-05	2,26E-08	2,26E-08	1,38E-05	1,50E-05	1,50E-05	1,50E-05	7,40E-05	1,50E-05	1,50E-05
4-tert-Octylphenol	140669	OIPs	G	NA	2,26E-08	NA	2,88E-04	2,30E-05	1,26E-04	1,15E-05	3,66E-05	3,10E-05	3,06E-04	5,00E-06	5,83E-06	5,00E-06	2,83E-05	1,53E-05	1,02E-04
Alkanes, C10-13, chloro	85535848	OIPs	D	NA	3,33E-02	NA	2,67E-04	NA	NA	3,63E-04	4,52E-06	4,52E-06	3,68E-04	2,73E-04	2,96E-04	4,32E-04	1,40E-04	1,29E-04	7,50E-05
Alkanes, C10-13, chloro	85535848	OIPs	G	NA	2,26E-07	NA	2,58E-04	1,00E-04	1,00E-04	9,24E-05	2,33E-04	3,10E-04	4,77E-04	1,67E-03	5,60E-05	2,35E-04	7,50E-05	7,50E-05	7,50E-05
Allyl chloride	107051	OIPs	D	NA	5,00E-05	NA	5,00E-05	NA	NA	5,00E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA
Allyl chloride	107051	OIPs	G	NA	5,00E-05	NA	4,02E-04	5,00E-04	2,33E-04	1,00E-04	1,00E-04	1,00E-04	1,00E-04	NA	NA	NA	NA	NA	NA
BDE 99	60348609	OIPs	D	NA	NA	NA	5,00E-06	NA	NA	NA	NA	NA	5,00E-06	3,40E-06	3,40E-06	5,00E-06	2,01E-06	6,51E-07	9,09E-07
BDE 99	60348609	OIPs	G	NA	NA	NA	2,20E-05	NA	NA	NA	1,00E-05	1,00E-05	1,00E-05	4,51E-07	3,66E-07	5,00E-07	3,41E-07	3,64E-07	4,63E-07
Benzene	71432	OIPs	D	NA	2,57E-04	NA	2,20E-04	NA	NA	4,62E-05	1,13E-08	1,13E-08	4,62E-05	5,00E-05	5,00E-05	5,00E-05	1,23E-04	5,00E-05	5,00E-05
Benzene	71432	OIPs	G	NA	2,35E-04	NA	3,54E-04	5,00E-04	2,33E-04	9,23E-05	4,62E-05	6,15E-05	9,54E-05	5,00E-04	5,00E-04	1,00E-03	1,00E-04	1,00E-04	1,00E-04
Bisphenol A	80057	OIPs	D	NA	NA	NA	1,00E-03	NA	NA	1,19E-01	NA	NA	NA	2,90E-04	5,83E-05	7,33E-05	7,00E-05	3,50E-04	6,63E-04
Bisphenol A	80057	OIPs	G	NA	NA	NA	NA	1,25E-04	1,25E-04	1,25E-04	5,00E-04	5,00E-04	5,00E-04	1,00E-05	1,00E-05	2,27E-05	2,50E-05	2,50E-05	2,50E-05
Bisphenol S	80091	OIPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6,00E-05	1,00E-05	8,25E-05	2,60E-05	1,00E-05	1,00E-05
Bisphenol S	80091	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05
Butyl benzyl phthalate	85687	OIPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,36E-04	1,36E-04	2,92E-04	1,25E-04	3,22E-04	8,17E-07
Butyl benzyl phthalate	85687	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,87E-05	3,35E-05	1,00E-04	5,25E-05	8,93E-05	2,79E-05
Chloroacetic acid	79118	OIPs	D	NA	2,50E-01	NA	1,25E-01	NA	NA	2,50E-02	NA	NA	NA	5,00E-03	5,00E-03	5,00E-03	3,40E-03	5,00E-03	5,00E-03
Chloroacetic acid	79118	OIPs	G	NA	2,50E-01	NA	7,67E-05	1,00E-03	1,00E-03	1,00E-03	1,00E-03	1,00E-03	1,00E-03	5,64E-04	2,50E-04	2,50E-04	1,00E-03	3,75E-04	2,50E-04
Chloroform	67663	OIPs	D	NA	4,86E-04	NA	3,73E-04	NA	NA	8,54E-04	1,13E-08	1,13E-08	2,31E-04	2,50E-04	2,50E-04	3,18E-04	1,90E-04	3,43E-04	1,67E-03
Chloroform	67663	OIPs	G	NA	4,70E-04	NA	4,07E-04	5,00E-04	1,10E-03	9,23E-05	4,62E-05	6,15E-05	9,54E-05	2,50E-04	2,50E-04	2,50E-04	1,00E-04	1,00E-04	1,00E-04
Chloroprene	126998	OIPs	D	NA	5,00E-04	NA	2,59E-03	NA	NA	2,50E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroprene	126998	OIPs	G	NA	5,00E-04	NA	3,92E-04	5,00E-04	2,33E-04	1,00E-04	1,00E-04	1,00E-04	1,00E-04	NA	NA	NA	NA	NA	NA
Decabromodiphenyl ether	1163195	OIPs	D	NA	NA	NA	4,67E-06	NA	NA	2,62E-05	2,26E-08	2,26E-08	2,26E-08	2,26E-08	2,26E-08	5,42E-08	1,13E-08	1,13E-08	1,13E-08
Decabromodiphenyl ether	1163195	OIPs	G	NA	NA	NA	4,68E-05	5,00E-05	3,54E-05	2,89E-05	1,07E-05	1,43E-05	1,43E-05	3,16E-08	1,42E-07	4,52E-08	1,13E-08	1,93E-07	1,13E-08
Dibutyl phthalate	84742	OIPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,36E-04	1,36E-04	2,50E-04	2,30E-04	4,50E-04	3,50E-04
Dibutyl phthalate	84742	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,87E-05	3,35E-05	1,00E-04	7,81E-05	1,81E-04	8,03E-05
Dibutyltin oxide	818086	OIPs	D	NA	NA	NA	NA	NA	NA	NA	4,52E-08	4,45E-08	7,80E-08	NA	NA	NA	NA	NA	NA
Dibutyltin oxide	818086	OIPs	G	NA	NA	NA	NA	NA	NA	NA	4,45E-08	4,45E-08	2,48E-08	NA	NA	NA	NA	NA	NA
Dichloromethane	75092	OIPs	D	NA	4,86E-04	NA	4,04E-04	NA	NA	1,33E-02	2,26E-08	2,26E-08	2,44E-03	2,78E-03	2,50E-03	4,01E-03	3,67E-02	4,72E-03	5,00E-03
Dichloromethane	75092	OIPs	G	NA	4,70E-04	NA	2,55E-03	5,00E-03	3,33E-03	2,31E-03	1,16E-03	1,54E-03	2,39E-03	2,50E-03	2,50E-03	2,50E-03	2,50E-03	2,50E-03	2,50E-03
Diethyl phthalate	84662	OIPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-03	5,21E-04	5,40E-04	2,00E-04	5,00E-04	5,00E-04
Diethyl phthalate	84662	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,60E-03	1,00E-04	1,00E-04	1,25E-04	1,25E-04	1,25E-04
Diisobutyl phthalate	84695	OIPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,50E-04	3,22E-04	2,15E-04
Diisobutyl phthalate	84695	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-04	2,50E-04	2,50E-04	1,56E-04	2,94E-04	1,61E-04
Dioctyl phthalate	117817	OIPs	D	NA	3,33E-02	NA	7,80E-05	NA	NA	9,31E-04	3,98E-07	6,61E-07	3,34E-04	4,71E-04	3,40E-04	4,21E-04	3,43E-04	8,00E-04	5,00E-04
Dioctyl phthalate	117817	OIPs	G	NA	2,26E-07	NA	1,40E-03	6,00E-04	6,24E-04	6,41E-04	2,14E-04	5,64E-04	4,46E-04	2,41E-04	1,26E-04	6,66E-04	1,25E-04	5,20E-04	2,28E-04
EDTA	60004	OIPs	D	NA	NA	NA	NA	NA	NA	2,56E-03	NA	NA	NA	9,80E-03	2,50E-03	2,50E-03	NA	NA	NA

EDTA	60004	OIPs	G	NA	NA	NA	NA	5,00E-05	5,00E-05	5,00E-05	5,00E-04	5,00E-04	5,00E-04	5,00E-03	2,20E-02	5,00E-03	NA	NA	NA
Epichlorohydrin	106898	OIPs	D	NA	5,00E-04	NA	2,75E-03	NA	NA	5,00E-05	NA	NA	NA	5,00E-05	5,00E-05	5,00E-05	5,00E-05	1,23E-04	5,00E-05
Epichlorohydrin	106898	OIPs	G	NA	5,00E-04	NA	1,45E-03	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05
Ethylbenzene	100414	OIPs	D	NA	2,26E-09	NA	2,25E-04	NA	NA	2,00E-04	1,13E-08	1,13E-08	4,35E-08	NA	NA	NA	NA	NA	NA
Ethylbenzene	100414	OIPs	G	NA	2,26E-09	NA	3,11E-04	5,00E-04	2,33E-04	8,41E-05	4,29E-05	5,71E-05	5,71E-05	NA	NA	NA	NA	NA	NA
Fluoride	16984488	OIPs	D	NA	5,00E-02	1,32E-01	1,05E-01	5,25E-02	8,50E-02	1,53E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoride	16984488	OIPs	G	NA	1,00E-01	1,05E-01	1,67E-01	1,10E-01	1,06E-01	1,00E-01	NA	NA	NA	NA	NA	NA	NA	NA	NA
HBCDDs	3194556	OIPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,26E-08	2,26E-08	NA	2,26E-08	2,26E-08	2,26E-08
HBCDDs	3194556	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,07E-08	2,26E-08	NA	2,26E-08	2,26E-08	2,26E-08
Hexachlorobutadiene	87683	OIPs	D	NA	3,33E-04	NA	7,45E-06	NA	NA	6,20E-06	2,26E-08	2,26E-08	1,38E-05	1,50E-05	1,50E-05	1,50E-05	1,10E-05	1,50E-05	1,50E-05
Hexachlorobutadiene	87683	OIPs	G	NA	2,26E-09	NA	4,66E-05	1,00E-05	1,00E-05	9,23E-06	4,63E-06	6,16E-06	1,61E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05	1,00E-05
Hexachlorocyclopentadiene	77474	OIPs	D	NA	NA	NA	1,32E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	77474	OIPs	G	NA	NA	NA	1,30E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Irganox 1076	2082793	OIPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,26E-07	2,26E-07	NA	8,35E-07	4,52E-08	2,13E-07
Irganox 1076	2082793	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,26E-07	2,26E-07	NA	1,18E-06	2,92E-07	2,74E-07
Monobutyltin	78763549	OIPs	D	NA	NA	NA	1,00E-06	NA	NA	NA	NA	NA	NA	1,69E-07	1,69E-07	NA	1,69E-07	1,69E-07	1,69E-07
Monobutyltin	78763549	OIPs	G	NA	NA	NA	3,50E-06	NA	NA	NA	NA	NA	NA	1,69E-07	1,69E-07	NA	1,69E-07	1,69E-07	1,69E-07
Nitrobenzene	98953	OIPs	D	NA	NA	NA	1,48E-04	NA	NA	NA	NA	NA	NA	5,00E-05	5,00E-05	5,00E-05	1,80E-05	5,00E-05	5,00E-05
Nitrobenzene	98953	OIPs	G	NA	NA	NA	5,00E-05	NA	NA	NA	NA	NA	NA	5,00E-05	5,00E-05	5,00E-05	1,00E-05	1,00E-05	1,00E-05
Nonylphenol	25144523	OIPs	D	NA	3,33E-03	NA	2,16E-04	NA	NA	1,11E-05	9,04E-08	9,04E-08	2,09E-05	NA	NA	NA	NA	NA	NA
Nonylphenol	25144523	OIPs	G	NA	2,26E-08	NA	3,26E-04	5,00E-05	2,50E-04	3,86E-04	6,66E-04	3,88E-04	4,77E-05	NA	NA	NA	NA	NA	NA
Octachlorodibenzofuran	39001020	OIPs	D	NA	NA	NA	NA	NA	NA	1,90E-11	NA	NA	NA	6,24E-12	1,28E-11	2,71E-11	NA	NA	1,30E-11
Octachlorodibenzofuran	39001020	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,34E-11	2,81E-11	3,34E-11	NA	NA	1,70E-11
PCDD 48	1746016	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	1,49E-12	NA	NA	NA	2,26E-12
PCDD 48	1746016	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,64E-12	5,65E-13	1,92E-12	NA	NA	3,39E-12
PCDD 54	40321764	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	5,65E-13	NA	NA	NA	2,26E-12
PCDD 54	40321764	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,30E-13	5,65E-13	1,64E-12	NA	NA	2,26E-12
PCDD 66	39227286	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	5,65E-13	2,11E-12	NA	NA	2,26E-12
PCDD 66	39227286	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,63E-13	1,76E-12	5,65E-13	NA	NA	2,26E-12
PCDD 70	19408743	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	1,40E-12	2,76E-12	NA	NA	2,26E-12
PCDD 70	19408743	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,55E-12	3,93E-12	2,20E-12	NA	NA	2,83E-12
PCDD 73	35822469	OIPs	D	NA	NA	NA	NA	NA	NA	4,06E-11	NA	NA	NA	2,07E-11	3,58E-11	7,10E-11	NA	NA	3,28E-11
PCDD 73	35822469	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,54E-11	8,55E-11	6,85E-11	NA	NA	7,01E-11
PCDD 75	3268879	OIPs	D	NA	NA	NA	NA	NA	NA	2,94E-10	NA	NA	NA	8,15E-11	1,85E-10	4,53E-10	NA	NA	2,61E-10
PCDD 75	3268879	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,21E-10	5,15E-10	6,59E-10	NA	NA	6,28E-10
PCDF 114	57117314	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	5,65E-13	1,89E-12	NA	NA	2,26E-12
PCDF 114	57117314	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,55E-12	5,65E-13	3,35E-12	NA	NA	2,83E-12
PCDF 118	70648269	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	5,65E-13	2,14E-12	NA	NA	2,26E-12
PCDF 118	70648269	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,47E-12	6,64E-12	1,56E-12	NA	NA	2,83E-12
PCDF 121	57117449	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	5,65E-13	1,46E-12	NA	NA	2,26E-12
PCDF 121	57117449	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,17E-12	5,74E-12	1,66E-12	NA	NA	2,83E-12
PCDF 130	60851345	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	5,65E-13	1,12E-12	NA	NA	2,26E-12
PCDF 130	60851345	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,34E-12	5,74E-12	1,81E-12	NA	NA	2,83E-12
PCDF 131	67562394	OIPs	D	NA	NA	NA	NA	NA	NA	9,04E-12	NA	NA	NA	3,07E-12	6,96E-12	1,23E-11	NA	NA	7,35E-12
PCDF 131	67562394	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,28E-11	4,76E-11	1,27E-11	NA	NA	1,41E-11
PCDF 134	55673897	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	5,65E-13	9,07E-13	NA	NA	2,26E-12
PCDF 134	55673897	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,80E-13	3,03E-12	2,28E-12	NA	NA	2,26E-12
PCDF 94	57117416	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	5,65E-13	5,65E-13	1,82E-12	NA	NA	2,26E-12
PCDF 94	57117416	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	9,80E-13	5,65E-13	1,86E-12	NA	NA	2,26E-12
PCDF134	57653857	OIPs	D	NA	NA	NA	NA	NA	NA	4,52E-12	NA	NA	NA	1,27E-12	2,44E-12	6,73E-12	NA	NA	2,26E-12
PCDF134	57653857	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,40E-12	6,28E-12	3,21E-12	NA	NA	3,39E-12
Perchlorate	14797730	OIPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,97E-03	5,00E-04	1,67E-03	7,33E-04	5,00E-04	5,00E-04
Perchlorate	14797730	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,50E-04	2,50E-04	2,50E-04	2,50E-04	9,18E-04	7,62E-04
Phenol, 4-nonyl-, branched	84852153	OIPs	D	NA	3,33E-03	NA	4,62E-06	NA	NA	1,49E-07	NA	NA	NA	3,37E-05	1,37E-04	4,19E-05	5,00E-05	4,57E-05	2,00E-05
Phenol, 4-nonyl-, branched	84852153	OIPs	G	NA	2,26E-08	NA	2,46E-04	5,00E-05	2,50E-04	3,58E-06	NA	NA	NA	5,00E-06	5,00E-06	4,62E-05	1,02E-03	6,18E-04	5,67E-04
Tetrachloroethylene	127184	OIPs	D	NA	4,86E-04	NA	4,36E-04	NA	NA	2,31E-04	1,13E-08	1,13E-08	2,31E-04	3,19E-04	2,92E-04	2,66E-04	7,00E-05	1,13E-04	2,53E-04
Tetrachloroethylene	127184	OIPs	G	2,50E-04	4,70E-04	NA	4,23E-04	5,00E-04	2,33E-04	9,23E-05	4,62E-05	6,15E-05	9,54E-05	2,50E-04	2,50E-04	2,50E-04	1,00E-04	1,00E-04	1,00E-04
Toluene	108883	OIPs	D	NA	5,00E-04	NA	2,75E-04	NA	NA	2,50E-04	NA	NA	NA	1,36E-04	6,26E-05	6,25E-05	2,26E-08	2,26E-08	2,26E-08
Toluene	108883	OIPs	G	NA	5,00E-04	NA	2,00E-04	5,00E-04	2,33E-04	1,00E-04	1,00E-04	1,00E-04	1,00E-04	8,61E-08	1,67E-04	1,10E-07	2,26E-08	2,26E-08	2,26E-08
Tributyl phosphate	126738	OIPs	D	NA	2,26E-07	NA	2,00E-03	NA	NA	4,00E-05	4,52E-08	4,52E-08	4,52E-08	1,50E-05	1,10E-05	8,50E-06	NA	NA	NA
Tributyl phosphate	126738	OIPs	G	NA	2,26E-07	NA	1,19E-03	2,50E-03	2,50E-03	2,10E-03	1,07E-05	9,71E-05	8,03E-05	2,96E-04	5,00E-05	5,00E-05	NA	NA	NA
Tributylstannane	688733	OIPs	D	NA	1,67E-03	NA	2,50E-06	NA	NA	9,23E-06	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tributylstannane	688733	OIPs	G	NA	1,13E-08	NA	3,47E-05	3,75E-05	2,71E-05	2,31E-05	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl chloride	75014	OIPs	D	NA	2,50E-04	NA	2,06E-04	NA	NA	5,00E-05	NA	NA	NA	7,22E-05	5,00E-05	5,00E-05	7,00E-05	5,00E-05	5,00E-05
Vinyl chloride	75014	OIPs	G	NA	2,50E-04	NA	3,31E-04	5,00E-04	1,33E-04	1,00E-04	1,00E-04	1,00E-04	1,00E-04	2,50E-04	2,50E-04	2,50E-04	1,00E-04	1,00E-04	1,00E-04
Vinylidene chloride	75354	OIPs	D	NA	5,00E-04	NA	3,12E-04	NA	NA	2,50E-04	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinylidene chloride	75354	OIPs	G	NA	5,00E-04	NA	3,82E-04	2,50E-03	4,00E-04	1,00E-04	1,00E-04	1,00E-04	1,00E-04	NA	NA	NA	NA	NA	NA
Xylene	1330207	OIPs	D	NA	NA	NA	1,50E-04	NA	NA	NA	NA	NA	NA	1,18E-04	1,16E-04	2,50E-04	2,26E-08	2,26E-08	2,26E-08
Xylene	1330207	OIPs	G	NA	NA	NA	2,26E-04	NA	NA	NA	NA	NA	NA	2,14E-04	2,50E-04	7,50E-04	2,26E-08	2,26E-08	2,26E-08
m-Cresol	108394	OIPs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,32E-04	7,33E-05	5,00E-05	5,00E-05	3,67E-05	4,75E-05
m-Cresol	108394	OIPs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05	5,00E-05
2-Methylfluoranthene	33543316	PAHs	D	NA	2,26E-09	NA	1,76E-07	NA	NA	4,52E-07	4,52E-08	4,52E-08	7,98E-08	NA	NA	NA	NA	NA	NA
2-Methylfluoranthene	33543316	PAHs	G	4,52E-08	3,41E-08	NA	5,27E-08	NA	NA	8,35E-07	4,52E-08	4,52E-08	2,51E-08	NA	NA	NA	NA	NA	NA

2-Methylnaphthalene	91576	PAHs	D	NA	2,26E-09	NA	2,02E-06	NA	NA	1,10E-05	4,52E-08	4,52E-08	4,52E-08	4,52E-08	4,52E-08	NA	3,50E-08	6,00E-08	2,26E-08
2-Methylnaphthalene	91576	PAHs	G	4,52E-08	2,26E-09	NA	2,86E-06	2,05E-05	7,00E-06	8,10E-06	2,44E-06	8,68E-06	1,44E-06	4,52E-08	4,52E-08	NA	2,26E-08	2,26E-08	2,26E-08
Acenaphthene	83329	PAHs	D	NA	2,26E-09	NA	3,51E-06	NA	NA	4,02E-06	4,52E-08	4,52E-08	4,52E-08	2,26E-08	2,26E-08	NA	2,26E-08	6,22E-08	2,26E-08
Acenaphthene	83329	PAHs	G	NA	2,03E-08	NA	2,86E-06	4,58E-05	3,33E-05	2,10E-05	1,10E-06	1,45E-06	1,44E-06	2,26E-08	2,26E-08	NA	2,26E-08	2,26E-08	2,26E-08
Acenaphtylene	208968	PAHs	D	NA	NA	NA	7,00E-06	NA	NA	8,75E-06	4,52E-08	4,52E-08	4,52E-08	NA	NA	NA	NA	NA	NA
Acenaphtylene	208968	PAHs	G	NA	NA	NA	5,00E-05	4,58E-05	3,33E-05	2,50E-05	1,10E-06	1,45E-06	1,44E-06	NA	NA	NA	NA	NA	NA
Anthanthrene	191264	PAHs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,95E-07	2,42E-07	2,41E-07	1,58E-07
Anthanthrene	191264	PAHs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,09E-07	7,54E-08	1,11E-07	1,23E-07
Anthracene	120127	PAHs	D	NA	3,33E-04	NA	1,48E-05	NA	NA	2,70E-06	2,26E-08	3,77E-08	1,57E-06	1,29E-06	1,32E-06	2,58E-06	3,00E-06	5,00E-06	5,00E-06
Anthracene	120127	PAHs	G	1,49E-07	6,85E-08	NA	8,41E-06	2,50E-06	2,50E-06	2,01E-06	5,84E-06	1,01E-06	1,94E-06	1,58E-06	1,30E-06	2,15E-06	2,50E-06	2,50E-06	2,50E-06
Benz[e]acephenanthrylene	205992	PAHs	D	NA	3,33E-03	NA	8,35E-06	NA	NA	1,81E-06	9,05E-08	3,69E-07	1,17E-06	3,32E-07	4,62E-07	4,22E-07	3,65E-07	3,93E-07	2,10E-07
Benz[e]acephenanthrylene	205992	PAHs	G	3,12E-07	4,33E-07	NA	1,04E-05	2,50E-06	2,50E-06	3,14E-06	1,02E-05	3,45E-06	3,02E-06	2,48E-07	3,03E-07	2,41E-07	1,69E-07	3,30E-07	1,74E-07
Benzo[a]anthracene	56553	PAHs	D	NA	2,26E-09	NA	3,66E-07	NA	NA	3,39E-07	7,07E-08	2,47E-07	2,32E-07	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	56553	PAHs	G	3,93E-07	3,74E-07	NA	9,79E-08	NA	NA	1,93E-06	7,92E-08	4,42E-07	1,51E-07	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	50328	PAHs	D	NA	3,33E-03	NA	5,07E-06	NA	NA	1,71E-06	9,52E-08	3,15E-07	1,15E-06	7,89E-07	8,73E-07	1,45E-06	3,48E-07	3,34E-07	2,26E-07
Benzo[a]pyrene	50328	PAHs	G	4,52E-08	4,91E-07	NA	9,82E-06	2,50E-06	2,50E-06	4,17E-06	1,07E-05	3,62E-06	1,57E-06	9,90E-07	1,34E-06	3,87E-06	1,48E-07	1,41E-06	7,49E-07
Benzo[ghi]perylene	191242	PAHs	D	NA	3,33E-03	NA	5,23E-06	NA	NA	3,97E-06	8,92E-08	2,37E-07	1,05E-06	1,48E-07	NA	NA	NA	NA	NA
Benzo[ghi]perylene	191242	PAHs	G	1,40E-07	1,26E-07	NA	1,44E-05	4,58E-06	3,33E-06	3,81E-06	6,63E-06	1,13E-06	3,62E-06	1,60E-07	NA	NA	NA	NA	NA
Benzo[k]fluoranthene	207089	PAHs	D	NA	7,07E-03	NA	1,28E-06	NA	NA	2,73E-06	4,97E-08	1,69E-07	9,81E-07	1,18E-07	1,54E-07	1,73E-07	2,14E-07	2,37E-07	1,10E-07
Benzo[k]fluoranthene	207089	PAHs	G	1,76E-07	1,72E-07	NA	9,48E-06	2,50E-06	2,50E-06	1,94E-06	5,49E-06	2,24E-06	1,52E-06	1,18E-07	9,49E-08	8,89E-08	7,61E-08	2,17E-07	8,66E-08
Chrysene	218019	PAHs	D	NA	2,26E-09	NA	2,71E-07	NA	NA	2,85E-07	6,18E-08	2,33E-07	2,91E-07	NA	NA	NA	NA	NA	NA
Chrysene	218019	PAHs	G	NA	3,33E-07	NA	1,58E-07	NA	NA	1,87E-06	7,34E-08	3,90E-07	1,47E-07	NA	NA	NA	NA	NA	NA
Dibenz[a,h]anthracene	53703	PAHs	D	NA	2,26E-09	NA	7,68E-08	NA	NA	5,65E-07	4,52E-08	4,52E-08	4,52E-08	NA	NA	NA	NA	NA	NA
Dibenz[a,h]anthracene	53703	PAHs	G	4,52E-08	2,35E-08	NA	5,27E-08	NA	NA	5,65E-07	4,52E-08	4,52E-08	2,51E-08	NA	NA	NA	NA	NA	NA
Fluoranthene	206440	PAHs	D	NA	3,33E-04	NA	1,78E-05	NA	NA	2,65E-06	1,52E-07	3,69E-07	2,13E-06	1,53E-06	1,58E-06	1,63E-06	1,76E-06	1,07E-06	3,26E-07
Fluoranthene	206440	PAHs	G	8,36E-07	3,14E-07	NA	6,05E-06	2,50E-06	2,50E-06	8,87E-06	1,10E-05	4,98E-06	2,65E-06	2,53E-06	1,48E-06	9,16E-06	8,51E-07	4,19E-06	4,50E-07
Fluorene	86737	PAHs	D	NA	2,26E-09	NA	8,00E-06	NA	NA	3,51E-06	4,52E-08	4,52E-08	4,52E-08	NA	NA	NA	NA	NA	NA
Fluorene	86737	PAHs	G	NA	1,69E-08	NA	2,11E-06	2,50E-06	2,50E-06	2,19E-06	1,10E-06	3,07E-06	1,44E-06	NA	NA	NA	NA	NA	NA
Indeno[1,2,3-cd]pyrene	193395	PAHs	D	NA	3,33E-03	NA	6,28E-06	NA	NA	3,97E-06	6,91E-08	1,66E-07	1,03E-06	1,22E-07	1,63E-07	1,84E-07	2,87E-07	5,00E-07	2,24E-07
Indeno[1,2,3-cd]pyrene	193395	PAHs	G	2,53E-07	3,15E-07	NA	1,30E-05	4,58E-06	3,33E-06	3,56E-06	1,03E-05	1,49E-07	3,71E-06	1,23E-07	9,29E-08	1,12E-07	1,31E-07	2,19E-07	1,78E-07
Naphthalene	91203	PAHs	D	NA	3,33E-04	NA	2,92E-05	NA	NA	2,03E-05	7,10E-08	2,26E-08	1,48E-05	1,00E-05	1,00E-05	1,00E-05	1,20E-05	1,00E-05	1,00E-05
Naphthalene	91203	PAHs	G	NA	6,01E-09	NA	3,00E-05	3,15E-05	1,10E-05	9,84E-06	6,54E-06	7,67E-06	1,19E-05	2,50E-06	6,33E-06	9,69E-06	1,25E-05	1,25E-05	1,25E-05
Phenanthrene	85018	PAHs	D	NA	2,26E-09	NA	9,10E-06	NA	NA	8,11E-06	1,13E-07	1,52E-07	2,49E-07	1,66E-07	1,82E-07	2,73E-07	3,67E-07	4,50E-07	1,54E-07
Phenanthrene	85018	PAHs	G	4,70E-07	2,25E-07	NA	3,71E-06	6,00E-06	6,00E-06	4,82E-06	3,54E-06	4,69E-06	2,90E-06	2,88E-07	3,19E-07	1,13E-07	1,24E-07	5,31E-07	1,80E-07
Pyrene	129000	PAHs	D	NA	2,26E-09	NA	3,66E-07	NA	NA	4,97E-07	1,16E-07	2,86E-07	4,34E-07	5,00E-06	5,00E-06	5,00E-06	NA	NA	NA
Pyrene	129000	PAHs	G	NA	3,72E-07	NA	1,03E-07	NA	NA	3,04E-06	1,18E-07	5,15E-07	2,70E-07	2,50E-06	2,50E-06	1,60E-05	NA	NA	NA
PCB 101	37680732	PCBs	D	5,00E-06	4,79E-06	NA	1,67E-06	NA	NA	1,23E-08	1,13E-08	3,01E-09	3,01E-09	3,96E-09	2,26E-09	3,47E-09	1,13E-08	1,53E-08	1,13E-08
PCB 101	37680732	PCBs	G	4,72E-06	4,60E-06	NA	9,49E-07	NA	NA	3,62E-08	2,26E-09	2,26E-09	1,21E-09	2,26E-09	2,26E-09	2,26E-09	1,13E-08	1,13E-08	1,13E-08
PCB 105	32598144	PCBs	D	NA	NA	NA	NA	NA	NA	2,26E-09	NA	NA	NA	2,26E-09	2,26E-09	2,26E-09	1,13E-08	1,87E-08	2,26E-09
PCB 105	32598144	PCBs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,26E-09	2,26E-09	NA	1,13E-08	1,13E-08	2,26E-09
PCB 118	31508006	PCBs	D	5,00E-06	4,79E-06	NA	1,67E-06	NA	NA	8,14E-09	1,13E-08	3,01E-09	3,01E-09	3,96E-09	2,26E-09	2,26E-09	1,13E-08	1,41E-08	2,26E-09
PCB 118	31508006	PCBs	G	4,72E-06	4,60E-06	NA	9,49E-07	NA	NA	2,11E-08	2,26E-09	2,26E-09	1,21E-09	2,26E-09	2,26E-09	2,26E-09	1,13E-08	1,13E-08	2,26E-09
PCB 138	35065282	PCBs	D	5,00E-06	4,79E-06	NA	1,67E-06	NA	NA	8,21E-09	1,13E-08	3,01E-09	4,52E-09	7,92E-09	3,96E-09	6,57E-09	1,13E-08	3,11E-08	1,13E-08
PCB 138	35065282	PCBs	G	4,72E-06	4,60E-06	NA	1,31E-08	NA	NA	5,42E-08	2,26E-09	2,26E-09	1,21E-09	3,77E-09	2,26E-09	4,97E-09	1,13E-08	1,13E-08	1,13E-08
PCB 153	35065271	PCBs	D	5,00E-06	4,79E-06	NA	1,67E-06	NA	NA	3,08E-08	1,13E-08	3,01E-09	4,52E-09	8,48E-09	3,96E-09	8,92E-09	1,13E-08	2,66E-08	1,13E-08
PCB 153	35065271	PCBs	G	4,72E-06	4,60E-06	NA	1,32E-08	NA	NA	7,99E-08	2,83E-09	2,26E-09	1,21E-09	3,77E-09	2,26E-09	6,33E-09	1,13E-08	1,13E-08	1,13E-08
PCB 180	35065293	PCBs	D	5,00E-06	4,79E-06	NA	1,67E-06	NA	NA	1,57E-08	1,13E-08	3,01E-09	4,52E-09	7,92E-09	2,26E-09	6,01E-09	1,13E-08	1,13E-08	1,13E-08
PCB 180	35065293	PCBs	G	4,72E-06	4,60E-06	NA	1,29E-08	NA	NA	2,11E-08	2,26E-09	2,26E-09	1,21E-09	2,26E-09	2,26E-09	4,37E-09	1,13E-08	1,13E-08	1,13E-08
PCB 52	35693993	PCBs	D	5,00E-06	4,79E-06	NA	1,67E-06	NA	NA	3,01E-09	1,13E-08	2,26E-09	2,26E-09	2,26E-09	2,26E-09	2,26E-09	1,13E-08	1,13E-08	1,13E-08
PCB 52	35693993	PCBs	G	4,72E-06	4,60E-06	NA	1,89E-06	NA	NA	9,05E-09	2,26E-09	2,26E-09	1,21E-09	2,26E-09	2,26E-09	NA	1,13E-08	1,13E-08	1,13E-08
Perfluoroheptanoic acid	375859	PFASs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,50E-06	5,00E-06	5,00E-06	NA	NA	NA
Perfluorohexanesulfonic acid	355464	PFASs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,36E-05	1,47E-05	6,00E-05	3,20E-05	2,00E-05	2,00E-05
Perfluorohexanesulfonic acid	355464	PFASs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2,90E-06	3,14E-06	5,00E-06	5,00E-05	5,00E-05	5,00E-05
Perfluorohexanoic acid	307244	PFASs	D	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,36E-05	1,70E-05	2,00E-05	3,20E-05	2,00E-05	2,00E-05
Perfluorohexanoic acid	307244	PFASs	G	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8,14E-06	3,14E-06	5,00E-06	5,00E-05	5,00E-05	5,00E-05
Perfluorooctanesulfonate	45298906	PFASs	D	NA	NA	NA	5,00E-05	NA	NA	1,00E-05	NA	NA	NA	1,70E-05	1,70E-05	2,50E-05	2,00E-05	1,28E-05	1,82E-05
Perfluorooctanesulfonate	45298906	PFASs	G	NA	NA														

Metals (Trace elements)	Arsenic	7440382	2.50e+01	1	5
Metals (Trace elements)	Chromium	7440473	3.36e+00	3	10
Metals (Trace elements)	Lead	7439921	7.13e-01	5	11
Metals (Trace elements)	Selenium	7782492	1.74e+00	5	13
Metals (Trace elements)	Uranium	7440611	2.10e-01	1	14
Metals (Trace elements)	Iron	7439896	3.67e+01	3	17
Metals (Trace elements)	Nickel	7440020	2.72e+00	4	20
Metals (Trace elements)	Mercury	7439976	1.05e-01	4	38
Metals (Trace elements)	Cadmium	7440439	4.59e-01	11	66
Metals (Trace elements)	Silver	7440224	6.15e-01	4	121
Metals (Trace elements)	Zinc	7440666	3.40e+00	16	127
Metals (Trace elements)	Copper	7440508	1.19e-01	23	223
OIPs (DP)	PCDD 54	40321764	5.53e-06	1	3
OIPs (DP)	PCDD 48	1746016	7.58e-05	4	37
OIPs (FR)	HBCDDs	3194556	2.17e-02	2	39
OIPs (FR)	Decabromodiphenyl ether	1163195	2.83e-02	2	76
OIPs (Others)	3-Chloroaniline	108429	6.80e+00	1	1
OIPs (Others)	4-n-Octylphenol	1806264	2.24e-02	1	1
OIPs (Others)	2-Nitrotoluene	88722	2.20e+01	1	2
OIPs (Others)	2-Chloroaniline	95512	3.15e+00	1	2
OIPs (Others)	1-Chloro-2-nitrobenzene	88733	3.55e+00	1	4
OIPs (Others)	m-Cresol	108394	3.22e+00	1	4
OIPs (Others)	Hexachlorobutadiene	87683	1.62e-01	2	7
OIPs (Others)	2-Chlorophenol	95578	6.90e+00	2	8
OIPs (Others)	Nitrobenzene	98953	1.65e+00	3	9
OIPs (Others)	EDTA	60004	2.63e+02	2	10
OIPs (Others)	Tributylstannane	688733	8.90e-04	3	11
OIPs (Others)	4-Chloroaniline	106478	4.96e+00	5	13
OIPs (Others)	Hexachlorocyclopentadiene	77474	3.94e+00	3	20
OIPs (Others)	4-Chlorophenol	106489	1.13e+01	5	20
OIPs (Others)	Tributyl phosphate	126738	1.94e+00	3	39
OIPs (Others)	4-tert-Octylphenol	140669	1.36e-01	5	70
OIPs (Others)	Bisphenol S	80091	3.35e-01	1	101
OIPs (Others)	Phenol, 4-nonyl-, branched	84852153	7.22e-02	7	144
OIPs (Others)	4-Nonylphenol	104405	1.42e-01	17	238
OIPs (Plasticizers)	Vinylidene chloride	75354	4.50e+01	2	17
OIPs (Plasticizers)	Diisobutyl phthalate	84695	3.90e+00	1	19
OIPs (Plasticizers)	Epichlorohydrin	106898	8.00e+00	1	27
OIPs (Plasticizers)	Butyl benzyl phthalate	85687	1.41e+00	6	69
OIPs (Plasticizers)	Diethyl phthalate	84662	5.27e+00	6	85
OIPs (Plasticizers)	Dibutyl phthalate	84742	3.25e-01	14	305
OIPs (Plasticizers)	Dioctyl phthalate	117817	6.26e-01	16	463
OIPs (Plasticizers)	Bisphenol A	80057	6.39e-01	16	672
OIPs (Solvents)	Ethylbenzene	100414	9.31e+01	1	2
OIPs (Solvents)	Vinyl chloride	75014	1.56e+02	3	6
OIPs (Solvents)	Benzene	71432	1.27e+01	4	13
OIPs (Solvents)	Dichloromethane	75092	6.62e+01	3	18
OIPs (Solvents)	Xylene	1330207	1.63e+01	2	19
OIPs (Solvents)	1,2,4-Trichlorobenzene	120821	2.15e+00	4	30
OIPs (Solvents)	Tetrachloroethylene	127184	1.63e+01	5	36
OIPs (Solvents)	Chloroform	67663	2.92e+01	5	46
OIPs (Solvents)	Toluene	108883	1.87e+01	6	63
PAHs (PAHs)	Fluorene	86737	1.21e+00	1	8
PAHs (PAHs)	Acenaphthene	83329	9.61e-01	2	19
PAHs (PAHs)	Phenanthrene	85018	1.15e-01	4	22
PAHs (PAHs)	Fluoranthene	206440	5.66e-02	5	22
PAHs (PAHs)	Anthracene	120127	9.14e-03	2	24
PAHs (PAHs)	Benzo[a]pyrene	50328	2.94e-02	3	27
PAHs (PAHs)	Naphthalene	91203	2.18e+00	7	38
PCBs (PCBs)	PCB 153	35065271	7.60e-04	1	1
PCBs (PCBs)	PCB 52	35693993	1.75e-02	1	1
PCBs (PCBs)	PCB 101	37680732	5.85e-03	1	1
PFASs (PFASs)	Perfluorohexanesulfonic acid	355464	2.37e+00	1	17
PFASs (PFASs)	Perfluoroheptanoic acid	375859	2.69e+01	1	26
PFASs (PFASs)	Perfluorohexanoic acid	307244	7.18e+00	1	75
PFASs (PFASs)	Perfluorooctanoic acid	335671	2.66e+00	8	605

Supplementary materials #6. $HC50_{SE}$ (calculated from the geometric mean of EC50s) for each endpoint, life stage and chemical compound. The number of species and tests used for these calculations is indicated.

Chemicals	CAS	Categories	Lifestages	HC50	n_{sp}	n_{test}
Development						
Tebuconazole	107534963	Agrochemicals (Fungicides)	adult	1.35e+00	1	8
Triclosan	3380345	Agrochemicals (Fungicides)	adult	5.56e-02	3	14
Hexachlorobenzene	118741	Agrochemicals (Fungicides)	embryon	1.64e-02	1	1
Flusilazole	85509199	Agrochemicals (Fungicides)	embryon	3.15e+00	1	3
Epoxiconazole	133855988	Agrochemicals (Fungicides)	embryon	1.77e+00	1	3
Myclobutanil	88671890	Agrochemicals (Fungicides)	embryon	8.73e-01	2	3
Triclosan	3380345	Agrochemicals (Fungicides)	embryon	8.23e-01	1	8
Tebuconazole	107534963	Agrochemicals (Fungicides)	embryon	1.68e+00	1	9
Tetraconazole	112281773	Agrochemicals (Fungicides)	embryon	3.12e+00	1	12
Carbendazim	10605217	Agrochemicals (Fungicides)	embryon	9.04e-01	1	13
Carbendazim	10605217	Agrochemicals (Fungicides)	juvenile	5.47e-01	1	3
Azoxystrobin	131860338	Agrochemicals (Fungicides)	juvenile	3.82e-01	1	3
Tebuconazole	107534963	Agrochemicals (Fungicides)	juvenile	4.29e-01	1	4
Hexachlorobenzene	118741	Agrochemicals (Fungicides)	larva	1.62e-02	1	1
Triclosan	3380345	Agrochemicals (Fungicides)	larva	1.02e-02	2	3
Simazine	122349	Agrochemicals (Herbicides)	adult	3.41e+00	1	1
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	adult	3.23e-04	1	4
Linuron	330552	Agrochemicals (Herbicides)	adult	2.89e-02	2	4
Acetochlor	34256821	Agrochemicals (Herbicides)	adult	2.72e-03	1	5
Dicamba	1918009	Agrochemicals (Herbicides)	adult	1.71e-01	1	6
2,4-D	94757	Agrochemicals (Herbicides)	adult	3.29e+02	1	7
Diuron	330541	Agrochemicals (Herbicides)	adult	4.03e-04	1	7
Roundup	38641940	Agrochemicals (Herbicides)	adult	2.79e+01	3	17
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	adult	7.89e-01	2	19
Triclopyr	55335063	Agrochemicals (Herbicides)	embryon	1.09e+01	1	2
Alachlor	15972608	Agrochemicals (Herbicides)	embryon	1.55e+00	1	3
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	embryon	1.76e+00	2	3
Linuron	330552	Agrochemicals (Herbicides)	embryon	3.51e+00	2	3
Clopyralid	1702176	Agrochemicals (Herbicides)	embryon	1.09e+01	1	4
AMPA	1066519	Agrochemicals (Herbicides)	embryon	6.67e+01	2	5
2,4-D	94757	Agrochemicals (Herbicides)	embryon	3.89e+01	3	6
Diuron	330541	Agrochemicals (Herbicides)	embryon	1.01e+00	3	8
Simazine	122349	Agrochemicals (Herbicides)	embryon	4.34e+00	1	11
Roundup	38641940	Agrochemicals (Herbicides)	embryon	1.93e+01	2	11
Dicamba	1918009	Agrochemicals (Herbicides)	embryon	1.54e+01	1	12
Hydroxyterbuthylazine	66753079	Agrochemicals (Herbicides)	embryon	2.49e-03	1	16
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	embryon	1.18e+00	5	63
Simazine	122349	Agrochemicals (Herbicides)	juvenile	2.05e-01	1	1
Diuron	330541	Agrochemicals (Herbicides)	juvenile	1.16e+01	1	1
Cyanazine	21725462	Agrochemicals (Herbicides)	juvenile	1.36e+00	1	1
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	juvenile	2.31e-01	1	3
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	juvenile	6.82e-01	3	3
Clopyralid	1702176	Agrochemicals (Herbicides)	juvenile	4.65e+02	1	4
Roundup	38641940	Agrochemicals (Herbicides)	juvenile	9.15e-02	2	4
Diuron	330541	Agrochemicals (Herbicides)	larva	3.41e-02	1	1
Clopyralid	1702176	Agrochemicals (Herbicides)	larva	1.02e-01	1	1
Acetochlor	34256821	Agrochemicals (Herbicides)	larva	6.82e-03	1	1
2,4-D	94757	Agrochemicals (Herbicides)	larva	9.74e+01	1	2
Roundup	38641940	Agrochemicals (Herbicides)	larva	3.41e-01	1	2
Alachlor	15972608	Agrochemicals (Herbicides)	larva	3.41e+00	1	3
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	larva	3.22e-01	2	7
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	larva	2.27e+00	4	13
Imidacloprid	138261413	Agrochemicals (Insecticides)	adult	1.45e+00	1	1
Permethrin	52645531	Agrochemicals (Insecticides)	adult	8.14e-03	1	2
Lindane	58899	Agrochemicals (Insecticides)	adult	3.09e-01	1	4
Cypermethrin	52315078	Agrochemicals (Insecticides)	adult	1.54e-04	1	12
Atrazine	1912249	Agrochemicals (Insecticides)	adult	9.89e-02	5	23
Carbofuran	1563662	Agrochemicals (Insecticides)	embryon	4.84e-01	1	1
Deethylatrazine	6190654	Agrochemicals (Insecticides)	embryon	3.26e-01	1	2
Lindane	58899	Agrochemicals (Insecticides)	embryon	2.15e+00	1	6
Permethrin	52645531	Agrochemicals (Insecticides)	embryon	3.07e-02	2	7
Cypermethrin	52315078	Agrochemicals (Insecticides)	embryon	1.03e-01	2	8
Atrazine	1912249	Agrochemicals (Insecticides)	embryon	2.48e-01	1	12
Hydroxyatrazine	2163680	Agrochemicals (Insecticides)	embryon	2.25e-03	1	16
Carbaryl	63252	Agrochemicals (Insecticides)	embryon	3.37e+00	2	22
Imidacloprid	138261413	Agrochemicals (Insecticides)	embryon	1.48e+01	2	31
Piperonyl butoxide	51036	Agrochemicals (Insecticides)	juvenile	8.53e-02	1	1
Cypermethrin	52315078	Agrochemicals (Insecticides)	juvenile	4.34e-04	1	2
Atrazine	1912249	Agrochemicals (Insecticides)	juvenile	2.31e-01	5	13
Imidacloprid	138261413	Agrochemicals (Insecticides)	juvenile	2.09e+00	2	30
Carbaryl	63252	Agrochemicals (Insecticides)	juvenile	3.41e+00	2	31
Lindane	58899	Agrochemicals (Insecticides)	larva	4.94e-03	2	4
Cypermethrin	52315078	Agrochemicals (Insecticides)	larva	3.41e-04	1	10

Carbaryl	63252	Agrochemicals (Insecticides)	larva	2.01e+00	3	13
Atrazine	1912249	Agrochemicals (Insecticides)	larva	1.77e+00	3	25
Pentachlorophenol	87865	Agrochemicals (muPesticides)	adult	2.87e-01	1	4
Ziram	137304	Agrochemicals (muPesticides)	embryon	1.35e-02	1	1
Dinocap	39300453	Agrochemicals (muPesticides)	embryon	3.41e-02	1	1
Pentachlorophenol	87865	Agrochemicals (muPesticides)	embryon	7.12e-02	3	7
Pentachlorophenol	87865	Agrochemicals (muPesticides)	juvenile	8.35e-02	4	4
Pentachlorophenol	87865	Agrochemicals (muPesticides)	larva	6.02e-01	5	14
Propylparaben	94133	HCPs (CosHy)	embryon	1.73e+00	1	1
Butylparaben	94268	HCPs (CosHy)	embryon	4.16e-01	1	1
Metformin	657249	HCPs (CosHy)	embryon	4.34e-02	1	1
Diclofenac	15307865	HCPs (Drugs)	adult	4.42e-03	1	4
Ibuprofen	15687271	HCPs (Drugs)	adult	9.48e-01	2	4
Sulfamethoxazole	723466	HCPs (Drugs)	adult	1.82e+00	1	13
Carbamazepine	298464	HCPs (Drugs)	adult	6.07e+00	1	15
Fenofibric acid	42017890	HCPs (Drugs)	adult	2.40e+00	1	15
Diclofenac	15307865	HCPs (Drugs)	embryon	3.22e-01	1	1
Carbamazepine	298464	HCPs (Drugs)	embryon	7.32e-01	2	3
Acetaminophen	103902	HCPs (Drugs)	embryon	1.32e+00	3	17
Ibuprofen	15687271	HCPs (Drugs)	embryon	2.86e-01	3	19
Ibuprofen	15687271	HCPs (Drugs)	juvenile	5.10e-01	2	8
Carbamazepine	298464	HCPs (Drugs)	juvenile	1.92e+00	2	14
Acetaminophen	103902	HCPs (Drugs)	larva	1.15e+00	1	1
Carbamazepine	298464	HCPs (Drugs)	larva	4.88e+00	1	1
Ofloxacin	82419361	HCPs (Drugs)	larva	3.41e+01	1	1
Estrone	53167	HCPs (Hormones)	adult	4.60e-04	2	16
Estrone	53167	HCPs (Hormones)	embryon	3.03e-04	1	4
Uranium	7440611	Metals (Trace elements)	adult	8.39e-01	1	1
Iron	7439896	Metals (Trace elements)	embryon	1.57e+02	1	1
Copper	7440508	Metals (Trace elements)	embryon	1.09e-02	1	1
Uranium	7440611	Metals (Trace elements)	embryon	2.67e-01	1	2
Mercury	7439976	Metals (Trace elements)	embryon	3.07e-02	1	4
Silver	7440224	Metals (Trace elements)	embryon	2.85e+00	2	29
Copper	7440508	Metals (Trace elements)	juvenile	3.04e-02	3	7
Chromium	7440473	Metals (Trace elements)	larva	1.02e+01	1	1
Copper	7440508	Metals (Trace elements)	larva	3.38e-02	1	1
Calcium	7440702	Metals (Trace elements)	larva	8.71e+01	1	2
Zinc	7440666	Metals (Trace elements)	larva	2.55e-01	1	3
PCDD 48	1746016	OIPs (DP)	embryon	7.57e-02	2	4
Decabromodiphenyl ether	1163195	OIPs (FR)	adult	2.48e-02	2	16
Decabromodiphenyl ether	1163195	OIPs (FR)	embryon	2.08e-01	1	5
HBCDDs	3194556	OIPs (FR)	embryon	3.06e-02	2	5
Decabromodiphenyl ether	1163195	OIPs (FR)	larva	3.41e-02	1	1
Tributylstannane	688733	OIPs (Others)	adult	7.60e-05	1	2
4-tert-Octylphenol	140669	OIPs (Others)	adult	1.71e-01	1	3
4-Nonylphenol	104405	OIPs (Others)	adult	3.20e-01	6	49
Tributylstannane	688733	OIPs (Others)	embryon	9.48e-03	1	1
2-Chlorophenol	95578	OIPs (Others)	embryon	1.36e+01	1	2
4-Chloroaniline	106478	OIPs (Others)	embryon	6.83e-01	1	2
Tributyl phosphate	126738	OIPs (Others)	embryon	4.77e+00	1	2
1-Chloro-2-nitrobenzene	88733	OIPs (Others)	embryon	2.82e+00	1	3
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	embryon	1.69e-01	2	4
4-Nonylphenol	104405	OIPs (Others)	embryon	2.87e-02	2	7
4-tert-Octylphenol	140669	OIPs (Others)	embryon	1.06e-01	2	8
Bisphenol S	80091	OIPs (Others)	embryon	4.10e-01	1	15
4-Chloroaniline	106478	OIPs (Others)	juvenile	6.82e-01	1	1
4-Nonylphenol	104405	OIPs (Others)	juvenile	5.01e-02	1	6
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	juvenile	4.20e-02	2	6
Nitrobenzene	98953	OIPs (Others)	larva	3.48e+01	1	1
4-Chloroaniline	106478	OIPs (Others)	larva	6.82e-01	1	1
4-Chlorophenol	106489	OIPs (Others)	larva	8.50e-01	1	3
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	larva	2.52e-01	1	4
4-Nonylphenol	104405	OIPs (Others)	larva	1.77e-01	1	7
Butyl benzyl phthalate	85687	OIPs (Plasticizers)	adult	3.22e-01	2	12
Dioctyl phthalate	117817	OIPs (Plasticizers)	adult	1.45e-01	5	25
Dibutyl phthalate	84742	OIPs (Plasticizers)	adult	2.51e-01	4	34
Bisphenol A	80057	OIPs (Plasticizers)	adult	3.52e-01	5	73
Diisobutyl phthalate	84695	OIPs (Plasticizers)	embryon	3.78e+00	1	13
Butyl benzyl phthalate	85687	OIPs (Plasticizers)	embryon	1.59e+00	3	19
Dibutyl phthalate	84742	OIPs (Plasticizers)	embryon	5.47e-01	3	23
Dioctyl phthalate	117817	OIPs (Plasticizers)	embryon	5.50e+00	4	35
Bisphenol A	80057	OIPs (Plasticizers)	embryon	6.26e-01	3	52
Dibutyl phthalate	84742	OIPs (Plasticizers)	juvenile	1.31e+00	2	7
Dioctyl phthalate	117817	OIPs (Plasticizers)	juvenile	2.28e+00	3	14
Bisphenol A	80057	OIPs (Plasticizers)	larva	7.44e-03	1	1
Dibutyl phthalate	84742	OIPs (Plasticizers)	larva	1.36e+00	1	3
Dioctyl phthalate	117817	OIPs (Plasticizers)	larva	2.95e-02	4	55
Tetrachloroethylene	127184	OIPs (Solvents)	embryon	1.71e+00	1	1
1,2,4-Trichlorobenzene	120821	OIPs (Solvents)	embryon	1.40e+00	1	2
Benzene	71432	OIPs (Solvents)	larva	3.48e+01	1	1
Toluene	108883	OIPs (Solvents)	larva	1.86e+01	1	1
Tetrachloroethylene	127184	OIPs (Solvents)	larva	1.84e+02	2	2

1,2,4-Trichlorobenzene	120821	OIPs (Solvents)	larva	1.50e+00	2	5
Anthracene	120127	PAHs (PAHs)	adult	2.08e-02	1	7
Benzo[a]pyrene	50328	PAHs (PAHs)	embryon	2.89e-02	1	2
Phenanthrene	85018	PAHs (PAHs)	embryon	4.77e-02	1	2
Fluoranthene	206440	PAHs (PAHs)	embryon	3.55e-02	1	3
Acenaphthene	83329	PAHs (PAHs)	embryon	3.69e-01	1	12
Fluorene	86737	PAHs (PAHs)	juvenile	4.26e-01	1	1
Phenanthrene	85018	PAHs (PAHs)	larva	9.16e-02	1	4
Perfluorooctanoic acid	335671	PFASs (PFASs)	adult	6.23e+00	3	33
Perfluorohexanesulfonic acid	355464	PFASs (PFASs)	embryon	6.73e+00	1	3
Perfluoroheptanoic acid	375859	PFASs (PFASs)	embryon	2.59e+01	1	13
Perfluorohexanoic acid	307244	PFASs (PFASs)	embryon	1.41e+01	1	18
Perfluorooctanoic acid	335671	PFASs (PFASs)	embryon	8.22e+00	4	84
Physiology						
Mancozeb	8018017	Agrochemicals (Fungicides)	adult	5.43e+00	1	3
Metalaxyl	57837191	Agrochemicals (Fungicides)	adult	7.60e+01	1	3
Triclosan	3380345	Agrochemicals (Fungicides)	adult	5.51e-02	3	6
Tebuconazole	107534963	Agrochemicals (Fungicides)	adult	8.60e-01	1	11
Azoxystrobin	131860338	Agrochemicals (Fungicides)	embryon	5.43e-03	1	1
Mancozeb	8018017	Agrochemicals (Fungicides)	embryon	1.10e+00	1	2
Tetraconazole	112281773	Agrochemicals (Fungicides)	embryon	2.57e+00	1	4
Triclosan	3380345	Agrochemicals (Fungicides)	embryon	1.16e-01	1	5
Carbendazim	10605217	Agrochemicals (Fungicides)	embryon	4.82e-02	1	7
Epoxiconazole	133855988	Agrochemicals (Fungicides)	embryon	3.25e-01	1	8
Myclobutanil	88671890	Agrochemicals (Fungicides)	embryon	2.73e-01	2	13
Flusilazole	85509199	Agrochemicals (Fungicides)	embryon	1.06e+00	2	24
Tebuconazole	107534963	Agrochemicals (Fungicides)	embryon	8.47e-01	1	44
Mancozeb	8018017	Agrochemicals (Fungicides)	juvenile	1.45e-01	3	10
Azoxystrobin	131860338	Agrochemicals (Fungicides)	juvenile	1.00e-01	2	24
Carbendazim	10605217	Agrochemicals (Fungicides)	juvenile	6.62e-01	1	27
Tebuconazole	107534963	Agrochemicals (Fungicides)	juvenile	8.23e-01	3	37
Triclosan	3380345	Agrochemicals (Fungicides)	larva	2.20e-02	1	1
AMPA	1066519	Agrochemicals (Herbicides)	adult	8.91e+01	1	1
2,4-D	94757	Agrochemicals (Herbicides)	adult	1.82e+01	1	3
Alachlor	15972608	Agrochemicals (Herbicides)	adult	1.28e-01	1	7
Acetochlor	34256821	Agrochemicals (Herbicides)	adult	1.16e-03	1	13
Diuron	330541	Agrochemicals (Herbicides)	adult	8.41e-04	4	14
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	adult	2.03e-02	2	19
Dicamba	1918009	Agrochemicals (Herbicides)	adult	4.22e+00	2	27
Linuron	330552	Agrochemicals (Herbicides)	adult	3.61e-02	3	36
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	adult	5.57e-01	2	39
Pendimethalin	40487421	Agrochemicals (Herbicides)	adult	1.01e+00	2	70
Roundup	38641940	Agrochemicals (Herbicides)	adult	1.53e+01	7	114
Simazine	122349	Agrochemicals (Herbicides)	embryon	2.05e-04	1	1
Aminotriazole	61825	Agrochemicals (Herbicides)	embryon	6.89e+01	1	2
Terbuthylazine	5915413	Agrochemicals (Herbicides)	embryon	1.11e+01	2	3
Dicamba	1918009	Agrochemicals (Herbicides)	embryon	1.54e+01	1	4
Chlortoluron	15545489	Agrochemicals (Herbicides)	embryon	2.17e+00	1	5
Hydroxyterbuthylazine	66753079	Agrochemicals (Herbicides)	embryon	2.49e-03	1	6
Roundup	38641940	Agrochemicals (Herbicides)	embryon	1.32e+01	2	7
2,4-D	94757	Agrochemicals (Herbicides)	embryon	2.96e+01	1	8
Linuron	330552	Agrochemicals (Herbicides)	embryon	1.04e+01	2	8
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	embryon	6.61e-01	3	8
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	embryon	2.60e+00	2	9
Acetochlor	34256821	Agrochemicals (Herbicides)	embryon	1.24e+00	1	33
Simazine	122349	Agrochemicals (Herbicides)	juvenile	2.05e-02	1	1
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	juvenile	5.65e-01	1	2
Triclopyr	55335063	Agrochemicals (Herbicides)	juvenile	2.94e-01	1	5
Diuron	330541	Agrochemicals (Herbicides)	juvenile	1.78e-04	1	6
Oxadiazon	19666309	Agrochemicals (Herbicides)	juvenile	3.70e-03	1	6
Cyanazine	21725462	Agrochemicals (Herbicides)	juvenile	3.43e+00	2	8
2,4-D	94757	Agrochemicals (Herbicides)	juvenile	8.70e+00	3	10
Linuron	330552	Agrochemicals (Herbicides)	juvenile	4.16e-02	3	26
AMPA	1066519	Agrochemicals (Herbicides)	juvenile	2.07e-02	1	29
Mesotrione	104206828	Agrochemicals (Herbicides)	juvenile	3.04e-01	1	72
Roundup	38641940	Agrochemicals (Herbicides)	juvenile	1.52e+00	13	420
Diuron	330541	Agrochemicals (Herbicides)	larva	1.64e+00	1	1
Linuron	330552	Agrochemicals (Herbicides)	larva	2.70e+00	1	1
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	larva	2.92e-01	2	4
Acetochlor	34256821	Agrochemicals (Herbicides)	larva	2.57e-02	2	6
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	larva	3.64e-01	1	24
Deethylatrazine	6190654	Agrochemicals (Insecticides)	adult	1.09e-01	1	2
Piperonyl butoxide	51036	Agrochemicals (Insecticides)	adult	5.43e+00	1	3
Lindane	58899	Agrochemicals (Insecticides)	adult	4.54e-01	1	3
Carbofuran	1563662	Agrochemicals (Insecticides)	adult	4.78e-01	2	18
Imidacloprid	138261413	Agrochemicals (Insecticides)	adult	9.14e-01	5	32
Cypermethrin	52315078	Agrochemicals (Insecticides)	adult	4.99e-04	2	61
Carbaryl	63252	Agrochemicals (Insecticides)	adult	3.96e-01	3	89
Atrazine	1912249	Agrochemicals (Insecticides)	adult	3.94e-02	8	92
Lindane	58899	Agrochemicals (Insecticides)	embryon	8.54e-01	1	1
Hydroxyatrazine	2163680	Agrochemicals (Insecticides)	embryon	2.25e-03	1	6
Deethylatrazine	6190654	Agrochemicals (Insecticides)	embryon	1.11e-01	1	19

Imidacloprid	138261413	Agrochemicals (Insecticides)	embryon	6.09e+00	2	19
Carbaryl	63252	Agrochemicals (Insecticides)	embryon	3.95e-01	1	21
Permethrin	52645531	Agrochemicals (Insecticides)	embryon	1.83e-02	1	29
Atrazine	1912249	Agrochemicals (Insecticides)	embryon	7.13e-01	1	86
Cypermethrin	52315078	Agrochemicals (Insecticides)	embryon	5.30e-02	2	108
Carbofuran	1563662	Agrochemicals (Insecticides)	juvenile	1.07e-01	2	5
Cypermethrin	52315078	Agrochemicals (Insecticides)	juvenile	2.94e-04	3	16
Carbaryl	63252	Agrochemicals (Insecticides)	juvenile	8.63e-01	5	27
Piperonyl butoxide	51036	Agrochemicals (Insecticides)	juvenile	1.28e-01	2	45
Atrazine	1912249	Agrochemicals (Insecticides)	juvenile	2.86e-01	10	118
Imidacloprid	138261413	Agrochemicals (Insecticides)	juvenile	1.13e+00	6	375
Carbofuran	1563662	Agrochemicals (Insecticides)	larva	4.41e-02	1	1
Cypermethrin	52315078	Agrochemicals (Insecticides)	larva	8.25e-05	2	5
Atrazine	1912249	Agrochemicals (Insecticides)	larva	2.78e+00	4	42
Pentachlorophenol	87865	Agrochemicals (muPesticides)	adult	2.61e-02	3	4
Ziram	137304	Agrochemicals (muPesticides)	embryon	1.66e-02	1	2
Pentachlorophenol	87865	Agrochemicals (muPesticides)	embryon	1.10e-01	3	12
Pentachlorophenol	87865	Agrochemicals (muPesticides)	juvenile	3.41e-02	1	4
Propylparaben	94133	HCPs (CosHy)	adult	4.11e-02	1	2
Metformin	657249	HCPs (CosHy)	embryon	1.09e-03	1	1
Butylparaben	94268	HCPs (CosHy)	juvenile	9.27e-02	2	6
Acetaminophen	103902	HCPs (Drugs)	adult	8.21e+02	1	1
Sulfamethoxazole	723466	HCPs (Drugs)	adult	8.69e-02	1	1
Fenofibric acid	42017890	HCPs (Drugs)	adult	2.40e+00	1	2
Carbamazepine	298464	HCPs (Drugs)	adult	4.81e-01	2	11
Ibuprofen	15687271	HCPs (Drugs)	adult	1.27e-01	3	24
Diclofenac	15307865	HCPs (Drugs)	adult	3.45e-03	1	26
Ibuprofen	15687271	HCPs (Drugs)	embryon	3.41e-01	1	1
Acetaminophen	103902	HCPs (Drugs)	embryon	1.72e-01	1	2
Sulfamethoxazole	723466	HCPs (Drugs)	embryon	4.19e+01	1	2
Carbamazepine	298464	HCPs (Drugs)	embryon	1.09e-05	1	3
Diclofenac	15307865	HCPs (Drugs)	juvenile	1.09e-02	1	7
Ibuprofen	15687271	HCPs (Drugs)	juvenile	1.92e-01	2	10
Carbamazepine	298464	HCPs (Drugs)	juvenile	7.78e-01	2	55
Carbamazepine	298464	HCPs (Drugs)	larva	8.46e+01	1	4
Ibuprofen	15687271	HCPs (Drugs)	larva	1.09e+00	1	8
Estrone	53167	HCPs (Hormones)	adult	3.32e-04	2	10
Estrone	53167	HCPs (Hormones)	embryon	9.27e-05	2	23
Estrone	53167	HCPs (Hormones)	juvenile	1.94e-05	2	5
Selenium	7782492	Metals (Trace elements)	adult	3.16e-01	1	1
Cadmium	7440439	Metals (Trace elements)	adult	7.71e+00	1	7
Uranium	7440611	Metals (Trace elements)	adult	1.19e-01	1	7
Chromium	7440473	Metals (Trace elements)	adult	1.36e+00	2	8
Nickel	7440020	Metals (Trace elements)	adult	3.49e+00	1	9
Copper	7440508	Metals (Trace elements)	adult	2.82e-03	2	10
Silver	7440224	Metals (Trace elements)	adult	5.01e+00	2	16
Zinc	7440666	Metals (Trace elements)	adult	1.36e+00	3	16
Copper	7440508	Metals (Trace elements)	embryon	2.67e-01	1	1
Iron	7439896	Metals (Trace elements)	embryon	3.21e+02	1	3
Arsenic	7440382	Metals (Trace elements)	embryon	2.50e+01	1	5
Silver	7440224	Metals (Trace elements)	embryon	2.31e+00	2	38
Lead	7439921	Metals (Trace elements)	juvenile	8.66e-01	1	2
Silver	7440224	Metals (Trace elements)	juvenile	2.56e-03	1	7
Copper	7440508	Metals (Trace elements)	juvenile	1.24e-01	5	68
Copper	7440508	Metals (Trace elements)	larva	5.32e-03	1	2
Calcium	7440702	Metals (Trace elements)	larva	8.71e+01	1	2
PCDD 54	40321764	OIPs (DP)	embryon	4.15e-06	1	1
PCDD 48	1746016	OIPs (DP)	embryon	1.01e-04	2	21
PCDD 48	1746016	OIPs (DP)	larva	7.02e-07	1	1
Decabromodiphenyl ether	1163195	OIPs (FR)	adult	2.34e-02	2	28
Decabromodiphenyl ether	1163195	OIPs (FR)	embryon	1.65e-01	1	14
HBCDDs	3194556	OIPs (FR)	embryon	1.21e-01	1	26
Decabromodiphenyl ether	1163195	OIPs (FR)	larva	6.06e-03	1	4
Bisphenol S	80091	OIPs (Others)	adult	1.16e-01	1	6
4-tert-Octylphenol	140669	OIPs (Others)	adult	5.92e-01	2	18
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	adult	4.64e-02	2	37
4-Nonylphenol	104405	OIPs (Others)	adult	1.35e-01	9	44
Tributylstannane	688733	OIPs (Others)	embryon	1.73e-02	1	2
4-tert-Octylphenol	140669	OIPs (Others)	embryon	1.59e-01	1	4
4-Nonylphenol	104405	OIPs (Others)	embryon	4.52e-02	2	5
Tributyl phosphate	126738	OIPs (Others)	embryon	9.79e-01	2	10
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	embryon	9.10e-03	1	25
Bisphenol S	80091	OIPs (Others)	embryon	2.33e-01	1	63
4-n-Octylphenol	1806264	OIPs (Others)	juvenile	2.24e-02	1	1
Tributylstannane	688733	OIPs (Others)	juvenile	3.81e-04	1	4
4-tert-Octylphenol	140669	OIPs (Others)	juvenile	1.62e-01	2	4
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	juvenile	7.10e-02	4	34
4-Nonylphenol	104405	OIPs (Others)	juvenile	1.16e-01	5	58
Tributyl phosphate	126738	OIPs (Others)	larva	2.27e+00	1	4
4-Nonylphenol	104405	OIPs (Others)	larva	2.07e-01	1	7
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	larva	1.32e-01	1	9
Butyl benzyl phthalate	85687	OIPs (Plasticizers)	adult	3.40e-01	2	9

Dibutyl phthalate	84742	OIPs (Plasticizers)	adult	3.87e-01	5	76
Dioctyl phthalate	117817	OIPs (Plasticizers)	adult	8.85e-02	6	127
Bisphenol A	80057	OIPs (Plasticizers)	adult	1.88e-01	11	195
Diisobutyl phthalate	84695	OIPs (Plasticizers)	embryon	3.44e+00	1	4
Butyl benzyl phthalate	85687	OIPs (Plasticizers)	embryon	2.12e+00	2	9
Diethyl phthalate	84662	OIPs (Plasticizers)	embryon	6.10e-01	2	26
Dioctyl phthalate	117817	OIPs (Plasticizers)	embryon	1.71e-01	3	52
Dibutyl phthalate	84742	OIPs (Plasticizers)	embryon	3.12e-01	2	55
Bisphenol A	80057	OIPs (Plasticizers)	embryon	3.62e+00	4	192
Bisphenol A	80057	OIPs (Plasticizers)	juvenile	9.06e-02	4	15
Diethyl phthalate	84662	OIPs (Plasticizers)	juvenile	1.53e+01	1	42
Dioctyl phthalate	117817	OIPs (Plasticizers)	juvenile	1.38e+00	4	49
Dibutyl phthalate	84742	OIPs (Plasticizers)	juvenile	1.19e+00	4	52
Dibutyl phthalate	84742	OIPs (Plasticizers)	larva	1.36e+00	1	1
Bisphenol A	80057	OIPs (Plasticizers)	larva	2.83e+00	2	20
Dioctyl phthalate	117817	OIPs (Plasticizers)	larva	1.18e-01	3	30
Dichloromethane	75092	OIPs (Solvents)	adult	5.98e+01	1	4
Tetrachloroethylene	127184	OIPs (Solvents)	adult	8.42e+00	1	4
Benzo[a]pyrene	50328	PAHs (PAHs)	adult	3.41e-01	1	6
Phenanthrene	85018	PAHs (PAHs)	embryon	1.38e+00	1	3
Benzo[a]pyrene	50328	PAHs (PAHs)	embryon	1.13e-02	1	6
Fluoranthene	206440	PAHs (PAHs)	embryon	2.08e-03	1	6
Benzo[a]pyrene	50328	PAHs (PAHs)	juvenile	3.04e-02	2	8
Fluoranthene	206440	PAHs (PAHs)	larva	2.20e+00	1	1
Perfluorooctanoic acid	335671	PFASs (PFASs)	adult	1.79e+00	6	157
Perfluoroheptanoic acid	375859	PFASs (PFASs)	embryon	2.53e+01	1	4
Perfluorohexanesulfonic acid	355464	PFASs (PFASs)	embryon	2.63e+00	1	7
Perfluorohexanoic acid	307244	PFASs (PFASs)	embryon	2.81e+00	1	32
Perfluorooctanoic acid	335671	PFASs (PFASs)	embryon	5.39e+00	4	200
Perfluorooctanoic acid	335671	PFASs (PFASs)	juvenile	4.22e+00	1	10
Perfluorooctanoic acid	335671	PFASs (PFASs)	larva	1.33e+02	1	7
Behavior						
Triclosan	3380345	Agrochemicals (Fungicides)	adult	2.41e-02	2	9
Tebuconazole	107534963	Agrochemicals (Fungicides)	adult	4.77e+00	1	11
Myclobutanil	88671890	Agrochemicals (Fungicides)	embryon	1.09e+00	1	1
Tetraconazole	112281773	Agrochemicals (Fungicides)	embryon	2.57e+00	1	1
Carbendazim	10605217	Agrochemicals (Fungicides)	embryon	4.86e-02	1	4
Tebuconazole	107534963	Agrochemicals (Fungicides)	embryon	1.83e+00	1	4
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	adult	2.10e-04	1	1
Diuron	330541	Agrochemicals (Herbicides)	adult	2.61e-04	1	2
Roundup	38641940	Agrochemicals (Herbicides)	adult	1.75e+00	1	10
Dicamba	1918009	Agrochemicals (Herbicides)	adult	1.46e+03	1	12
Clopyralid	1702176	Agrochemicals (Herbicides)	embryon	1.09e+01	1	1
Dicamba	1918009	Agrochemicals (Herbicides)	embryon	1.54e+01	1	1
Chlortoluron	15545489	Agrochemicals (Herbicides)	embryon	2.67e+00	1	1
Triclopyr	55335063	Agrochemicals (Herbicides)	embryon	1.09e+01	1	1
Terbuthylazine	5915413	Agrochemicals (Herbicides)	embryon	8.95e+00	1	2
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	embryon	1.13e+00	2	6
Roundup	38641940	Agrochemicals (Herbicides)	juvenile	4.51e+00	2	3
Bentazon	25057890	Agrochemicals (Herbicides)	juvenile	1.09e+01	1	4
Nicosulfuron	111991094	Agrochemicals (Herbicides)	juvenile	1.66e-01	1	33
Atrazine	1912249	Agrochemicals (Insecticides)	adult	3.42e-02	3	20
Lindane	58899	Agrochemicals (Insecticides)	embryon	6.49e+00	1	2
Carbaryl	63252	Agrochemicals (Insecticides)	embryon	3.90e+00	1	2
Deethylatrazine	6190654	Agrochemicals (Insecticides)	embryon	2.26e-01	1	3
Atrazine	1912249	Agrochemicals (Insecticides)	embryon	4.75e-01	1	7
Imidacloprid	138261413	Agrochemicals (Insecticides)	embryon	4.75e+00	2	9
Cypermethrin	52315078	Agrochemicals (Insecticides)	embryon	7.31e-02	1	14
Carbaryl	63252	Agrochemicals (Insecticides)	juvenile	5.43e-01	1	1
Cypermethrin	52315078	Agrochemicals (Insecticides)	juvenile	3.26e-04	1	1
Permethrin	52645531	Agrochemicals (Insecticides)	juvenile	3.26e-03	1	2
Carbofuran	1563662	Agrochemicals (Insecticides)	juvenile	5.43e-02	1	7
Atrazine	1912249	Agrochemicals (Insecticides)	juvenile	4.91e+00	2	9
Imidacloprid	138261413	Agrochemicals (Insecticides)	juvenile	3.41e+00	3	19
Lindane	58899	Agrochemicals (Insecticides)	larva	6.99e-02	1	2
Carbaryl	63252	Agrochemicals (Insecticides)	larva	4.86e-01	2	2
Carbofuran	1563662	Agrochemicals (Insecticides)	larva	8.02e-02	1	4
Ziram	137304	Agrochemicals (muPesticides)	embryon	1.66e-02	1	1
Carbamazepine	298464	HCPs (Drugs)	adult	9.78e+00	1	3
Diclofenac	15307865	HCPs (Drugs)	adult	1.92e+00	1	8
Acetaminophen	103902	HCPs (Drugs)	embryon	2.52e+00	3	13
Carbamazepine	298464	HCPs (Drugs)	juvenile	3.41e-01	1	1
Carbamazepine	298464	HCPs (Drugs)	larva	8.98e+01	1	2
Estrone	53167	HCPs (Hormones)	embryon	3.41e-04	1	1
Estrone	53167	HCPs (Hormones)	larva	3.41e-04	1	3
Cadmium	7440439	Metals (Trace elements)	embryon	2.34e-02	1	21
Cadmium	7440439	Metals (Trace elements)	larva	3.58e-02	1	4
HBCDDs	3194556	OIPs (FR)	embryon	1.26e-02	1	1
Decabromodiphenyl ether	1163195	OIPs (FR)	embryon	1.75e-01	1	3
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	adult	2.41e-01	1	8
EDTA	60004	OIPs (Others)	embryon	1.52e+02	1	1
Bisphenol S	80091	OIPs (Others)	embryon	2.17e-01	1	2

4-tert-Octylphenol	140669	OIPs (Others)	embryon	6.73e-03	1	2
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	embryon	4.43e-02	1	2
Tributyl phosphate	126738	OIPs (Others)	embryon	6.79e-01	1	4
Hexachlorobutadiene	87683	OIPs (Others)	juvenile	8.74e-02	1	2
4-Nonylphenol	104405	OIPs (Others)	juvenile	1.37e-01	1	3
Tributyl phosphate	126738	OIPs (Others)	larva	1.01e+00	1	4
Bisphenol A	80057	OIPs (Plasticizers)	adult	1.71e+00	1	4
Dibutyl phthalate	84742	OIPs (Plasticizers)	adult	3.26e-03	1	6
Diethyl phthalate	84662	OIPs (Plasticizers)	embryon	2.05e+01	1	1
Diisobutyl phthalate	84695	OIPs (Plasticizers)	embryon	1.93e+01	1	1
Dibutyl phthalate	84742	OIPs (Plasticizers)	embryon	1.93e+01	1	1
Butyl benzyl phthalate	85687	OIPs (Plasticizers)	embryon	1.92e+00	1	2
Dioctyl phthalate	117817	OIPs (Plasticizers)	embryon	6.80e+01	1	2
Bisphenol A	80057	OIPs (Plasticizers)	embryon	8.96e-01	2	53
Dioctyl phthalate	117817	OIPs (Plasticizers)	juvenile	3.41e-01	1	1
Dioctyl phthalate	117817	OIPs (Plasticizers)	larva	6.98e-01	1	2
Chloroform	67663	OIPs (Solvents)	juvenile	4.54e+00	1	1
Benzene	71432	OIPs (Solvents)	juvenile	1.02e+00	1	2
1,2,4-Trichlorobenzene	120821	OIPs (Solvents)	juvenile	5.96e-01	1	2
Toluene	108883	OIPs (Solvents)	juvenile	2.16e+00	2	5
Fluoranthene	206440	PAHs (PAHs)	juvenile	1.54e-02	2	2
Phenanthrene	85018	PAHs (PAHs)	juvenile	2.92e-02	1	3
Fluorene	86737	PAHs (PAHs)	juvenile	1.52e+00	1	6
Perfluorooctanoic acid	335671	PFASs (PFASs)	adult	2.80e+00	1	14
Perfluorohexanesulfonic acid	355464	PFASs (PFASs)	embryon	1.10e+00	1	6
Perfluoroheptanoic acid	375859	PFASs (PFASs)	embryon	2.92e+01	1	7
Perfluorohexanoic acid	307244	PFASs (PFASs)	embryon	1.69e+01	1	20
Perfluorooctanoic acid	335671	PFASs (PFASs)	embryon	5.51e+00	1	30
Mortality						
Metalaxyl	57837191	Agrochemicals (Fungicides)	adult	1.46e+02	1	2
Tetraconazole	112281773	Agrochemicals (Fungicides)	adult	2.82e+00	1	2
Azoxystrobin	131860338	Agrochemicals (Fungicides)	adult	2.78e-01	1	2
Mancozeb	8018017	Agrochemicals (Fungicides)	adult	8.78e+00	2	8
Tebuconazole	107534963	Agrochemicals (Fungicides)	adult	1.20e+01	2	10
Hexachlorobenzene	118741	Agrochemicals (Fungicides)	embryon	1.64e-02	1	1
Mancozeb	8018017	Agrochemicals (Fungicides)	embryon	2.34e-01	1	1
Azoxystrobin	131860338	Agrochemicals (Fungicides)	embryon	1.15e+00	1	2
Flusilazole	85509199	Agrochemicals (Fungicides)	embryon	1.07e+01	2	2
Epoxiconazole	133855988	Agrochemicals (Fungicides)	embryon	4.96e+00	2	2
Myclobutanil	88671890	Agrochemicals (Fungicides)	embryon	3.49e+00	2	3
Tetraconazole	112281773	Agrochemicals (Fungicides)	embryon	7.51e+00	2	3
Carbendazim	10605217	Agrochemicals (Fungicides)	embryon	6.61e-01	1	5
Tebuconazole	107534963	Agrochemicals (Fungicides)	embryon	3.12e+00	2	7
Triclosan	3380345	Agrochemicals (Fungicides)	embryon	2.15e-01	3	13
Biphenyl	92524	Agrochemicals (Fungicides)	juvenile	1.30e+00	1	1
Triclosan	3380345	Agrochemicals (Fungicides)	juvenile	2.06e-01	1	1
Tetraconazole	112281773	Agrochemicals (Fungicides)	juvenile	2.88e+00	1	2
Metalaxyl	57837191	Agrochemicals (Fungicides)	juvenile	8.17e+01	2	2
Azoxystrobin	131860338	Agrochemicals (Fungicides)	juvenile	3.24e-01	2	3
Mancozeb	8018017	Agrochemicals (Fungicides)	juvenile	7.95e+00	3	6
Tebuconazole	107534963	Agrochemicals (Fungicides)	juvenile	2.63e+00	3	8
Carbendazim	10605217	Agrochemicals (Fungicides)	juvenile	8.28e-01	7	26
Tetraconazole	112281773	Agrochemicals (Fungicides)	larva	5.20e+00	1	2
Azoxystrobin	131860338	Agrochemicals (Fungicides)	larva	4.88e-01	1	2
Triclosan	3380345	Agrochemicals (Fungicides)	larva	1.69e-01	2	4
Mancozeb	8018017	Agrochemicals (Fungicides)	larva	2.50e+00	4	4
Hexachlorobenzene	118741	Agrochemicals (Fungicides)	larva	2.47e-01	3	7
Carbendazim	10605217	Agrochemicals (Fungicides)	larva	2.48e-01	4	8
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	adult	3.03e+00	1	1
AMPA	1066519	Agrochemicals (Herbicides)	adult	4.02e+01	1	1
Dicamba	1918009	Agrochemicals (Herbicides)	adult	1.21e+03	1	4
Cyanazine	21725462	Agrochemicals (Herbicides)	adult	6.94e+00	2	4
Pendimethalin	40487421	Agrochemicals (Herbicides)	adult	2.40e+00	2	5
Acetochlor	34256821	Agrochemicals (Herbicides)	adult	8.46e-01	2	8
2,4-D	94757	Agrochemicals (Herbicides)	adult	7.40e+01	5	11
Roundup	38641940	Agrochemicals (Herbicides)	adult	1.65e+01	3	14
Simazine	122349	Agrochemicals (Herbicides)	embryon	1.02e+01	1	1
Dicamba	1918009	Agrochemicals (Herbicides)	embryon	1.54e+01	1	1
Chlortoluron	15545489	Agrochemicals (Herbicides)	embryon	3.61e+00	1	1
Hydroxyterbuthylazine	66753079	Agrochemicals (Herbicides)	embryon	2.49e-03	1	1
Mesotrione	104206828	Agrochemicals (Herbicides)	embryon	2.56e-02	1	1
Cyanazine	21725462	Agrochemicals (Herbicides)	embryon	1.02e+01	1	2
Diuron	330541	Agrochemicals (Herbicides)	embryon	3.48e-01	1	3
Alachlor	15972608	Agrochemicals (Herbicides)	embryon	2.55e+00	1	3
Linuron	330552	Agrochemicals (Herbicides)	embryon	2.86e+00	1	4
Acetochlor	34256821	Agrochemicals (Herbicides)	embryon	2.99e+00	1	5
AMPA	1066519	Agrochemicals (Herbicides)	embryon	6.67e+01	2	5
2,4-D	94757	Agrochemicals (Herbicides)	embryon	3.01e+01	4	16
Roundup	38641940	Agrochemicals (Herbicides)	embryon	3.65e+00	5	22
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	embryon	9.81e-01	5	28
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	embryon	3.61e-01	5	32
Linuron	330552	Agrochemicals (Herbicides)	juvenile	5.14e+00	1	1

Dicamba	1918009	Agrochemicals (Herbicides)	juvenile	2.92e+01	1	1
Mesotrione	104206828	Agrochemicals (Herbicides)	juvenile	3.11e+02	1	1
Nicosulfuron	111991094	Agrochemicals (Herbicides)	juvenile	5.85e+02	1	1
Acetochlor	34256821	Agrochemicals (Herbicides)	juvenile	8.56e-01	1	2
2,4-MCPA	94746	Agrochemicals (Herbicides)	juvenile	2.16e+00	2	2
Metolachlor	51218452	Agrochemicals (Herbicides)	juvenile	1.29e+01	2	2
Oxadiazon	19666309	Agrochemicals (Herbicides)	juvenile	6.79e+00	3	3
Clopyralid	1702176	Agrochemicals (Herbicides)	juvenile	1.33e+02	2	4
Alachlor	15972608	Agrochemicals (Herbicides)	juvenile	2.59e+00	4	5
Ethofumesate	26225796	Agrochemicals (Herbicides)	juvenile	2.21e+01	1	6
Cyanazine	21725462	Agrochemicals (Herbicides)	juvenile	3.20e+00	2	6
Aminotriazole	61825	Agrochemicals (Herbicides)	juvenile	2.29e+02	3	6
Diuron	330541	Agrochemicals (Herbicides)	juvenile	4.99e+00	4	9
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	juvenile	4.01e+00	5	10
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	juvenile	1.60e+00	4	15
Simazine	122349	Agrochemicals (Herbicides)	juvenile	3.44e+01	7	15
Triclopyr	55335063	Agrochemicals (Herbicides)	juvenile	4.55e+00	6	25
2,4-D	94757	Agrochemicals (Herbicides)	juvenile	2.66e+01	11	34
Roundup	38641940	Agrochemicals (Herbicides)	juvenile	1.32e+01	20	216
Mecoprop	93652	Agrochemicals (Herbicides)	larva	5.85e+00	1	1
2,4-MCPA	94746	Agrochemicals (Herbicides)	larva	2.84e+02	1	1
Linuron	330552	Agrochemicals (Herbicides)	larva	3.76e+00	1	1
Clopyralid	1702176	Agrochemicals (Herbicides)	larva	1.02e-01	1	1
Oxadiazon	19666309	Agrochemicals (Herbicides)	larva	5.03e-02	1	1
Triclopyr	55335063	Agrochemicals (Herbicides)	larva	1.52e-01	1	1
Pendimethalin	40487421	Agrochemicals (Herbicides)	larva	2.92e-02	1	2
Alachlor	15972608	Agrochemicals (Herbicides)	larva	4.31e+00	3	8
2,4-D	94757	Agrochemicals (Herbicides)	larva	9.82e+01	5	10
Diuron	330541	Agrochemicals (Herbicides)	larva	1.32e+00	7	11
Simazine	122349	Agrochemicals (Herbicides)	larva	2.56e+02	2	13
2,4-Dichlorophenol	120832	Agrochemicals (Herbicides)	larva	2.15e+00	5	13
3,4-Dichloroaniline	95761	Agrochemicals (Herbicides)	larva	1.94e+00	3	16
Roundup	38641940	Agrochemicals (Herbicides)	larva	1.86e+01	11	45
Atrazine	1912249	Agrochemicals (Insecticides)	adult	1.60e-01	3	5
Permethrin	52645531	Agrochemicals (Insecticides)	adult	3.67e-02	3	5
Lindane	58899	Agrochemicals (Insecticides)	adult	2.15e-01	4	6
Carbofuran	1563662	Agrochemicals (Insecticides)	adult	3.79e-01	7	9
Imidacloprid	138261413	Agrochemicals (Insecticides)	adult	1.17e+02	2	13
Cypermethrin	52315078	Agrochemicals (Insecticides)	adult	4.24e-03	5	19
Carbaryl	63252	Agrochemicals (Insecticides)	adult	3.30e+00	8	21
α-Hexachlorocyclohexane	319846	Agrochemicals (Insecticides)	embryon	1.00e+01	1	1
Hydroxyatrazine	2163680	Agrochemicals (Insecticides)	embryon	2.25e-03	1	1
Deethylatrazine	6190654	Agrochemicals (Insecticides)	embryon	3.26e-01	1	1
Lindane	58899	Agrochemicals (Insecticides)	embryon	1.69e+00	1	5
Permethrin	52645531	Agrochemicals (Insecticides)	embryon	3.53e-02	2	5
Carbofuran	1563662	Agrochemicals (Insecticides)	embryon	5.10e-01	4	6
Imidacloprid	138261413	Agrochemicals (Insecticides)	embryon	8.02e+00	2	8
Carbaryl	63252	Agrochemicals (Insecticides)	embryon	3.33e+00	4	17
Cypermethrin	52315078	Agrochemicals (Insecticides)	embryon	8.52e-03	4	22
Atrazine	1912249	Agrochemicals (Insecticides)	embryon	9.07e-01	4	24
Piperonyl butoxide	51036	Agrochemicals (Insecticides)	juvenile	7.66e+00	1	2
Imidacloprid	138261413	Agrochemicals (Insecticides)	juvenile	6.99e+00	5	6
Atrazine	1912249	Agrochemicals (Insecticides)	juvenile	4.49e+00	8	12
Carbofuran	1563662	Agrochemicals (Insecticides)	juvenile	7.91e-01	8	20
Permethrin	52645531	Agrochemicals (Insecticides)	juvenile	3.17e-02	9	27
Cypermethrin	52315078	Agrochemicals (Insecticides)	juvenile	1.13e-02	10	36
Lindane	58899	Agrochemicals (Insecticides)	juvenile	5.83e-02	13	37
Carbaryl	63252	Agrochemicals (Insecticides)	juvenile	3.74e+00	18	62
Cypermethrin	52315078	Agrochemicals (Insecticides)	larva	1.13e-03	4	8
Imidacloprid	138261413	Agrochemicals (Insecticides)	larva	1.09e+01	4	13
Carbofuran	1563662	Agrochemicals (Insecticides)	larva	5.20e-01	6	15
Permethrin	52645531	Agrochemicals (Insecticides)	larva	2.69e-03	7	28
Lindane	58899	Agrochemicals (Insecticides)	larva	9.29e-02	10	28
Atrazine	1912249	Agrochemicals (Insecticides)	larva	5.39e+00	7	33
Carbaryl	63252	Agrochemicals (Insecticides)	larva	1.50e+00	15	66
Metaldehyde	108623	Agrochemicals (Others -cides)	larva	4.27e+00	1	1
Dinocap	39300453	Agrochemicals (muPesticides)	adult	2.05e-01	1	1
Pentachlorophenol	87865	Agrochemicals (muPesticides)	adult	1.30e-01	3	16
Ziram	137304	Agrochemicals (muPesticides)	embryon	1.54e-01	1	6
Pentachlorophenol	87865	Agrochemicals (muPesticides)	embryon	1.11e+00	4	24
Ziram	137304	Agrochemicals (muPesticides)	juvenile	6.32e-01	1	8
Pentachlorophenol	87865	Agrochemicals (muPesticides)	juvenile	1.16e-01	12	81
Triphenyltin chloride	639587	Agrochemicals (muPesticides)	larva	1.71e+03	1	1
Pentachlorophenol	87865	Agrochemicals (muPesticides)	larva	1.05e-01	14	56
Metformin	657249	HCPs (CosHy)	embryon	4.34e-02	1	1
Carbamazepine	298464	HCPs (Drugs)	adult	6.07e+00	1	1
Sulfamethoxazole	723466	HCPs (Drugs)	adult	1.82e+00	1	1
Fenofibric acid	42017890	HCPs (Drugs)	adult	2.40e+00	1	1
Carbamazepine	298464	HCPs (Drugs)	embryon	2.96e+00	2	6
Ibuprofen	15687271	HCPs (Drugs)	embryon	1.05e+00	3	10
Acetaminophen	103902	HCPs (Drugs)	embryon	1.74e+00	3	17
Acetaminophen	103902	HCPs (Drugs)	juvenile	4.76e+02	1	1

Carbamazepine	298464	HCPs (Drugs)	juvenile	1.16e+01	1	1
Ibuprofen	15687271	HCPs (Drugs)	juvenile	8.30e+01	1	1
Acetaminophen	103902	HCPs (Drugs)	larva	1.15e+00	1	1
Ibuprofen	15687271	HCPs (Drugs)	larva	5.85e+01	1	1
Ofloxacin	82419361	HCPs (Drugs)	larva	3.41e+01	1	1
Carbamazepine	298464	HCPs (Drugs)	larva	1.14e+01	2	2
Estrone	53167	HCPs (Hormones)	adult	8.48e-04	1	1
Nickel	7440020	Metals (Trace elements)	adult	7.95e+00	1	1
Uranium	7440611	Metals (Trace elements)	adult	8.39e-01	1	1
Selenium	7782492	Metals (Trace elements)	adult	5.85e-01	1	1
Cadmium	7440439	Metals (Trace elements)	adult	4.47e+00	2	2
Copper	7440508	Metals (Trace elements)	adult	2.01e-01	3	6
Silver	7440224	Metals (Trace elements)	adult	1.01e+01	3	7
Zinc	7440666	Metals (Trace elements)	adult	9.00e+00	3	7
Iron	7439896	Metals (Trace elements)	embryon	1.57e+02	1	1
Lead	7439921	Metals (Trace elements)	embryon	1.36e-02	1	1
Selenium	7782492	Metals (Trace elements)	embryon	1.36e-01	1	1
Nickel	7440020	Metals (Trace elements)	embryon	4.30e-02	1	2
Uranium	7440611	Metals (Trace elements)	embryon	2.67e-01	1	3
Cadmium	7440439	Metals (Trace elements)	embryon	2.69e-01	2	7
Copper	7440508	Metals (Trace elements)	embryon	4.85e-02	2	7
Mercury	7439976	Metals (Trace elements)	embryon	1.92e-01	2	13
Zinc	7440666	Metals (Trace elements)	embryon	3.92e+00	3	13
Silver	7440224	Metals (Trace elements)	embryon	1.42e+00	2	24
Nickel	7440020	Metals (Trace elements)	juvenile	2.92e+00	2	5
Lead	7439921	Metals (Trace elements)	juvenile	1.64e+00	4	6
Iron	7439896	Metals (Trace elements)	juvenile	1.43e+01	2	12
Cadmium	7440439	Metals (Trace elements)	juvenile	9.03e-01	3	12
Mercury	7439976	Metals (Trace elements)	juvenile	5.78e-02	2	21
Zinc	7440666	Metals (Trace elements)	juvenile	4.06e+00	9	33
Copper	7440508	Metals (Trace elements)	juvenile	1.65e-01	12	86
Chromium	7440473	Metals (Trace elements)	larva	4.09e+01	1	1
Lead	7439921	Metals (Trace elements)	larva	1.45e+00	1	2
Nickel	7440020	Metals (Trace elements)	larva	5.89e+01	1	3
Selenium	7782492	Metals (Trace elements)	larva	6.47e+00	3	10
Cadmium	7440439	Metals (Trace elements)	larva	4.39e-01	6	13
Copper	7440508	Metals (Trace elements)	larva	8.52e-02	8	34
Zinc	7440666	Metals (Trace elements)	larva	1.86e+00	6	55
PCDD 54	40321764	OIPs (DP)	embryon	6.37e-06	1	2
PCDD 48	1746016	OIPs (DP)	embryon	8.14e-04	3	10
PCDD 48	1746016	OIPs (DP)	juvenile	1.70e-06	1	1
Decabromodiphenyl ether	1163195	OIPs (FR)	adult	1.02e-01	1	1
HBCDDs	3194556	OIPs (FR)	embryon	4.19e-02	2	2
Decabromodiphenyl ether	1163195	OIPs (FR)	embryon	3.88e-01	1	4
HBCDDs	3194556	OIPs (FR)	juvenile	1.65e-03	1	5
4-Chloroaniline	106478	OIPs (Others)	adult	2.08e+01	1	1
Tributyl phosphate	126738	OIPs (Others)	adult	4.19e+00	1	1
4-Nonylphenol	104405	OIPs (Others)	adult	1.78e-01	2	5
Hexachlorocyclopentadiene	77474	OIPs (Others)	adult	4.83e-02	1	12
1-Chloro-2-nitrobenzene	88733	OIPs (Others)	embryon	7.06e+00	1	1
2-Chlorophenol	95578	OIPs (Others)	embryon	1.36e+01	1	1
4-Chlorophenol	106489	OIPs (Others)	embryon	2.38e+01	1	1
3-Chloroaniline	108429	OIPs (Others)	embryon	6.80e+00	1	1
Tributyl phosphate	126738	OIPs (Others)	embryon	4.57e+00	1	1
EDTA	60004	OIPs (Others)	embryon	9.48e+02	1	2
Nitrobenzene	98953	OIPs (Others)	embryon	2.00e-03	1	2
Tributylstannane	688733	OIPs (Others)	embryon	5.47e-02	1	2
4-Chloroaniline	106478	OIPs (Others)	embryon	1.17e+01	2	2
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	embryon	7.76e-02	2	6
4-Nonylphenol	104405	OIPs (Others)	embryon	2.30e-01	3	11
Bisphenol S	80091	OIPs (Others)	embryon	2.02e+00	1	15
4-tert-Octylphenol	140669	OIPs (Others)	embryon	6.95e-02	2	28
Tributyl phosphate	126738	OIPs (Others)	juvenile	6.67e+00	1	1
2-Nitrotoluene	88722	OIPs (Others)	juvenile	2.20e+01	1	2
2-Chloroaniline	95512	OIPs (Others)	juvenile	3.15e+00	1	2
Nitrobenzene	98953	OIPs (Others)	juvenile	5.57e+01	2	3
Hexachlorobutadiene	87683	OIPs (Others)	juvenile	2.10e-01	2	5
2-Chlorophenol	95578	OIPs (Others)	juvenile	4.91e+00	2	5
4-Chloroaniline	106478	OIPs (Others)	juvenile	1.58e+01	3	5
Hexachlorocyclopentadiene	77474	OIPs (Others)	juvenile	4.17e+01	2	6
EDTA	60004	OIPs (Others)	juvenile	1.35e+02	1	7
4-Nonylphenol	104405	OIPs (Others)	juvenile	1.66e-01	3	7
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	juvenile	1.65e-01	3	7
4-Chlorophenol	106489	OIPs (Others)	juvenile	2.57e+00	2	11
4-Chloroaniline	106478	OIPs (Others)	larva	2.81e+01	1	1
Hexachlorocyclopentadiene	77474	OIPs (Others)	larva	5.24e-03	1	2
Phenol, 4-nonyl-, branched	84852153	OIPs (Others)	larva	1.87e-01	1	2
Nitrobenzene	98953	OIPs (Others)	larva	5.09e+01	1	3
4-tert-Octylphenol	140669	OIPs (Others)	larva	3.48e-03	1	3
m-Cresol	108394	OIPs (Others)	larva	3.22e+00	1	4
4-Chlorophenol	106489	OIPs (Others)	larva	1.50e+01	3	5
Tributyl phosphate	126738	OIPs (Others)	larva	4.83e+00	1	12

4-Nonylphenol	104405	OIPs (Others)	larva	1.36e-01	7	29
Dioctyl phthalate	117817	OIPs (Plasticizers)	adult	6.74e-01	2	2
Dibutyl phthalate	84742	OIPs (Plasticizers)	adult	4.69e-01	2	5
Bisphenol A	80057	OIPs (Plasticizers)	adult	3.69e+00	4	8
Vinylidene chloride	75354	OIPs (Plasticizers)	adult	4.68e+01	1	15
Diisobutyl phthalate	84695	OIPs (Plasticizers)	embryon	1.93e+00	1	1
Diethyl phthalate	84662	OIPs (Plasticizers)	embryon	1.51e+00	1	3
Butyl benzyl phthalate	85687	OIPs (Plasticizers)	embryon	7.17e-01	3	9
Dibutyl phthalate	84742	OIPs (Plasticizers)	embryon	7.39e-01	4	18
Dioctyl phthalate	117817	OIPs (Plasticizers)	embryon	7.41e+00	7	46
Bisphenol A	80057	OIPs (Plasticizers)	embryon	8.68e-01	3	53
Bisphenol A	80057	OIPs (Plasticizers)	juvenile	3.82e+00	1	1
Vinylidene chloride	75354	OIPs (Plasticizers)	juvenile	4.33e+01	1	2
Butyl benzyl phthalate	85687	OIPs (Plasticizers)	juvenile	1.63e+00	4	9
Dioctyl phthalate	117817	OIPs (Plasticizers)	juvenile	1.23e+00	4	9
Diethyl phthalate	84662	OIPs (Plasticizers)	juvenile	1.29e+01	5	13
Dibutyl phthalate	84742	OIPs (Plasticizers)	juvenile	1.78e+00	6	19
Epichlorohydrin	106898	OIPs (Plasticizers)	juvenile	8.04e+00	1	20
Bisphenol A	80057	OIPs (Plasticizers)	larva	1.53e+00	2	5
Dibutyl phthalate	84742	OIPs (Plasticizers)	larva	7.49e-01	4	5
Epichlorohydrin	106898	OIPs (Plasticizers)	larva	7.86e+00	1	7
Dioctyl phthalate	117817	OIPs (Plasticizers)	larva	2.66e-01	3	14
Benzene	71432	OIPs (Solvents)	adult	2.29e+02	1	3
Toluene	108883	OIPs (Solvents)	adult	8.30e+01	2	4
Dichloromethane	75092	OIPs (Solvents)	adult	1.47e+02	1	5
Tetrachloroethylene	127184	OIPs (Solvents)	adult	1.19e+01	1	5
1,2,4-Trichlorobenzene	120821	OIPs (Solvents)	embryon	7.16e-01	1	1
Benzene	71432	OIPs (Solvents)	embryon	8.44e+00	1	2
Dichloromethane	75092	OIPs (Solvents)	embryon	1.86e+01	2	4
Tetrachloroethylene	127184	OIPs (Solvents)	embryon	6.17e+02	2	5
Chloroform	67663	OIPs (Solvents)	embryon	1.42e+01	4	10
Toluene	108883	OIPs (Solvents)	embryon	9.02e+00	4	10
Ethylbenzene	100414	OIPs (Solvents)	juvenile	9.31e+01	1	2
Benzene	71432	OIPs (Solvents)	juvenile	6.68e+00	2	2
Vinyl chloride	75014	OIPs (Solvents)	juvenile	6.65e+02	2	4
Dichloromethane	75092	OIPs (Solvents)	juvenile	1.46e+02	3	5
Tetrachloroethylene	127184	OIPs (Solvents)	juvenile	7.54e+00	4	17
1,2,4-Trichlorobenzene	120821	OIPs (Solvents)	juvenile	2.29e+00	4	18
Xylene	1330207	OIPs (Solvents)	juvenile	1.63e+01	2	19
Toluene	108883	OIPs (Solvents)	juvenile	1.07e+01	3	25
Chloroform	67663	OIPs (Solvents)	juvenile	4.06e+01	3	30
Vinyl chloride	75014	OIPs (Solvents)	larva	8.53e+00	1	2
1,2,4-Trichlorobenzene	120821	OIPs (Solvents)	larva	1.58e+00	2	2
Tetrachloroethylene	127184	OIPs (Solvents)	larva	1.95e+02	2	2
Benzene	71432	OIPs (Solvents)	larva	1.64e+01	1	3
Chloroform	67663	OIPs (Solvents)	larva	8.09e+01	1	5
Toluene	108883	OIPs (Solvents)	larva	9.92e+00	2	18
Naphthalene	91203	PAHs (PAHs)	adult	1.03e+02	1	3
Fluoranthene	206440	PAHs (PAHs)	embryon	3.55e-02	1	2
Naphthalene	91203	PAHs (PAHs)	embryon	4.88e-01	3	3
Acenaphthene	83329	PAHs (PAHs)	embryon	5.83e-01	1	4
Benzo[a]pyrene	50328	PAHs (PAHs)	embryon	1.21e-01	1	5
Phenanthrene	85018	PAHs (PAHs)	embryon	5.60e-02	2	5
Phenanthrene	85018	PAHs (PAHs)	juvenile	1.37e-01	1	1
Fluorene	86737	PAHs (PAHs)	juvenile	8.53e-01	1	1
Acenaphthene	83329	PAHs (PAHs)	juvenile	2.05e+00	1	2
Naphthalene	91203	PAHs (PAHs)	juvenile	1.19e+00	3	4
Fluoranthene	206440	PAHs (PAHs)	juvenile	8.71e-02	2	7
Anthracene	120127	PAHs (PAHs)	juvenile	4.01e-03	1	17
Acenaphthene	83329	PAHs (PAHs)	larva	1.81e+00	1	1
Fluoranthene	206440	PAHs (PAHs)	larva	3.99e-03	1	1
Phenanthrene	85018	PAHs (PAHs)	larva	2.11e-02	2	4
Naphthalene	91203	PAHs (PAHs)	larva	1.22e+00	5	28
PCB 153	35065271	PCBs (PCBs)	larva	7.60e-04	1	1
PCB 52	35693993	PCBs (PCBs)	larva	1.75e-02	1	1
PCB 101	37680732	PCBs (PCBs)	larva	5.85e-03	1	1
Perfluorooctanoic acid	335671	PFASs (PFASs)	adult	8.69e+01	2	21
Perfluorohexanesulfonic acid	355464	PFASs (PFASs)	embryon	5.10e+00	1	1
Perfluoroheptanoic acid	375859	PFASs (PFASs)	embryon	2.97e+01	1	2
Perfluorohexanoic acid	307244	PFASs (PFASs)	embryon	8.23e+00	1	5
Perfluorooctanoic acid	335671	PFASs (PFASs)	embryon	7.06e+01	2	38
Perfluorooctanoic acid	335671	PFASs (PFASs)	juvenile	1.25e+02	1	10
Perfluorooctanoic acid	335671	PFASs (PFASs)	larva	2.42e+02	1	1

9. Abstract & Résumé

A. Abstract

The allis shad (*Alosa alosa*) is a diadromous migratory fish that breeds in rivers. A decline in this species, on a European scale and in the GGD catchment (historically the largest population), has been observed since the late 1990's. Several theories explaining this decline have been investigated, including the recent hypothesis of a link between embryo mortality and water contamination. However, information on water quality in allis shad spawning grounds is limited. Thus, using the SIEAG database, this study first categorized the contaminants present (quantified or detected) in these spawning grounds. However, only the presence of contaminants does not provide information on toxicity. For this reason, we used the PAF (Potentially Affected Fraction) method, which is an indicator of potential toxicity that compares environmental concentrations (here, annual averages) with toxicity values. These toxicity values were extracted from the ECOTOX Knowledgebase. The PAF method was applied to the fish taxon and its various life stages. Using quantified environmental data, the Garonne spawning grounds presented a potential toxic risk associated with the fish taxon over the entire study period ($msPAF_{F-T} > 5\%$), unlike the Dordogne spawning grounds ($msPAF_{F-T} < 5\%$). The larval stage was the most at-risk life stage in terms of development and physiology ($msPAF_{SE-T} > 5\%$), and embryonic stage for mortality effect ($msPAF_{SE-T} > 1\%$) using quantified environmental data. Embryos appeared to be lethally more sensitive to metals, and larvae to industrial pollutants. Finally, a number of substances contributed particularly to the toxic risk (PAFi > 5%): metals (zinc, lead, copper and calcium), phenols, agrochemicals (simazine and cypermethrin) and drugs (metformin and carbamazepine). This method has made it possible to fill a data gap on contamination of allis shad spawning grounds in the GGD catchment, and to show that allis shad and other diadromous fish could face a potentially significant toxic risk.

B. Résumé

La grande alose (*Alosa alosa*) est un poisson migrateur amphihalin qui se reproduit dans les rivières. Un déclin de cette espèce, à l'échelle européenne et dans le bassin GGD (historiquement la plus grande population), a été observé depuis la fin des années 1990. Plusieurs théories expliquant ce déclin ont été étudiées, dont l'hypothèse récente d'un lien entre la mortalité embryonnaire et la contamination de l'eau. Cependant, les informations sur la qualité de l'eau dans les frayères de grande alose sont limitées. Ainsi, en utilisant la base de données du SIEAG, cette étude a d'abord catégorisé les contaminants présents (quantifiés ou détectés) dans ces frayères. Cependant, la présence seule de contaminants ne fournit pas d'information sur la toxicité. C'est pourquoi nous avons utilisé la méthode PAF (Potentially Affected Fraction), un indicateur de toxicité potentielle qui compare des concentrations environnementales (ici, moyennes annuelles) avec des valeurs de toxicité. Ces valeurs de toxicité ont été extraites de la base de données ECOTOX Knowledgebase. La méthode PAF a été appliquée au taxon de poisson et à ses différents stades de vie. Les frayères de la Garonne présentaient un risque toxique potentiel associé au taxon poisson sur l'ensemble de la période étudiée ($msPAF_{F-T}$ > 5%), contrairement à celles de la Dordogne ($msPAF_{F-T}$ < 5%), à des données environnementales quantifiées. Le stade larvaire était le stade de vie le plus à risque en termes de développement et de physiologie ($msPAF_{SE-T}$ > 5%) et le stade embryonnaire pour un effet de mortalité ($msPAF_{SE-T}$ > 1 %) à des données environnementales quantifiées. Pour l'effet létal, les embryons semblaient être plus sensibles aux métaux et les larves aux polluants industriels. Enfin, un certain nombre de substances a particulièrement contribué au risque toxique (PAFi > 5%) : les métaux (zinc, plomb, cuivre et calcium), les phénols, les pesticides (simazine et cyperméthrine) et les médicaments (metformine et carbamazépine). Cette méthode a permis de combler un manque de données sur la contamination des frayères de grande alose dans le bassin GGD et de montrer que cette espèce et les autres migrateurs amphihalins pouvaient être confrontés à un risque toxique potentiellement important.