

# ECOTOX Knowledgebase and Application

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US EPA Office of Research and Development  
 EPA Tools and Resources Webinar  
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Recent Additions

ECOTOX: Aquatic Report

2. 10/10/2017 10:10:10 AM

1. 10/10/2017 10:10:10 AM

2. 10/10/2017 10:10:10 AM

3. 10/10/2017 10:10:10 AM

4. 10/10/2017 10:10:10 AM

5. 10/10/2017 10:10:10 AM

6. 10/10/2017 10:10:10 AM

7. 10/10/2017 10:10:10 AM

8. 10/10/2017 10:10:10 AM

9. 10/10/2017 10:10:10 AM

10. 10/10/2017 10:10:10 AM

Spec. Set Name	Class Name	Health	Repr. Sp.	ML	MLL	MLL	MLL	MLL	MLL	MLL	MLL	MLL	MLL	MLL	MLL	MLL	MLL	MLL	MLL
Spec. Occurrence Name	Class Occurrence Name	Health Occurrence Name	Repr. Sp. Occurrence Name	ML Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name	MLL Occurrence Name
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...



## Problem

- Risk assessors needed a cost-effective means of locating high quality ecological effects data to use in prioritizing chemical cleanup at hazardous waste sites and assisting in the assessment of potential hazards of pollutants through the Clean Air Act (CAA), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), Clean Water Act (CWA) and Toxic Substances Control Act (TSCA).
- Duplicative efforts for data gathering wastes resources across state and federal agencies.
- There is a clear need for 1) authoritative sources of toxicological data for regulators, and 2) an efficient way for the regulated community and researchers to document literature searches and acquisition of data used for risk assessments, risk management and research.

## ECOTOX Knowledgebase

- ECOTOX is a ***comprehensive, publicly available ECOTOXicology knowledgebase*** developed originally in the early 1980s and maintained by EPA ORD.
- ECOTOX provides access ***to environmental toxicity data on aquatic life, terrestrial plants and wildlife*** derived from publications identified after a comprehensive search of the open literature.
- ECOTOX literature is retrieved using a comprehensive strategy from electronic databases augmented with review bibliographies and summary articles; this process is evaluated and revised continually.
- ECOTOX is an ***internationally utilized comprehensive knowledgebase*** summarizing the toxicity of single chemicals to aquatic and terrestrial organisms.

## Overview of ECOTOX

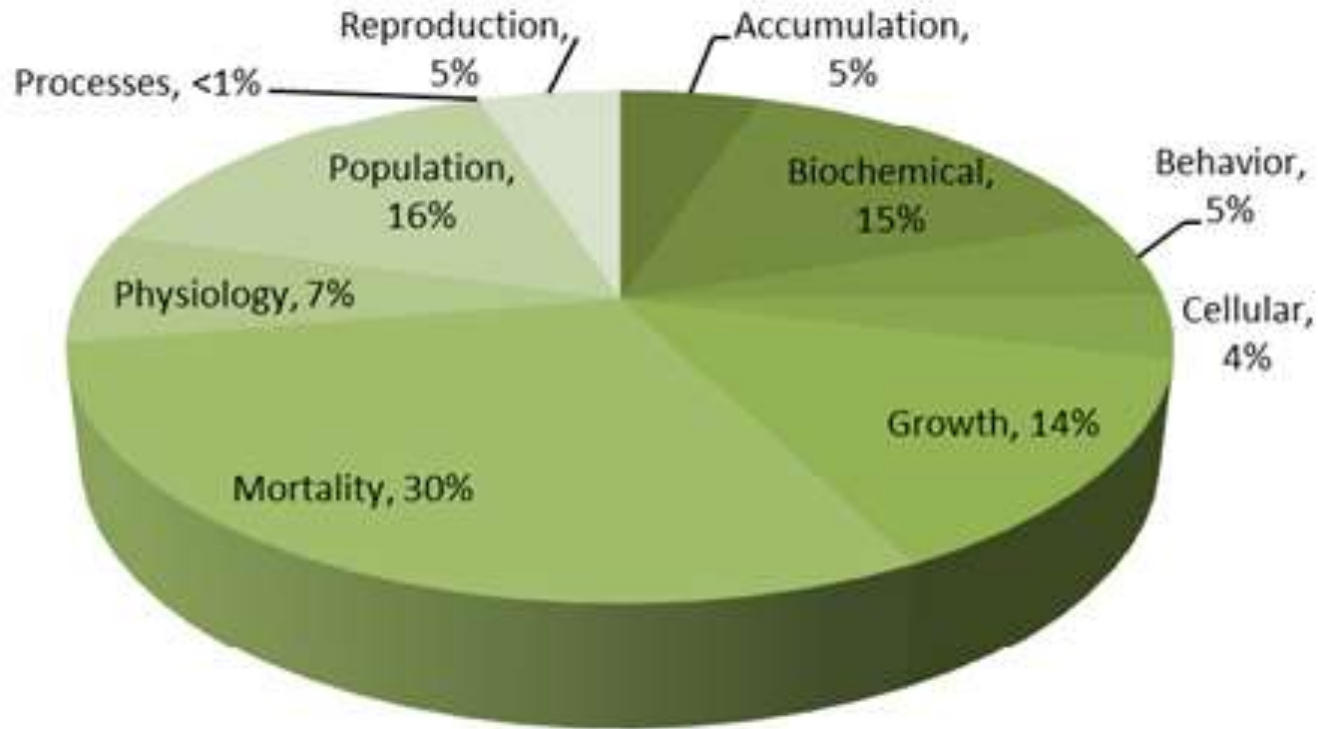
- Available on the Internet (<http://www.epa.gov/ecotox>)
- Includes 881,950 result records from 46,754 publications and 7 independently compiled data sets (EPA, USGS, OECD, Russia) covering 11,268 chemicals and 12,395 terrestrial and aquatic species. ***On average, 15,000 new records are added quarterly to the public website.***
  - Interactive Quick or Advanced queries (chemical, species, endpoint)
  - Outputs can be via *html*, delimited file output, MS Excel, or ASCII *download* files with relationship diagram for local setup
  - Default output format that includes critical fields, but users can customize the output to include all data fields that are coded
  - Web application maintained on EPA servers; ColdFusion front end; Oracle back end

# Growth of the ECOTOX Database

- Species, chemicals and number of records added each year

Year	Unique Species	Unique Chemicals	Result Records
2007	1974	900	43524
2008	2528	1012	61080
2009	2764	1170	58434
2010	2043	1812	67832
2011	1361	1764	46972
2012	1681	1353	42052
2013	2222	1347	48933
2014	2043	1456	53153
2015	1919	1306	60477
2016	2221	1007	44351

## Summary of Ecological Effects in ECOTOX



# State and Federal Regulatory Applications

**CERCLA**

**AWQ**

**CWA**

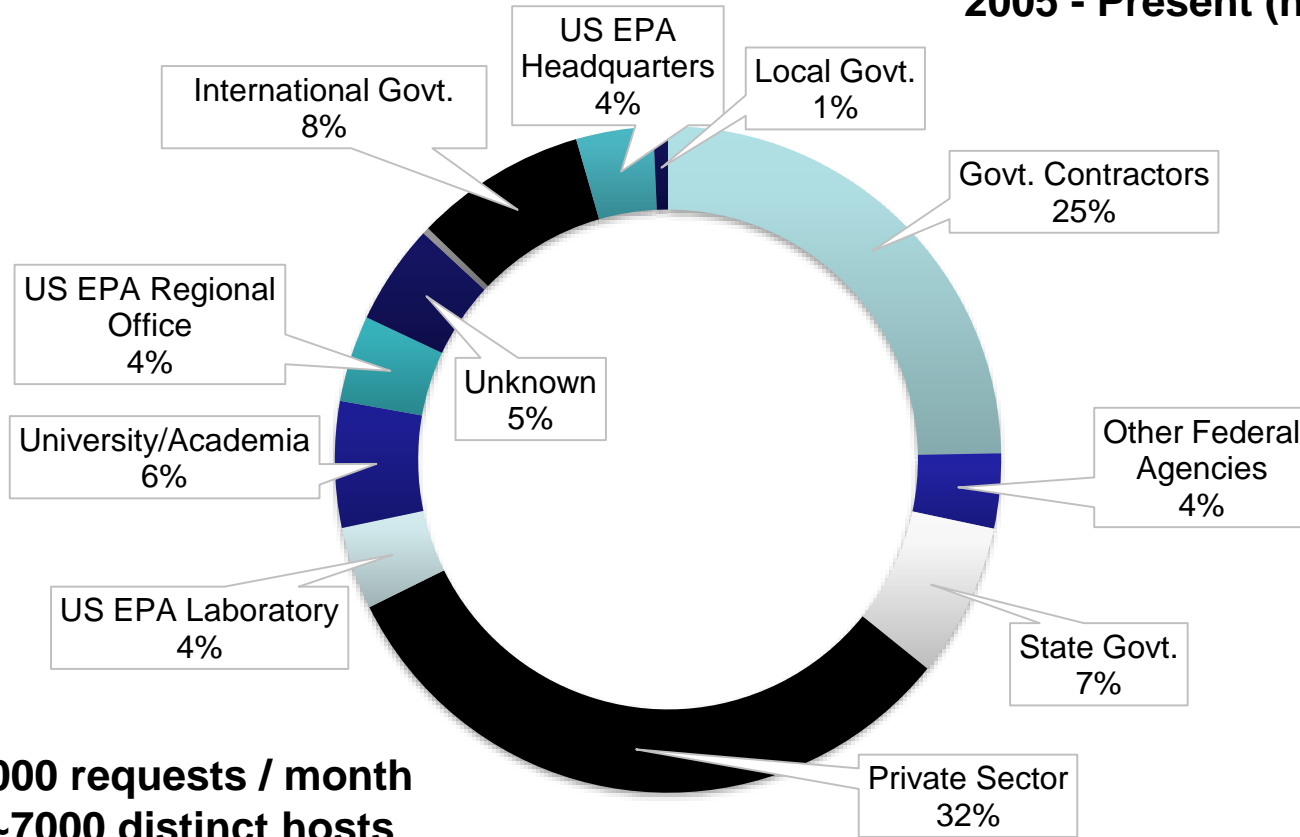
- Site-specific ecological risk assessments on hazardous waste sites
- Development of benchmarks
  - Ecological soil screening levels
  - Organism toxicity reference values
  - Surface water effect concentrations
  - Sediment effect concentrations
- Ambient Water Quality Criteria for Aquatic Life
- Pesticide Registration
- Data source for Endangered Species chemical assessments
- Emergency Response
  - Assessment of ecological effects
  - Prioritization of threat from chemicals

**RCRA**

**FQPA**

# Who has been using the ECOTOX Knowledgebase?

## Clients Contacting ECOTOX Support Line 2005 - Present (n = 2813)



**~150,000 requests / month  
from ~7000 distinct hosts**

- Govt. Contractors
- Private Sector
- US EPA Regional Office
- International Govt.
- Other Federal Agencies
- US EPA Laboratory
- Unknown
- US EPA Headquarters
- State Govt.
- University/Academia
- Non-profit Organization
- Local Govt.



# Use of ECOTOX: Case Examples in Emergency Response



2014 Elk River Chemical Spill: Crude 4-methylcyclohexanemethanol (MCHM) was released from a Freedom Industries facility into the Elk River, a tributary of the Kanawha River in West Virginia.

\*ECOTOX provided unique access to EPA toxicity data not published in scientific literature for assessment of risk to fish.



2005 Hurricane Katrina: \*ECOTOX was used as a rapid source for toxicity data to develop chemical benchmarks for water and sediment quality assessments (e.g-mercury, cyanide, heavy metals, polycyclic aromatic hydrocarbons (PAH), pesticides, salinity).



NOAA'S "Chemical Aquatic Fate and Effects (CAFE) database is a software program risk assessors can use to estimate the fate and effects of thousands of chemicals, oils and dispersants." \*ECOTOX is used by NOAA to assess and remediate hemical spills.

# Real-World Application of ECOTOX



**Chemical of interest: Perfluorooctanoic acid (PFOA)**

**Produced by 3M. Used in Teflon, Gore-Tex and firefighting foam on military bases.**

**On May 19, 2016, US EPA established a health advisory level of 0.07 parts per billion for PFOA and PFOS for human health.**


**There are no ecological receptor-based benchmarks or criteria.**


**Regulatory Authorities: Clean Water Act (CWA), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA)**

# Search Parameters and Output Fields

Chemical	Species	Methods		Results	Source of Data
CAS Registry No.	Common Name	Route of Exposure	Chemical Analysis Info	Major Effect Category (e.g., Enzyme)	Author
Collective Indices Name	Scientific Name	Exposure Media	Application Frequency / Season / Date / Rate	Observed Effect Measurements (e.g., P450 Enzyme Response)	Publication Year
Synonyms	Taxonomic Hierarchy	Study / Exposure Duration	Habitat Description for Field Studies	Calculated Endpoints (e.g., EC50)	Reference Number
Chemical Grade	Organism Age	Application Frequency	Longitude / Latitude for Field Studies	Dose Response (Terrestrial Studies only)	Full Citation Presented for Each Test Result
Chemical Formulation	Organism Sex	Study Location	Water / Soil Chemistry	% Effect Response	Independently Compiled Data Set
Chemical Purity	Organism Source	Control Type	Chemical Concentration Information	Statistical Info	Database Update
Solvent / Vehicle Used	Initial Weight and Length	Chemical Concentration Information	Comments on Experimental Design		
Chemical Radiolabel	Initial Life Stage				
Other Comments on Chemical Noted by Author	Other Comments on Organism Noted by Author				

# Current ECOTOX Screen Shots


U.S. ENVIRONMENTAL PROTECTION AGENCY 



## ECOTOX Knowledgebase


[Recent Additions](#) | [Contact Us](#)    Search:  All EPA  This Area

You are here: [EPA Home](#) > [ECOTOX](#)



**Quick Database Query**

Recent Additions



**Advanced Database Query**

Quick User Guide

Getting Started (PDF, 2 p, 244 KB)

### Welcome to ECOTOX

The ECOTOXicology knowledgebase (ECOTOX) is a comprehensive, publicly available knowledgebase providing single chemical environmental toxicity data on aquatic life, terrestrial plants and wildlife.

**JUNE 15, 2016**

**New Report Feature!**  
 The ECOTOX Advanced Query is now displaying short descriptions for most data fields rather than ECOTOX codes. This feature is the default option for all ECOTOX reports. If you prefer the ECOTOX codes, on the Report Format tab, select the "Display lookup codes instead of descriptions" checkbox prior to your search. The fields using the short descriptions are:


Application Frequency	Application Type	Chemical Analysis
Chemical Formulation	Chemical Grade	Concentration Type
Control Type	Duration Unit	Effect
Endpoint Assigned	Exposure Type	Gender
Lifestage	Measurement	Media Type
Organic Matter Type	Organism Source	Response Site
Sample Size Unit	Statistical Significance	Study Type
Substrate	Test Location	Test Method
Test Type	Trend	

**With the June 2016 ECOTOX update, data has been added for the following Recent Chemicals of Interest to EPA:**

Carbamazepine	Cerbaryl	Cypermethrin
Diethyl phthalate	Dimethoate	Fipronil
Flumioxazin	Isophorone	Mercury

## Advanced Database Query


Main Taxonomy **Chemical** Test Results Test Conditions Publications/ Updates Report Format

**Chemical** 

You may construct a query based on chemical information by using the simple [Chemical Entry](#), and/or by selecting [Predefined Chemical Groups](#). Information entered/selected in both sections will be joined during the query process.

**KEY FUNCTIONS**

- Review Query
- Restore Defaults
- Perform Query for Aquatic Data
- Perform Query for Terrestrial Data

**Chemical Entry** 

Clear Selections


**Search Tip:** You may use the [Browse Chemical Index](#) feature to identify whether or not your chemical is included in the ECOTOX database, prior to conducting a search.

Enter either chemical names and/or CAS Registry numbers below. The system allows for both chemical names and CAS numbers to be entered in the same query. Place each individual entry on a separate line. To ensure your final entry is included, end your selection list with a final return (enter key).

For name searches:

**Contains**     **Exact Match**

Chemical Search: Enter chemical identifier or choose predefined chemical groups.

**Predefined Chemical Groups** 

Clear Selections

**Metal or Organometal Compounds**

<input type="checkbox"/> Aluminum	<input type="checkbox"/> Chromium	<input type="checkbox"/> Mercury
<input type="checkbox"/> Antimony	<input type="checkbox"/> Cobalt	<input type="checkbox"/> Nickel
<input type="checkbox"/> Arsenic	<input type="checkbox"/> Copper	<input type="checkbox"/> Silver
<input type="checkbox"/> Barium	<input type="checkbox"/> Iron	<input type="checkbox"/> Organotin
<input type="checkbox"/> Beryllium	<input type="checkbox"/> Lead	<input type="checkbox"/> Selenium
<input type="checkbox"/> Cadmium	<input type="checkbox"/> Manganese	<input type="checkbox"/> Vanadium
		<input type="checkbox"/> Zinc

**Organic Compounds**

<input type="checkbox"/> Conazoles <b>NEW</b>	<input type="checkbox"/> Perchlorates <b>NEW</b>
<input type="checkbox"/> DDT and Metabolites	<input checked="" type="checkbox"/> Perfluorooctane Sulfonates and Acids (PFOS/PFOA) <b>NEW</b>
<input type="checkbox"/> Dibenzofurans	<input type="checkbox"/> Phthalate Esters
<input type="checkbox"/> Endocrine Disrupting Chemicals (EDCs) <b>NEW</b>	<input type="checkbox"/> Polyaromatic Hydrocarbons (PAHs)
<input type="checkbox"/> Explosives <b>NEW</b>	<input type="checkbox"/> Polybrominated Diphenyl Ethers (PBDEs) <b>NEW</b>
<input type="checkbox"/> Glycol Ethers	<input type="checkbox"/> Polychlorinated Biphenyls (PCBs)
<input type="checkbox"/> Major Ions <b>NEW</b>	<input type="checkbox"/> Pharmaceutical Personal Care Products (PPCPs) <b>NEW</b>
<input type="checkbox"/> Neonicotinoids <b>NEW</b>	<input type="checkbox"/> Strobins <b>NEW</b>
<input type="checkbox"/> Nitrosamines	

View/Edit List Entries

## Advanced Database Query

[Main](#)
[Taxonomic](#)
[Chemical](#)
[Test Results](#)
[Test Conditions](#)
[Publications/ Updates](#)
[Report Format](#)

**Taxonomic** ?

You may construct a query based on taxonomic information by using the simple [Taxonomic Name Entry](#), and/or by selecting [Predefined Taxonomic Groups](#). Information entered/selected in both sections will be joined during the query process.

**KEY FUNCTIONS**

- Review Query
- Restore Defaults
- Perform Query for Aquatic Data
- Perform Query for Terrestrial Data

**Taxonomic Name Entry** ?

[Clear Selections](#)

**Search Tip:** you may use the [Browse Species Index](#) feature to identify whether or not your species is included in the ECOTOX database, prior to conducting a search.

Kingdom:     Animals     Plants     Both

Enter either common or scientific organism names and/or species numbers below. Place each individual entry on a separate line. To ensure your final entry is included, end your selection list with a final return (enter key) .

For name searches:

- Genus/Species Name
- Species Common Name
- Other Taxonomic Names
- Contains
- Exact Match

Species Search: Enter species identifier or choose predefined biological groups.

**Predefined Taxonomic Groups** ?

[Clear Selections](#)

**Note:** The Endangered Species List is current as of June 2016.

**Animals**

- Amphibians
- Birds
- Crustaceans
- Fish
- Insects/Spiders
- Other Invertebrates
- Mammals
- Molluscs
- Reptiles
- Worms

**Plants**

- Algae, Moss, Fungi
- Flowers, Trees, Shrubs, Ferns

**Special Interest**

- Standard Test Species
- U.S. Threatened and Endangered Species
- U.S. Exotic/Nuisance Species

[View/Edit List Entries](#)



# Advanced Database Query

[Main](#)
[Taxonomic](#)
[Chemical](#)
[Test Results](#)
[Test Conditions](#)
[Publications/ Updates](#)
[Report Format](#)

## Test Results: ?

You may construct a query by selecting measured [Endpoints](#) and/or [Effects Measurements](#).

**KEY FUNCTIONS**

- Review Query
- Restore Defaults
- Perform Query for Aquatic Data
- Perform Query for Terrestrial Data

Effects Search: Identify effect endpoints of interest.

Effect Measurements ? Clear Selections

**Search Tip:** You may use the [Browse Effects Index](#) to view and select effects found in the system.

**Accumulation Group**
 **Ecosystem Group**
 **Physiology Group**

Ecosystem Process
  Injury
  Immunological
  Intoxication
  Physiological

**Behavior Group**
 **Growth Group**
 **Population Group**

Avoidance
  Developmental
  Behavior
  Growth
  Feeding Behavior
  Morphological

**Biochemical Group**
 **Mortality Group**
 **Reproduction Group**

Biochemical
  Enzyme
  Hormone
  Reproduction
  Avian/Reptilian Egg

**Cellular Group**
 **No Effect Group Coded**
 *Include Recovery Results*

Cellular
  Genetic
  Histological

Click on the "View/Edit Effect Measurements" button to refine your effect search further or to display the measurements for the effects you have selected.

View/Edit Effect Measurements

**Selections from Browse Effects:**  
You may go back to [Browse Effects Index](#) to modify selections.

## Next Generation ECOTOX is soon to be released!



Improved data accessibility and end user experience



Risk assessor default output focused on critical data



Direct linkages to other chemical knowledgebases



Graphical Data Visualization tools





# New Home Screen

**ECOTOX Knowledgebase** Home Search Explore Help [Contact Us](#)

Recent chemicals with full searches and coding completed:

Abamectin	Chlorzoxolon	N-Methylpiperidone
Asbestos	Cyclic Aliphatic Bromides	Pyrimethozine
Atrazine	Dazomet	Pyriproxyfen
1-Bromopropane	1,4-Dioxane	Tetrachloroethylene
Bromoxynil	Dithiopyr	Trichloroethylene
Carbon tetrachloride	Methylene chloride	

Total in database:

11,268	Chemicals	12,395	Species
46,754	References	881,950	Results*

**ECOTOX IS IN BETA!**  
Click here to help us improve your experience by providing feedback.

## About ECOTOX

The ECOTOXicology knowledgebase (ECOTOX) is a comprehensive, publicly available knowledgebase providing single chemical environmental toxicity data on aquatic life, terrestrial plants and wildlife.



[LEARN MORE](#)

## Getting Started

If you know the exact search term(s) you are looking for, you can head straight to the [Search](#) page. However, if you'd like to explore the ECOTOX system and its available search parameters, use the [Explore](#) page. Utilize the [Help](#) page for more information and how to's.

## NEW Data Visualizations!



Using the ECOTOX Knowledgebase FXP DRF feature allows you to browse data within ECOTOX and use the data plotting option to view your results. You can interact with the data plots by hovering over specific data points or scrolling to zoom in on specific sections of data.

[START EXPLORING](#)

[DOWNLOAD ASCII DATA](#)

## Search Tip

### Chemical, Species and Effect Groups

To locate examples of related effects in ECOTOX, the following query can be completed by searching Chemical Group, Species Group and Effect in the ECOTOX Advanced Query:

- Open Advanced Query
- On the Taxonomic tab, Predefined Taxonomic Groups, select Amphibians
- On the Chemical tab, select Pharmaceutical Personal Care Products (PPCPs) from the Predefined Chemical Groups
- On the Test Results tab, select Behavior Group and Reproduction Group
- Select 'Perform Query for Aquatic Data' for aquatic life stages or 'Perform Query for Terrestrial Data' for the terrestrial life stages


[GET UPDATES VIA EMAIL](#)

## Other Links

- [Limitations](#)
- [Frequent Questions](#)
- [Other Tools/Databases](#)
- [Recent Additions](#)


Single chemical search strategies have similar approaches to current Advanced Search functions with some significant upgrades

## ECOTOX Knowledgebase

Parameters  **AQUATIC** TERRESTRIAL

**< Chemicals**

*Enter each chemical name and/or CAS registry number on separate lines.*

See [EPA Chemistry Dashboard](#) 

**Any Chemical Group**


Metal or Organometal Compounds

Aluminum  Lead  
 Antimony  Manganese  
 Arsenic  Mercury



## ECOTOX Knowledgebase

Home Search Explore Help

Parameters  **AQUATIC** TERRESTRIAL

393 results

Chemical	Organism Group	Endpoint	Test Condition	Publication Options
Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Antimony	Antimony	Antimony	Antimony	Antimony
Arsenic	Arsenic	Arsenic	Arsenic	Arsenic
Lead	Lead	Lead	Lead	Lead
Manganese	Manganese	Manganese	Manganese	Manganese
Mercury	Mercury	Mercury	Mercury	Mercury



## Chemistry Dashboard

Search a chemical by systematic name, synonym, CAS number, or InChIKey



Single component search  Ignore isotopes

See what people are saying, read the dashboard comments!

Need more? Use advanced search.

747 Thousand Chemicals

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Latest News

Choose a starting point below.



CHEMICALS



SPECIES



EFFECTS

### About Explore

**Explore** is a great tool for searching the ECOTOX Knowledgebase if you do not know the exact parameters you want to search, or would like a visual representation of general and specific data trends.

The ECOTOX Knowledgebase **Explore** function is an interactive way to examine search paths by Chemical, Species, and Effects. Once you've selected the path to explore, additional data fields will be displayed to filter your data, e.g. Effects, Endpoints, Publication Year.

During the exploration there are also options to examine the data visually via plotting functions. Once you have completed your exploration, you are able to select different options for exporting the data.

# Data visualization of chemical, effect and species data searched “On-The-Fly”

ECOTOX Knowledgebase

Home Search **Explore** Help

Contact Us

Explore > Chemicals > Perfluorooctane Sulfonates and Acids (PFOS/PFOA)

AQUATIC  TERRESTRIAL

1,745 Total Records – 1,599 Plottable Records

Plottable Records selected by Standardized Concentration Units and ordered by Concentration (low-high)

Query Filters

Select one or more of each filter to reduce the records.

Chemicals (6)

All

Species Group (115)

All

Species (140)

All

Effect Groups (119)

All

Effect Measurements (220)

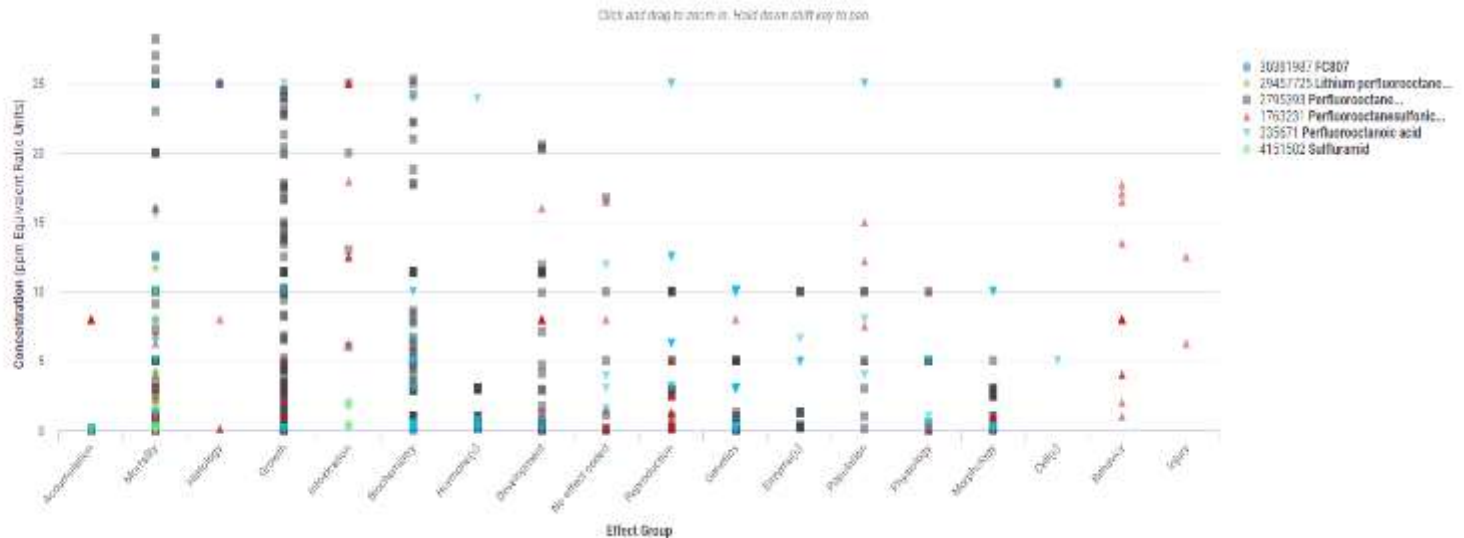
All

DUR - CHEM DUR - ENDP **EFFECT - CHEM**

EXPORT

Reduced to 1,745 records

RESET



# “Zoom” and Filter visually with corresponding tabular output

AQUATIC

TERRESTRIAL

**Query Filters**

Select one or more [+](#) of each filter to include the records.

**Chemicals** (18)

All

**Species Group** (1)

Fish

**Species** (18)

All

**Effect Groups** (14)

All

**Effect Measurements** (14)

All

**Endpoints** (3)

3 Selected

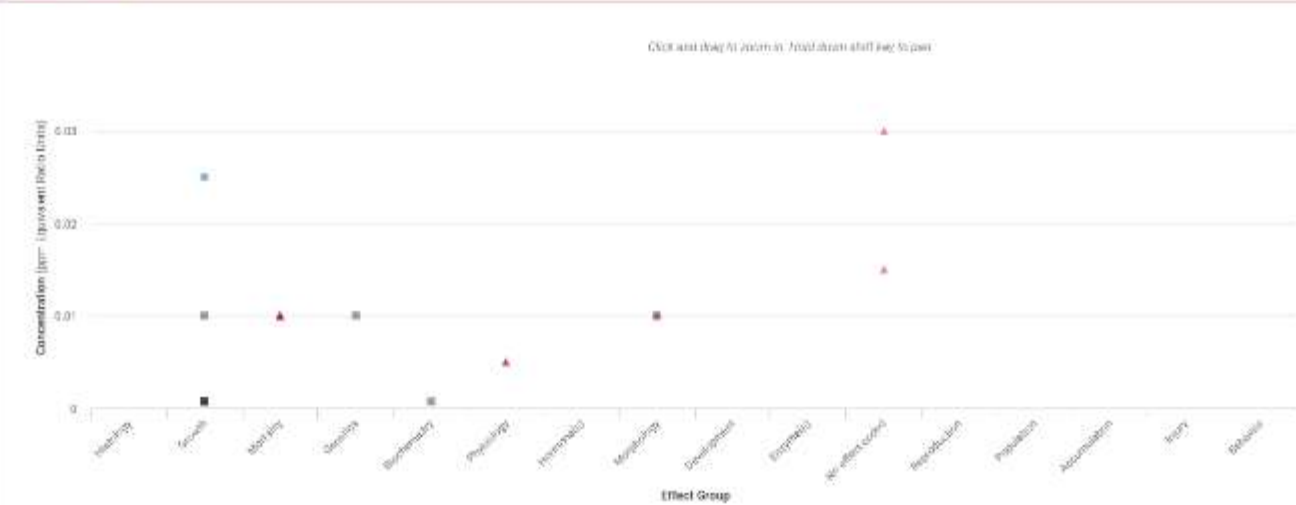
**Publication Years**

2019 to 2017

**980 Total Records – 951 Plottable Records**

Plottable Records selected by [Standardized Concentration Units](#) and ordered by [Concentration \(low-high\)](#)

Reduced to 20 records



CAS NO.	CHEMICAL NAME	SPECIES...	COMMON...	EFFECT	MEASUREMENT	ENDPOINT	DUR (STD)	CONC. TY...	CONC. ME...	CONC. UN...	PUB. YEAR	REFEREN...
1740031	Perfluorooctanesulfonic acid	Cyrtias latipes	Japanese Medaka	Mortality	Fish	LD50	78	First-order	< 0.1	All mg/l	2008	114978

CAS NO.	CHEMICAL NAME ^	SPECIES NAME	COMMON ...	EFFECT	MEASUREMENT	ENDPOINT	DUR (STD)	CONC. TY..	CONC. ME.. ^	CONC. UN..	PUB. YEAR	REFEREN..
type to filter...	...	...	...	...	...	...	...	...	...	...	...	...
335671	Perfluorooctanoic acid	Mytilus galloprovincialis	Mediterranean Mussel	Development	Normal	NOEC	2	Formulation	0	Al mg/L	2014	169855
335671	Perfluorooctanoic acid	Mytilus galloprovincialis	Mediterranean Mussel	Development	Normal	LDEC	2	Formulation	0.0001	Al mg/L	2014	169855
1763231	Perfluorooctanesulfonic acid	Xenopus laevis	African Clawed Frog	Genetics	Thyroid hormone regulated basic transcription element-binding protein mRNA	LDEC	67	Active ingredient	0.0001	Al mg/L	2011	157821
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Biochemistry	Vitelogenin	LDEC	316	Active ingredient	0.0007	Al mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	LDEC	180	Active ingredient	0.0007	Al mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	LDEC	226	Active ingredient	0.0007	Al mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Weight	LDEC	90	Active ingredient	0.0007	Al mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	LDEC	316	Active ingredient	0.0007	Al mg/L	2012	160092



CAS No.	Chemical Name	Species Name	Common Name	Effect	Measurement	Endpoint	Dur (Std)	Conc. Type	Conc.	Conc. Units	Pub. Year	Reference No
335671	Perfluorooctanoic acid	Mytilus galloprovincialis	Mediterranean Mussel	Development	Normal	NOEC		2 Formulation	0	AI mg/L	2014	169855
335671	Perfluorooctanoic acid	Mytilus galloprovincialis	Mediterranean Mussel	Development	Normal	LOEC		2 Formulation	0.0001	AI mg/L	2014	169855
1763231	Perfluorooctanesulfonic acid	Xenopus laevis	African Clawed Frog	Genetics	Thyroid hormone regulated	LOEC		67 Active ingredient	0.0001	AI mg/L	2011	157821
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Biochemistry	Vitellogenin	LOEC		316 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	LOEC		180 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	LOEC		226 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Weight	LOEC		90 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	LOEC		316 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	LOEC		226 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Weight	LOEC		226 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	NOEC		180 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	NOEC		316 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Weight	NOEC		316 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Weight	NOEC		316 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Weight	LOEC		180 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Danio rerio	Zebra Danio	Growth	Length	LOEC		90 Active ingredient	0.0007	AI mg/L	2012	160092
2795393	Perfluorooctane sulfonate potassium salt	Cyprinus carpio	Common Carp	Accumulation	Residue	BCF		58 Active ingredient	0.0019	AI mg/L	2012	160552
2795393	Perfluorooctane sulfonate potassium salt	Chironomus tentans	Midge	Development	Emergence	NOEC		20 Active ingredient	0.0023	AI mg/L	2004	87173
2795393	Perfluorooctane sulfonate potassium salt	Chironomus tentans	Midge	Development	Emergence	LOEC		20 Active ingredient	0.0023	AI mg/L	2004	87173
1763231	Perfluorooctanesulfonic acid	Lampsilis siliquoidea	Lamp-Mussel	Development	Metamorphosis	NOEC		44 Active ingredient	0.0045	AI mg/L	2012	160209
1763231	Perfluorooctanesulfonic acid	Lampsilis siliquoidea	Lamp-Mussel	Accumulation	Residue	BCF		36 Active ingredient	0.0045	AI mg/L	2012	160209
335671	Perfluorooctanoic acid	Cyprinus carpio	Common Carp	Accumulation	Residue	BCF		28 Active ingredient	0.0047	AI mg/L	2012	160552
1763231	Perfluorooctanesulfonic acid	Danio rerio	Zebra Danio	Physiology	Heart rate	NOEC		1.75 Active ingredient	0.005	AI mg/L	2010	151614
1763231	Perfluorooctanesulfonic acid	Danio rerio	Zebra Danio	Physiology	Heart rate	NOEC		2.25 Active ingredient	0.005	AI mg/L	2010	151614
2795393	Perfluorooctane sulfonate potassium salt	Crassostrea gigas	Pacific Oyster	Accumulation	Residue	BAF		28 Active ingredient	0.0061	AI mg/L	2010	150289
2795393	Perfluorooctane sulfonate potassium salt	Crassostrea gigas	Pacific Oyster	Accumulation	Residue	BCF		7 Active ingredient	0.0061	AI mg/L	2010	150289
2795393	Perfluorooctane sulfonate potassium salt	Crassostrea gigas	Pacific Oyster	Accumulation	Residue	BAF		28 Active ingredient	0.0061	AI mg/L	2010	150289
2795393	Perfluorooctane sulfonate potassium salt	Crassostrea gigas	Pacific Oyster	Accumulation	Residue	BCF		7 Active ingredient	0.0061	AI mg/L	2010	150289
2795393	Perfluorooctane sulfonate potassium salt	Crassostrea gigas	Pacific Oyster	Mortality	Mortality	NR-ZERO		56 Active ingredient	0.0061	AI mg/L	2010	150289
2795393	Perfluorooctane sulfonate potassium salt	Crassostrea gigas	Pacific Oyster	Mortality	Mortality	NR-ZERO		56 Active ingredient	0.0061	AI mg/L	2010	150289
335671	Perfluorooctanoic acid	Crassostrea gigas	Pacific Oyster	Mortality	Mortality	NR-ZERO		56 Active ingredient	0.0065	AI mg/L	2010	150289
335671	Perfluorooctanoic acid	Crassostrea gigas	Pacific Oyster	Accumulation	Residue	BCF		7 Active ingredient	0.0065	AI mg/L	2010	150289
335671	Perfluorooctanoic acid	Crassostrea gigas	Pacific Oyster	Accumulation	Residue	BAF		28 Active ingredient	0.0065	AI mg/L	2010	150289
335671	Perfluorooctanoic acid	Crassostrea gigas	Pacific Oyster	Mortality	Mortality	NR-ZERO		56 Active ingredient	0.0067	AI mg/L	2010	150289
335671	Perfluorooctanoic acid	Crassostrea gigas	Pacific Oyster	Accumulation	Residue	BAF		28 Active ingredient	0.0067	AI mg/L	2010	150289
335671	Perfluorooctanoic acid	Crassostrea gigas	Pacific Oyster	Accumulation	Residue	BCF		7 Active ingredient	0.0067	AI mg/L	2010	150289
335671	Perfluorooctanoic acid	Crassostrea gigas	Pacific Oyster	Accumulation	Residue	BCF		7 Active ingredient	0.0068	AI mg/L	2010	150289



# State and Federal Regulatory Applications

**CERCLA**

**AWQ**

**CWA**

- Site-specific ecological risk assessments on hazardous waste sites
- Development of benchmarks
  - Ecological soil screening levels
  - Organism toxicity reference values
  - Surface water effect concentrations
  - Sediment effect concentrations
- Ambient Water Quality Criteria for Aquatic Life
- Pesticide Registration
- Data source for Endangered Species chemical assessments
- Emergency Response
  - Assessment of ecological effects
  - Prioritization of threat from chemicals

**RCRA**

**FQPA**



## Contact Information

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