

# The ECOTOXicology Knowledgebase Literature Search and Review Processes for Identifying and Curating Toxicity Data for Ecological Risk Assessments

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*The views expressed in this presentation are those of the authors  
and do not necessarily reflect the views or policies of the U.S. EPA.*

# The Challenge

- Risk assessors needed a cost-effective means of locating relevant ecological toxicity data for:
  - Prioritizing chemical cleanup at hazardous waste sites
  - Assisting in the assessment of potential hazards of pollutants through the Clean Air Act, the Clean Water Act, the Federal Insecticide, Fungicide and Rodenticide Act and the Toxic Substances Control Act.
- Data must be identified with transparent processes and be accessible
- Duplicative efforts for data gathering wastes resources across state and federal agencies

# The On-going Challenge and Opportunities

- The accelerated pace of chemical risk assessment for ecological receptors
- Discovery of “new” chemicals of ecotoxicological concern
- Increase in number and diversity of journals
- Changing landscape of toxicity data used for ecological risk assessment
- Decreasing dependency of traditional whole animal testing
- Tool development to:
  - Expedite information gathering of information
  - Rapidly sort through BROAD keyword searches (e.g., chemical name)
- Digital formats of journals allow for use of data analytic applications
- Shift from apical endpoints to NAMs requires transparent development of controlled vocabulary for systematic data curation
- Providing a means to take full advantage of existing data before conducting new toxicity studies

# What is the ECOTOXicology Knowledgebase?

- 30+ years of curating single chemical toxicity effects data for aquatic and terrestrial organisms
- Systematic and transparent literature search and review of open and grey literature
- >1 million test results from >52,000 references

The screenshot shows the ECOTOX Knowledgebase website. At the top is the EPA logo and navigation links: Environmental Topics, Laws & Regulations, and About EPA. Below this is the ECOTOX Knowledgebase header with tabs for Home, Search, Explore, and Help. A search bar is in the top right. The main content area is divided into several sections:

- Data last updated:** Sep 15, 2022. A link to "See update totals" is provided.
- Recent chemicals with full searches completed and data extracted:** A table showing ADBAC, Dinotefuran, Per- and Polyfluoroalkyl Substances (PFAS), and Thallium.
- Total in database:** A table showing 12,619 Chemicals, 13,768 Species, 53,452 References, and 1,122,354 Results.
- About ECOTOX:** A brief description of the Knowledgebase and a link to "Learn More".
- Getting Started:** A list of links including "Use Search", "Use Explore", "ECOTOX Quick User Guide", "ECOTOX User Guide", and "ECOTOX Terms Appendix".
- Other Links:** A list of links including "Frequent Questions", "Limitations", "Other Tools/Databases", "Recent Additions", and "Literature Search Dates".
- New Additions!:** A link to "New Additions" and a "Get Updates via Email" button.
- Search Tip:** A link to "Search Tip".
- ASCII Download:** A link to "Download ASCII Data".

[www.epa.gov/ecotox](http://www.epa.gov/ecotox)

## ECOTOX Data Curation Pipeline



# ECOTOX Data Curation Pipeline



- Verify CASRN
- Search various sources for chemical term
- Synonyms
- Eliminate poor search terms

Tak(Acidid OR Albrass OR Bexton OR "CP 31393" OR "Kartex A" OR Muharicid OR Niticid OR Propachlor OR Propachlore OR Ramrod OR Satecid OR "US EPA PC Code 019101")

**\* Web-based tool to identify and document relevant search terms**

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## Chemical-based Literature Searches

### Search Engines

1. Scopus/Science Direct
2. ProQuest
3. Web of Science
4. PubAg/AGRICOLA
5. PubMed Toxline/TOXNET
6. Dissertation Abstracts

**\* Semi-automated batch searches with Abstract Sifter Plus**

# ECOTOX Data Curation Pipeline



Chemical  
verification &  
development of  
search terms

Conduct  
literature  
searches

Identify and  
acquire potentially  
applicable studies

Review  
literature for  
applicability

Extract study  
and toxicity  
data

Literature Search  
Results

Title and  
Abstract  
Screening

Full Text  
Screening

Author	Year	Title	Call Number	Ref Type	Keywords
Song	1995	Doing Christian theology with Jesus in Asia		Journal (simple)	Incarn; LibThe
Song	1976	From Israel to Asia: A theological leap		Book Section	Incarn; LibThe
Song	1983	Jesus Christ — The life of the world — An Asian meditation		Journal Article	Incarn; LibThe
Song	1997	Christian theology: Towards an Asian reconstruction		Electronic So...	
Song	2006	Contextualization and discipleship: Closing the gap between t...		Journal (simple)	Contextualisa
Sonn	2004	A brief history of Islam		Book (Simple)	Islam
Sorntag	1977	On photography		Book (Simple)	Env
Sookhdeo	1987	New frontiers in mission		Edited Book	
Sorros	1999	The crisis of global capitalism		Book (Simple)	Future
Sorrell	1988	St Francis of Assisi and nature: Tradition and innovation in W...		Book (Simple)	Env
Sorum	1993	Cheap grace, costly grace, and just plain grace		Journal Article	Incarn; Bonho
Soakice	1985	Metaphor and religious language	BU1.5	Book (Simple)	Incarn; Christi
South African...	2009	Climate change: A challenge to the churches in South Africa		Book (Simple)	Env
South African T...	1998	Final report [of the TRC]		Electronic So...	Reconciliation
Southern	1997	Western society and the church in the middle ages		Book (Simple)	Book (Simple)
Southgate	2008	The groaning of creation: God, evolution and the problem of evil	Req 1003	Book (Simple)	Evolution
Southgate	1999	God, humanity and the cosmos: A textbook in science and religion	RF20.2	Book (Simple)	Env
Spangler	1977	Towards a planetary vision		Book (Simple)	New Age
Spangler	1993	The New Age: The movement toward the divine		Book Section	New Age
Spanio	2003	Adolescent brain development		Journal (simple)	Chaplaincy
Spears	1978	Australian popular culture		Book (Simple)	Aust
Spedell	1990	Incarnational social ethics		Book Section	Incarn; Other
Spedell	1987	The incarnation as the hermeneutical criterion for liberation a...		Journal (simple)	Incarn; LibThe
Spencer	1998	God the stranger: An intercultural Hispanic American perspective	RQ20	Book Section	Multicultural
Spencer	1998	The global God: Multicultural evangelical views of God	231	Edited Book	Multicultural

4. 2 Ecom Entomol. 2016 Jul 18; pii: t0w146. [Epub ahead of print]  
Sulfur Dust Bags: A Novel Technique for Ectoparasite Control in Poultry Systems.  
Murtillo AC(1), Mullens BA(2).

Author information:  
(1)Department of Entomology, University of California, Riverside, CA 92521  
(2)Department of Entomology, University of California, Riverside, CA 92521 (alock008@ucr.edu; bradley.mullens@ucr.edu; alock008@ucr.edu; bradley.mullens@ucr.edu).

Animal welfare-driven legislation and consumer demand are changing how laying chickens are housed, thus creating challenges for ectoparasite control. Hens housed in suspended wire cages (battery cages) are usually treated with high-pressure pesticides. This application type is difficult in enriched-cage or cage-free production. Alternatives to pesticide sprays are needed in enriched-cage or cage-free systems. In this study, we tested the efficacy of sulfur dust applied in 'dust bags' for control against the northern fowl mite (*Ornithonyssus sylvestris*), which causes host stress, decreased egg productivity, and reduced feed conversion efficiency. Dust bags were hung from the tops of cages or were clipped to the inside front cages. We also tested permethrin-impregnated plastic strips, marketed for ectoparasite control in caged or cage-free commercial and backyard flocks. Previous work has shown sulfur to be very active against poultry ectoparasites; however, we found that the placement of bags was important for mite control. Sulfur in hanging bags reduced mites on treatment birds by 95 or 97% (depending on trial) within one week of being deployed, and mite counts on these birds were zero after 2 wk. Clipped bags acted more slowly and did not significantly reduce mites in one trial, but reduced mite counts to zero after 4 wk in trial 2. Permethrin strips had no effect on mite populations. This may have been due to mite resistance, even though this mite population has not been exposed to pyrethroids for several years. Sulfur bags should be effective in caged or cage-free systems.

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DOI: 10.1093/ee/t0w146

Ecotoxicology 2, 93–120 (1993)

The impact of the Cyanamid Canada Co. discharges to benthic invertebrates in the Welland River in Niagara Falls, Canada

MIKE DICKMAN and GRAZYNA RYGIEL

Biological Sciences Department, Brock University, St. Catharines, Ontario, Canada L2S 3A1

Received 15 July 1992; accepted 6 December 1992

In 1986, the International Joint Commission (IJC) recommended that the Niagara River watershed should be declared an Area of Concern (AOC). This IJC recommendation was ratified by the 4 signatories of the Great Lakes Water Quality Agreement. In order to delist an AOC, it is necessary to locate any areas of impairment within the watershed and carry out remediation projects that permit uses that were previously impaired. To this end we attempted to determine whether or not the sediments at 7 study sites near the Cyanamid Canada (Chemical) Co. were contaminated at levels that would result in the impairment of the natural biota which inhabit the watershed.

The Cyanamid Canada (Chemical) Co. discharges ammonia wastes, cyanide, arsenic and a variety of heavy metals into treatment systems which ultimately discharge to the Welland River, the major Canadian tributary to the Niagara River. This portion of the Welland River near the factory was designated a 'Provincially Significant (Class one) wetlands by the Ontario Ministry of Natural Resources. In 1986, the mean discharge to a creek from Cyanamid Canada Co. was 27,342 m<sup>3</sup> per day (MCE, 1987). Similar discharge volumes occurred in 1989. In 1991, the total discharge was 25,000 m<sup>3</sup> per day (MOE, 1991).

The majority of the benthic invertebrates collected from the study area were pollution tolerant taxa (e.g., sludge worms constituted 68% of all the organisms collected). The lowest chironomid densities were observed at stations 1, 2, and 4, which were the only stations situated close to Cyanamid's discharge pipes. The absence of clams and mussels which burrow to greater depths than do chironomids and sludge worms, probably reflects the inability of the deeper dwelling burrowers to tolerate the contaminants which we recorded at these 3 stations. The absence of all crustaceans from these same 3 stations (stations 1, 2 and 4) when coupled with their low biotic diversity and the elevated heavy metal concentrations in the sediments were cause for concern. In addition, stations 2 and 4 displayed the highest frequency of chironomid midgut deformities. Stations 1 and 2 were located near a pipe which was one of Cyanamid Canada Company's major discharge point sources to the Welland River until a court order in 1980 stopped the company from discharging toxic material to the Welland River via that pipe. Elevated levels of cobalt (10 times above background), molybdenum (6 times above background), nickel (8 times above background), tungsten (24 times above background) and zinc (20 times above background) near the abandoned discharge pipe were correlated with the presence of pollution tolerant chironomid taxa such as *Polypedilum* and *Procladius*. The highest sludge worm densities were also observed at the abandoned pipe site which was the only site where oily wastes were found in the sediments.

Among the 1,275 chironomids taken from the seven Cyanamid Canada stations, the great majority were pollution tolerant taxa. The low biotic diversity and the presence of considerable numbers of pollution tolerant benthic macroinvertebrates in combination with the chemical

0963-6292/93/09030000\$05.00/0

# Applicability Requirements

Identify and  
acquire potentially  
applicable studies

Review  
literature for  
applicability

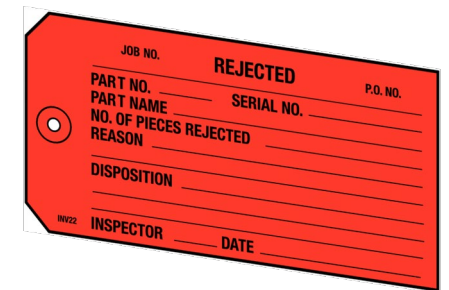
Key Area	Data Requirement
Species	<ul style="list-style-type: none"><li>• Taxonomically verifiable, ecologically-relevant organisms (including cells, organs, gametes, embryos, plant cuttings) [NOT bacteria, humans, monkeys, viruses, or yeast]</li></ul>
Chemical	<ul style="list-style-type: none"><li>• Single, verifiable chemical toxicants, administered through an acceptable route.</li></ul>
Exposure Amount (Concentration)	<ul style="list-style-type: none"><li>• Exposure amount is quantified, either as a concentration in the environment when administered via soil or water, or as a dosage when introduced directly into or on the organism, via injection, orally, or topically.</li></ul>
Exposure Duration	<ul style="list-style-type: none"><li>• Known duration from the time of initial exposure to the time of measurement.</li></ul>
Control	<ul style="list-style-type: none"><li>• Must have a control treatment</li></ul>
Effect	<ul style="list-style-type: none"><li>• Biological effect measured</li><li>• Effect concurrent with associated chemical exposure</li></ul>
Publication Type	<ul style="list-style-type: none"><li>• Primary source of the data [NOT a Review]</li><li>• Study must be a full article in English</li></ul>



# Exclusion Documentation

All Excluded and Non-Applicable studies are Tagged with the reason for rejection

- Abstract – published as an abstract
- Bacteria – only test organism is a bacteria
- CAS # Unavailable – could not verify/locate chemical CAS Registry number
- Chemical method – description of chemical analysis procedures
- Fate – only report chemical distribution in media
- Human Health – data on human subjects of surrogate animal subjects for human health risk assessment
- Incident – reports death of animal by poison, but does not provide concentration/duration of exposure
- Method – paper only reports methods for conducting a toxicity test or other aspect of an experiment
- Mixture – paper reports results from mixture of chemicals; no single chemical exposure results
- Modeling – results of the development of a model; no primary data available
- No Conc – the authors report a response in an organism but do not provide conc/dose/app rate
- No Duration – duration of exposure is not presented
- No Effect – paper does not report observed responses adverse of otherwise
- No Toxicant (ozone, CO2)
- Non-English
- Nutrient – in situ chemical tested as nutrient
- PUBL AS – duplicate data published elsewhere
- Retracted – paper retracted by Journal
- Review – primary data published elsewhere
- Sediment – only sediment concentration presented
- Survey – chemical measured in organism, but lack quantification of exposure (dose/duration)
- Virus – virus is only test organism
- Yeast – yeast is only test organism



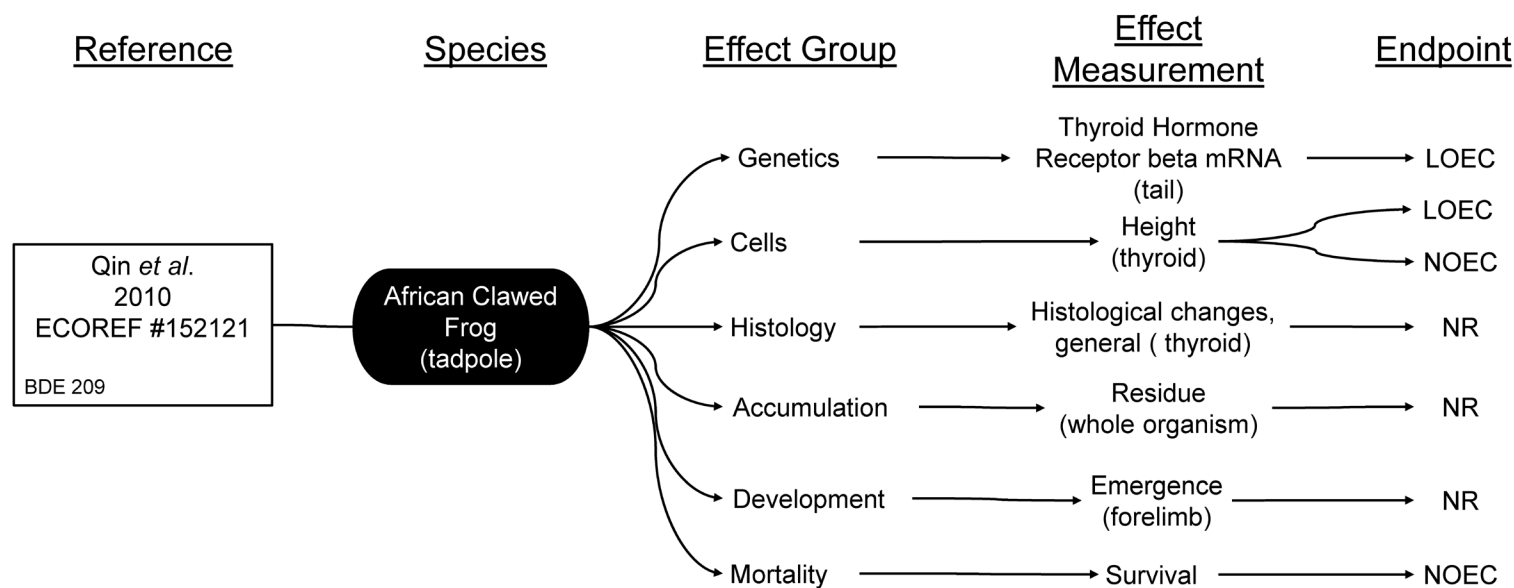
# ECOTOX Data Curation Pipeline



Journal of Environmental Sciences  
Volume 22, Issue 5, 2010, Pages 744-751



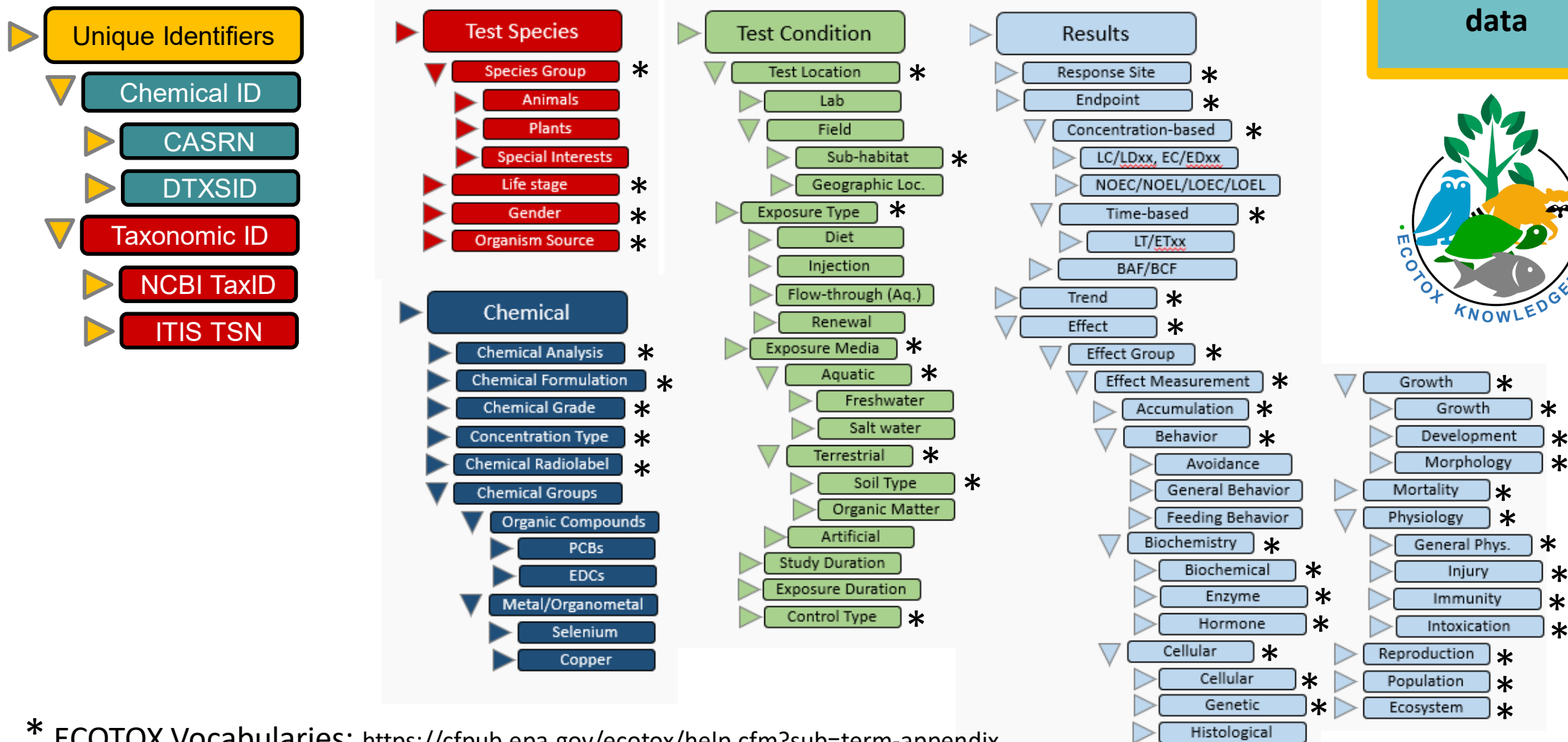
Thyroid disruption by technical decabromodiphenyl ether (DE-83R) at low concentrations in *Xenopus laevis*



NOEC = No Observed Effect Level LOEC = Lowest Observed Effect Level NR = Not Reported

# ECOTOX Data Fields

Extract study  
and toxicity  
data



\* ECOTOX Vocabularies: <https://cfpub.epa.gov/ecotox/help.cfm?sub=term-appendix>

# ECOTOX Data Fields

Extract study  
and toxicity  
data

## GUI for data curation

- Up to 90 entities (300-400 data fields) per study
- Following controlled vocabularies
- Computationally assisted
- Consistent extraction

\* ECOTOX Vocabularies:  
<https://cfpub.epa.gov/ecotox/help.cfm?sub=term-appendix>

Test

Print Excel Add Result Copy Test Copy Test Copy Test Delete Test Close

Reference Skim

Errors: 0 Warnings: 0

ECOREF#: 179843

Nine-Year Response of Douglas-Fir and the Mixed Hardwood-Shrub Complex to Chemical and Manual Release Treatments on an ICHmw2 Site near Salmon Arm, by Simard, S., and J. Heinemann, 1996

ID	Chemical	Habitat	Species	Age	Lifestage	Study Type	Exposure Type	Test Location	#Results	Create Date	Modified Date	Expand
2231248	38641940 - Vision	Soil	3795 - Pseudotsuga menziesii	NR	NR	NR	HS	FIELDN	1	10/30/2019	10/30/2019	
2231249	38641940 - Vision	Soil	3214 - Betula papyrifera	NR	NR	NR	HS	FIELDN	1	10/30/2019	10/30/2019	

Chemical Information Species Information Test Information Habitat Information (Soil)

Study Duration: 9 yr, Application Frequency: 1 yr, Control/Dose Types: B,C

Exposure Duration: 9 yr, Concentration Types: A, Exposure Type: ENV - HS, Media Type: NAT, Media Comments: BRUNISOLIC GRAY LUVIS

# Doses: 3, Doses: 1, 2, 3, Experimental Design: RANDOMIZED COMPLETE BLOCK DESIGN


Other Effects: MANUAL CUTTING

Cancel Save Save and Add Copy Save and Continue Save and Add Result

# Informing Study Evaluation

Regulatory Toxicology and Pharmacology 88 (2017) 227–237


Contents lists available at [ScienceDirect](#)

 **ELSEVIER**

Regulatory Toxicology and Pharmacology


journal homepage: [www.elsevier.com/locate/yrtph](http://www.elsevier.com/locate/yrtph)

Relevance and reliability of experimental data in human health risk assessment of pesticides

 **ELSEVIER**

Toxicology Letters

Volume 189, Issue 2, 10 September 2009, Pages 138–144



“ToxRTool”, a new tool to assess the reliability of toxicological data

Klaunig  
Agnes

**Environmental  
Toxicology and Chemistry**

Hazard/Risk Assessment | [Open Access](#) | 

CRED: Criteria for reporting and evaluating ecotoxicity

Caroline T.A. Moermond , Robert Kase, Muris Korkaric, Marlene Ågerstrand

First published: 24 September 2015 | <https://doi.org/10.1002/etc.3259> | Citations: 85

## Select study evaluation questions with relevant ECOTOX field(s)

<b>Chemical</b>	<ul style="list-style-type: none"> <li>Is test substance identified? <b>Required for inclusion in ECOTOX</b></li> <li>Is the purity of test substance reported? <b>Chemical Purity</b></li> <li>Were chemical concentrations verified? <b>Chemical Analysis</b> (e.g., nominal versus measured concentrations)</li> </ul>
<b>Species</b>	<ul style="list-style-type: none"> <li>Is the species given? <b>Verifiable species (Scientific Name, etc.) required for inclusion in ECOTOX</b></li> <li>Are the organisms well described? <b>Organism Source, Lifestage, Age, Gender, Initial and Final Weight</b></li> </ul>
<b>Test Conditions</b>	<ul style="list-style-type: none"> <li>Are appropriate controls performed? <b>A control is required for inclusion in ECOTOX</b>, type described in <b>Control</b></li> <li>Is a guideline method (e.g., OECD) used? <b>Test Method</b></li> <li>Are the experimental conditions appropriate and acceptable for the test substance and organism? <b>Test Method, Media Type, Test Location, Experimental Design</b>, Physical and Chemical Soil and Water Parameters (e.g., <b>pH, Temperature, Dissolved Oxygen</b>)</li> </ul>
<b>Test Results</b>	<ul style="list-style-type: none"> <li>Are the reported effects and endpoints appropriate for the purpose, test substance and organism? <b>Effect Measurement, Endpoint</b></li> <li>Is the response/effect statistically significant? <b>Statistical Significance, Significance Level</b></li> </ul>

# Developing Data Evaluation Tools

WHAT'S NEXT?

Collaboration with  
USEPA's Office of Water

Manage Existing DERs

**Office of Water DER Template**

Preview DER      Return to Dashboard

DER ID: 345

Last Modified: 10/19/2020 14:11      By: Steve Erickson

**Save**      Workflow Status: QAing      Assigned To: Brian Kinziger

**Data Evaluation Report on the Effects of Potassium perfluorooctanesulfonate on Fish *Danio rerio***

The DER template below has been populated with ECOTOX data coded in UNIFY. Fill in any supplemental information to prepare the DER for the Risk Assessor's evaluation.

Part A: Overview

**I. Test Information**

**Chemical**

CAS Name: Potassium perfluorooctanesulfonate  
CAS Number: 2795393  
Purity: 98  
[UNIFY purity comments are also displayed if valued.]

Storage Conditions: NR

Solubility in Water (units): approximately 500 mg/l

**General Notes:**

The concentration of PFOS in any experiment was always well below its reported solubility in water (~500 mg/L) [26]. [26] Beach SA, Newsted JL, Coady K, Giesy JR. 2006. Ecotoxicological evaluation of perfluorooctanesulfonate (PFOS). Rev Environ Contam Toxicol 186:133-174.

☒ Controlled Experiment (manipulated)  
☐ Field Study/Observation (not manipulated)

Primary Reviewer: Anne Pilli      Date: 10/12/2020      ☐ EPA      ☒ Contractor      **Sign Electronically**

QA Reviewer:      Date:      ☐ EPA      ☐ Contractor      **Sign Electronically**

Secondary Reviewer:      Date:      ☐ EPA      ☐ Contractor      **Sign Electronically**

(At least one reviewer should be from EPA for sensitive taxa)

**Save**      Top of page

**Citation:**

Indicate: author(s), year, study title, journal, volume, and pages (e.g., Slonim, A.R. 1973. Acute toxicity of beryllium sulfate to the common guppy. J. Wat. Pollut. Contr. Fed. 45(10): 2110-2122).

Sharpe, R.L., J.P. Benskin, A.H. Laarman, S.L. MacLeod, J.W. Martin, C.S. Wong, and G.G. Goss. 2010. Perfluorooctane Sulfonate Toxicity, Isomer-Specific Accumulation, and Maternal Transfer in Zebrafish (*Danio rerio*) and Rainbow Trout (*Oncorhynchus mykiss*). Environ. Toxicol. Chem. 29(9): 1957-1966. ECOTOX Ref. No. 151619

**Companion Papers:**

- Application pulls objective data extracted from existing records
- Platform now has ability for curators to add subjective observations
- Allows multiple reviewers
  - Primary
  - QA
  - Secondary



# ECOTOX Version 5

[www.epa.gov/ecotox](http://www.epa.gov/ecotox)



Environmental Topics    Laws & Regulations    About EPA

## ECOTOX Knowledgebase

Home    Search    Explore    Help

Contact Us

Search EPA.gov

## Search

- All Chemicals +
- All Effects +
- All Endpoints +
- All Species +
- All Test Conditions +
- All Publication Options +

### About Search

**Search** is a great tool for retrieving data from the ECOTOX Knowledgebase using exact parameters you want to search.

The **Search** function provides a direct method to retrieve data that can be filtered by the search based on specific parameters including but not limited to: Chemical, Endpoint, Control, and Media Type. Once you have selected your search parameters, you can view the report in the browser or export to an Excel spreadsheet or download the data.

[Search Tip >](#)

Get Updates via Email

## Explore

- ☒ Aquatic
- ☒ Terrestrial

Group Summary    Records    Plot View    [Send Query Filters to Search](#)

[Export CSV](#)

### Query Filters

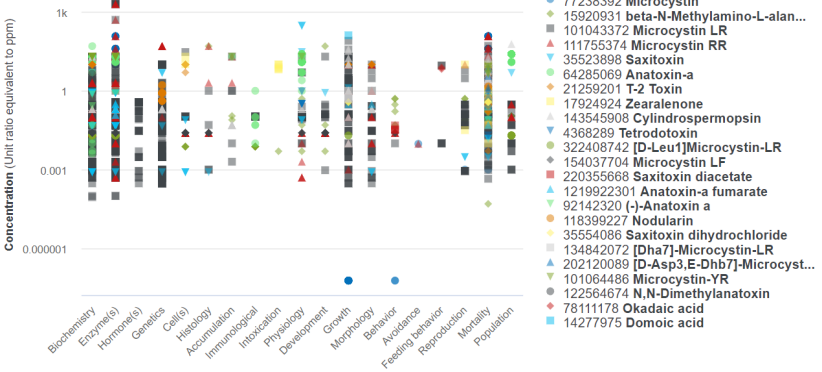
Select one or more of each filter to reduce the records.

- Chemicals (26)  
26 Selected
- Species Group (11)  
All
- Class (25)  
All

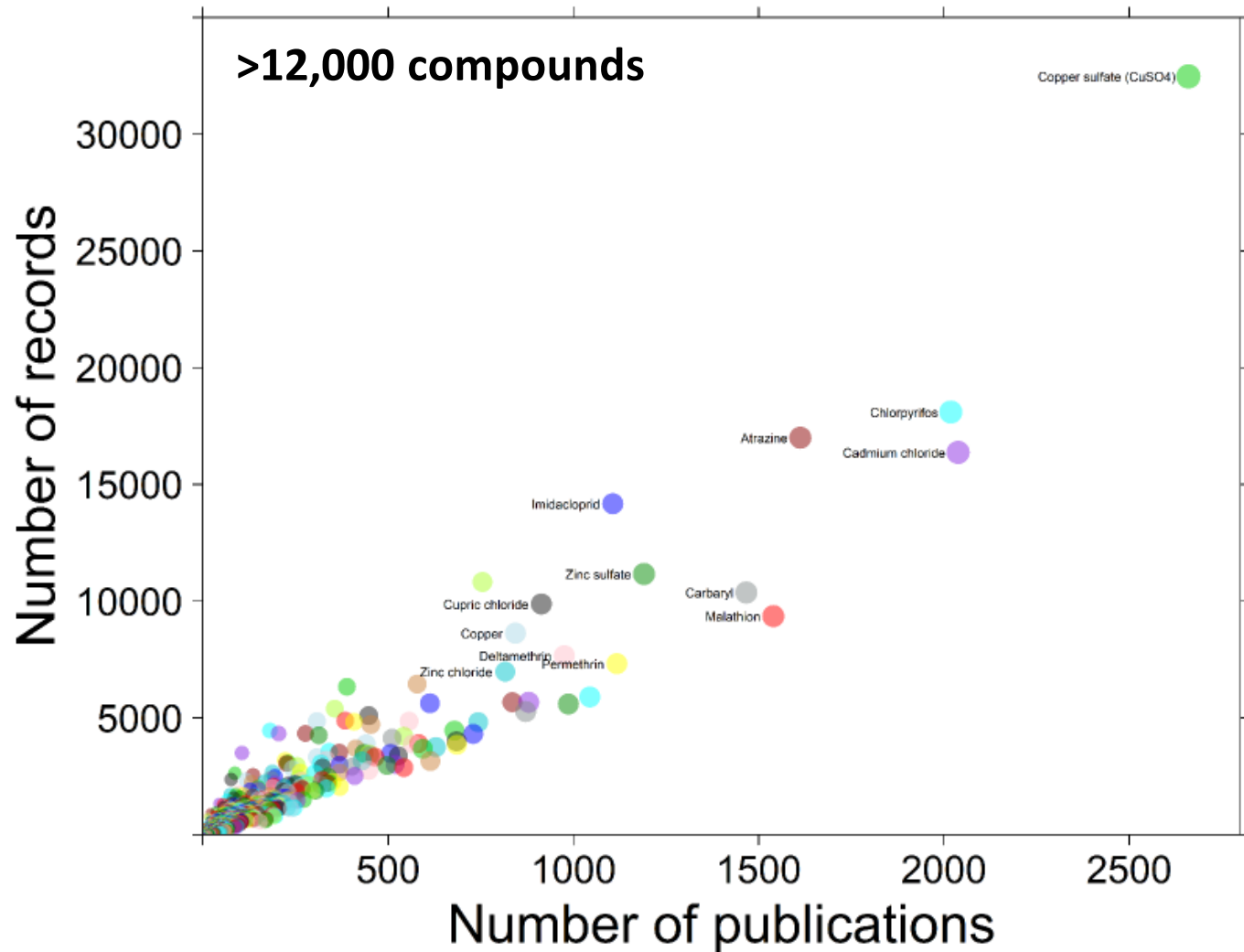
### 26 Chemicals

Chemicals are ordered by CAS Number.

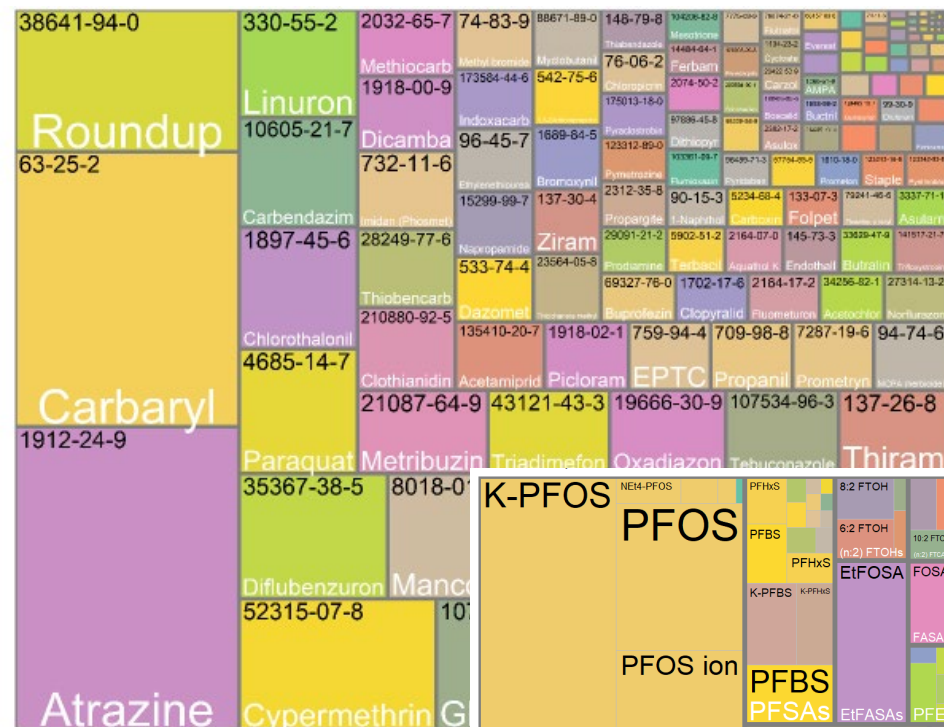
### Interactive Data Filtering and Data Visualization



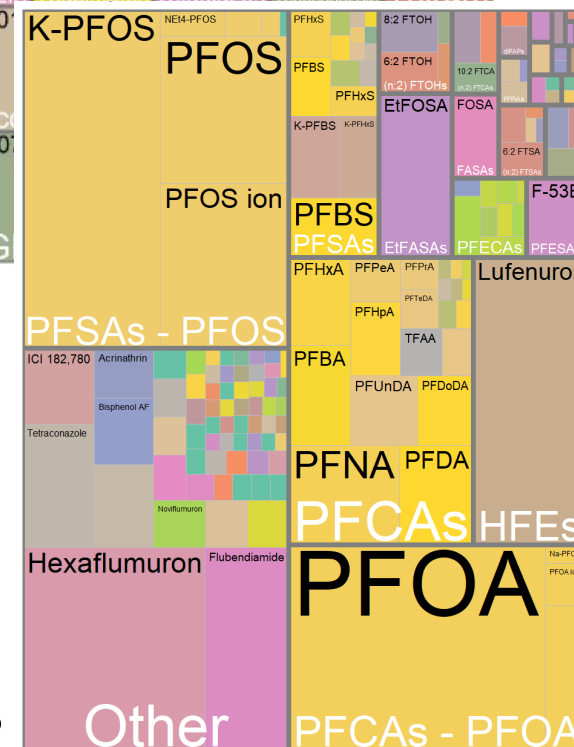
# Chemicals



## Pesticides



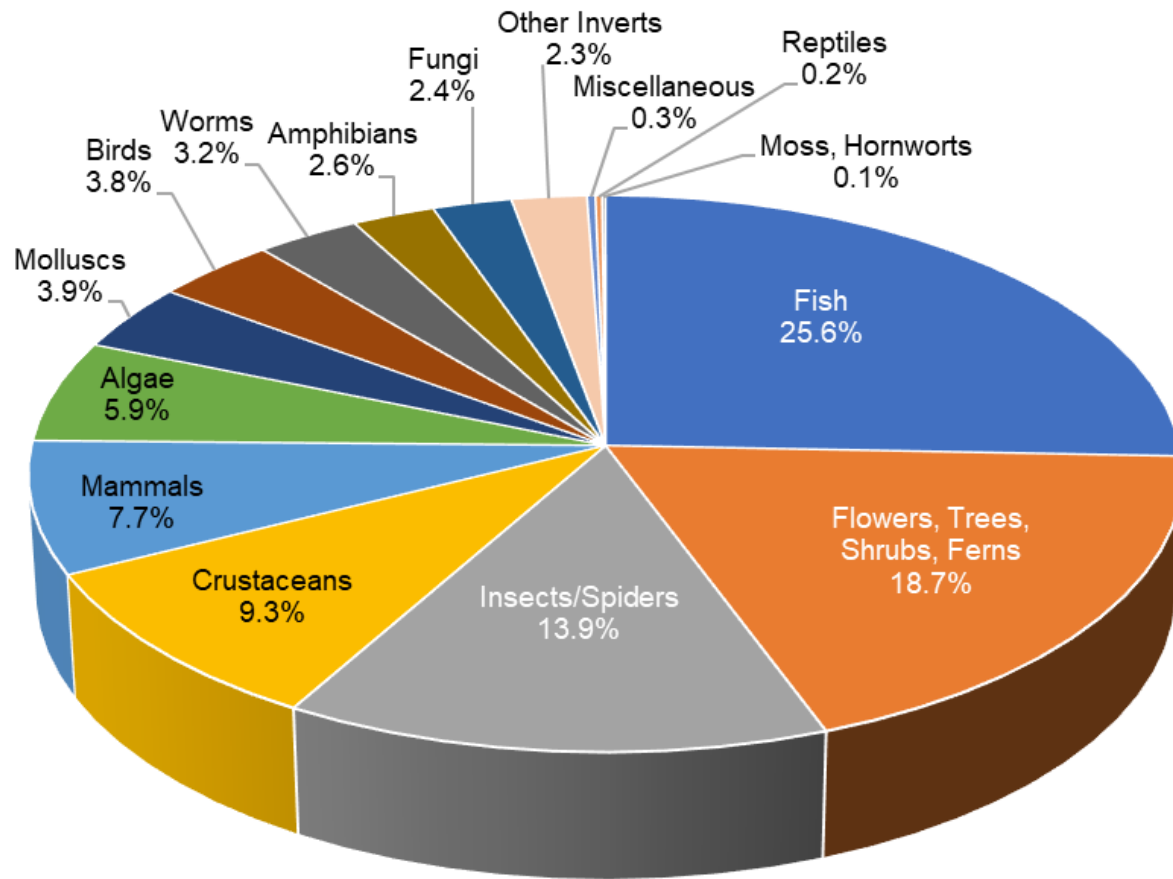
PFAS



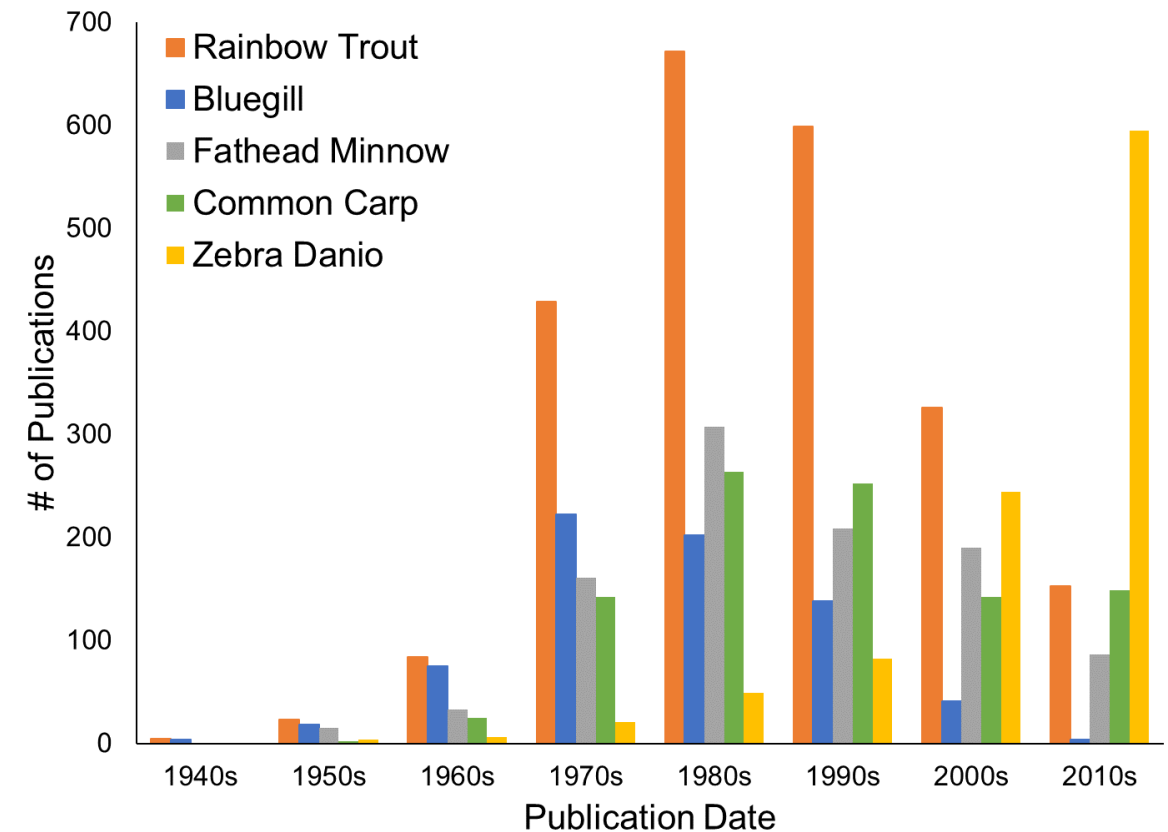


# Species (n = 13,621)

## % of Records by Species Group (Sept 2021)

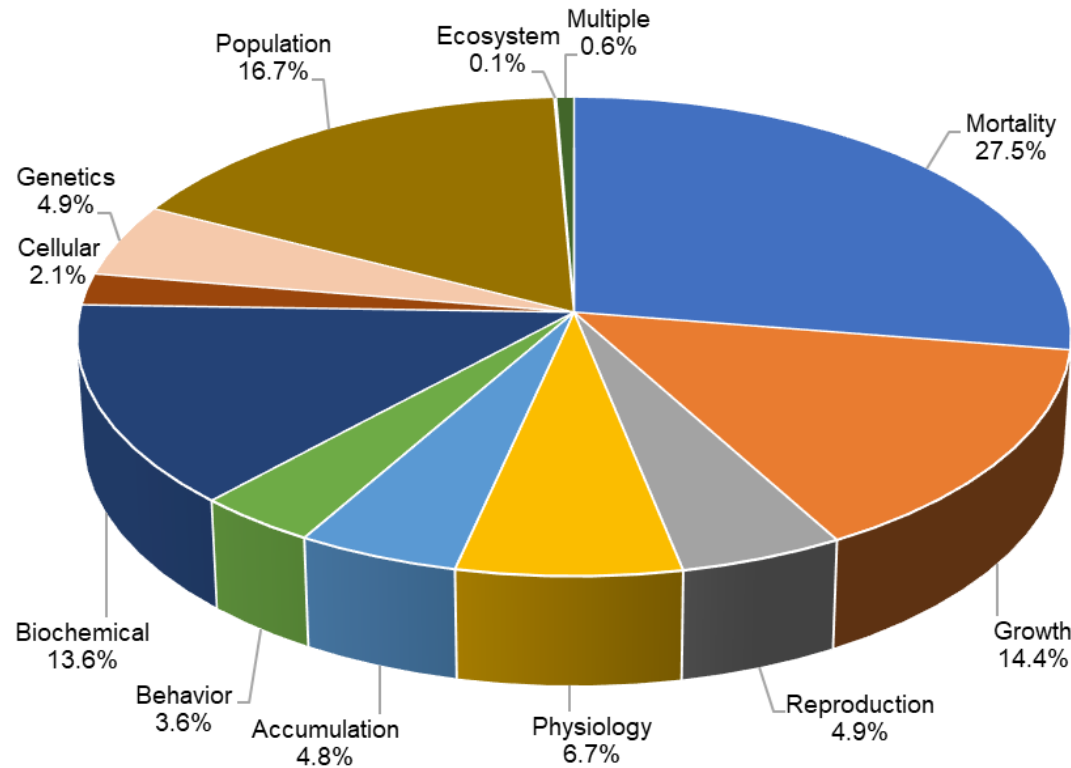


## Decadal Shifts in Test Species

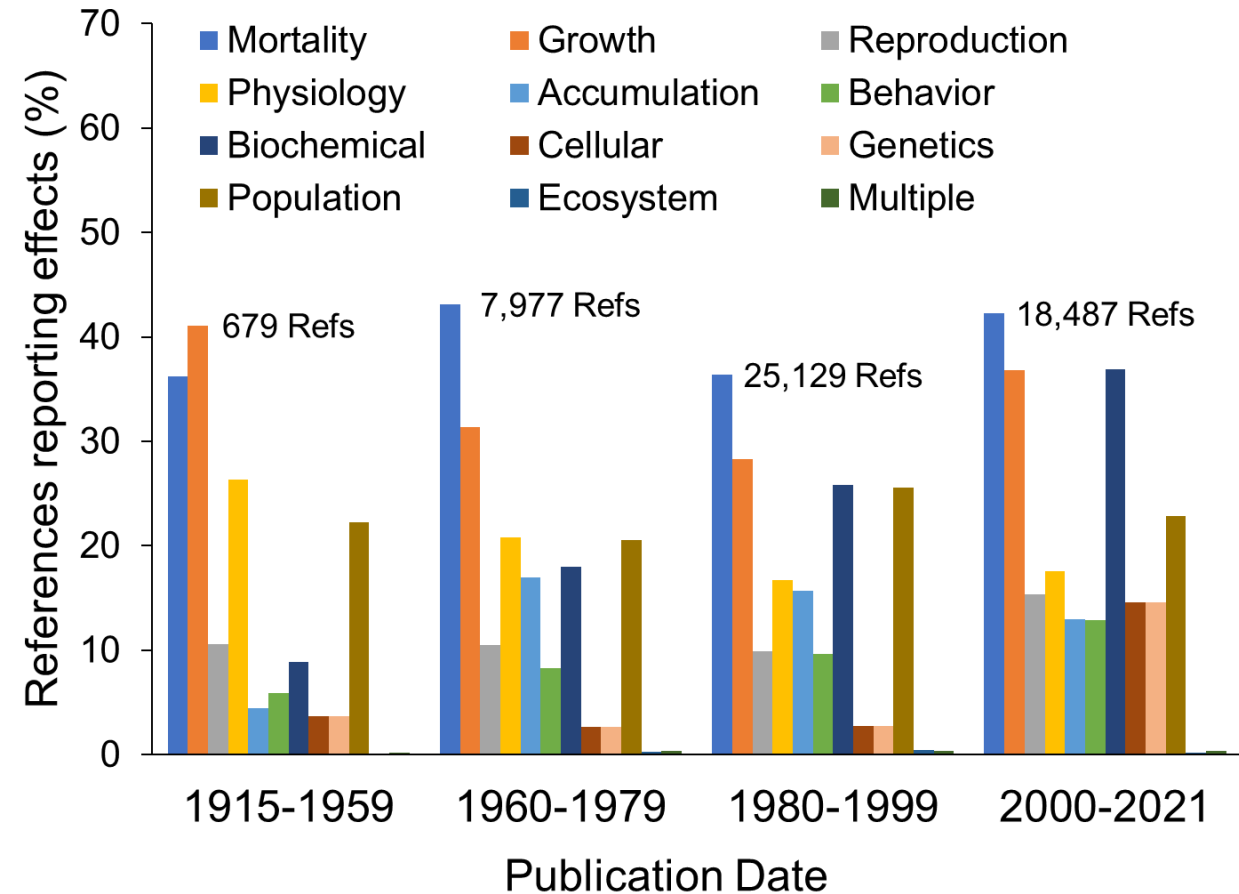


# Diversity of Effects

% of Records by Effect Group (Sept 2021)



Increases in Biochemical and Genetic Effects Reported



# Applications

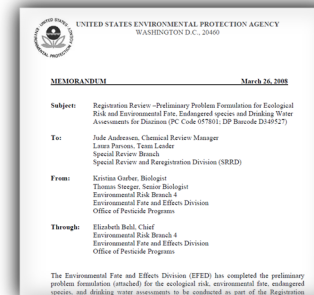
*Chemical environmental toxicity data for aquatic life, terrestrial plants and wildlife*



Provides data to

**EPA Program Offices and Regions, States, Tribes, Other Federal Agencies and International Entities**

Ecological Risk Assessment for Office of Pesticides for chemical registration and re-registration.



Ambient Water Quality Criteria for Aquatic Life

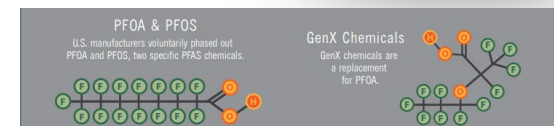
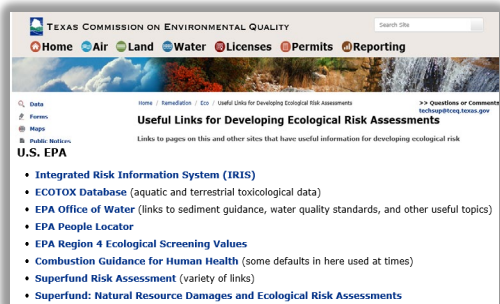
Ecological hazard data for the Prioritization and Assessment of Chemicals for TSCA/Lautenberg Act.

## Overview of TSCA Work Plan Methodology

Maria Doa  
U.S. EPA, Office of Pollution Prevention and Toxics  
December 11, 2017

Ecological Site Assessments and in Emergency Response by Office of Land and Emergency Management (Superfund and ORCR), HQ, Regions and States.

Ecological toxicity data for PFAS to researchers, EPA Eco Risk Assessment Forum, DoD Tri-Services ERA Work Group and others.



**Ecological Hazard**  
Ecological hazard data are extracted from the EPA ToxValDB database where it had been compiled from the EPA ECOTOX database. Although data are available for a variety of species, only data for aquatic species are used in the current illustration. The data can come from any of the following study types: mortality:acute, mortality:chronic, reproductive:acute, reproductive:chronic, growth:chronic (all from ECOTOX). The types of effect levels are LDxx/LCxx/ECxx/EDxx where xx can range from 1% to 100%, and LOEL/NOEL/LOEC/NOEC. Values must be in units of mg/L. For each chemical, the lowest toxicity value was separately determined for acute and chronic studies, regardless of species. The

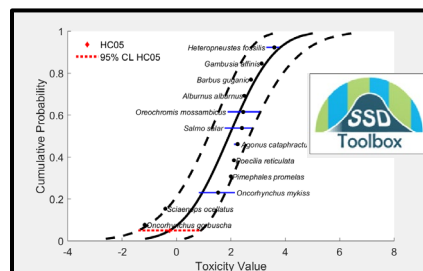
# Applications

*Chemical environmental toxicity data for aquatic life, terrestrial plants and wildlife*



Provides data to

Data used for



<https://doi.org/10.23645/epa.comptox.11971392>

Linking environmental contaminant concentrations to potential effects

Identify data gaps, Inform study design, Compare to new toxicity studies

Adverse Outcome Pathway (AOP) development

**EPA Program Offices and Regions, States, Tribes, Other Federal Agencies and International Entities**

## Tools and Applications

Toxicity Reference Values (TRVs) and Benchmarks

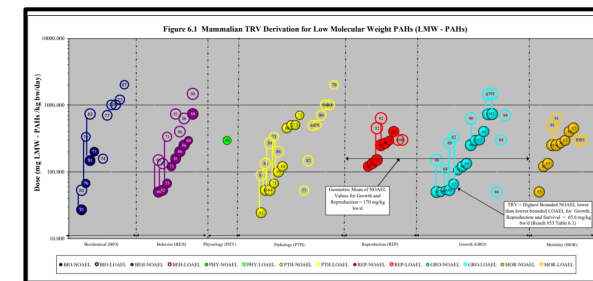
Species Sensitivity Distributions (e.g., US EPA's SSD Toolbox, Endangered species analyses, U.S. EPA's WebICE, NOAA's CAFE)

Predicted No Effect

Concentrations (PNECs) and Eco-TTCs (e.g., EnviroTox, NORMAN)

Quantitative Structure-Activity Relationships and other models

**QSAR TOOLBOX**  
<https://qsartoolbox.org>



<https://www.epa.gov/chemical-research/interim-ecological-soil-screening-level-documents>

EnviroTox Search Analysis Documentation About

<https://doi.org/10.1002/etc.4382>

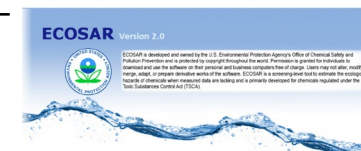
PNEC Derivation and EcoTTC Analysis; CTD Analysis



SEARCH ECOTOX DATA

NORMAN Ecotoxicology Database — Lowest PNECs

<https://www.norman-network.com/nds/ecotox>



<https://www.epa.gov/tsca-screening-tools/ecological-structure-activity-relationships-ecosar-predictive-model>

**T.E.S.T. (Toxicity Estimation Software Tool)**

<https://www.epa.gov/chemical-research/toxicity-estimation-software-tool-test>

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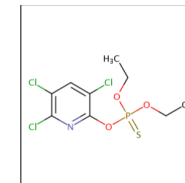
**Tools and Applications**

**Databases/Resources**

*U.S. EPA CompTox Chemicals Dashboard*  
(<https://comptox.epa.gov/dashboard/>)

*OECD eChemPortal*

(<https://www.echemportal.org/echemportal/>)



*Biological Ontologies\**



<https://lod-cloud.net/>

<http://www.obofoundry.org/>

*Pathways and Disease Databases\**



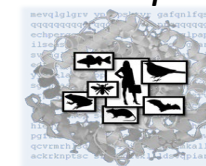
*Health & Environmental Research Online (HERO)\**  
(<https://hero.epa.gov/>)

*Adverse Outcome Pathway Wiki\**  
(<https://aopwiki.org/>)



*Sequence Alignment to Predict Across Species  
Susceptibility (SeqAPASS)\**

(<https://doi.org/10.1093/toxsci/kfw119>)



*\*Future*

# Summary

- Systematic and transparent procedures to identify and curate ecological toxicity data
- 30 year plus history, with major recent updates and evolution in the near future
  - Maintain comprehensive and quality review of toxicity data
  - Enhance ease of data access and clarity
  - Meet the demands for increased pace of chemical assessments
  - Expand to reflect shifts in toxicity testing paradigm
- Curated data on public website ([www.epa.gov/ecotox](http://www.epa.gov/ecotox)), readily available for exploration, querying, and export for risk assessments, risk management and research



# Acknowledgements and Contact Info

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