EPA United States Environmental Protection Agency

EPA Center for Computational Toxicology and Exposure

ECOTOXicology Knowledgebase Virtual Training

Jennifer H. Olker
US EPA Office of Research and Development

May 17, 2022

EPA NAMs Pilot Training Program

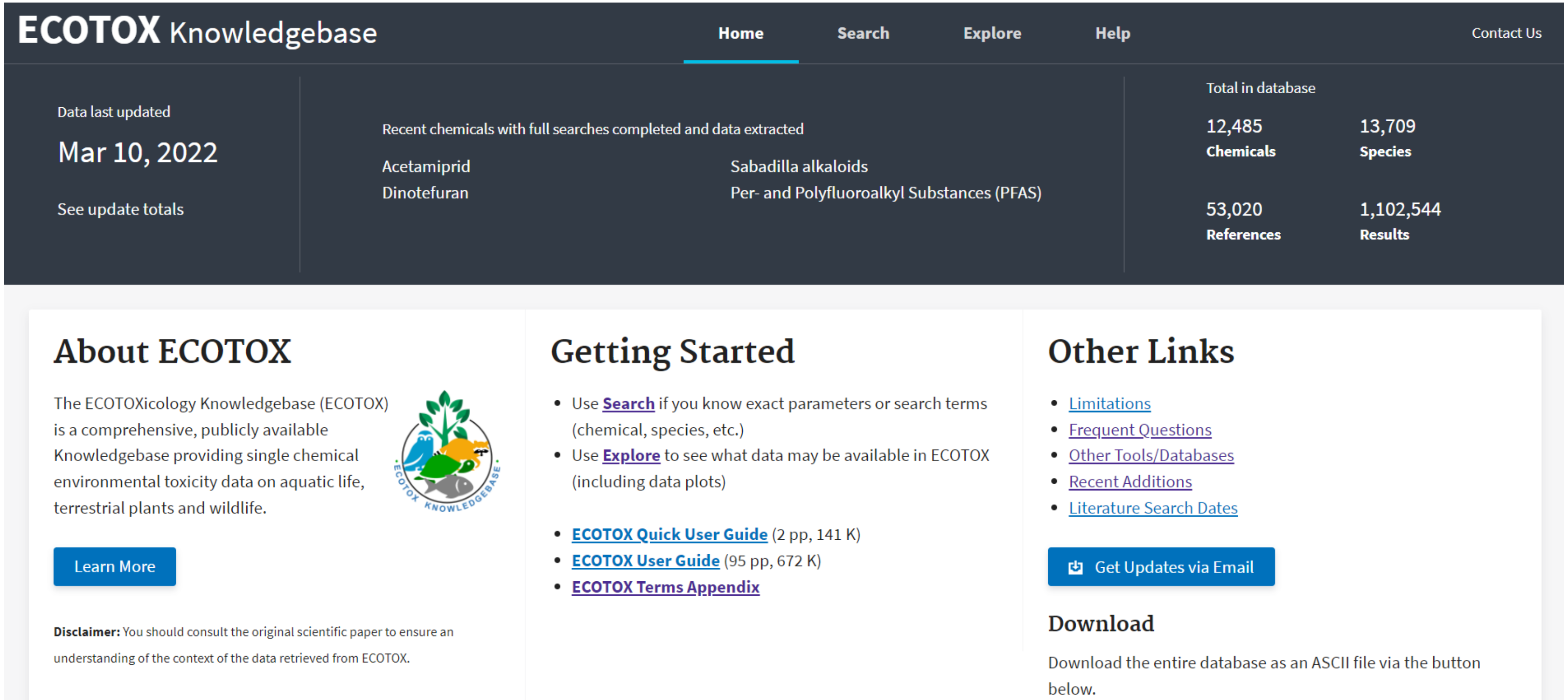
EPA United States Environmental Protection Agency

- New Approach Methodologies (NAMs) Training Program is a deliverable in the Agency's Work Plan, first released in 2019 and updated in 2021.
  - First topic: Today's ECOTOX Knowledgebase training
- **Goal: Develop, implement and maintain an engaging training program.**
  - Interactive case studies to encourage active learning
  - Train the trainer
  - Obtain feedback
- More virtual and in-person trainings are being planned.
- The EPA NAMs training website includes existing training resources, including recordings and guidance documents.

EPA NAMs Training: www.epa.gov/chemical-research/new-approach-methods-nams-training

Agenda

- Welcome and Introductions
- Background of ECOTOX
- Basic Features
- Demonstration
- Case Studies
- Summary



United States Environmental Protection Agency

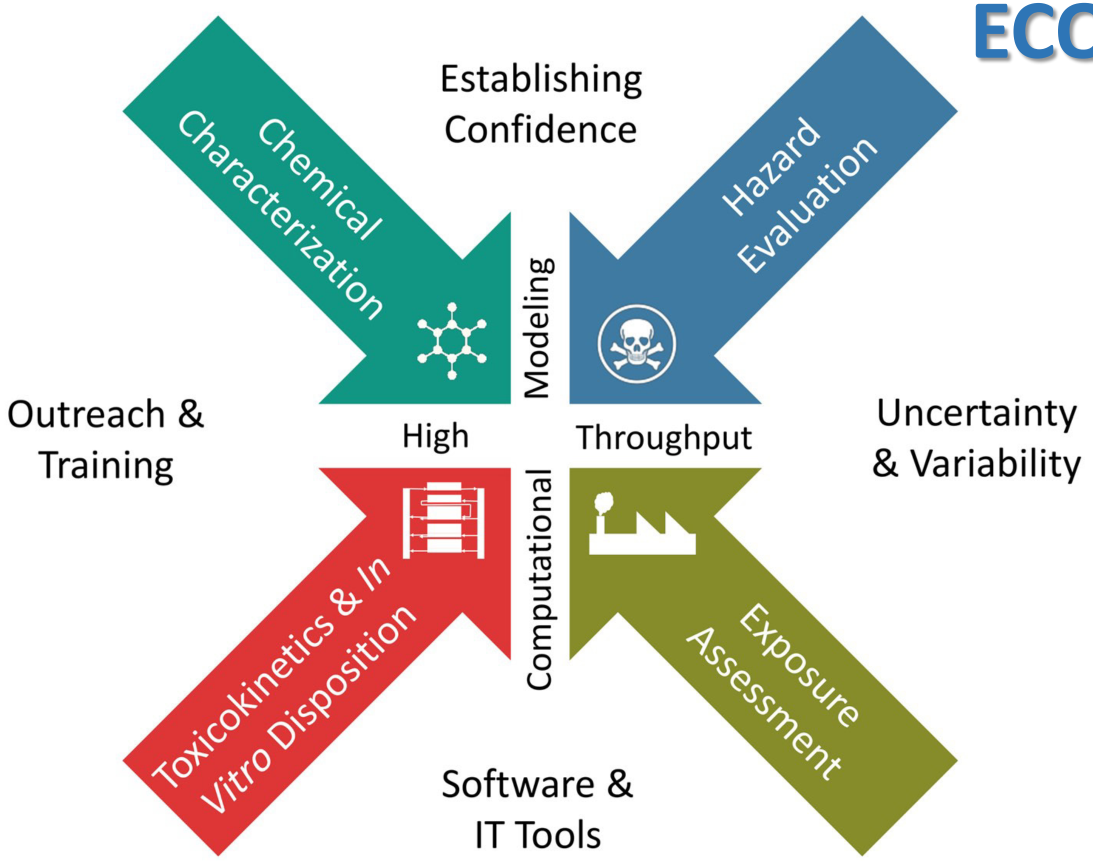
Background of ECOTOX

History of ECOTOX

- **1981**
  - AQUIRE was developed
- **Early 1990s**
  - Major updates to AQUIRE
- **Late 1990s**
  - Combined system was created (ECOTOX)
- **2017**
  - Interactive version of ECOTOX developed

- Developed to meet the need for—
  - Authoritative source of toxicological data
  - Document literature searches of data
  - Development and validation

ECOTOX and the next generation of chemical safety evaluation



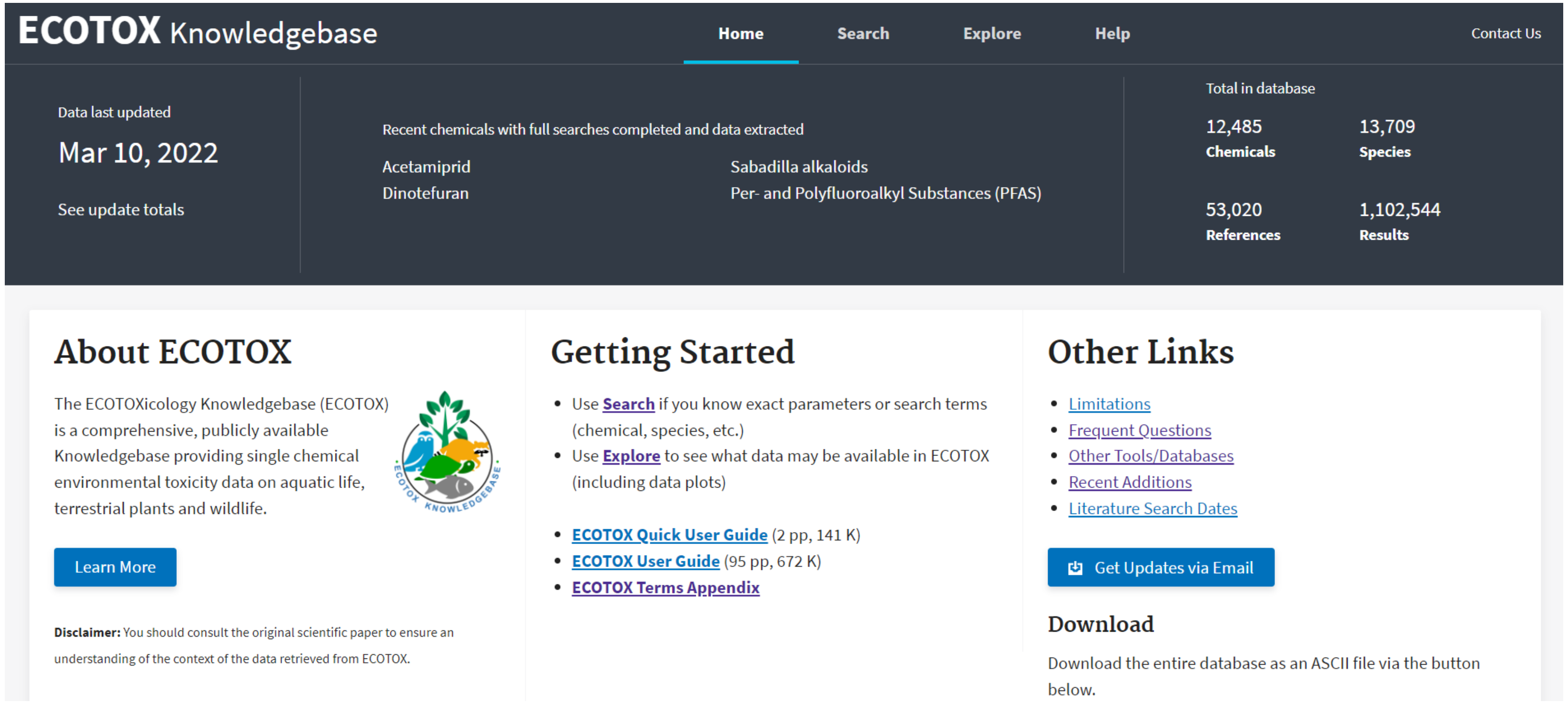
Thomas et al. 2019 [10.1093/toxsci/kfz058](https://doi.org/10.1093/toxsci/kfz058)

ECOTOX Accessible, structured empirical data from *in vivo* toxicity tests

- Chemical risk assessments
- Identify data gaps and guide targeted testing
- Development of computational models
- Support development, evaluation, and adoption of new approach methodologies

What is the ECOTOX Knowledgebase?

- From comprehensive search and review of open and grey literature
- Updated quarterly to public website
- 30+ year history
- 8,000 distinct hosts search the Knowledgebase each month



www.epa.gov/ecotox

EPA Program and Regional Office Applications

United States Environmental Protection Agency

United States Environmental Protection Agency | Office of Water 4304T | EPA 822-R-16-006 June 2016

Aquatic Life Ambient Water Quality Criterion for Selenium – Freshwater 2016

U.S. Environmental Protection Agency
Office of Water
Office of Science and Technology
Washington, D.C.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Search Site

Home Air Land Water Licenses Permits Reporting

Data
Forms
Maps
Public Notices

Home / Remediation / Eco / Useful Links for Developing Ecological Risk Assessments

>> Questions or Comments
techsup@tceq.texas.gov

Useful Links for Developing Ecological Risk Assessments

Links to pages on this and other sites that have useful information for developing ecological risk

U.S. EPA

- **Integrated Risk Information System (IRIS)**
- **ECOTOX Database** (aquatic and terrestrial toxicological data)
- **EPA Office of Water** (links to sediment guidance, water quality standards, and other useful topics)
- **EPA People Locator**
- **EPA Region 4 Ecological Screening Values**
- **Combustion Guidance for Human Health** (some defaults in here used at times)
- **Superfund Risk Assessment** (variety of links)
- **Superfund: Natural Resource Damages and Ecological Risk Assessments**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C., 20460

MEMORANDUM **March 26, 2008**

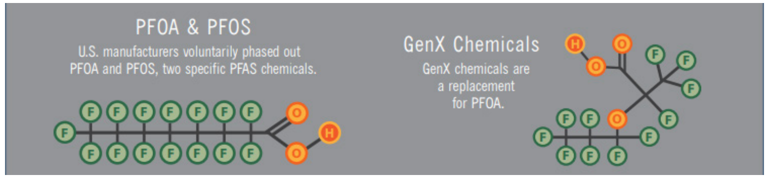
Subject: Registration Review –Preliminary Problem Formulation for Ecological Risk and Environmental Fate, Endangered species and Drinking Water Assessments for Diazinon (PC Code 057801; DP Barcode D349527)

To: Jude Andreasen, Chemical Review Manager
Laura Parsons, Team Leader
Special Review Branch
Special Review and Reregistration Division (SRRD)

From: Kristina Garber, Biologist
Thomas Steeger, Senior Biologist
Environmental Risk Branch 4
Environmental Fate and Effects Division
Office of Pesticide Programs

Through: Elizabeth Behl, Chief
Environmental Risk Branch 4
Environmental Fate and Effects Division
Office of Pesticide Programs

The Environmental Fate and Effects Division (EFED) has completed the preliminary problem formulation (attached) for the ecological risk, environmental fate, endangered species, and drinking water assessments to be conducted as part of the Registration



Overview of TSCA Work Plan Methodology

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

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:acute, 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 of ECOTOX

Chemical environmental toxicity data for aquatic and terrestrial organisms

Provides data to

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

Ecological Risk Assessments
Ambient Water Quality Criteria
Ecological Screening Values
Chemical Prioritization
Emergency Response

Data used for

Tools and Applications

Species Sensitivity Distributions
Predicted No-Effect Concentrations and
Eco-Thresholds for Toxicological Concern
Quantitative Structure–Activity Relationships
Bioaccumulation Factor Modeling and Validation
Adverse Outcome Pathway Development

Data linked to

Databases/Resources

ECOTOX Pipeline

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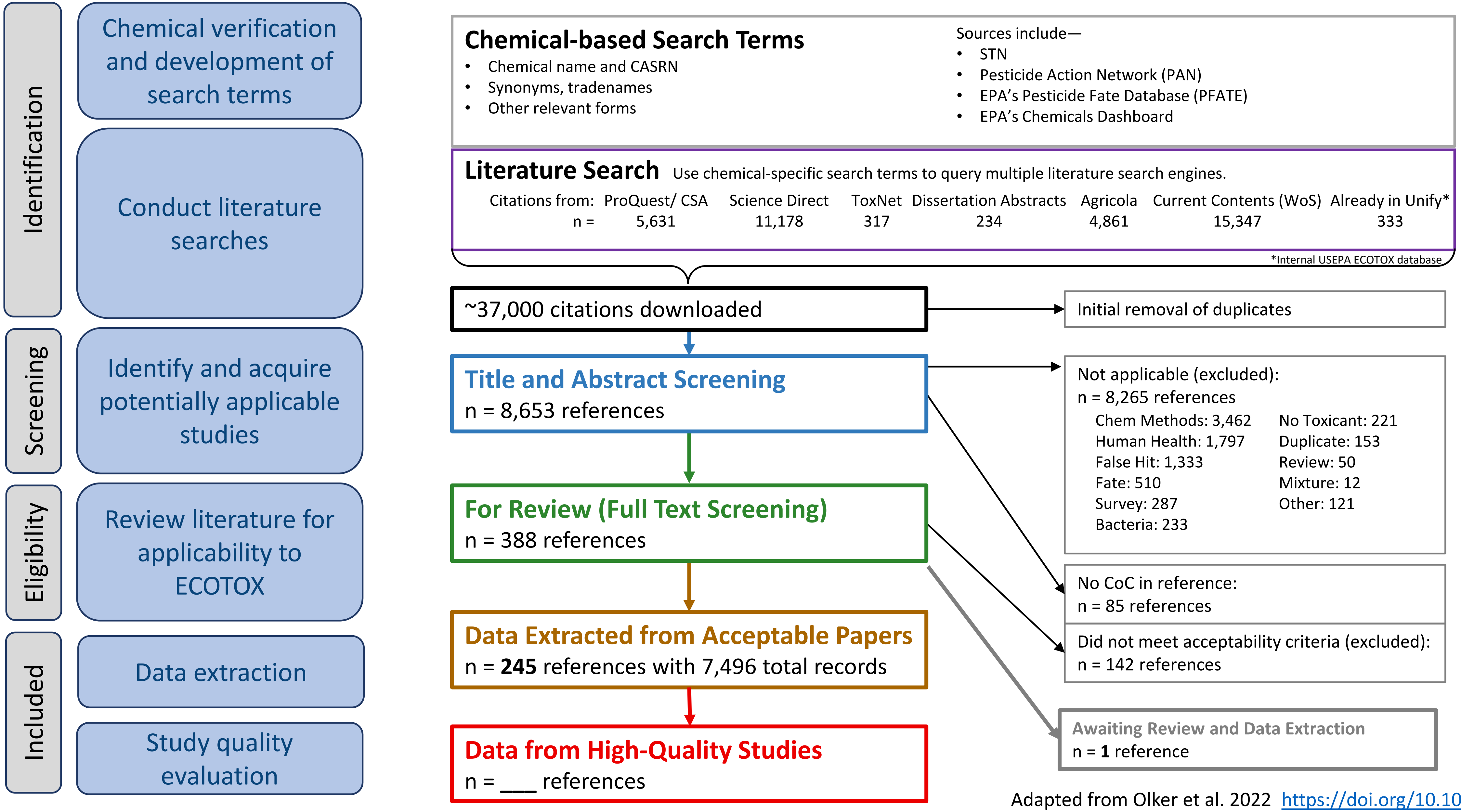


Adapted from Olker et al. 2022 https://doi.org/10.1002/etc.5324

Chemical Search Terms: ID, Test and QA

United States Environmental Protection Agency

Identification
- Chemical verification and development of search terms
- Conduct literature searches

Screening
- Identify and acquire potentially applicable studies

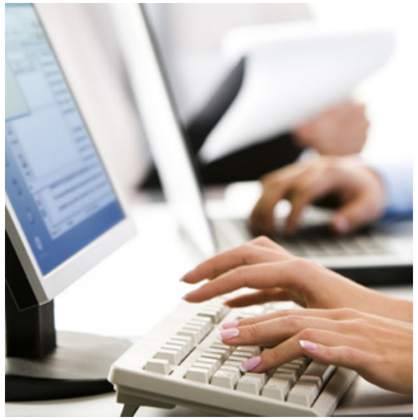
Eligibility
- Review literature for applicability to ECOTOX

Included
- Data extraction
- Study quality evaluation

Chemical Requested by Program Office or Research Project

Verify CASRN, search various sources for chemical terms and synonyms, and eliminate poor search terms.

Tak (Acilid 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")



Enter chemical terms into template for abstracting databases.

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

Literature Searches

United States Environmental Protection Agency

Identification
- Chemical verification and development of search terms
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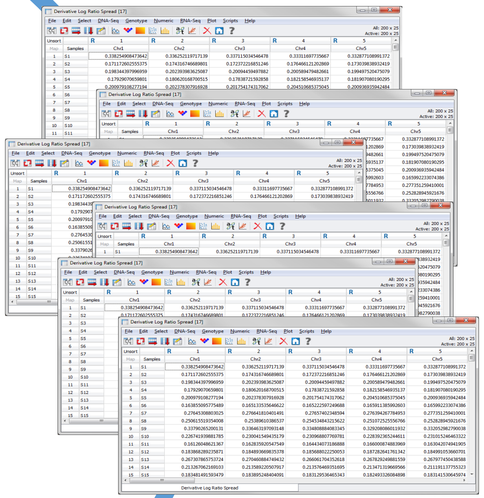
Eligibility
- Review literature for applicability to ECOTOX

Included
- Data extraction
- Study quality evaluation

Chemical-based literature searches
(using terms from chemical verification step)
OR
Monthly electronic searches
of 11 highly relevant journals

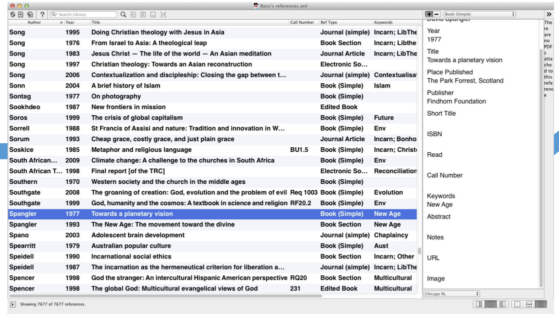


Search Engines

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*

Collate data and remove duplicates.



100,000–400,000 references screened for applicability each year

Skimming for Applicability: Title and Abstract

United States Environmental Protection Agency

- Identification
  - Chemical verification and development of search terms
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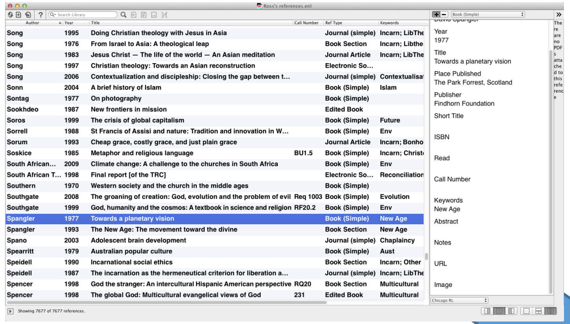
- Included
  - Data extraction
  - Study quality evaluation

Literature Search Results



Skim titles and abstracts and use exclusion criteria to eliminate non-applicable results.

4. J Econ Entomol. 2016 Jul 18. pii: tow146. [Epub ahead of print]

Sulfur Dust Bag: A Novel Technique for Ectoparasite Control in Poultry Systems.

Murillo AC(1), Mullens BA(2).

Author information:
(1)Department of Entomology, University of California, Riverside, CA 92521 (alock001@ucr.edu; bradley.mullens@ucr.edu) alock001@ucr.edu. (2)Department of Entomology, University of California, Riverside, CA 92521 (alock001@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 deployed in "dust bags" for control against the northern fowl mite (Ornithonyssus sylviarum), which causes host stress, decreased egg production, and reduced feed conversion efficiency. Dust bags were hung from the tops of cages or were clipped to the inside front of 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 sulfur 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 had not been exposed to pyrethroids for several years. Sulfur bags should be effective in caged or cage-free systems.

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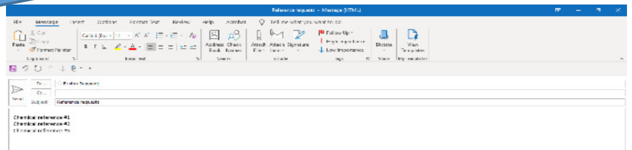
DOI: 10.1093/jee/tow146



Send the applicable reference list for acquisition.

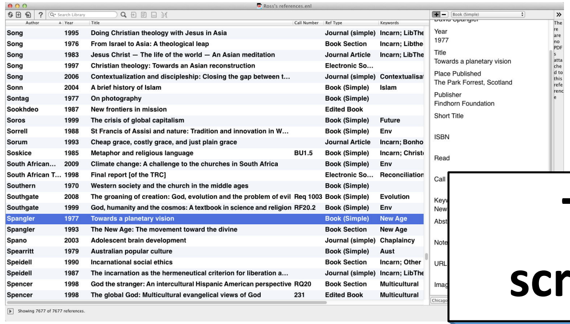
** Recently incorporated filtering and AI tools*

Review for Applicability: Full text

United States Environmental Protection Agency

Identification	Chemical verification and development of search terms
	Conduct literature searches
Screening	Identify and acquire potentially applicable studies
Eligibility	Review literature for applicability to ECOTOX
Included	Data extraction
	Study quality evaluation

Literature Search Results


Ross's references.enl

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
Sontag	1977	On photography		Book (Simple)	
Sookhdeo	1987	New frontiers in mission		Edited Book	
Soros	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
Soskice	1985	Metaphor and religious language	BU1.5	Book (Simple)	Incarn; Christ
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	1970	Western society and the church in the middle ages		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
Spano	2003	Adolescent brain development		Journal (simple)	Chaplaincy
Spearritt	1979	Australian popular culture		Book (Simple)	Aust
Speidell	1990	Incarnational social ethics		Book Section	Incarn; Other
Speidell	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

Showing 7677 of 7677 references.

Year
1977
Title
Towards a planetary vision
Place Published
The Park Forrest, Scotland
Publisher
Findhorn Foundation
Short Title
ISBN
Read

Title and abstract screening = applicable

Review full text


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^3 per day (MOE, 1987). Similar discharge volumes occurred in 1989. In 1991, the total discharge was 25,000 m^3 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 mayflies 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 mentum 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 (284 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

0963-9292 © 1993 Chapman & Hall

Moves on to be curated into ECOTOX.

1,100–2,500 references are added to the public website each year.

ECOTOX Applicability Criteria

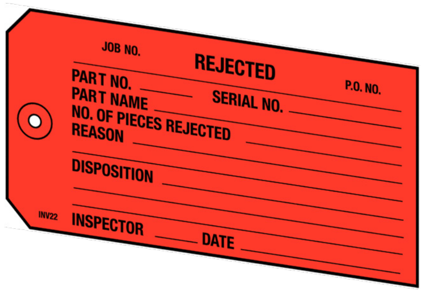
	Key Area	Data Requirement
P (Population)	Species	• Taxonomically verifiable, ecologically relevant organisms (including cells, organs, gametes, embryos, plant cuttings) [NOT bacteria, humans, monkeys, viruses or yeast]
E (Exposure)	Chemical	• Single, verifiable chemical toxicants, administered through an acceptable route
	Exposure Amount (Concentration)	• 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
	Exposure Duration	• Known duration from the time of initial exposure to the time of measurement
C (Comparator/ Control)	Control	• Must have a control treatment
O (Outcome)	Effect	• Biological effect measured • Effect concurrent with associated chemical exposure
	Publication Type	• Primary source of the data [NOT a Review] • Study must be a full article in English

Exclusion Documentation

United States Environmental Protection Agency

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, CO_2)
- 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



Data Extraction

United States Environmental Protection Agency

Identification
- Chemical verification and development of search terms
- Conduct literature searches

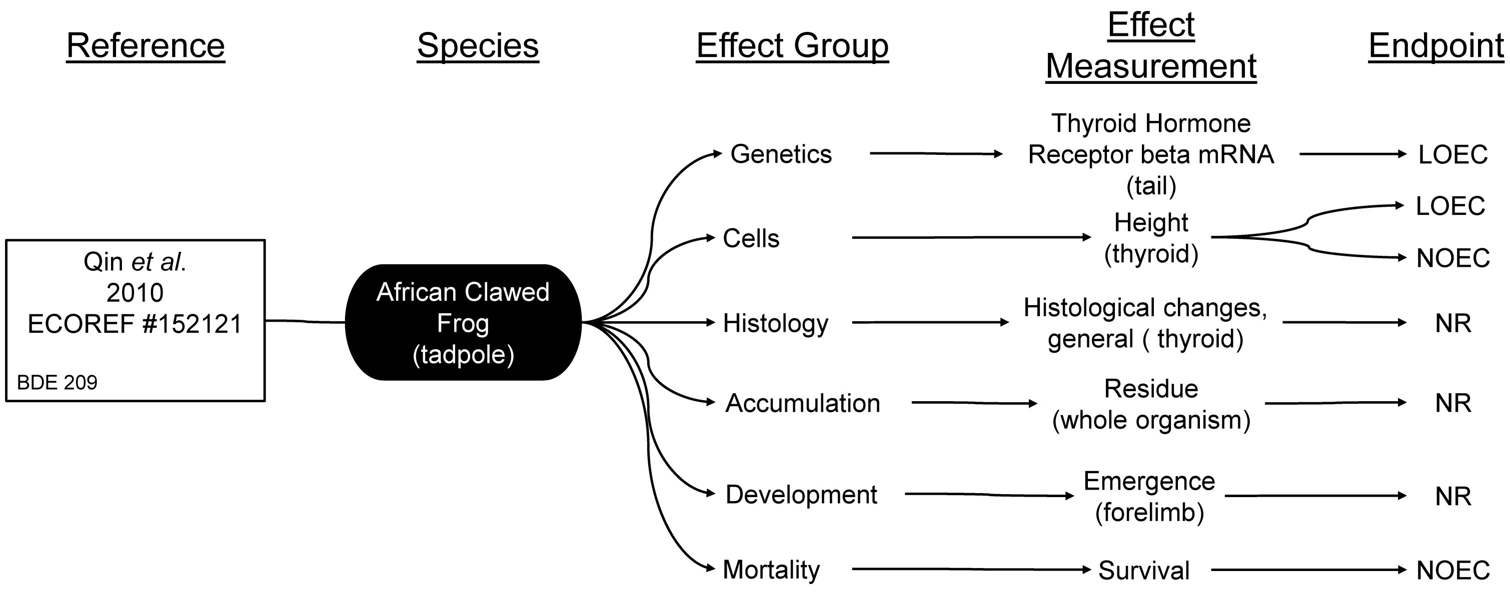
Screening
- Identify and acquire potentially applicable studies

Eligibility
- Review literature for applicability to ECOTOX

Included
- Data extraction
- Study quality evaluation

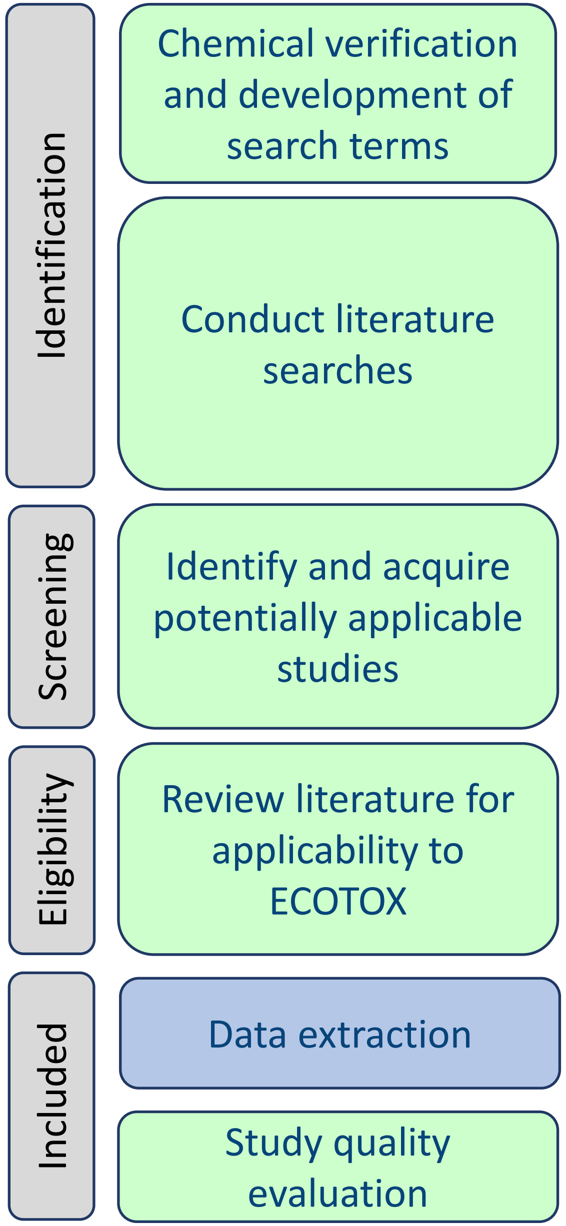
ELSEVIER
Journal of Environmental Sciences
Volume 22, Issue 5, 2010, Pages 744-751

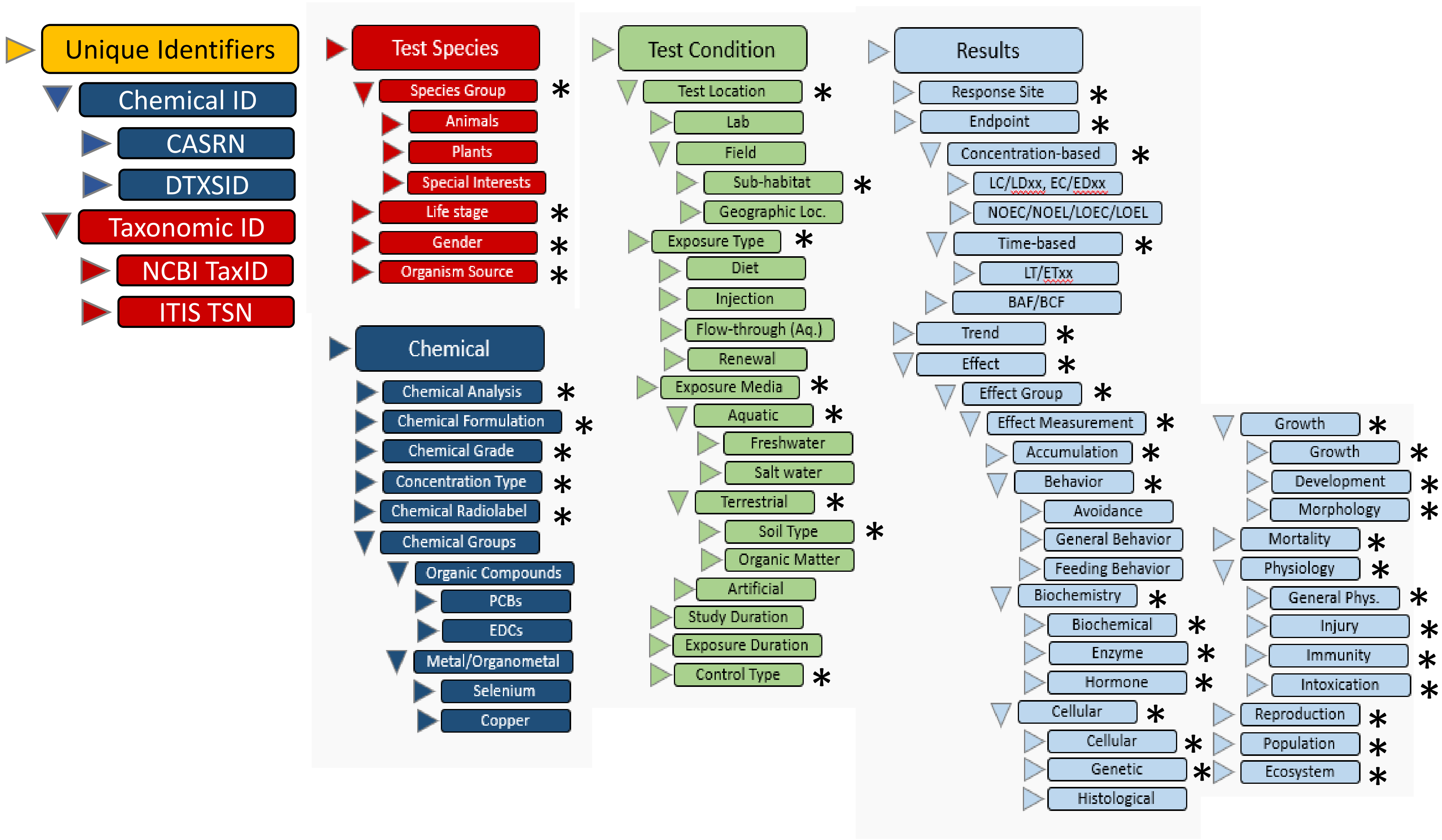
Thyroid disruption by technical decabromodiphenyl ether (DE-83R) at low concentrations in *Xenopus laevis*



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

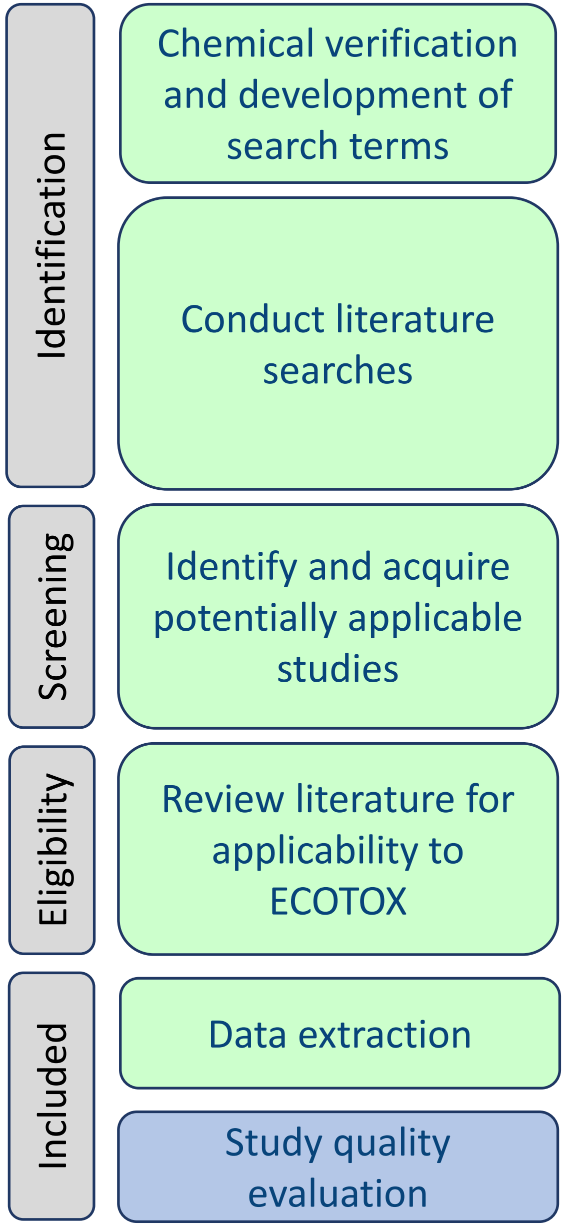
Data Extraction





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

Study Quality Evaluation



Many fields in ECOTOX can inform study evaluation.

Category	Select study evaluation questions with relevant ECOTOX field(s)
Chemical	• Is the test substance identified? **Required for inclusion in ECOTOX** • Is the purity of the test substance reported? **Chemical Purity** • Were chemical concentrations verified? **Chemical Analysis** (e.g., nominal versus measured concentrations)
Species	• Is the species given? **Verifiable species (Scientific Name, etc.) required for inclusion in ECOTOX** • Are the organisms well described? **Organism Source**, **Lifestage**, **Age**, **Gender**, **Initial** and **Final Weight**
Test Conditions	• Are appropriate controls performed? **Control required for inclusion in ECOTOX**, type described in **Control** • Is a guideline method (e.g., OECD) used? **Test Method** • Are the experimental conditions appropriate and acceptable for the test substance and organism? **Test Method**, **Media Type**, **Test Location**, **Experimental Design**, Physical and Chemical Soil and Water Parameters (e.g., **pH**, **Temperature**, **Dissolved Oxygen**)
Test Results	• Are the reported effects and endpoints appropriate for the purpose, test substance and organism? **Effect Measurement**, **Endpoint** • Is the response/effect statistically significant? **Statistical Significance**, **Significance Level**

Basic Features

Search Planner

United States Environmental Protection Agency

ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Table of Contents

Select Search Parameters

Search Planner (PDF) (5 pp, 133 K, About PDF)

Taxonomic Searching

Within ECOTOX you may conduct a search by entering the Species Name or number(s), Genus/Species Name(s), or Common Name or Other Taxonomic Name(s). The Contains and Exact Match radio buttons allow for partial or exact name matches. You can also search by Species Group. All data records within ECOTOX include a Scientific name for the test species. All names and predefined groups have been verified in reliable taxonomic sources.

The ECOTOX species file includes historical synonyms for the species. If a search is conducted using a species name that is noted as a taxonomic synonym in our system, ECOTOX will present the results using the currently acceptable genus and species name.

Taxonomic Entry

Species Number: All species in ECOTOX have been assigned a unique number. You can include numbers and text information (either Scientific or common names) in one search. Species numbers are always searched as an exact match.

Example Taxonomic Search

The example below is the correct method of entering query text. You can enter a mix of numbers and species terms. Number will always be treated as exact matches by the ECOTOX query.

Example Genus/Species Name Query

ECOTOX SEARCH PLANNING FORM

Use this form to help plan your searches or to document searches for yourself or others to perform.

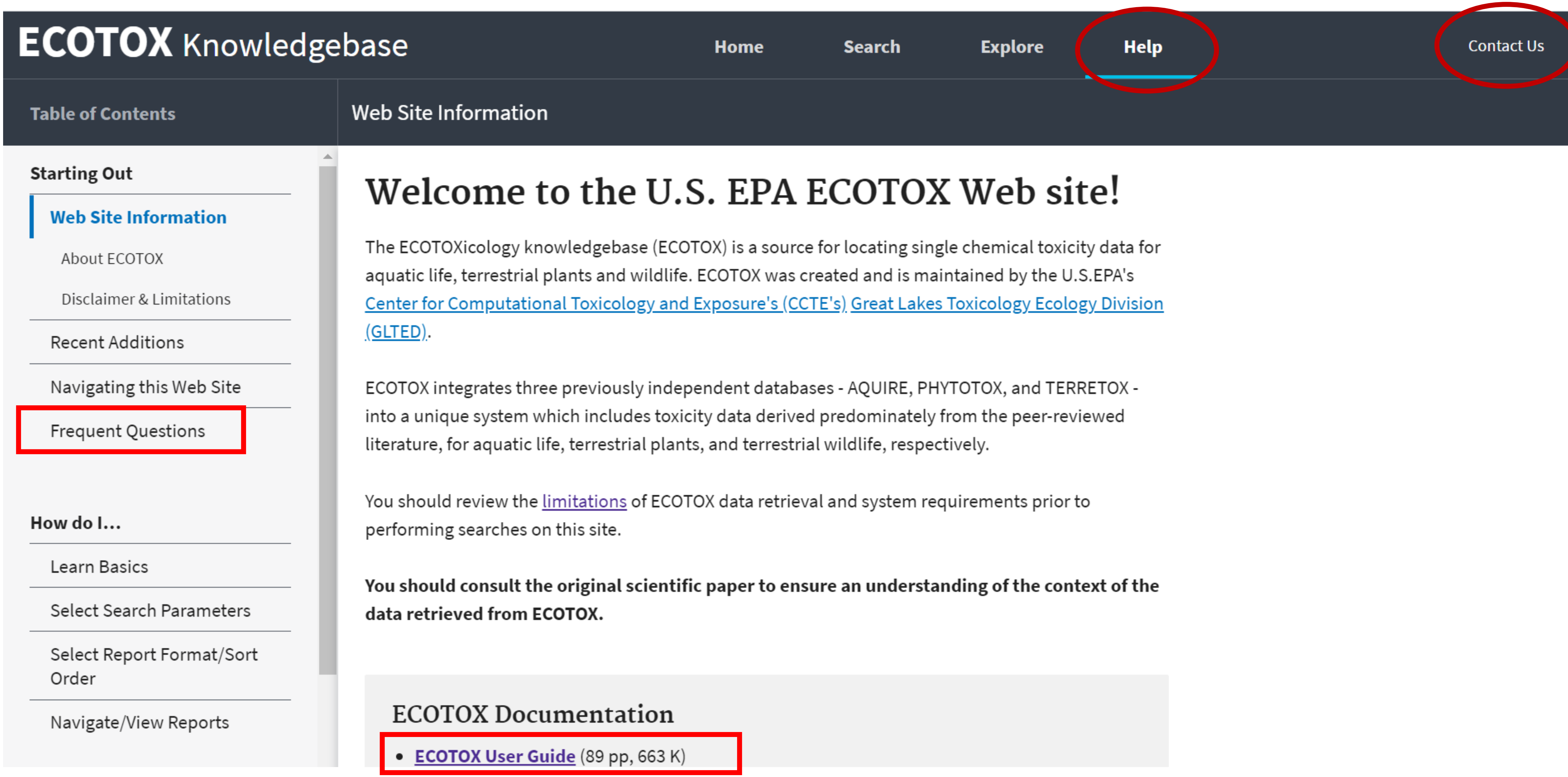
Chemicals

Chemical Names	CAS Numbers	Predefined Groups
		Metal Compounds: Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Mercury, Nickel, Organotin, Selenium, Silver, Vanadium, Zinc **Organic Compounds**: Conazoles, Cyanotoxins, DDT and metabolites, Dibenzofurans, Explosives, Glycol Ethers, Major Ions, Neonicotinoids, Nitrosamines, Perchlorates, Phthalate Esters, Polyaromatic Hydrocarbons (PAH), Polychlorinated Biphenyls (PCB), Polybrominated Diphenyl Ethers (PBDE), Pharmaceutical Personal Care (PPCP), Strobins, Per- and Polyfluoroalkyl Substances (PFAS)

Species

Scientific Names/ Taxonomic Levels	Common Names	Species ECOTOX Numbers or NCBI TaxIDs	Predefined Taxonomic Groups
			All Animals: Amphibians, Insects/Spiders, Molluscs, Birds, Other Invertebrates, Reptiles, Crustaceans, Mammals, Worms, Fish **All Plants**: Algae, Moss/Hornworts, Fungi, Flowers, Trees, Shrubs, Ferns **Special Interest**: Standard Test Species, US Threatened/Endangered Species, US Exotic/Nuisance

Help and Contact Us



ECOTOX Knowledgebase

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Web Site Information

Starting Out

- **Web Site Information**
  - About ECOTOX
  - Disclaimer & Limitations
- Recent Additions
- Navigating this Web Site
- Frequent Questions

How do I...

- Learn Basics
- Select Search Parameters
- Select Report Format/Sort Order
- Navigate/View Reports

Welcome to the U.S. EPA ECOTOX Web site!

The ECOTOXicology knowledgebase (ECOTOX) is a source for locating single chemical toxicity data for aquatic life, terrestrial plants and wildlife. ECOTOX was created and is maintained by the U.S.EPA's Center for Computational Toxicology and Exposure's (CCTE's) Great Lakes Toxicology Ecology Division (GLTED).

ECOTOX integrates three previously independent databases - AQUIRE, PHYTOTOX, and TERRETOX - into a unique system which includes toxicity data derived predominately from the peer-reviewed literature, for aquatic life, terrestrial plants, and terrestrial wildlife, respectively.

You should review the limitations of ECOTOX data retrieval and system requirements prior to performing searches on this site.

You should consult the original scientific paper to ensure an understanding of the context of the data retrieved from ECOTOX.

ECOTOX Documentation

- ECOTOX User Guide (89 pp, 663 K)

United States Environmental Protection Agency

Demonstration

Demo of ECOTOX: www.epa.gov/ecotox

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ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Data last updated

Mar 10, 2022

See update totals

Recent chemicals with full searches completed and data extracted

Acetamiprid	Sabadilla alkaloids
Dinotefuran	Per- and Polyfluoroalkyl Substances (PFAS)

Total in database

12,485 **Chemicals**	13,709 **Species**
53,020 **References**	1,102,544 **Results**

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

Disclaimer: You should consult the original scientific paper to ensure an understanding of the context of the data retrieved from ECOTOX.

Getting Started

- Use **Search** if you know exact parameters or search terms (chemical, species, etc.)
- Use **Explore** to see what data may be available in ECOTOX (including data plots)

- **ECOTOX Quick User Guide** (2 pp, 141 K)
- **ECOTOX User Guide** (95 pp, 672 K)
- **ECOTOX Terms Appendix**

Other Links

- Limitations
- Frequent Questions
- Other Tools/Databases
- Recent Additions
- Literature Search Dates

Get Updates via Email

Download

Download the entire database as an ASCII file via the button below.

Download ASCII Data

Recent Additions and Literature Search Dates

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Contact Us

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Mar 10, 2022

See update totals

Total in database

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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

Literature Search Dates

801 results

Targeted literature searches are conducted using chemical names, synonyms, and CASRNs in multiple search engines (e.g., Web of Science, Agricola, ToxNet, ProQuest, etc). Chemicals listed below had targeted searches corresponding to the date indicated in the second column. Each search is identified in the table by the requested chemical or chemical group, with some searches including multiple chemicals/CASRNs. Citations from these searches are reviewed. Studies meeting inclusionary criteria added to ECOTOX; toxicity data results may take 6 months or longer to appear on-line. There may be more recent publications in ECOTOX for a chemical due to related chemical literature searches.

type to find...

CHEMICAL	DATE
Sabadilla alkaloids	November 2021
Dinotefuran	November 2021
Acetamiprid	November 2021
PFAS	July 2021
Cyanotoxins	June 2021
2-Phenylphenol	December 2020
Chlorflurenol	November 2020

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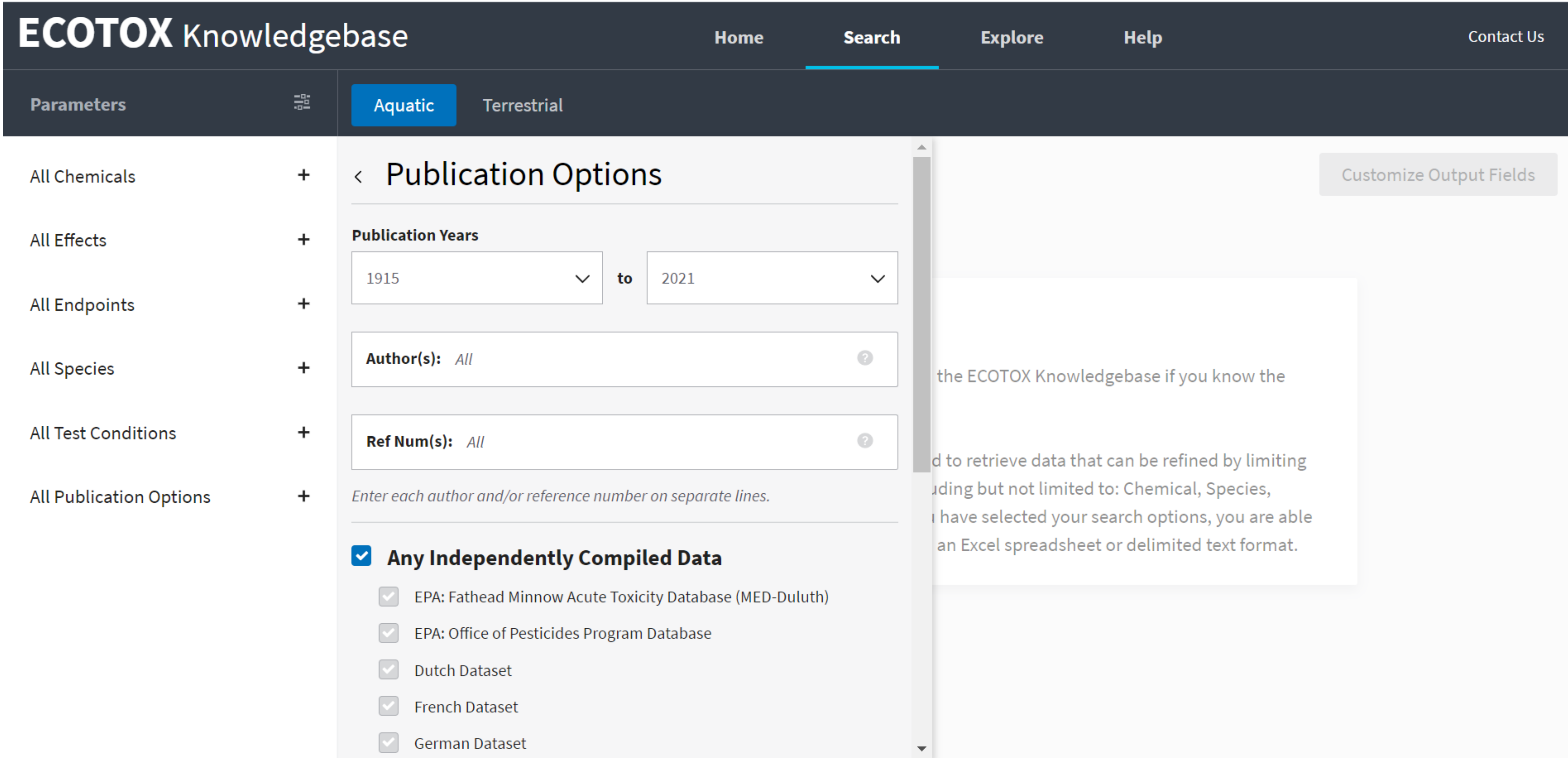
Search: Exact Parameters or Search Terms



Explore: Interactive Filters and Visualization

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ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Explore | Effects

Custom Group

Create a custom effects group by browsing available effect measurements or entering a list of effect and measurement terms.

Create Custom Group...

Defined Groups

Select one or more categories from the graph to filter groups in the table.

23 Effect Groups

Select one or more groups then click "Explore Data" to continue.

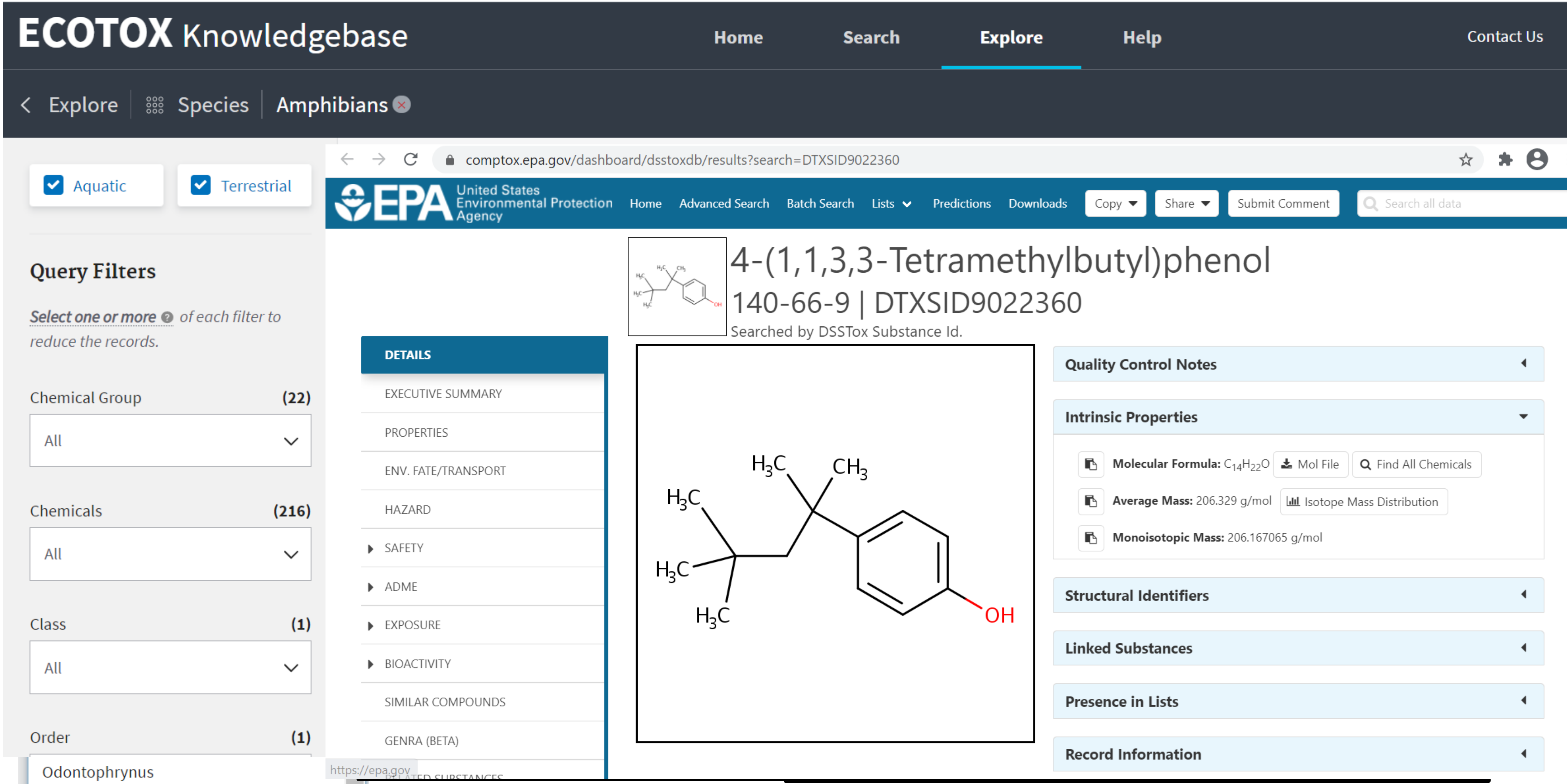
× Reset All

Export CSV

Explore Data >

EFFECT GROUP	RECORDS	PUBLICATIONS	YEAR MIN	YEAR MAX
Accumulation	47626	7217	1915	2020
Avoidance	4394	579	1947	2020
Behavior	18751	2591	1946	2020
Biochemistry	76629	9784	1931	2020
Cell(s)	12786	2306	1935	2020
Development	32771	3904	1925	2020
Ecosystem process	743	161	1963	2018
Enzyme(s)	47201	6323	1931	2020
Feeding behavior	10281	2304	1937	2020

Explore by Species: Filter and Visualize



Explore by Species: Send to Search

ECOTOX Knowledgebase

Home | Search | Explore | Help | Contact Us

Parameters

Aquatic | Terrestrial

Chemicals +

Groups

- DDT and Metabolites
- Neonicotinoids
- Perchlorates

All Effects +

All Endpoints +

Species +

Groups

- Amphibians

All Test Conditions +

All Publication Options +

Per- and Polyfluoroalkyl Substances (PFAS)

759 results

Customize Output Fields | Export as...

Results shown in condensed table. Use "Customize Output Fields" to view expanded data results.

CAS NUM / CHEM. NAME	CHEM. GRADE	CHEM. ANAL.	CHEM. PUR.	SPEC. SCI. NAME / SPEC. COMMON NAME	SPEC. GROUP	ORG. LIFESTG.
50293 / 1,1'-(2,2,2-Trichloroethylidene)bis[4-chlorobenzene]	Not reported	Unmeasured	NR	Rana cyanophlyctis / Skipping Frog	Amphibians	Not reported
50293 / 1,1'-(2,2,2-Trichloroethylidene)bis[4-chlorobenzene]	Not reported	Unmeasured	NR	Rana cyanophlyctis / Skipping Frog	Amphibians	Not reported
50293 / 1,1'-(2,2,2-Trichloroethylidene)bis[4-chlorobenzene]	Not reported	Unmeasured	NR	Bufo bufo ssp. japonicus / Toad	Amphibians	Tadpole

Search: Refine Query Parameters

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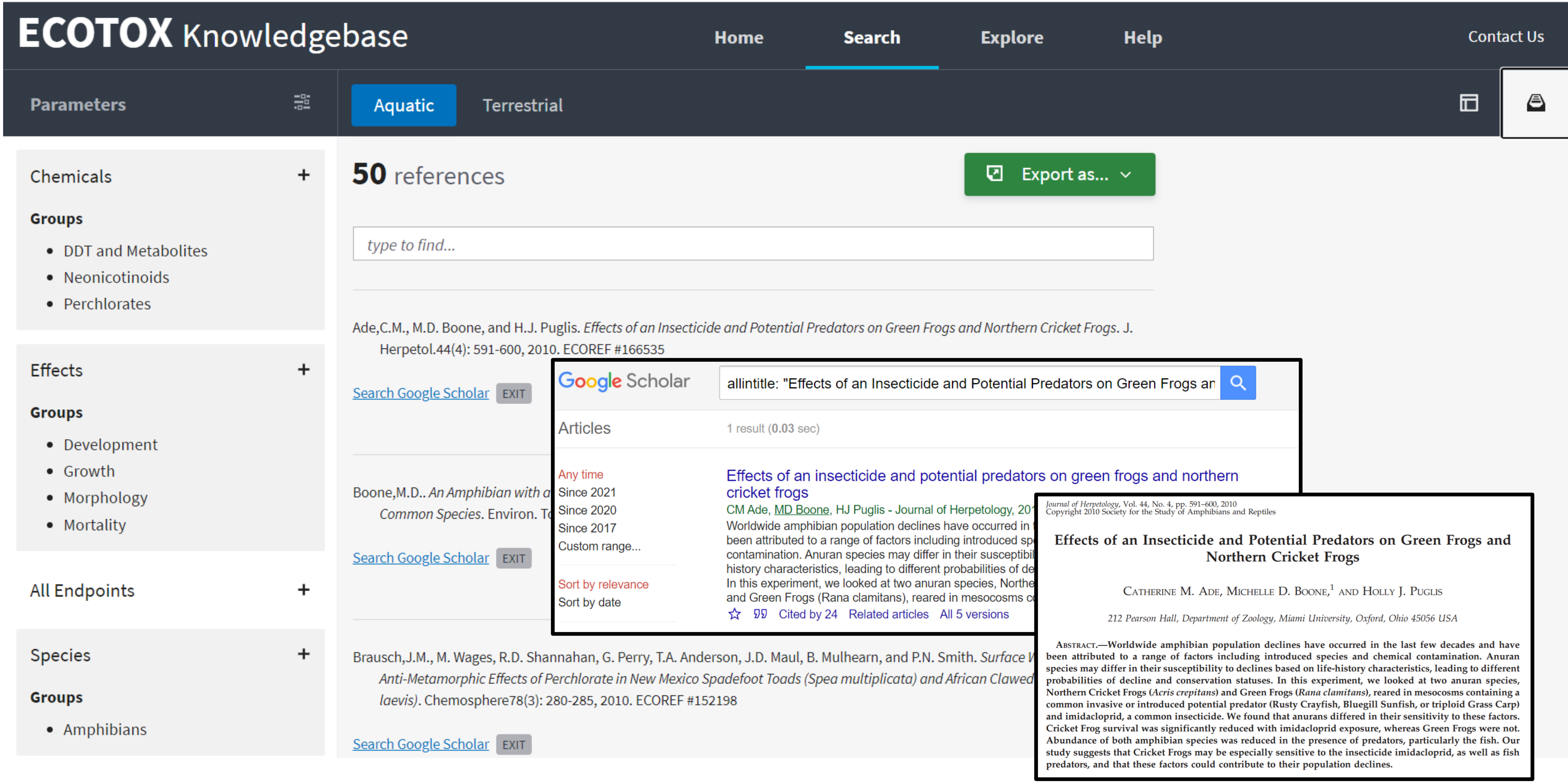

Search: Export Toxicity Data and References

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ECOTOX Knowledgebase

Home Search Explore Help Contact Us

Parameters

Aquatic Terrestrial

Chemicals +

Groups

- DDT and Metabolites
- Neonicotinoids
- Perchlorates

Effects +

Groups

- Development
- Growth
- Morphology
- Mortality

All Endpoints +

Species +

Groups

- Amphibians

50 references

Export as...

- CSV
- RIS

type to find...

REF. NUMBER	AUTHOR	TITLE	SOURCE	PUB. YEAR	CITATION
166535	Ade,C.M., M.D. Boone, and H.J. Puglis	Effects of an Insecticide and Potential Predators on Green Frogs and Northern Cricket Frogs	J. Herpetol.44(4): 591-600	2010	Ade,C.M., M.D.
179050	Boone,M.D.	An Amphibian with a Contracting Range is not more Vulnerable to Pesticides in Outdoor Experimental Communities than Common Species	Environ. Toxicol. Chem.37(10): 2699-2704	2018	Boone,M.D.. An
152198	Brausch,J.M., M. Wages, R.D. Shannahan, G. Perry, T.A. Anderson, J.D. Maul, B. Mulhearn, and P.N. Smith	Surface Water Mitigates the Anti-Metamorphic Effects of Perchlorate in New Mexico Spadefoot Toads (Spea multiplicata) and African Clawed Frogs (Xenopus laevis)	Chemosphere78(3): 280-285	2010	Brausch,J.M., M.
58050	Clark,E.J., D.O. Norris, and R.E. Jones	Interactions of Gonadal Steroids and Pesticides (DDT, DDE) on Gonaduct Growth in Larval Tiger Salamanders, Ambystoma tigrinum	Gen. Comp. Endocrinol.109(1): 94-105	1998	Clark,E.J., D.O. N
156168	Conners,D.E., E.D. Rogers, K.L. Armbrust, J.W. Kwon, and M.C. Black	Growth and Development of Tadpoles (Xenopus laevis) Exposed to Selective Serotonin Reuptake Inhibitors, Fluoxetine and Sertraline, Throughout Metamorphosis	Environ. Toxicol. Chem.28(12): 2671-2676	2009	Conners,D.E., E.
2784	Cooke,A.S.	The Effects of DDT, Dieldrin and 2,4-D on Amphibian Spawn and Tadpoles	Environ. Pollut.3:51-68	1972	Cooke,A.S.. The

Brausch,J.M., M. Wages, R.D. Shannahan, G. Perry, T.A. Anderson, J.D. Maul, B. Mulhearn, and P.N. Smith. *Surface Water Mitigates the Anti-Metamorphic Effects of Perchlorate in New Mexico Spadefoot Toads (Spea multiplicata) and African Clawed Frogs (Xenopus laevis)*. Chemosphere78(3): 280-285, 2010. ECOREF #152198

Search Google Scholar EXIT

Export Close

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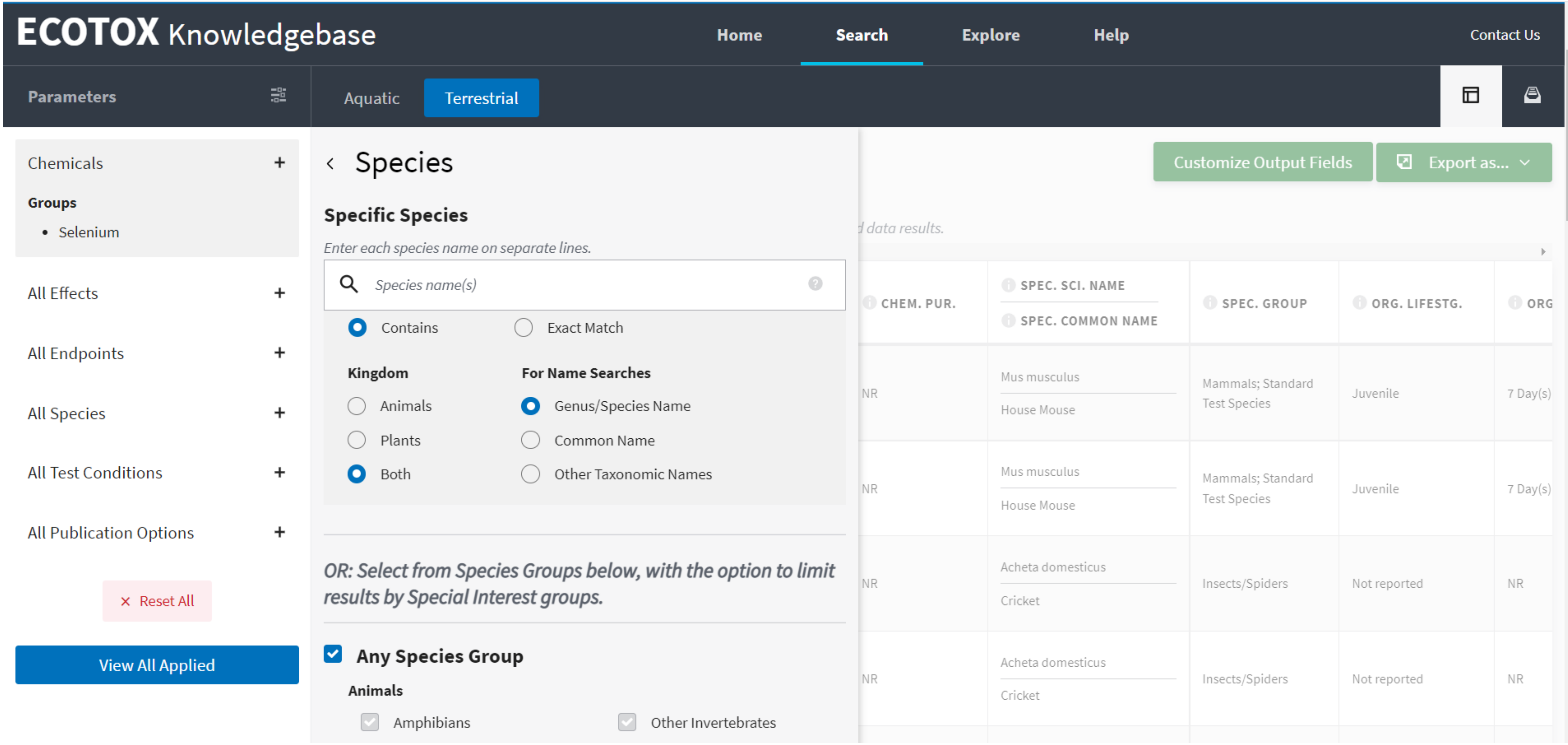
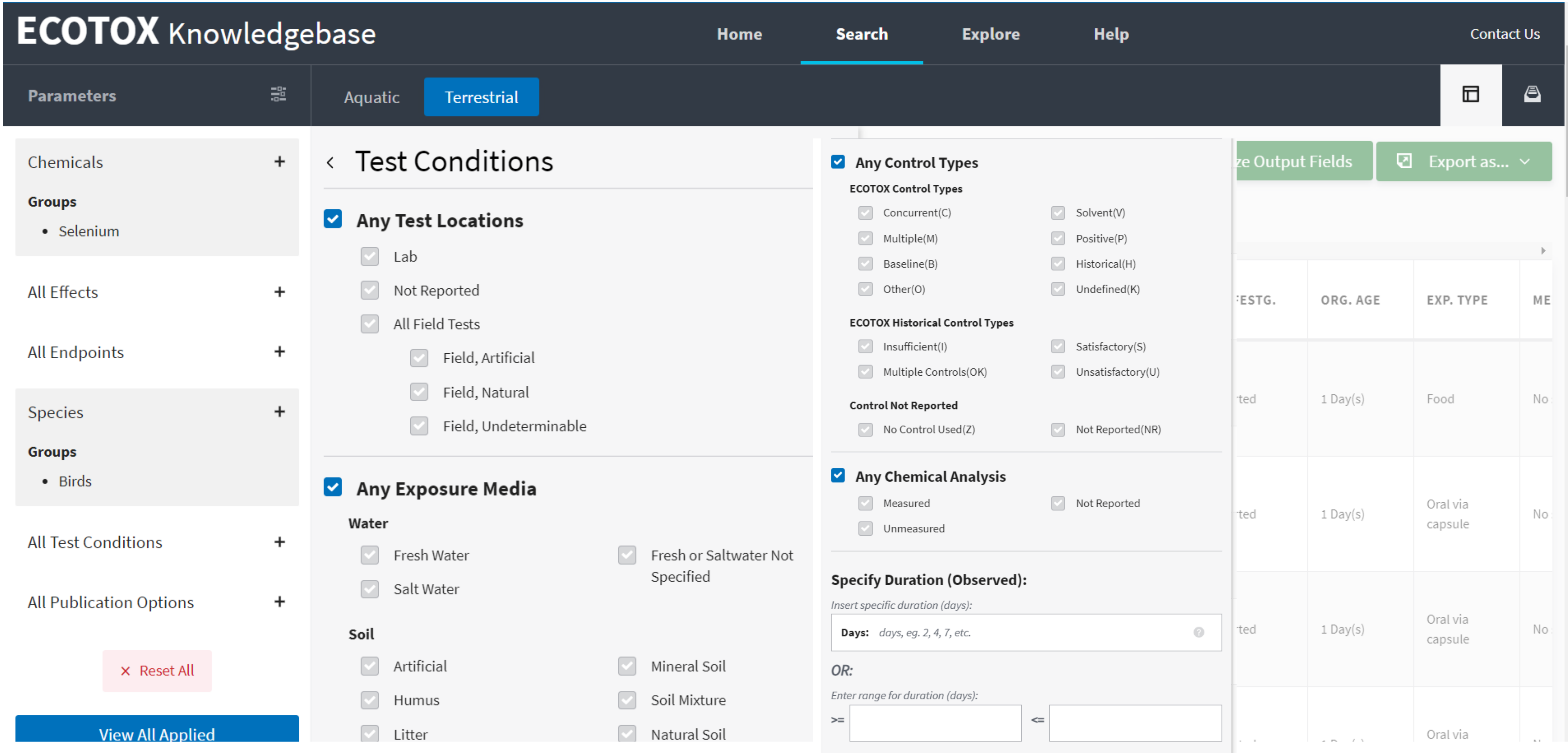
Example

Example: Selenium



Example: Selenium

United States Environmental Protection Agency



Example: Selenium

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ECOTOX Knowledgebase

Home | Search | **Explore** | Help | Contact Us

< Explore | Chemicals | Selenium

☑ Aquatic ☑ Terrestrial

Group Summary | Records | Plot View

Send Query Filters to Search

Query Filters

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

Chemicals (35)

All

Species Group (15)

Birds

- All
- --- Animals ----------
- Amphibians
- Birds
- Crustaceans
- Fish
- Insects/Spiders
- Other Invertebrates
- Mammals
- Molluscs

35 Chemicals

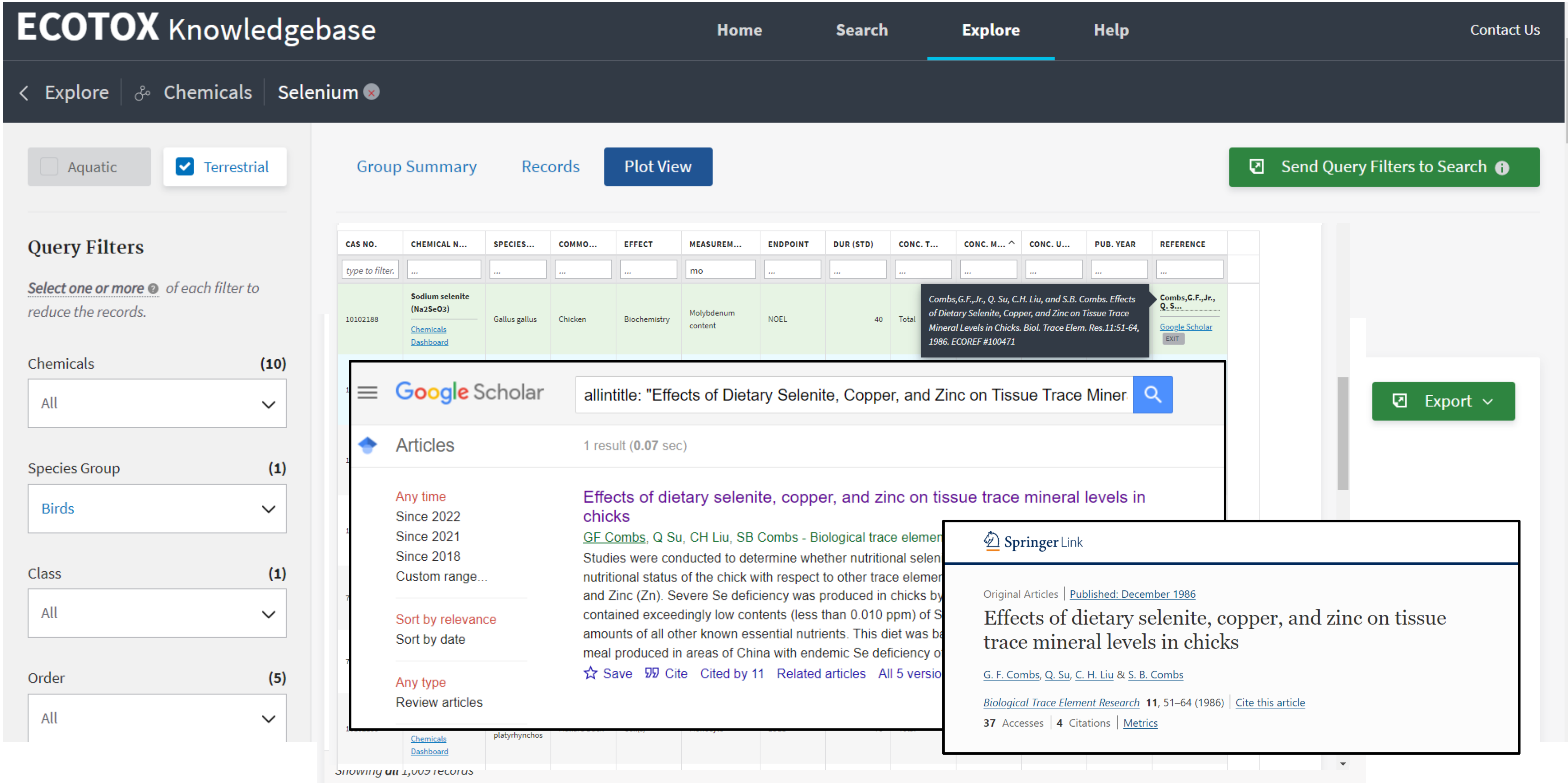
Export CSV

Chemicals are ordered by **CAS Number**.

*Showing **all** 35 chemicals from **144343** to **1238388561***

CAS	CHEMICAL NAME	RECORDS	PUBLICATIONS	YEAR MIN	YEAR MAX
type to filter...	...	...	...	...	...
144343	**Methyl selenac** Chemicals Dashboard	7	3	1963	1969
1313855	Sodium selenide	2	1	1987	1987
1464422	**Selenomethionine (Unspecified)** Chemicals Dashboard	1075	61	1971	2014
2697612	**Selenocystamine** Chemicals Dashboard	6	1	2000	2000
	Zinc	30867	3270	1915	2021

Example: Selenium



Example: Selenium

Test Number	CAS Number	Chemical Name	Author	Reference Number	Title	Source	Publication Year
2156245	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., and M.A. Fitzgerald	58951	Overwinter Survival of Mallards fed Selenium	Arch. Environ. Conta	1993
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
2164321	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., and D.J. Hoffman	40269	Comparison of the Effects of Seleno-L-Methionine, Seleno-DL-Me	Environ. Pollut.91(2)	1996
2156295	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	58953	Interactive Effects of Selenium, Methionine, and Dietary Protein c	Arch. Environ. Conta	1992
2156295	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	58953	Interactive Effects of Selenium, Methionine, and Dietary Protein c	Arch. Environ. Conta	1992
2157062	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., and G.H. Heinz	39729	Embryotoxic and Teratogenic Effects of Selenium in the Diet of M	J. Toxicol. Environ. H	1988
2250263	1464422	2-Amino-4-(methylseleno)butanoic acid	Fairbrother,A., and J. Fowles	35152	Subchronic Effects of Sodium Selenite and Selenomethionine on S	Arch. Environ. Conta	1990
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
2157083	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., and G.H. Heinz	39729	Embryotoxic and Teratogenic Effects of Selenium in the Diet of M	J. Toxicol. Environ. H	1988
2155941	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., and D.J. Hoffman	58949	Methylmercury Chloride and Selenomethionine Interactions on He	Environ. Toxicol. Che	1998
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
2156361	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., D.J. Hoffman, and L.J. LeCaptain	40189	Toxicity of Seleno-L-Methionine, Seleno-DL-Methionine, High Sele	Arch. Environ. Conta	1996
562708	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	39733	Interactive Effects of Boron, Selenium, and Dietary Protein on Sur	Arch. Environ. Conta	1991
2156902	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, and A.J. Krynitsky	39873	Hepatic Glutathione Metabolism and Lipid Peroxidation in Respon	J. Toxicol. Environ. H	1989
2156245	1464422	2-Amino-4-(methylseleno)butanoic acid	Heinz,G.H., and M.A. Fitzgerald	58951	Overwinter Survival of Mallards fed Selenium	Arch. Environ. Conta	1993
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
2156902	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, and A.J. Krynitsky	39873	Hepatic Glutathione Metabolism and Lipid Peroxidation in Respon	J. Toxicol. Environ. H	1989
2156802	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, J.D. E	50242	Toxicity and Oxidative Stress of Different Forms of Organic Seleni	Arch. Environ. Conta	1996
2156902	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, and A.J. Krynitsky	39873	Hepatic Glutathione Metabolism and Lipid Peroxidation in Respon	J. Toxicol. Environ. H	1989
562713	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	39733	Interactive Effects of Boron, Selenium, and Dietary Protein on Sur	Arch. Environ. Conta	1991
2155067	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, C.M.	58954	Subchronic Hepatotoxicity of Selenomethionine Ingestion in Malla	J. Toxicol. Environ. H	1991
2156902	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, and A.J. Krynitsky	39873	Hepatic Glutathione Metabolism and Lipid Peroxidation in Respon	J. Toxicol. Environ. H	1989
2156295	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	58953	Interactive Effects of Selenium, Methionine, and Dietary Protein c	Arch. Environ. Conta	1992
562710	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	39733	Interactive Effects of Boron, Selenium, and Dietary Protein on Sur	Arch. Environ. Conta	1991
562715	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	39733	Interactive Effects of Boron, Selenium, and Dietary Protein on Sur	Arch. Environ. Conta	1991
2156879	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, J.D. E	50242	Toxicity and Oxidative Stress of Different Forms of Organic Seleni	Arch. Environ. Conta	1996
2156044	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., and G.H. Heinz	50244	Effects of Mercury and Selenium on Glutathione Metabolism and	Environ. Toxicol. Che	1998
2156295	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., C.J. Sanderson, L.J. LeCaptain, E	58953	Interactive Effects of Selenium, Methionine, and Dietary Protein c	Arch. Environ. Conta	1992
2156879	1464422	2-Amino-4-(methylseleno)butanoic acid	Hoffman,D.J., G.H. Heinz, L.J. LeCaptain, J.D. E	50242	Toxicity and Oxidative Stress of Different Forms of Organic Seleni	Arch. Environ. Conta	1996

Terrestrial-Export | References | Search_Parameters

Case Studies

Case Studies

- Breakout groups are assigned based on your familiarity with and level of ECOTOX use.
- Each breakout group has a moderator to help participants and answer questions.
- There is a beginner and advanced case study. Each case study has an associated worksheet to guide the breakout group.
- Use the associated worksheet to complete the case study.
- If you finish early, notify your breakout group moderator. They can provide you other activities to complete.
- After the time is up, we will debrief the case studies.

Debrief: Level 1 Case Study

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- In what case example from your work environment would ECOTOX be useful?
- What have you learned about the process and workflow used to find information and papers in ECOTOX?
- What challenges did you encounter, and how did you solve them?

Debrief: Level 2 and Additional Case Studies

- What process did you follow in ECOTOX to explore the information presented in the initial publication?
- What challenges did you encounter? How did you solve them?
- In what case example from your work environment would ECOTOX be useful?

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Summary

Summary

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- Systematic and transparent procedures to identify and curate ecological toxicity data
- 30+ year 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 are on the public website (www.epa.gov/ecotox), readily available for exploration, querying and export for risk assessments, risk management and research

Thank You!

ECOTOXicology Knowledgebase Team

Dale Hoff, Great Lakes Toxicology and Ecology Division (GLTED) Director

Jason Berninger, GLTED

Colleen Elonen, Scientific Computing and Data Curation Division (SCDCD) (previous ECOTOX Coordinator)

Sara Vliet, SCDCD (liaison to ECOTOX)

Contract staff:

- General Dynamics Information Technology (GDIT)
- SpecPro Professional Services (SPS)

Senior Environmental Employment (SEE) staff

Training Breakout Room Moderators

Jason Berninger – Center for Computational Toxicology and Exposure (CCTE) GLTED

Anita Pomplun – GDIT

Brian Kinziger – GDIT

Colleen Elonen – CCTE SCDCD

Sara Vliet – CCTE SCDCD

Prarthana Shankar – CCTE GLTED Post-Doc

Chris Schaupp – CCTE GLTED Post-Doc

Monique Hazemi– CCTE GLTED Post-Doc

Jill Franzosa – CCTE Research Planning and Implementation Staff (RPIS)

Sammy Hanf – CCTE RPIS

Nisha Sipes – CCTE RPIS

Monica Linnenbrink – CCTE RPIS

Jessica Daniel – CCTE RPIS

Steven Black – ICF

Whitney Fies – ICF

Future NAMs Trainings: Potential Topics

Topic Area	Specific Products, Including Web Applications, Databases, Tools and Workflows
CompTox Chemicals Dashboard	CompTox Chemicals Dashboard: overview, all sub-modules and their functionality tailored to be a chemical specific case study approach that is trainee/user-defined.
Ecotoxicology	ECOTOX Knowledgebase, SeqAPASS
Exposure	CPDat (CPCat, CPCPdb, Ingredient Lists, Functional Use Data, Measured Data), Expocast/SEEM3; SHEDS HT
Databases relevant to toxicity and bioactivity	ToxCast, ToxRefDB, ToxVal, TEST; invitroDB
Toxicokinetics and dosimetry	High-Throughput Toxicokinetics R-Package (HTTK)
Chemical safety proof-of-concept (POC) workflows	Toxic Substances Control Act (TSCA) POC, Bioactivity:Exposure Ratio
Chemistry	GenRA; phys-chem properties (OPERA models); ENTACT; Non-Targeted Analysis (NTA)

For more information: www.epa.gov/chemical-research/new-approach-methods-nams-training

Contact

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Great Lakes Toxicology and Ecology Division

US EPA ORD Center for Computational Toxicology and Exposure

olker.jennifer@epa.gov

For questions about this or future NAMs trainings:

Jessica Daniel

Section Lead | Outreach, Stakeholder Engagement, and Training Section

Research Planning and Implementation Staff

US EPA ORD Center for Computational Toxicology and Exposure

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218-529-5225

ecotox.support@epa.gov

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