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ECOTOX

ECOTOXicology Knowledgebase System

User Guide – Version 5.6

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DISCLAIMER

ECOTOX attempts to be comprehensive, but the searches may not locate all relevant literature to a research program. In addition, the time lag from conducting a literature search, acquiring the publication, and extracting the data into ECOTOX can be up to, or exceed, six months. For this reason, it is suggested that users conduct searches of the most recent publication year to ensure data may be captured which has not been entered in to ECOTOX or met the criteria for inclusion.

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the U. S. government.

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

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1. INTRODUCTION

In the development and implementation of environmental management decision-making, there is the need to establish scientifically credible risk assessments for chemical stressors.

Ecological assessments are required to characterize and diagnose the relative risk of chemical pollutants and to predict future risk as a function of environmental management options.

The U.S. EPA's ECOTOXicology Knowledgebase (hereinafter referred to as 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 Office of Research and Development's (ORD's) Duluth Minnesota laboratory.

ECOTOX integrates toxicity data derived predominantly from the peer-reviewed literature, for aquatic and terrestrial organisms. Not all data published in the peer-reviewed ecotoxicology literature are included in ECOTOX. Users are encouraged to refer to the Limitations and Minimum Data Requirements section of this document to understand test results that are not considered for inclusion in the database.

To learn more about the ECOTOX process of identifying and curating ecotoxicity data, or to cite ECOTOX in your publications, please refer to:

> Olker, J. H., Elonen, C. M., Pilli, A., Anderson, A., Kinziger, B., Erickson, S., Skopinski, M., Pomplun, A., LaLone, C. A., Russom, C. L., & Hoff, D. (2022). The ECOTOXicology Knowledgebase: A Curated Database of Ecologically Relevant Toxicity Tests to Support Environmental Research and Risk Assessment. *Environmental Toxicology and Chemistry*, 41(6):1520-1539. https://doi.org/10.1002/etc.5324

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

For more information about ECOTOX or to report anything that you feel may be in error:

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2. GETTING STARTED

2.1. Access

To access the ECOTOX website, users need a computer equipped with a JavaScript enabled browser and internet connectivity. Start browser software and type in the Internet address http://www.epa.gov/ecotox/ to be connected to the ECOTOX Home page.

ECOTOX has the following browser limitations:

- The query pages require browser support for JavaScript and this feature must be activated in browser preferences.
- ECOTOX Version 5 requires a modern browser that supports HTML5. It has been tested in Chrome, Firefox, and Internet Explorer. Chrome is the recommended browser.
- After data or security updates, there are occasionally issues with ECOTOX displaying; it is recommended to clear your browsing data, cache, or history if you experience issues.
- If a popup blocker program is activated, ECOTOX Reports, Help and Browse features will not display. Please add the ECOTOX website to popup browser exception list to ensure full usability.

2.2. Navigating within ECOTOX

2.2.1. Home

The Home page provides a general overview of ECOTOX with links to the other pages within the application ('Search', 'Explore', and 'Help') and links to more information for statistics and other databases. These selections will open the requested information. To avoid losing your current 'Explore' and 'Search' selections, right click the link and open tab in a new window.

About ECOTOX: This section of the website provides a general overview of the ECOTOX, including the history of the system's development, and Help Center linkages which describes the ECOTOX website contents and navigational resources available. The information described below can be accessed by clicking "Learn More".

The Help center resources are listed in one of four web pages:

Starting Out - Information on how to begin navigating and searching the ECOTOX website. This page also provides links to the limitations associated with ECOTOX, Recent additions, Navigational help, Frequent questions, and PDF versions of the ECOTOX User Guide (this document), and the "ECOTOX Terms Appendix", which provides detailed information regarding ECOTOX controlled vocabularies (terms) used in the aquatic and terrestrial reports.

How do I... – Provides information on how to perform searches, select 'Search' parameters and report format, and navigate or retrieve outputs in ECOTOX.

What is... – Provides Data Field Definitions and Terms for each field available within ECOTOX searches and output. It also provides an overview on data sources, including sources used by ECOTOX staff for Species and Chemical verification. For a brief overview of data extraction processes used within ECOTOX see Appendix C.

More Resources – Includes a glossary of terms as well as links to related databases and websites. Providing these links does not imply endorsement by the U.S. EPA.

This printable User Guide is available in PDF (Portable Document Format) under the ECOTOX Documentation section as "ECOTOX User Guide."

2.2.2. Search

The ECOTOX 'Search' feature provides a direct method to retrieve data that can be refined by limiting the search parameters e.g., Chemicals, Effects, Endpoints or Species. Users can refine or filter selections before continuing a search. Once search options have been selected or updated, users can view the report in the browser, change the data fields, or export the report in an Excel or delimited format. 'Search' utilizes all available search and output features.

2.2.3. Explore

The ECOTOX 'Explore' feature is an interactive way to initiate queries by Chemicals, Species, or Effects via Groups. Once a Group is selected (or Custom Group created) for exploration, query filters will be displayed to refine data via drop down boxes.

During the exploration there are also options to examine the data visually via plotting functions. Once data exploration is complete, users can select report output options or Send Query Filters from 'Explore' to ECOTOX 'Search' for further refinement.

Note: ECOTOX Limitations**:** The following restrictions are placed on data included in ECOTOX. Data not satisfying these requirements are excluded from ECOTOX.

Minimum Data Requirements

Criteria	Requirement/Inclusions	Limitations/Exclusions
Chemical	• Single chemicals relevant to environmental exposure • Verifiable Chemical Abstract Services (CAS) number	• Mixtures (petroleum fuels, tank mix, effluent) • Air pollution e.g., CO_2 and ozone (except when ozone is dissolved in water) • Plastics and microplastics • Clay and diatomaceous earth products • Biological toxicants (e.g., algal species with registered CAS numbers)
Species	• Ecologically relevant species • Priority species are wild (test results for terrestrial domestic and laboratory species are used to fill data gaps when needed) • Organism taxonomic information verifiable against standard taxonomic sources	• Human, monkey, bacteria, viral and yeast
Effect/ Response	• Biological adverse or neutral response of an acceptable organism to a chemical toxicant. • Adverse effects are priority (beneficial or nutritional effects are lower priority)	
Exposure Amount (Concentration / Dose)	• Concurrent environmental chemical concentration or dose reported as concentration, dose, or application rate. • Sediment studies which have a reported water concentration	• Inhalation dose route (including intratracheal instillation) • Lead shot • Sediment only concentration • Concentration only reported as a log value
Exposure Duration	• Known duration from the time of initial exposure to the time of measurement for a biological effect	

Publication /Data Format	• Primary data source • Full text in English (some Non-English papers with an English abstract have data extracted)	• Reviews • Full text foreign language • Abstract only format

ECOTOX system limitations:

- In 'Explore' there is a maximum of 3,000 data records that can be viewed but all records can be retrieved through multiple exports of tabular results. [Each data record is a separate row in a tabular output.]
- In 'Search', exports are limited to 10,000 data records. For search results with 5,000 data records or greater, exporting as a 'Delimited' file is recommended. Searches that exceed these limitations can be split by selecting specific publication years, species, chemicals, or effects to create multiple smaller export files. For instance, if you want specific search parameters, but the number of data records retrieved exceeds the limitations for viewing and exporting, you may want to add a filter for Publication years. This strategy allows to you to output your search in sections, export several files, and then collate data records together for a complete report. You will need to select a range of publication years (e.g., 1990-2000) that fits within the record limit. Example: Intersect search with publication years 1915-1980, then years 1981-1996, then years 1997-2017.
- If popup blocker program is used, ECOTOX report exports may not display. Please add the ECOTOX website to popup browser exception list to ensure full usability.

Data Downloads**:** Users can download delimited ASCII files of the entire database into windows .exe or .zip files. This does not include any software and will require combining various files together to view entire data records. The data are divided into two sections: Aquatic and Terrestrial. Within these sections you will find data tables, field descriptions, and graphical relations of the data structure.

3. OVERVIEW OF SEARCH OPTIONS FOR DATA IN ECOTOX

Database retrievals can be conducted using either 'Search' or 'Explore' options. 'Search' supports queries on Species, Chemicals, Effects, Endpoints, Test Conditions, or by Publication Options. 'Search' includes all options under 'Explore' and enables users to focus on additional criteria such as study site type (e.g., laboratory, field), exposure media (e.g., freshwater, soil), route of chemical exposure (e.g., oral, diet), and statistically derived endpoints (e.g., LD50, NOEL). 'Search' results can be downloaded either as a Microsoft (MS) Excel spreadsheet or delimited file format as .txt with pipe delimiter (|), which can be transferred into a database or spreadsheet.

Within the 'Search' page, the  inside of a text entry box or output display field has context-sensitive help or information that will display in a separate window if selected. If 'Help' is opened in a separate tab or window, users may navigate within the 'Help' window without affecting the session in 'Search'.

3.1. Search Strategy Basics

The ‘Search’ or ‘Explore’ pages are each designed to search on all data, unless users restrict the search by choosing specific search criteria (e.g., adding the check in the checkbox, enter text in a text entry field). In ‘Search’, the first step is to select the database of interest: Aquatic or Terrestrial. ‘Explore’ includes result records from both Aquatic and Terrestrial unless the user deselects one or the other at the top of the Query Filters. Searches may be performed at any time after specific search criteria have been selected. Users do not need to enter something in every ‘Search’ criteria area.

The search logic includes two basic strategies: combination/union and intersection. Within a ‘Search’ area (e.g., Chemicals), the search will combine all search selections. Between each ‘Search’ area, the search will intersect selections (e.g., intersection between chemical and taxonomic selections). Users can use the ECOTOX Search Planner located in Appendix A to plan searches. Appendix B describes practice searches to assist users in learning and using the ECOTOX system.

Before searching, users should read Appendix C to find out more about ECOTOX and Appendix E for specific data field descriptions.

3.2. Overview of Search and Explore Pages

3.2.1. Moving Within Pages and Target Menu

Users may move within an ECOTOX output table by using the scroll bar located at the right of computer screen; the output table has top and bottom scroll bars to move left and right in the table.

3.2.2. Selection Box and Types

All search and report selection options will be displayed in a box using multiple selection methods: radio button, checkbox, drop-down lists, typing in text (one entry per line).

Green buttons are used for general changes when new items are applied. Red buttons are used for removing or resetting information. Blue buttons are used for general functionality and switching among sections in ECOTOX.

Users must search at least one parameter. Any additional selections made using multiple parameter search boxes within the ‘Search’ or ‘Explore’ page will narrow the results.

3.2.3. Key Functions

There are some functions that can aid in searching. These Key Functions include:

Update Search - Updates query to most recently selected parameters in ‘Search’ page.

Reset or Reset All - Erases previously selected criteria within a ‘Search’ area (Reset) or across all ‘Search’ or ‘Explore’ areas (Reset All).

Aquatic Button - Loads or filters Aquatic data records.

Terrestrial Button - Loads or filters Terrestrial data records.

Customize Output Fields - A popup window that allows users to change or add data fields to display in the search results. This allows selection of all available fields for display and export (the default includes a limited number of the most commonly requested fields). Note: This option will only be available once a search has been conducted.

Export as…- A drop-down menu which allows export of results data to Excel or Delimited files or structured for use in developing Species Sensitivity Distributions.

> Note: Under this button, users can choose to have full output version of test results or "Condensed". "Excel (Full)" outputs six Excel columns for each numeric field selection: mean operator (~, <, <=, >, >=), mean value, min operator, min value, max operator, and max value. "Excel (Condensed)" outputs one Excel column for each numeric field (mean operator + mean value) and summarizes other values in a separate column at the far right.

View All Applied - A popup window showing parameters applied to specific search. Users can export this criteria list for documentation purposes. For Excel exports, this information is also included on a separate 'Search_Parameters' tab.

References - By selecting the references button  at the top right of the screen users can view and export all reference citations for the data searched. For Excel exports, this information is also included on a separate 'References' tab.

3.2.4. Options for Searching in ECOTOX

ECOTOX offers the following search options: 'Search' or 'Explore'.

'Search' provides a broader range of query parameters than those available in 'Explore'. The default for each selection box is *All Data* will be searched. As selections are added to Search criteria, the number of records that can be retrieved from ECOTOX may be reduced.

Users must search on at least one parameter. Any additional selections made using multiple parameter search boxes within the 'Search' or 'Explore' page will narrow the results.

Search Page Menu: The main 'Search' page provides an overview of how to navigate within 'Search' and has a navigational tool bar located at the left of the page, which allows users to navigate to different search parameters and enter specific search criteria based on parameter field.

> *All Chemicals* – Specific or Multiple Chemical Entry using either the Chemical Abstract Services (CAS) Registry number or chemical name to identify the substance(s) or select one or more predefined group under "Any Chemical Group."
>
> *All Effects* – Specific or Multiple Effects or Measurements or select one or more general effect type under "Any Effect Group."

All Endpoints- Specific or Multiple Concentration Based Endpoints, Time Based Endpoints, Bioaccumulation/Bioconcentration Factor Endpoints, or No Endpoints.

All Species – Specific or Multiple Taxonomic Entry using either the scientific name, common name, or ECOTOX species number to identify the organism(s) or select one or more predefined group under "Any Species Group."

All Test Conditions – Select any Test Location, Exposure Media, Exposure Type, Control Type, Chemical Analysis, or specify Duration.

All Publication Options – Enter Author, Reference Number, Publication Year, or select grouped data under Independently Compiled Data and Recent Modifications/Additions.

As selections are made, they will appear in the left frame navigation tool. Users may also review search selections using the "View All Applied" button after "Update Search'" has been applied. Each parameter selection box also includes a 'Reset' button in the upper right-hand corner of the box. 

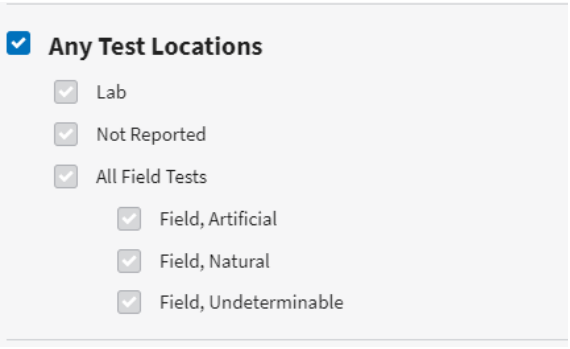
When you click on 'Reset', all selections *within* the box are removed, however selections remain in the other boxes.

In summary, the ECOTOX 'Search' feature is designed to lead users through a search session using multiple forms. The left frame provides a menu and navigational search forms containing search parameter selections. Users must use the navigation tool bar to move from form to form within 'Search.' To reset all data fields and start over, select 'Reset All'.

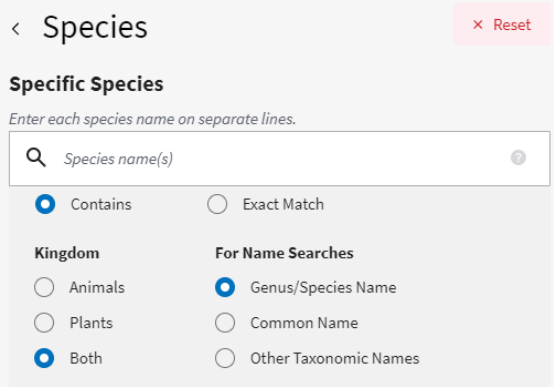
***Note*: Using your browser's Back button will result in the loss of all entries made in any of the ECOTOX forms.**

'Search' selection types may include:

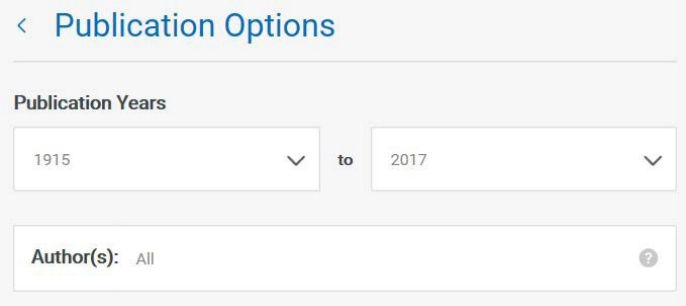
Checkbox: To select an item, click on the checkbox to include. To remove a selection, click on the checkbox again. One or more items may be selected.



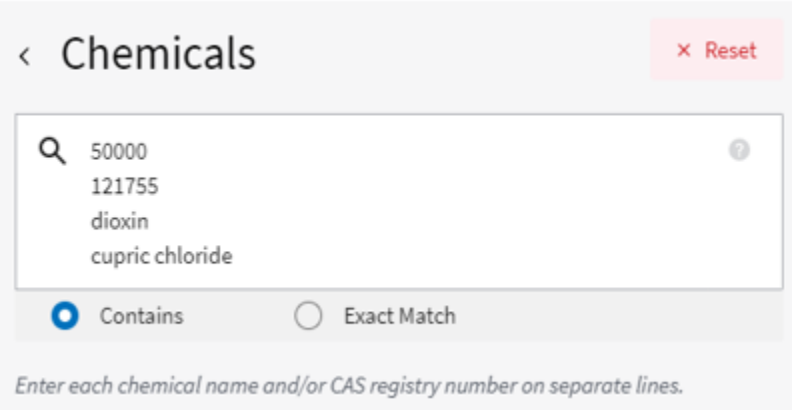
Radio button: To select an option, click on the radio button box to include. To unselect, click on the radio button again. Only one option listed may be chosen.



Drop-down List: To modify searches using the drop-down list, click on the arrow icon on the right side. Clicking on this icon drops down a list immediately below the field and shows which values can be chosen. Click on the entry item to select.



Text Entry: Chemical, Effects, Species, Author, or Reference Number searches may require typing the search criteria into the selection box. Each entry must be on a single line, followed by clicking “Enter” on keyboard. The text must match the type of data within ECOTOX, either as a sub-string search (Contains) or exactly (Exact Match). Users may enter both text and numeric data into text boxes.



View/Edit**:** For predefined groups within the ‘Search’ parameters, users can view and/or further edit selected lists after “Update Search” has been completed. To access the

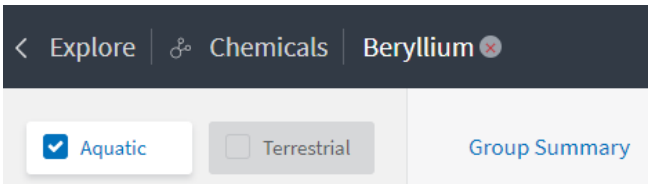
view and edit feature, click on the button located at the bottom for the search box labeled “View/Modify Entries for Selected Groups.” This displays a popup window with detailed list(s) for selections. Changes can be made by *deselecting* any search selection and clicking on ‘Save Modifications’ and selecting ‘Update Search’ to change the data output. A ‘Restore All’ link is also provided to return the parameter to the default selections or select the ‘Cancel’ button to return to original search parameters.

If you click on your browser “Back” button, your edits will not be saved.

Explore Page Menu

The ‘Explore’ feature supports searches for Predefined or Custom groups for Chemicals, Species or Effects Groups. The ‘Explore’ menu includes a more limited set of filter options and the data fields in the displayed tables cannot be modified. The query options within ‘Explore’ are also available in ‘Search’, but the ‘Search’ contains more search and output options.

A directory path noting the location in ‘Explore’ appears in the top banner after parameters are entered. Users can move up the path by closing the level using the  button. Selecting the back button returns you to the main ‘Explore’ page.



In summary, ECOTOX offers the following ‘Explore’ options:

- Chemical: Within the Chemical Entry search box, users may select any or multiple Chemicals Groups to explore available data. Users can also ‘Create Custom Group…’ by browsing chemicals in ECOTOX or entering CAS Number(s).
- Species: Within the Species Group, users may select any or multiple Species Groups or develop a custom list to explore available data. Users can also ‘Create Custom Group…’ by browsing available species or entering NCBI TaxID(s).
- Effects: Within the Effects Group, users may select any or multiple Effect Groups in the Group list to explore available data. Users can also ‘Create Custom Group…’ by browsing available effect measurements or entering a specific list of terms.

4. ECOTOX DATA SEARCHES

To retrieve ECOTOX data, select either the ‘Search’ or ‘Explore’ on the Home page banner. The query page will then load, however, transferring between the ‘Search’ and ‘Explore’ features will lose your current search strategy.

4.1. Using 'SEARCH' to locate data

4.1.1. Chemical Searches

Under the 'All Chemicals' search tab, users can conduct queries on CAS Registry numbers, partial or complete chemical names, and predefined groups of chemicals. The default within ECOTOX is that *all* chemicals are selected for searching. All chemicals within ECOTOX include a CAS Registry number and a chemical name, typically a Collective Indices name. This information is verified in reliable sources. Appendix D describes the verification process for chemicals in the ECOTOX system. In Search, the Collective Indices name is identified as the preferred name within ECOTOX, and this is the name displayed on the output even if the search was conducted using a common or trade name of a substance. ECOTOX includes chemical synonym searching as an option; however, if a synonym is used by more than one CAS number, both chemicals will be queried. In Explore, the most common name is displayed on the output. For example, if you Create a Custom Chemical group and enter Glyphosate, then select the name that contains 'Glyphosate isoproylamine' (e.g. CAS: 38641940 | N-(Phosphonomethyl)glycine compd. With 2-propanamine (1:1)), Roundup will display in the output since it is the most common name.

4.1.2. Chemical Entry

To conduct a search, type in the CAS Registry number(s) and/or chemical name(s). Users may enter the CAS Registry number with or without hyphens and leading zeroes. CAS number queries are always exact matches.

Users can search for an unlimited number of entries and each entry must be entered on a separate line. Users can mix numbers and name entries.

Chemical Name*:* Users can search ECOTOX for chemical synonyms. Enter the names of the chemicals, placing each name in a separate field.

> *Note:* If the term *benzene* is entered with the "Contains" radio button, all chemicals that contain the sub-string *benzene* will be retrieved. Selecting the "Exact Match" will return only results for *benzene*. It is recommended to search on CAS Registry numbers (CASRN) to specifically restrict search to selected chemical(s).

Chemical Dashboard: On the 'All Chemicals' searching parameter, a link directs users to the U.S. EPA's CompTox Chemicals Dashboard to search by CASRN for more information on a chemical.

> *Note:* CAS Registry number with or without hyphens may be entered for ECOTOX searches, but exact CAS Registry number with hyphens is preferred for the CompTox Chemicals Dashboard searches.

4.1.3. Predefined Chemical Groups

The option to select from predefined lists is available in the 'Search' function. Chemical

lists have been provided to effectively search a variety of Metal/Organometal or Organic compounds chemical groups. To select a chemical group or specific chemical(s) of interest, click on the checkbox to search. To unselect, click on the checkbox again.

4.1.4. Search Tips for Chemicals

Some guidance when conducting a chemical search:

Metal Compounds: It may be more effective to search metal compounds by chemical name, i.e., entering *cupr* and *copper* as chemical names will find copper and several copper compounds with fewer keystrokes than typing all the individual CAS Registry numbers. Users may also search a group of copper compounds using the ECOTOX Predefined Chemical Group option.

Organic Compounds: These compounds may be searched by chemical name, i.e., entering *dioxin* as a chemical name will be more efficient than entering all the specific dioxin chemical names or CAS Registry numbers. Remember, though, entering some chemical names may identify many non-applicable chemicals (e.g., benzene will result in all compounds with the sub-string 'benzene' in the chemical name), therefore it is recommended to search by CAS Registry number if a specific chemical is required.

Pesticides: Pesticides are usually found by typing the common synonym name or trade name. Chemical CAS Registry numbers may be located via link to CompTox Chemicals Dashboard or accessing other chemical indexing resources.

4.2. Search by Effect Measurements

Under the **"**All Effects" search tab, users can conduct queries on specific effect measurements (including Post-exposure results), or by predefined groups of effects.

> *Note*: If the term *vitellogenin* is entered with the "Contains" radio button, all effects that contain that sub-string will be retrieved. Selecting the "Exact Match" will return only results for *vitellogenin*.

The default within ECOTOX is that *all* effects are selected for searching. All effects are categorized into one of 11 major effect groupings such as Accumulation, Growth, Mortality, etc.

Each effect includes a list of observed measurements. For instance, the Effect Measurement "Biochemical Group" includes three effect categories: *Biochemistry*, *Enzyme(s)*, and *Hormone(s)*. Within each of these effects there are multiple measurements located under "View/Modify Entries for the Selected Group(s)".

For further refinement of observed effect information, users may click on the "View/Modify Entries" button located at the bottom of the 'Effect Measurements' selection box. A new window will open and display the list of specific measurements for each of the selected effect(s) and/or effect group(s). Measurements include quantitative observations that describe and evaluate biological responses to toxicants. Each effect (e.g., Growth) can have several associated measurements (e.g., length, weight). The "ECOTOX Terms Appendix" located in the "What Is..." section of the Help web page provides definitions of each effect measurement term used in ECOTOX.

The 'View/Modify Entries' window allows users to view and edit Effect Measurements to

include in search. To remove a specific measurement, click on the highlighted blue box to remove the effect, and more than one measurement may be removed at a time. Measurements may be restored by clicking on the “Restore All” default button.

Note: If only a few effect measurements are desired, select “Clear All” and reselect only those measurements of interest. When complete, click on the “Save Modifications” button to close the window and return the ‘Search’ page. If you click on “Back” button, edits will not be saved.

Select “Update Search” -to apply changes to the output.

Post-exposure Measurements**:** Within the “All Effects” tab, this option allows users to exclude results of responses observed during a post-exposure period. A post-exposure study has an exposure to a chemical followed by a recovery, depuration or elimination period or is a delayed effect. ‘Post-exposure Measurements’ and are included in the search results unless the check box is selected to exclude them.

For post-exposure effects, the observation time is recorded (Observed Duration) and will be greater than the Exposure Duration; comparing these two fields is the best way to recognize records with measurements taken post-exposure.

Many historical records for Post-exposure Measurements can also be recognized by clicking the ‘Customize Output Fields’ button and selecting the ‘Display lookup terms instead of descriptions’ checkbox at the bottom of the pop-up window. In some cases, post Exposure Measurements will be displayed with a tilde (~) in front of the Effect Measurement Term. For example, a post exposure measurement mortality effect would have ~MOR for the Effect Measurement Term.

Note: When using the ‘Explore’ feature, Post-exposure Measurements are also automatically included in a query and currently cannot be separated.

4.3. Search by Endpoints

Under the **“**All Endpoints” search tab, users can conduct queries on any or all specific endpoints or by predefined group of effects.

The default within ECOTOX is that “All Endpoints” are selected for searching. For the purposes of ECOTOX, an endpoint is defined as the quantification of an observed effect obtained through statistics or other means of calculation for the express purpose of comparing equivalent effects (e.g., LC50).

For each toxicity test, pertinent information on test results presented by the authors are encoded within the database. Endpoint information is included if it is reported by the author.

Within the “Any Endpoints” tab, users can choose one or more endpoints within the checkbox by clicking to select endpoints to include in query. The Endpoint selection box is divided into the following sections: Concentration-Based or Time-Based Endpoints, Bioaccumulation / Bioconcentration Factors (all statistically-derived, or calculated as reported by the author or determined by the ECOTOX staff), or Statistics, No Endpoint (which contains statistically analyzed data but authors did not identify a specific endpoint or one could not be determined by ECOTOX staff) or

Endpoint Not Reported (NR) where data was not statistically analyzed.

The “View All Applied” box allows users to view and export all search parameters. More endpoints can be selected after conducting the initial search, but users must select “Update Search” to apply changes to the output.

4.4. Search by Taxonomy

Under the “All Species” search tab, users can conduct a search by using Species Names or ECOTOX Species Number, or by using Predefined Species Groups. All data records within ECOTOX include a Scientific name for the test species. All names have been verified in reliable taxonomic sources. Appendix D contains information regarding the verification of species data in ECOTOX.

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.

4.4.1. Taxonomic Entry

Users can search for an unlimited number of species entries, but each entry must be entered on a separate line or separated by a comma. Users can mix numbers and name entries, but the name entry must be the same type (e.g., genus/species and common names cannot be searched within one entry screen).

Genus/Species Name*:* Users can conduct a search on whole or fragments of scientific names (Genus, Species).

Species Common Name*:* All data records within ECOTOX include a common name for each species. Users can conduct an exact search (Exact Match) on the common name or fragments.

Other Taxonomic Names: Key taxonomic levels (Kingdom, Phylum/Division, Superclass, Class, Order, Family, Genus, Species, Subspecies, and Variety) searches are available by typing the appropriate scientific name.

> *Note:* If a species name is entered, users can select either the “Contains” or the “Exact Match” radio buttons. For example, if users enter *trout* and select the “Contains” radio button, it will return everything that contains the sub-string *trout*. For name searches, users are required to select the type of name (e.g., Genus/Species name, etc.). If *trout* is entered, users would need to select the Species Common Name radio button to retrieve any results. Selecting the “Exact Match” is best utilized when the literal string (exact name) of the species is known (e.g., *rainbow trout* or *Daphnia sp*.)

4.4.2. Predefined Species Groups

Species lists have been provided to effectively search a variety of species groups.

For further refinement of a species group, users may click on the “View/Modify Entries for Selected Group(s)” button located at the bottom of the Species selection box. A new

window will open and display the list of specific species for each of the selected groups.

The View/Modify entries window allows users to view and edit species to include in search. To remove one or many specific species, click on the highlighted blue box to remove the species. Users may restore species by clicking on the “Restore All” default button. If only a few species are desired, select “Clear All” and reselect only those species of interest. When completed, click on the “Save Modifications” button to close window and return the ‘Search’ page. Clicking on browser “Back” button will remove all edits.

Select “Update Search” to apply changes to the output.

> *Note:* Users cannot display both the Animal and Plant species groups due to the large number of species within these lists.

Taxonomic kingdom (plant or animal) searching is available in ‘Search’. The kingdom is searched using a radio button option located within “All Species” as “Plants” for the plant kingdom or “Animals” for the animal kingdom.

The Plant kingdom search also includes species representing Monera and Fungi. Some studies report both plant and animal species as one effect measurement (e.g., aquatic community, plankton, soil community). These results will be included when either plant, animal or both kingdoms are selected.

4.4.3. Search Tips for Taxonomic Searches

Clicking on “All Species” on the frame at the left of the search page will move users to the Taxonomic Search area. Some examples are provided to help when developing your search strategy:

Genus/Species Name: Entering *Pimephales promelas* in the search text box will result in only data for fathead minnows. Entering *daphnia* genus as the genus/species name will result in all *Daphnia* and *Ceriodaphnia* species. If a specific genus and/or species names is consistently searched, a user may want to use the ECOTOX Species Number for searching.

Users may also enter a historical Scientific Name and still retrieve data for a species. For example, if *Salmo gairdneri* is entered, the output will display the currently accepted name, *Oncorhynchus mykiss*.

Other Taxonomic Name*:* Any taxonomic level (Kingdom, Phylum/Division, Superclass, Class, Order, Family, Genus, Species, Subspecies, and Variety) can be searched using this Taxonomic Entry box. For example, entering *Salmonidae* will retrieve all species for this family.

Species Common Name: Using some common names may be an effective way to search if there is a unique common name for that organism. For example, entering *mallard* in the common name field will result in only mallard duck results.

> *Note:* Entering the term *duck* will output results for *duck* and *duckweed*. In this case, searching using the common name (exact) or performing only performing the query on terrestrial data will eliminate the duckweed from the

search.

Note: Entering *bird* in the common name field will result in *bird* and *ladybird beetle* data. In addition, using the term *bird* will not ensure that all bird data in the system will be extracted because the species name may not use the term *bird* in the common name.

ECOTOX Species Number: The species number is the unique indexing number assigned to each species in ECOTOX and can be used as a shortcut method to search genus and/or species data. The ECOTOX Species number can be identified by selecting it in the output.

4.5. Search by Test Conditions

For each toxicity test, pertinent information on testing procedures presented by the authors are documented within the database. Search selections available on this page are: Test Location, Exposure media, Exposure types, Control types and Chemical analysis. These options are briefly described below.

4.5.1. Test Location

The valid entries for test location are Lab (laboratory), Field (all outdoor field tests, artificial, natural or undeterminable) and Not Reported (i.e., the author(s) did not present sufficient information to determine test location). The default within ECOTOX is that *all* data, regardless of test location, are included in search result. To selectively search on a specific test location, click to mark the appropriate checkbox.

4.5.2. Exposure Media

The default within ECOTOX is that *all* data, regardless of test media, are included in search result. To search on a specific exposure media, click to mark the appropriate checkbox.

Aquatic freshwater tests include those conducted in freshwater, reconstituted water, distilled water, or tap water. Saltwater tests include those conducted in natural or artificial seawater, brackish water, or estuarine water.

Terrestrial tests include those conducted in both soil and non-soil habitats. Soil media include, but aren't limited to natural soil, artificial soil, mineral soil, humus, and litter. Non-soil tests use artificial media that include, but aren't limited to, hydroponic, filter paper, plaster of paris, agar, and culture. No substrate (NONE) is used if there is no substrate in the experimental vessel.

4.5.3. Exposure Type

Users can select the exposure type by clicking the items in the search selection box area. Organisms are typically exposed to toxicants through aqueous, diet, injection, in vitro, topical, or environmental routes. Occasionally, an exposure may occur through multiple routes (e.g., such as topical and oral).

ECOTOX includes chemical exposures on whole living organisms as well as organisms that are not intact (*in vitro*). For example, *in vitro* exposures can contain studies using excised organs and cell cultures. Inclusion of *in vitro* studies into ECOTOX have the

same species criteria requirements as those for whole organisms (ecologically relevant and exclude humans, monkeys, rats, and mice).

4.5.4. Control Type

Control Type allows the capability to filter toxicity tests based on author reported test control types, as well as the ability to select specific control type(s).

Individual control types may be selected by choosing the appropriate checkbox(es) from the following options:

ECOTOX Control Types

- Concurrent (C) - A non-treated group run simultaneously to the toxicant treated group.
- Multiple (M) - A legacy term where multiple control types are reported, e.g., solvent and concurrent.
- Baseline (B) - A treatment group whose measurements were collected before administration of the toxicant in the treated group.
- Other (O) - Control run in a different system, e.g., using dilution water from a different source or soil from a different source or type.
- Solvent (V) - A treatment group exposed only to the solvent or carrier used to dissolve or carry the toxicant in the treated group.
- Positive (P) - Groups receiving a treatment with a known result showing a particular or expected change.
- Undefined (K) - A legacy term where data for a control is presented but without accompanying methodology to identify procedures used.

Historical ECOTOX Control Types

- Insufficient (I) - A legacy term where no information about the controls or their mortality is given.
- Satisfactory (S) - A legacy term corresponding to a control with mortality less than or equal to 10% or where the control mortality exceeds 10% and the authors correct for it with a mortality correction formula.
- Unsatisfactory (U) – A legacy term corresponding to a control with mortality exceeding 10% where the authors don't correct for it with a mortality correction formula.

Control Not Reported

- Not Reported (NR) - No information about presence or absence of controls in the publication

4.5.5. Chemical Analysis

The method of chemical analysis filters toxicity tests based on the author reported chemical concentrations, as measured or nominal values. Individual chemical analysis types may be selected by choosing the appropriate checkbox(es) from the following

options:

Measured**:** Exposure and/or observation concentrations or doses are quantitative. Analysis methods may be reported.

Unmeasured**:** Exposure and/or observation concentrations or doses are clearly identified as nominal values, or when the author does not report whether the concentrations were measured or nominal (i.e., unmeasured is used as a default value when there is no information provided about the reported chemical concentrations).

Not Reported**:** Exposure and/or observation concentrations or doses are not reported.

4.5.6. Duration

Specify Duration (Observed) can be used to filter results returned to a specific value or a range, in days, for the Observed Duration. The Observed Duration is the time at which an effect measurement was observed/measured and reported (for example, a 24-hour LC50). The Observed Duration may be different than the Study Duration and Exposure Duration. For example, measurements may be taken at intervals within a study, resulting in several records with Observed Durations shorter than the Study Duration. The Observed Duration for effects measured post-exposure will be greater than the Exposure Duration. You can enter a specific duration or range of durations in text boxes, in days, to filter to the selected value(s) from the records that are able to be converted to a standard unit (days).

4.6. Search by Publication Options

4.6.1. Publication Year(s)

The default within ECOTOX is that *all* data, regardless of publication year, are included in search result. The default publication year search may be overridden by selecting a range of publication years.

The Aquatic component of ECOTOX contains data from publication years 1915 to present. The Terrestrial component of ECOTOX contains data from publication years 1926 to present.

4.6.2. Author(s)

Searches may be conducted on specific authors. To search on an author, enter the specific author names in the selection box while in the “All Publication Options” of the ‘Search’ page, one author per line. Partial author names may be used. Only authors who have associated data in ECOTOX are returned.

4.6.3. Reference Number

Each publication abstracted for ECOTOX is assigned a unique Reference Number (also called an ECOREF Number). These reference numbers are available for selection for any ECOTOX outputs. To conduct a search, enter a valid ECOTOX Reference Number(s) in the selection box in the “Ref Num(s)” box, with one reference number per line.

4.6.4. Independently Compiled Data

ECOTOX includes several independently compiled data sets. Data sets from the Organization for Economic Cooperation and Development (OECD), Russia, Office of Pesticide Programs, the U.S. Geological Survey, and U.S. EPA Duluth Lab are included as subsets of ECOTOX. For further information on these data files, refer to Appendix F.

4.6.5. Recent Modifications and Additions

The default within ECOTOX is that *all* data, regardless of the date added to the database, are included in search results. Data may be restricted to newly updated or modified data using this filter. The Recent Modifications/Additions search box allows searches based on the last 10 updates to ECOTOX, which typically span two to three years. This feature is useful for specific queries (e.g., list of species and/or chemicals) conducted on a regular basis.

Users can select “View All Applied” box to view the selected parameters used in the ‘Search’ function. This information can be exported to retain a dated record of each search. For Excel exports, this information is also included on a separate ‘Search_Parameters’ tab.

4.7. Output and Report Format Options

Within ‘Search’ function, the output table report has been condensed to include only the most utilized output fields. All or some of the fields can be exported by first selecting “Customize Output Fields” button, then click on “Select All” or clicking on any additional fields to display in search results. All updated fields will be displayed in the output table.

Navigating within Output table**:** Users can move through the report in several ways. To view within a page, use the scroll bar on the right side of the window. To view all output fields, scroll down to bottom and then scroll to right of table. To move from one page to another page of the report, use the numbered hyperlinks located at bottom of each report page.

Users can also choose to export data to an Excel spreadsheet or delimited file. The report will be saved as either Aquatic or Terrestrial depending on selected output.

In the downloaded/saved Excel report, if the author did not report data for a database field, the output report will not populate the field (cell will be blank in output). Definitions for any terms presented in the report can be found in the “ECOTOX Terms Appendix” located under the “Help” tab.

Excel exports include separate tabs for the data records, list of references, and the search parameters applied (included date and time stamp). When delimited exports are used, it is recommended to also export and save the References (by selecting the references button on the top right of the ‘Search’ page) and the Parameters Applied (by selecting the ‘View All Applied’ button on the bottom of the left-hand panel in ‘Search’) for record keeping purposes.

Note: Users must first export output to Excel or delimited file; currently, users

cannot print directly from the HTML output.

If preferred, users can generate a delimited data file (.txt) of search results. The delimited tabular output format has set default output fields. If the author did not report data for a parameter, the delimited output will have an NR or 'Not reported' in the data field. Definitions for all terms presented in the report can be found in the "ECOTOX Terms Appendix" located in the "Help" section under the "Home" page.

The exported data file may be imported into spreadsheet or database software for further refinements. Each data element is separated into a unique field, and each result number appears as a data record on a single line. For delimited reports, the Reference Citation field will appear in the separate delimited fields (Reference Number, Author, Title, Publication Year and Source).

When delimited exports are used, it is recommended to also export and save the References (by selecting the references button on the top right of the 'Search' page) and the Parameters Applied (by selecting the 'View All Applied' button on the bottom of the left-hand panel in 'Search').

> *Note:* Each field in the delimited file report will be separated by a vertical bar ("|"). Users may have to specify the vertical bar as the delimiter when importing the data. A forward slash (/) within a field refers to an associated comment. Comment fields can be selected in output to help interpret unique test conditions but for a complete understanding of the toxicity study, refer to the full publication.

4.7.1. Display Fields

Select data parameters are presented in the default versions of the Aquatic and Terrestrial tabular reports. Users can change the display fields for Excel and delimited outputs by selecting the "Customize Output Fields" button. Within "Customize Output Fields", a checkmark appears for data fields that are displayed in the default output format. To change this, users can click on an unchecked box to include specific fields in the output, or click on a checked box to uncheck it, and remove it from the output. Other available functions include:

- Select All – checks all fields to include the output.
- Clear All – clears all fields and allows users to select only the ones they are interested in.
- Restore Defaults – restores the default fields to include in the output.
- Study Evaluation Results – checks fields that are commonly used for evaluation of study relevance and reliability. These fields will be included in the output, and users can select other fields to also include.

After selections are made, select "Save" and the query will automatically re-run with the desired output fields.

4.8. Using 'EXPLORE' to locate data

About Explore

The ‘Explore’ feature is a great tool for searching ECOTOX if you do not know the exact parameters you wish to search for or if you would like a visual representation of general and specific data trends. Explore is an interactive way to examine search paths by Chemical, Species and Effects, including data visualizations with several plotting options. Users can investigate available data with these ‘Explore’ options and then send the query filters to ‘Search’ for further refinement and export of the resulting data records.

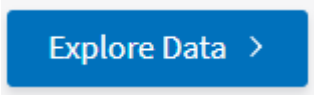
4.9. Explore by Chemical

4.9.1. Predefined and Custom Chemical Groups

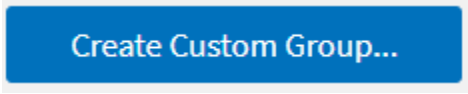
The option to select from predefined lists is available in ‘Explore.’ Chemical lists have been provided to effectively search a variety of Metal/Organometal or Organic compounds chemical groups. To select a chemical group or group(s) of interest, click on the checkbox you want to search. To unselect, click on the checkbox again.

Searches for data on a specific user-defined single chemical or “custom group” of chemicals can also be conducted from the ‘Explore’ Chemicals page, however users cannot select both a chemical from the pre-defined group list and enter in a custom group chemical.

After a specific group is selected, click on “Explore Data” button.



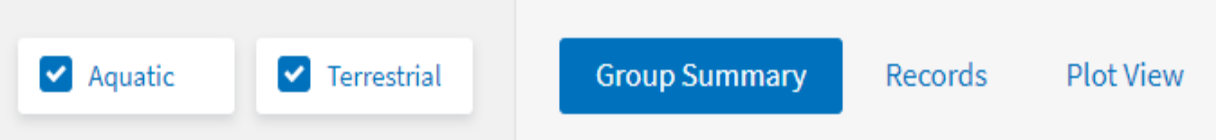
To create a custom group of chemicals, select the “**Create Custom Group…”** button from the left side panel.



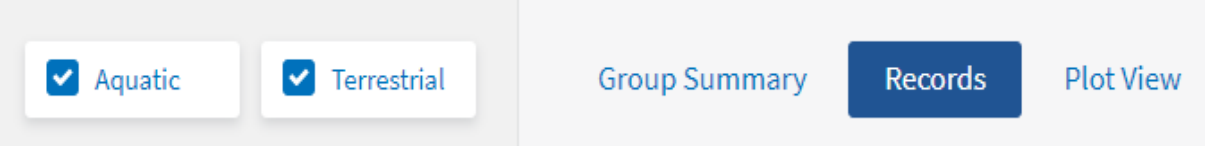
From there, you can either “**Browse Chemicals”** by entering a chemical name or CAS Number and then selecting one or more species or chose to “**Enter by CAS Number**.” You can also copy and paste CAS Number(s) into the appropriate box.

The default within ECOTOX is that *all* chemicals in the selected group are selected for searching. The output can be refined by using the Query Filters on the left side of table to limit results to specific chemicals in that group. Users can also limit the displayed tabular data using the text entry fields at the top of each column, but this does not affect the query.

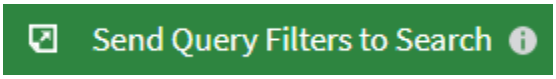
Notice that the initial output has both Aquatic and Terrestrial data reported under the Group Summary tab. Users can deselect one or the other by clicking the checkbox to filter data.



Users can view all available data results by selecting the “Records” tab above the table to show all Distinct records in the Group.



Note: There are fewer output columns displayed in the ‘Explore’ feature as compared to the ‘Search’ feature. To see all available fields for specific results, users can send the query filters and search parameters to the ‘Search’ feature using the green button on the upper right of the Records Table, which will open in a new browser tab.

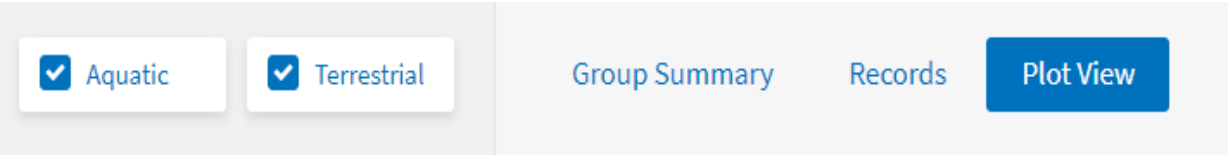


4.9.2. Refining/Filtering data using Query Filters

Users can refine tabular data using the Query Filters on the left side of the table. All chemicals, species, and effects data resulting from the initial ‘Explore’ page can be refined via the dropdown boxes under each filter group. Users may select one or multiple options in each box. Multiple selections can be made by holding the Ctrl key down while clicking the item. Once filters are selected, click ‘Enter’ on keyboard or mouse-click outside the box to apply to data output table. Users can select “View All Applied” box to view the selected parameters. This information can also be exported to retain a dated record of parameters applied in ‘Explore’.

4.9.3. Data Visualization Plots

Data output presented in the ‘Explore’ table can also be plotted (if applicable) by selecting the ‘Plot View’ tab.



Currently, only Aquatic data or Terrestrial data that can be converted to ppm equivalents are viewable in the Plot View. ECOTOX unit conversion logic can be found here: https://cfpub.epa.gov/ecotox/help.cfm. There are three types of pre-defined plots available: Effect by Chemical, Duration by Chemical and Duration by Endpoint. There is also the option for a Custom Plot, in which the Y-axis can be set to Concentration or

Duration, and the X-axis and Legend can be set to categorical fields such as Chemical, Species, Effect, Endpoint, etc.

The data presented in the table or in the plot can be further refined using the query filters on the left side of the webpage. Users can also “zoom” into the plot to refine output, or by deselecting/selecting items in plot legend.

Hovering the cursor over any of the data points in the graph will highlight the study. Clicking on any data point in the plot will highlight the result in the table below the plot.

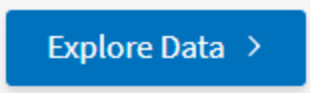
Notice in the ‘Explore’ plot table, only 13 output columns are shown. To see all available data for specific results, users should select “Send Query filters to Search” to apply the search parameters to the ‘Search’ feature of ECOTOX. In ‘Search’ additional filtering options are available and the output can be expanded to include more fields using the ‘Customize Output Fields’ button.

4.10. Explore by Species

4.10.1. Predefined and Custom Species Groups

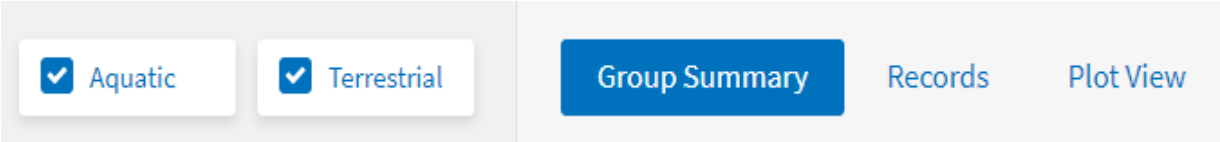
The option to select from predefined group or a Custom Group is available in the ‘Explore’ feature. “**Species groups”** have been provided to effectively search a variety of Animal, Plants, or Special interest groups. To select one or many species group(s) of interest, click on the checkbox(es) you want to search. To unselect, click on the checkbox again.

After specific group is selected, click on “Explore Data” button.

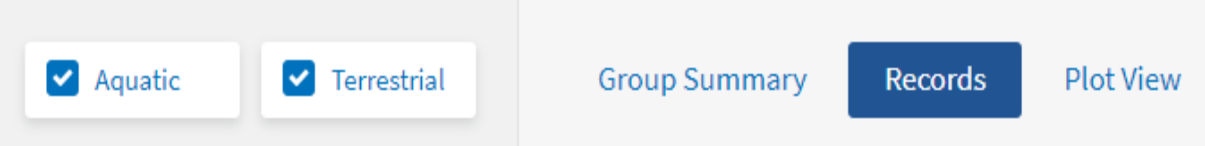


The default within ECOTOX is that all species in the selected group are selected for searching. If you want to limit results to specific species in that group, the output can be refined by filtering tabular data using the text entry fields at the top of the table columns, or by using the Query filters on the left side of table.

Notice that the initial output has both Aquatic and Terrestrial data reported under the Group Summary tab (if data are available and applicable). You can deselect one or the other by clicking the checkbox to filter data.



You can focus on available data results by selecting “Records” tab above the table which will show all distinct records in the group:



To create a custom group of species that spans the predefined species groups, return to the Explore Species page and select the "**Create Custom Group"** button from the left side panel.

From there, you can either "**Browse Species"** by entering a common name, Latin name or NCBI TaxID and then selecting one or more species or chose to "**Enter by NCBI TaxID**." You can also copy and paste a list of NCBI TaxIDs into the appropriate box.

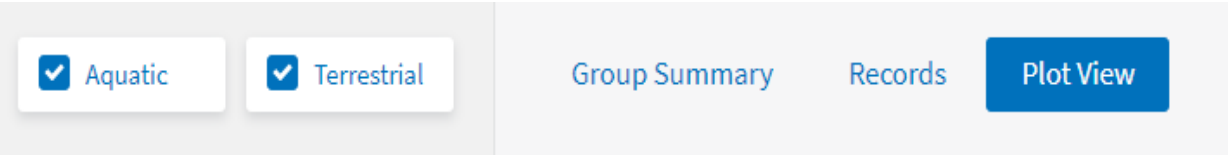
> *Note:* While searching for data using the 'Explore' feature, you will notice fewer output columns as compared to Search feature (currently 6 under Group summary and 9 under Records). To see all available data for specific results, users should select "Send Query filters to Search" to apply the search parameters to the 'Search' feature of ECOTOX. In 'Search' additional filtering options are available and the output can be expanded to include more fields using the 'Customize Output Fields' button.

4.10.2. Refining/Filtering data using Query filters

Users can refine tabular data using the Query Filters on the left side of the webpage. All chemicals, species, and effects data resulting from the initial 'Explore' page can be refined via the dropdown boxes under each filter group. Users may select one or multiple options in each box. Once filters are selected, click 'Enter' on keyboard or mouse-click outside the box to apply to data output table. Users can select "View All Applied" box to view the selected parameters. This information can also be exported to retain a dated record of each search.

4.10.3. Data Visualization Plots

Data outputs presented in the 'Explore' table can also be plotted (if applicable) by selecting the 'Plot View' tab.



Currently, only Aquatic data or Terrestrial data that can be converted to ppm equivalents are viewable in the Plot View, and there are three types of pre-defined plots available: Effect by Chemical, Duration by Chemical and Duration by Endpoint. There is also the option for a Custom Plot, in which the Y-axis can be set to Concentration or Duration, and the X-axis and Legend can be set to categorical fields such as Chemical,

Species, Effect, Endpoint, etc.

The data presented in the table or in the plot can be further refined using the Query Filters on the left side of the webpage. Users can "zoom' into the plot to refine output, or by deselecting/selecting items in plot legend.

Hovering the cursor over any of the data points in the graph will highlight the study. Clicking on any data point in the plot will highlight the result in the table below the plot.

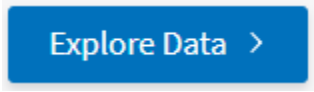
> *Note:* Notice in the 'Explore' plot table, only 13 output columns are shown. To see all available data for specific results, users should select "Send Query filters to Search" to apply the search parameters to the 'Search' feature of ECOTOX.

4.11. Explore by Effects

4.11.1. Predefined and Custom Effects Groups

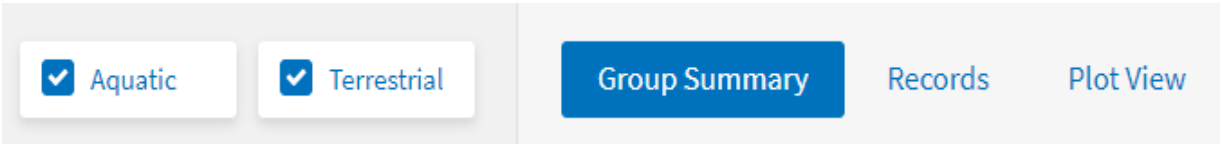
The option to select from predefined lists is available in the 'Explore' feature. Predefined effects groups have been provided to effectively search a variety of typical apical effects such as Growth, Reproduction and Mortality, but also include newer effects groups such as Behavior and Physiology effects. To select one or many species group(s) of interest, click on the checkbox(es) you want to search. To unselect, click on the checkbox again.

After a specific group is selected, click on the "Explore Data" button in the upper right-hand section of the Effect Groups pane.

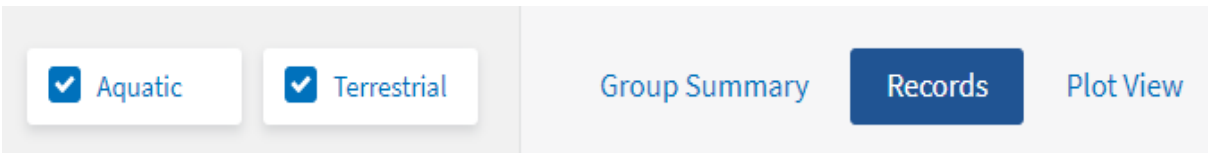


The default within ECOTOX is that all effects in the selected group are selected for searching. If you want to limit results to a specific effect measurement in that group, the output can be refined by filtering Tabular data using text entry fields at the top of the table columns, or by using the Query filters on the left side of table.

> *Note:* Notice that the initial output has both Aquatic and Terrestrial data reported under the Group Summary tab (if data are available and applicable). You can deselect one or the other by clicking on the checkbox to filter data.

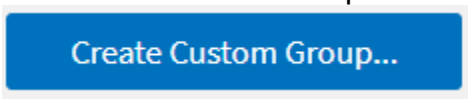


You can zero in on available data results by selecting the "Records" tab above the table which will show all Distinct records in the Group:



Any specific Effect on the output table can be selected for viewing by clicking on the green arrow on right side of output table  This will refine the output table to all records by selected effect.

To create a custom group of effect measurements, select the "**Create Custom Group"** button from the left side panel.



From there, you can either "**Browse Effect Measurement"** by entering the exact measurement term or some component(s) of the measurement description, and then selecting one or more measurements. You can also choose to **Enter by Term** using the exact effect and measurement terms (see "ECOTOX Terms Appendix").

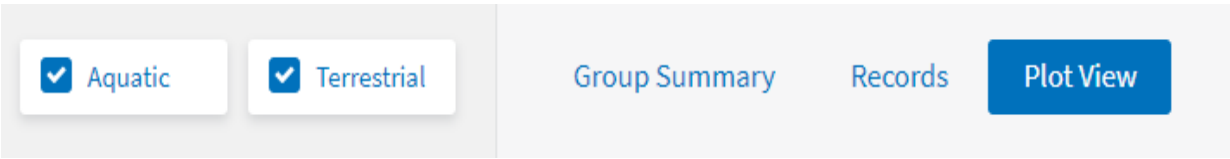
> *Note:* While searching for data using the 'Explore' feature, you will notice fewer output columns as compared to Search feature (currently 6 under Group summary and 9 under Records). To see all available data for specific results, users should select "Send Query filters to Search" to apply the search parameters to the 'Search' feature of ECOTOX. In 'Search' additional filtering options are available and the output can be expanded to include more fields using the 'Customize Output Fields' button.

4.11.2. Refining/Filtering data using Query Filters

Users can refine tabular data using Query Filters on the left side of the webpage. All chemicals, species, and effects data resulting from an initial search can be refined via the dropdown boxes under each filter group. Users may select one or multiple options in each box. Once filters are selected, click 'Enter' on keyboard or mouse-click outside the box to apply to data output table. Users can select "View All Applied" box to view the selected parameters. This information can also be exported to retain a dated record of each search.

4.11.3. Data Visualization Plots

Data output presented in the 'Explore' table can also be plotted (if applicable) by selecting the 'Plot View' tab.



Currently, only Aquatic data or Terrestrial data that can be converted to ppm equivalents are viewable in the Plot View, and there are three types of pre-defined plots available: Effect by Chemical, Duration by Chemical and Duration by Endpoint. There is also the option for a Custom Plot, in which the Y-axis can be set to Concentration or Duration, and the X-axis and Legend can be set to categorical fields such as Chemical,

Species, Effect, Endpoint, etc.

The data presented in the table or in the plot can be further refined using the Query Filters on the left side of the webpage. Users can also “zoom’ into the plot to refine output, or by deselecting/selecting items in plot legend.

Hovering the cursor over any of the data points in the graph will highlight the study. Clicking on any data point in the plot will highlight the result in the table below the plot.

Notice in the ‘Explore’ plot table, only 13 output columns are shown. To see all available data for specific results, users should select “Send Query filters to Search” to apply the search parameters to the ‘Search’ feature of ECOTOX.

4.12. Exporting Data in Explore

Tabular data output can be exported to CSV file by clicking on the 

button and saving the file to computer. If the number of records is larger than you would like to view, you may close the report window and return to ECOTOX window to refine your search strategy.

Once search is completed, and report window closed, users will be returned to ECOTOX window. The search strategy will remain intact, so refinements can be made, or if you want to conduct another search, you may clear the search by clicking the “Reset All” button.

5. EXITING ECOTOX

Exiting your Web browser or visiting another Web site will leave the program. Exiting the Web browser will not save your search strategy.

6. APPENDIX A: ECOTOX SEARCH PLANNING FORM

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

6.1. 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 Thallium Vanadium Zinc	**Organic Compounds** Conazoles Cyanide Cyanotoxins DDT and metabolites Dibenzofurans Explosives Glycol Ethers Major Ions Neonicotinoids Nitrosamines Per- and Polyfluoroalkyl Substances (PFAS) Perchlorates Pharmaceutical Personal Care (PPCP) Phthalate Esters Polyaromatic Hydrocarbons (PAH) Polybrominated Diphenyl Ethers (PBDE) Polychlorinated Biphenyls (PCB) Strobins

6.2. 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

6.3. Test Results

Endpoints: _____

Effect Groups:

___Accumulation ___Mortality

___Behavior ___Multiple

___Biochemical ___Physiology

___Cellular ___Population

___Ecosystem ___Reproduction

___Growth

___Specific Effect Measurements_____

___Exclude Post-exposure Measurements

6.4. Test Conditions

Test Location(s):

___ Lab ____All Field Tests ___Not Reported
____Field Artificial
____Field Natural
____Field Undeterminable

Exposure Media:

WATER: ___Freshwater ____Saltwater __Fresh or Saltwater Not Specified
SOIL: ___Artificial ____ Humus ___Litter ___Manure ___Mineral Soil ____Natural Soil
_____Unspecified Soil ____Soil Mixture
ARTIFICIAL: ___Hydroponic _____Other

___No Substrate

___Not Reported

Exposure Type:

__ Diet
__ Injection
__ Topical
__ Environmental
__ Multiple Entry
__ In-vitro
__ Not Reported
__ Flow-through (aquatic)
__ Leaching (aquatic)
__ Intermittent (aquatic)
__ Renewal (aquatic)
__ Lotic (aquatic)
__ Static (aquatic)
__ Lentic (outdoor aquatic)
__ Tidal (outdoor aquatic)

Control Type:

__ Concurrent
__ Multiple
__ Baseline
__ Solvent
__ Positive
__ Undefined
__ Other

Historical Control Type:

__ Insufficient
__ Satisfactory
__ Unsatisfactory

Control Not Reported:

__ Not Reported

Chemical Analysis: ___ Measured ____Unmeasured ___Not Reported

Duration: specific # of Days: ___ range of Days: ≥___ ≤___

6.5. Publications

Publication Years: _____

Author: _____

Reference Number(s):_____

Independently Compiled Data:

_____EPA: Fathead Minnow Acute Toxicity

_____ EPA: Office of Pesticide Program Database

_____ Dutch Dataset

_____ French Dataset

_____ German Dataset

_____ Russian Dataset

_____ USGS Acute Toxicity Dataset

Recent Update Dates: _____

6.6. Report Output

Aquatic Output Elements Standard default output elements are listed in **bold**. Some output options are available for Field Data only and are indicated by 'field only'.	Terrestrial Output Elements Standard default output elements are listed in **bold**. Some output options are available for Field Data only and are indicated by 'field only'.
___ Alkalinity	___ Application Date (field only)
___ Application Date (field only)	___ Application Date /Season (field only)
___ Application Date /Season (field only)	___ Application Frequency
___ Application Frequency	___ Application Rate (field only)
___ Application Rate (field only)	___ Author
___ Application Type (field only)	___ **CAS Number/ Chemical Name**
___ Author	___ Chemical DTXSID
___ BCF Value	___ **Chemical Analysis Method**
___ Calcium	___ Chemical Carrier (includes all associated fields)
___ CAS Number	___ Chemical Comment
___ **CAS Number/ Chemical Name**	___ Chemical Formulation
___ Chemical DTXSID	___ **Chemical Grade**
___ Chemical Analysis	___ Chemical Half Life (field only)
___ Chemical Carrier (includes all associated fields)	___ Chemical Name
___ Chemical Comments	___ Chemical Purity
___ Chemical Formulation	___ Chemical Radiolabel
___ **Chemical Grade**	___ Conc (Author) (Excel and Delimited only)
___ Chemical Half Life (field only)	___ Control Type
___ Chemical Name	___ **Dose (Author)**
___ **Chemical Purity**	___ Doses
___ Chemical Radiolabel	___ EE Comment
___ Chlorine	___ **Effect**
___ Concentration (Author)	___ Effect %
___ **Concentration (Standardized)**	___ Effect Measurement
___ Conductivity	___ **Endpoint**
___ Control	___ Endpoint Assignment
___ Dissolved Inorganic Carbon	___ Endpoint / BCF/BAF
___ Dissolved Oxygen	___ Experimental Design
___ Doses	___ Exposure Comment
___ EE Comment	___ Exposure Duration (Author)
___ Effect	___ Exposure Duration (Days)
___ Effect %	___ Exposure Sample Number
___ Effect Measurement	___ **Exposure Type**
___ **Effect /Effect Measurement**	___ Exposure Type/Chemical Analysis method
___ **Endpoint**	___ Gender
___ Endpoint Assignment	___ General comments
___ Endpoint / BCF value	___ Geographic Term (Field Data Only)
___ Experimental Design	___ Geographic Location (Field Data Only)
___ Exposure Duration (Author)	___ Habitat
___ Exposure Duration (Days)	___ Intake Rate
___ Exposure Sample Number	___ Ionic Fraction
___ Exposure Type	___ Longitude/Latitude (Field Data Only)
___ **Exposure Type/Chemical Analysis method**	___ Media Cation Exchange Capacity
___ Gender	___ Media Moisture
___ General comments	___ Media Organic Matter and Type
___ Geographic Term (Field Data Only)	___ **Media Type**
___ Geographic Location (Field Data Only)	___ Media Type/Test Location
___ Habitat	___ Number of Doses
___ Hardness	___ Number of Replicates
___ Humic Acid	___ Observed Duration (Author)
___ Intake Rate	___ **Observed Duration (Days)**
___ Ionic Fraction	___ Observed Response [includes BCF/BAF]
___ Longitude/Latitude (Field Data Only)	___ **Organism Age**
___ Magnesium	___ Organism Comment
___ Media Type	___ Organism Initial Weight
___ Media Type/Test Location	___ Organism Length
___ Number of Doses	___ **Organism Lifestage**
___ Number of Doses/Result Sample Unit	
___ Number of Replicates	___ Organism Source

___ Observed Duration (Author)
___ **Observed Duration (Days)**
___ Organic Carbon Type/Value
___ **Organism Age**
___ Organism Comment
___ Organism Initial Weight
___ Organism Length
___ **Organism Lifestage**
___ Organism Source
___ Organism Strain
___ Other Effects
___ pH
___ Potassium
___ Publication Year
___ **Reference Citation**
___ Reference Number
___ **Response Site**
___ Response Site/Exposure Duration (Days)
___ Result Percent Dry/Wet Weight
___ Result Comment
___ Result Percent Lipid
___ Result Sample Number/Unit
___ Result Sample Number
___ Result Sample Unit
___ Salinity
___ Season
___ Significance Level
___ Significance Level/Statistical Significance
___ Sodium
___ Species Common Name
___ Species ECOTOX Number
___ Species Final Weight
___ **Species Group**
___ Species NCBI TaxID
___ Species Scientific Name
___ **Species Scientific Name/Species Common Name**
___ Species Taxonomic Information
___ Statistical Significance
___ Steady State
___ Study Duration (Author)
___ Study Duration (Days)
___ Study Type
___ Sub-Habitat Term (Field only)
___ Sub-Habitat Description (Field only)
___ Sub-Habitat Comment (Field only)
___ Substrate Term (Field only)
___ Substrate Comment (Field only
___ Sulfate
___ Sulfur
___ Temperature
___ Test Location
___ Test Method
___ Test Number
___ Test Type
___ Trend
___ Trend/Effect %
___ Water Depth

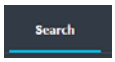
___ Organism Strain
___ Other Effects
___ Publication Year
___ **Reference Citation**
___ Reference Number
___ **Response Site**
___ Response Site/Exposure Duration (Days)
___ Result Percent Dry/Wet Weight
___ Result Comment
___ Result Percent Lipid
___ Result Sample Number/Unit
___ Result Sample Number
___ Result Sample Unit
___ Significance Level
___ Significance Level/Statistical Significance
___ Soil Clay %
___ Soil Dose Measured
___ Soil pH
___ Soil Sand %
___ Soil Silt %
___ Soil Type
___ Species Common Name
___ Species ECOTOX Number
___ Species Final Weight
___ **Species Group**
___ Species NCBI TaxID
___ Species Scientific Name
___ **Species Scientific Name/Species Common Name**
___ Species Taxonomic Information
___ Statistical Significance
___ Steady State
___ Study Duration (Author)
___ Study Duration (Days)
___ Study Type
___ Sub-Habitat Term (Field only)
___ Sub-Habitat Description (Field only)
___ Sub-Habitat Comment (Field only)
___ Substrate Term (Field only)
___ Substrate Comment (Field only)
___ Temperature
___ Test Comments
___ **Test Location**
___ Test Method
___ Test Number
___ Test Type
___ Trend
___ Trend/Effect %

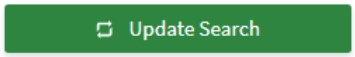
7. APPENDIX B: PRACTICE SEARCHES

These examples are for you to try in the 'Search' Page. After each example search, remember to click on "Reset All" before proceeding to the next search.

7.1. Example A

You want to locate All Reproductive effects data for Nickel compounds. You want to include the specific habitat information for any results.

1. From home page (https://www.epa.gov/ecotox), click on search. 

2. Click on "All Chemicals" from the menu. Scroll down to "Any Chemical Group".
3. Select **Nickel** checkbox from the metal compound list.
4. Click on "All Effects" from the menu. Select **Reproduction Group**.
5. Click on the "Update Search" button. 

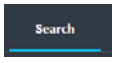
6. Notice that **Aquatic data** is displayed, click on "Customize Output Fields" 

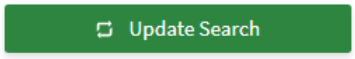
in the upper right hand. Scroll down and click on the **Habitat** checkbox to add this field to your output. Then click '**Save'**.
7. *Note:* If you wish to view Terrestrial data, click on the **Terrestrial** button. You will have to select the same Output field for the Terrestrial button. 

8. Click "Export As…" button. Choose either 'Excel' or 'Delimited' report option for the results.

7.2. Example B

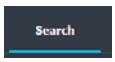
You want to locate LC50 data on Freshwater organisms exposed to Malathion.

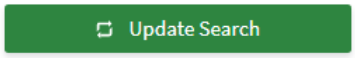
1. From home page (https://www.epa.gov/ecotox), click on search. 

2. Click the "All Chemicals" menu on the left frame of the Search page. Type in '**Malathion**' or CAS Number either formatted ('**121-75-5**') or unformatted ('**121755**') in the Chemical entry selection box.
3. Click "All Endpoints" menu. Within the "Concentration Based Endpoint" menu, select '**LC50'** checkbox.
4. Click "All Test Conditions" menu. Scroll down to the "Exposure Media" selection box and click on the **Fresh Water** checkbox.
5. Click on the "Update Search" button. 

7.3. Example C

You want to locate recently published, lethality endpoint only studies on Daphnia magna.

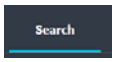
1. From home page (https://www.epa.gov/ecotox), click on search. 

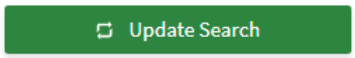
2. Click “All Species” menu on the left frame of the ‘Search’ page. Type in “**Daphnia magna**’ and confirm that the **Genus/Species Name** radio button is highlighted.
3. Click on the “All Effects” menu and select the ‘**Mortality Group’** checkbox.
4. Click on the “All Publication Options” menu. Within the “Publication Years” selection box, select **2016** from the first drop down list and select **2024** from the second drop down list.
5. Click on the “Update Search” button. 

6. *Note*: Only ‘Aquatic’ data should be presented in the table.

7.4. Example D

You want to locate toxicity data for Amphibian tests performed in an outdoor location. You would like to move these data records into your own database.

1. From home page (https://www.epa.gov/ecotox), click on search. 

2. Click on the “All Species” menu on the left frame of the ‘Search’ page. Scroll down to the “Any Species Groups” and check the ‘**Amphibians**’ checkbox.
3. Click on the “All Test Conditions” menu. Within the “Any Test Locations” area, select the checkbox ‘**All Field Tests’** from the list. Also, within the “Exposure Media - Water” select ‘**Fresh**’, **‘Salt’** and ‘**Not Specified**’.
4. Click on the “**Terrestrial”** button. (Selecting ‘Aquatic’ will return too many to view, but if desired, you could select additional filters to refine output).
5. Click on the “Update Search” button. 

6. Click “Export As…” button. Choose either ‘Excel’ or ‘Delimited’ report option for the results.

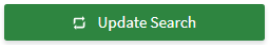
7.5. Additional SEARCH and EXPLORE examples

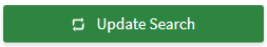
After each example, remember to click on “Reset All” before proceeding to the next example.

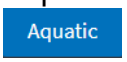
I. Search Example

You want to locate all reproductive effects data for Buprofezin. What types of reproductive effects were measured?

1. From the ECOTOX home page, click search. 

2. Select the ‘All Chemicals’ tab from the left frame.
3. Type “Buprofezin” into the chemical name search box and click the green 

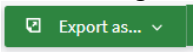
button.
4. Select the ‘All Effects’ tab from the left frame and scroll down to ‘Reproduction Group.’
5. Deselect the checkbox next to ‘Any Measurements’ and/or just select the checkbox next to ‘Reproduction Group’ then click. 

6. Select the **‘Aquatic**’ button for aquatic data or ‘**Terrestrial**’ button for terrestrial data. The data fields and display format are different for an **aquatic exposure** versus a **terrestrial exposure**. If you would like to view data for both Aquatic and Terrestrial, you can toggle between the two by select either ‘Aquatic’ 

or ‘Terrestrial.’ 

7. Click the blue ‘View All Applied’ button to view/export search parameters applied. 

8. Select green “Customize Output Fields” to select additional data fields to be shown in the output table. 

9. Select ‘References’ tab in upper right to see list of references for the results from this search. 
10. Click the green ‘Export as…’ drop-down to select type of file to download. 

Note: Please confirm that what you select/deselect makes sense in the database. If you have selected “Reproduction” and “Growth” you should not be seeing any other effects in your report. Also, if you are viewing **Aquatic** tab in the results table, you should not be able to see any bird species under the Results table.

Conversely if you are viewing the **Terrestrial** table, there should only be terrestrial organisms listed, but you can also go back to all species and select a smaller group of results, such as worms.

If you are seeing anything that you feel may be an error or bug, please “View All Applied” and copy/save and send the information to Ecotox.support@epa.gov .

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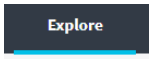
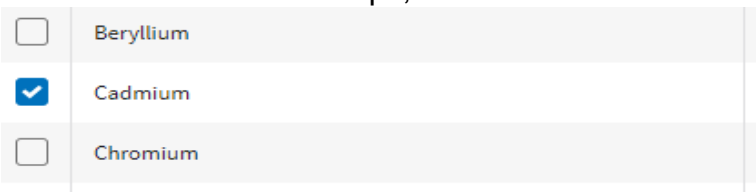
The second example is using the 'Explore' feature. You might use this when you are not sure what type of chemical information or species are in ECOTOX.

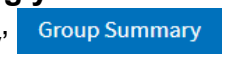
II. Explore Example

You want to Explore data on the Reproductive effects of Cadmium on fish.

1. From the ECOTOX home page, click 'Explore' on the top banner. 

2. Click the 'Chemicals' icon. 
3. Under the Chemicals Groups, scroll down and select Cadmium checkbox.


4. Click the 'Explore Data' button to begin exploring. 

5. The compounds are listed by CAS number. You can browse this list by CAS, or Chemical name, or number of publications just by typing in the column header. To Remove this filter, just click on the "X Reset" in the upper red bar.
6. To view information on specific CAS number listed in output table, click the green '>' (greater than) sign on the right side of the output table, and all the Aquatic and Terrestrial Records for that compound will be displayed. You can filter additionally by Aquatic or Terrestrial by deselecting one or the other.
    - *Note*: Depending on the number of Records, the output may be limited to the first 3,000.
7. If you want to go back to your original list of compounds, you must go back to 'Query Filters' on left side of the webpage, and 'Reset All' by clicking the red 'x' at the bottom of the 'Query Filters.' **Using the browser Back key or closing out of the tab above, will bring you all the way back to the Home page**. You can then Select 'Group Summary' 

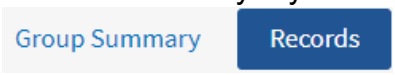
to see the original list of compounds.
8. From the list of 'Query filters', click the drop down 'Species Group' selection box and select **Fish.** If you wish to select multiple species groups, hold the 'ctrl' key and click on multiple selections. Click outside of the 'Species Group' drop down menu or click Enter on your keyboard to apply new parameters.

Notice now that above 'Query Filters,' the **Terrestrial** box is no longer highlighted due to the selection of 'Fish' (Aquatic organism) as your species of interest. 

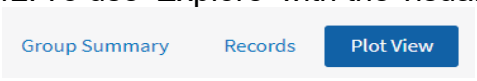
You can continue to refine the output by *Effect:*

9. From the drop down 'Effect Groups' selection box. Scroll down to Select 'Reproduction'. Again, click outside of the dropdown menu or click Enter on your

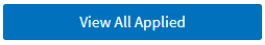
keyboard to apply new parameters. On the top left corner of the page, above additional 'Query Filters', ensure that only the **Aquatic** checkbox is selected.

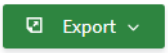
10. The data matching your 'Explore' criteria will automatically display in the Group Summary view. You can switch to view records individually by clicking the 'Records' button located under the top banner. 

11. You can again filter or refine your Table view by typing in a filter in the header (i.e., "LOEC" under Endpoint) which will reduce the number of Records (red bar).
    - *Note*: If you export to CSV file from here, you will only get this subset of records, not all original record output.
12. To use 'Explore' with the visualization feature, select the 'Plot View' button.



13. There are 4 interactive figures to display ECOTOX Records which have exposure concentrations (standardized to an equivalent of ppm (parts per million)).
    - Dur x Chem: Duration (in days) on x-axis, Exposure Concentration on y- axis, Chemical for point shape and color
    - Dur x Endpt: Duration (in days) on x-axis, Exposure Concentration on y- axis, Endpoint for point shape and color
    - Effect x Chem: Effect Groups on x-axis, Exposure Concentration on y-axis, Chemical for point shape and color
    - Custom Plot: y-axis can be set to Exposure Concentration or Duration (days), x-axis and legend can be set to categorical fields such as Chemical, Species, Effect, Endpoint, etc.
        - *Note*: Zoom in by drawing rectangle around area of interest. Turn Chemicals or Endpoints off and on by clicking on name in legend. Hover over points of interest for more information. Click on point to be directed to record in table below the figure.
14. Simplified table below each figure shows subset of data for each record.
15. You can continue to refine the output with the Query filters on left hand side.
16. Click the blue 'View All Applied' button to view/export 'Explore' parameters applied.



17. Click the green "Export" button to download figure or simple table. 

    - *Note*: Default output table does not include all fields. Return to 'Search' and apply filter parameters to download complete data tables.

8. APPENDIX C: ECOTOX OVERVIEW

8.1. Data Sources

The primary source of toxicity effect information in ECOTOX is from peer-reviewed literature that are identified through online computerized searches. Searches were historically initiated with the 1970 publication year and continue through to the present; in the last five years this has changed to have no date restrictions on the literature searches. Comprehensive searches are designed to include the effect of nearly all toxic substances on aquatic and terrestrial organisms within the scope of each ECOTOX systems' guidelines.

Commercial literature sources are continually evaluated for relevance to the ECOTOX literature searches. The search strategy is evaluated regarding the success ratio of each search. Additional literature sources include abstract journals, review bibliographies, and the U.S. EPA library collections.

The abstracts obtained through computerized searches of abstracting databases are screened to identify toxicity references applicable to aquatic and terrestrial habitats. Those references pertinent to one or more of the databases are acquired through a variety of literature acquisition procedures such as author reprint requests, inter-library loans, and commercial sources. As the publications are received, a reference number is assigned for storage and retrieval purposes, and a final check for applicability and duplication is made. A bibliographic sub-file stores the citations, and a reprint of each publication is archived.

Publications used in ECOTOX usually contain unique data. For various reasons authors may report the same data point in different publications. If the authors themselves cross-reference the data, ECOTOX abstracts the data only once and notes the cross-reference as part of the bibliographic citation. This type of cross-reference most frequently occurs in the publication of a thesis and subsequent journal articles. If the author does NOT acknowledge multiple publications of a single data point, it is likely this data point will occur in ECOTOX as multiple records, each with a different citation. This type of publication occurs most frequently when data is published in different sources such as a textbook and journal article, an agency publication and a journal article, or a regional journal and an international journal.

Toxicity test data are included unless the data have been cited as published elsewhere. Data reported in review papers are abstracted from the original publication. International publications may be reviewed by ECOTOX staff if either an English abstract or a translated table of data is included. International cooperative efforts with the Organization for Economic Cooperation and Development (OECD) and Russia (Borok Institute) have been used to enhance review of the international literature.

Data obtained from independently compiled data files must meet the minimum data requirements and quality assurance guidelines defined for each ECOTOX component. The key data fields that must be included are test chemical name, test organism, test duration, effect, and effect concentration or application rate. Documentation describing the test methods must be provided within the publication. If tests are missing key parameters, the data are rejected for inclusion into ECOTOX.

No effort is made to locate unreported data (e.g., authors are not contacted, citations referring to methods used are not obtained). During the incorporation of an electronic data file, a quality assurance check of the CAS number, species scientific name, and reference citation is completed. Data files that have been included in the aquatic dataset are the U.S. EPA Duluth Lab fathead minnow acute toxicity database (http://archive.epa.gov/med/med_archive_03/web/html/prods_pubs.html) Center for Lake Superior Studies, University of Wisconsin-Superior, 1984, 1985, 1986, 1988, and 1990), and datasets from France, Germany, the Netherlands and Russia. ECOTOX also includes the U.S. EPA OPP's Pesticide Ecotoxicity Database for both aquatic and terrestrial toxicity tests. Appendix F contains additional information and contacts for independently compiled data files.

8.2. Quality Assurance

Quality assurance procedures begin with literature acquisition and cataloging, and continue through the chemical and species verification, the literature review process, data entry, and data retrieval. The ECOTOX literature is abstracted by trained document data curators. An intensive training period, a well-documented manual (U.S. EPA 2022), and close interaction with the data coordinator help to ensure a high level of accuracy and consistency in the reviewing process. Data entry for all steps of the process is QA'd by an experienced data curator.

8.3. Test and Result Identification

Each reference included in ECOTOX may include multiple unique tests. A computer-generated Test Number used to designate each unique test design. A unique test design may be characterized by a new test chemical, test species, test location, or exposure type. Additionally, there are experimental design parameters that will influence a test scenario sufficiently to warrant an independent test number. Such parameters include tests conducted at different test temperatures or conducted during different seasons.

Each Test Number within a reference may include multiple effects and endpoints. A separate line is used for each effect or endpoint from either a unique experimental design or within one design scenario for statistically defined effects or endpoints. Each of these lines is designated with a Result Number and is one data record in ECOTOX. If no statistics are used to distinguish endpoints or effects and experimental designs are similar, the data may be combined into one data record. Endpoints always require a discrete line. Effects lacking an author reported endpoint may be combined based on statistical representation by the author. Food chain effects are abstracted for organisms at the first level of exposure.

8.4. Aquatic Data Elements

Aquatic data includes toxic effect results from exposures of single chemicals to aquatic organisms. Bioassays not included are water chemistry effects (e.g., pH), complex effluents, chemical mixtures, and sediment studies that do not report a water concentration. If a publication contains data for a single chemical besides one of the above categories of toxicants, the paper is retained and only the single chemical data are used in ECOTOX. Test organisms are limited to those that are exclusively aquatic. Amphibian and insect data for purely aquatic life stages of the organism are included. Information and data for terrestrial life stages of these organisms is included in the terrestrial database. Classes of organisms associated with the aquatic environment (e.g., birds, mammals, reptiles) are abstracted for the terrestrial database. Microbial communities (bacteria and virus) are omitted from the aquatic database. Terrestrial plants tested in hydroponic or nutrient solutions are abstracted for the terrestrial database.

The data elements for each test are grouped by chemical, organism, exposure conditions, and effect endpoint. The test chemical parameters describe the toxicant, the associated CAS registry number, and the grade, purity and/or composition of the toxicant. The test organism parameters define the type of organism and the life-stage being tested. The test conditions identify the test water, test location, exposure type and duration, control parameters, and basic water chemistry. The effect endpoint parameters consist of a term to define the lethal, sublethal, or residue endpoint and the corresponding test chemical concentration.

Toxicity test results are primarily reported for observations taken during the chemical exposure. However, when results are reported only for the time period after the exposure, i.e., recovery or delayed effects (called ‘Post-Exposure Measurements’ in ECOTOX), the observation time is recorded (Observed Duration) and will be greater than the Exposure Duration.

In some cases, this type of result is noted by using a “~” in conjunction with the endpoint/effect term, e.g., ~MOR for a post-exposure or delayed mortality effect.

8.5. Terrestrial Data Elements

Toxicity data includes toxic effect results from exposures of single chemicals to terrestrial organisms. Graphical data may be recorded as ranges and are reported by using <, > or ~ operators with the value.

Like for aquatic data, terrestrial data include toxic effect results from exposures of single chemicals. Bioassays that are not included are contaminated soils, sediment studies and chemical mixtures. If a publication contains data for a single chemical besides one of the above categories of toxicants, the paper is retained and only the single chemical data are used in ECOTOX. Test organisms are limited to those that are exclusively terrestrial.

The data elements for each test are grouped by chemical, organism, exposure conditions, and effect endpoint. The test chemical parameters describe the toxicant, the associated CAS registry number, and the grade, purity and/or composition of the toxicant. The test organism parameters define the type of organism, organism source,

and the lifestage being tested. The test conditions identify the test location, exposure type and duration, control parameters, and basic soil parameters. The effect endpoint parameters consist of a term to define the lethal, sublethal, or residue endpoint and the corresponding test chemical concentration.

If the author does not report data for a terrestrial database field, the field will display a “NR” (not reported).

The terrestrial data identifies sources of alternative data (domestic, laboratory animal or plant toxicity and bioaccumulation information) when there is a paucity of information on wildlife species. Animals associated with the aquatic environment that breathe using lungs (e.g., ducks, beaver, muskrat) are included in the terrestrial database, unless exclusively aquatic (e.g., whales, manatee). Exposures to the aquatic life stages of amphibians and insects are included in the aquatic database.

Decisions regarding the inclusion of animal terrestrial species are based on published terrestrial wildlife toxicity standard methods and procedures documentation. The priority for the animal portion of the database is wildlife avian species (e.g., mallard, pheasant or bobwhite), mammalian species (e.g., meadow vole, deer mouse or mink), and beneficial invertebrate species (e.g., earthworm, honeybee, leafcutter bee or alkali bee). If data for other species including laboratory, domestic or non-beneficial organisms are reported in a publication, data for all test species are abstracted for ECOTOX inclusion.

Terrestrial plant data includes native, crop, or weed species. Terrestrial plants tested in hydroponic or nutrient solutions are abstracted for the terrestrial database. Aquatic plant exposures are recorded in the aquatic database portion of ECOTOX.

8.6. References

Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, 1984, 1985, 1986, 1988, and 1990. *Acute Toxicities of Organic Chemicals to Fathead Minnows (Pimephales promelas)*, Vol. 1-5. University of Wisconsin-Superior, Superior, WI.

U.S. Environmental Protection Agency. 2022. *GLTED Ecotoxicology Knowledgebase System: ECOTOX Data Abstraction Guidelines* (prepared by General Dynamic Information Technology, Contract CIO-SP3, HHSN316201200013W, Task EP-G16H-01256, SMAVCS3), Great Lakes Toxicology and Ecology Division, Duluth, MN.

9. APPENDIX D: SPECIES AND CHEMICAL VERIFICATION

9.1. Species Verification

The test organism is identified by the current scientific name as verified in the taxonomic literature. For each species entry, the verified name, taxonomic hierarchy, synonyms, and verification sources are kept on file for documentation purposes. Taxonomic kingdoms are divided into Plantae, Animalia, Chromista, Monera, Protista, Fungi and “Community.” The taxonomic levels are verified by ITIS (Integrated Taxonomic Information System), located at https://www.itis.gov. If the taxonomic levels are not available with ITIS, other approved taxonomic sources are used.

ECOTOX retains all species name synonyms that are no longer used for taxonomic classification. Searches in ECOTOX can be done using the species synonym name, however, output will contain the currently accepted species name.

Field studies may report results for a target community (e.g., benthic macroinvertebrates) or for an entire enclosed ecosystem (e.g., system-level primary productivity or respiration). If a community of organisms was tested, the species grouping from the publication is reported. For example, benthic invertebrates may be entered under the Genus Invertebrates and a community of organisms may fall under the Genus Plankton.

For more information, please refer to the Species Verification section, linked from the ECOTOX help page under “ECOTOX Documentation.”

The species of Special Interest Groups were compiled using the following references:

Standard Test Species References (Updated Annually)

1. Amiard-Triquet, C., Amiard, J. C., and Mouneyrac, C. (2015). Aquatic Ecotoxicology - Advancing Tools for Dealing with Emerging Risks. Kidlington, Oxford: Elsevier/Academic Press. Print.
2. ASTM International - Environmental Assessment Standards and Risk Management Standards - Biological Effects and Environmental Fate. Years 2012-2021.
3. EPA, Office of Prevention, Pesticides and Toxic Substances, Harmonized Test Guidelines, Series 850, Ecological Effects Test Guidelines. Years 2012/2016.
4. EPA, Office of Solid Waste and Emergency Response. (1994). ECO Update Catalogue of Standard Toxicity Tests for Ecological Risk Assessment Publication 9345.0-051. Volume 2 Number 2.
5. Nikinmaa, M. (2014). An Intro to Aquatic Toxicology. Waltham, MA: Elsevier/Academic Press. Print.
6. OECD (Organization for Economic Cooperation and Development) Test Guidelines. (2016). OECD Guidelines for the Testing of Chemicals, Section 2: Effects on Biotic Systems. Years 1984-2021.
7. Rand, G. M. (2003). Fundamentals of aquatic toxicology: effects, environmental fate and risk assessment – Second Edition. Ecological Services, Inc. New York, NY: Taylor and Francis Group. Print.

U.S. Threatened and Endangered Species Reference (Updated Quarterly)

U.S. Fish and Wildlife Service (http://ecos.fws.gov/tess_public/pub/adHocSpeciesForm.jsp)

U.S. Invasive Species References (Updated Annually)

1. Swearingen, J., C. Bargeron. 2016 Invasive Plant Atlas of the United States. University of Georgia Center for Invasive Species and Ecosystem Health. https://www.invasiveplantatlas.org/distribution.cfm (https://www.invasive.org/species.cfm)
2. University of Georgia - Center for Invasive Species and Ecosystem Health - https://www.invasive.org/south/index.html (https://www.invasive.org/species.cfm)
3. USDA Species Profiles List - https://www.invasivespeciesinfo.gov/species-type

9.2. Chemical Verification

A standardized identification number and name for each chemical recorded in the database is used for consistency. Chemicals reported in ECOTOX are cataloged by using a Chemical Abstracts Service (CAS) registry number. If a CAS registry number is not available for the test chemical, toxicity data cannot be included in ECOTOX. Toxicants not included in ECOTOX are water chemistry effects (e.g., tests based on hardness, pH, etc. as the tested toxicant), complex effluents, chemical mixtures, and biological toxicants. If the author states that a soil nutrient is added to maintain test organism growth, the test is included. If the test includes a series of nutrient doses and a toxicant to produce interactive effects, this is considered a mixture and excluded.

Retrieval is made by using the CAS number, chemical name, or chemical list. The Collective Index (CI) or International Union of Pure and Applied Chemistry (IUPAC) name is used as the standardized name for storage and retrieval. A separate index file is available for screening CAS numbers and chemical names used in ECOTOX. It is recommended, especially for critical decision-making, that users refer to the original publication to obtain additional test chemical information which may affect the context of toxicity information retrieved from ECOTOX.

For more information, please refer to the Chemical Verification section, linked from the ECOTOX Help page under “ECOTOX Documentation.”

10. APPENDIX E: ECOTOX DATA FIELD DESCRIPTIONS

All associated terms for these fields are located in the "ECOTOX Terms Appendix," available linked from the ECOTOX Help page.

Data fields are listed for both aquatic and terrestrial. If the field is only available for one database, this is noted (Aquatic only or Terrestrial only).

10.1. Bibliographic Fields

10.1.1. Author

Publication author name(s), if available.

10.1.2. Reference Number

Each publication abstracted for ECOTOX is assigned a unique ECOTOX reference number (also called an ECOREF Number). These reference numbers appear in all default ECOTOX outputs.

10.1.3. Title

Publication title.

10.1.4. Source

Publication source or journal name.

10.1.5. Publication Year

Publication year.

10.1.6. Reference Citation

The reference number, author, publication year, title and source combined in one field.

10.2. Chemical Fields

10.2.1. CAS Number

Chemical Abstracts Service (CAS) Number.

10.2.2. Chemical Name

CAS Collective Index Name.

10.2.3. Chemical DTXSID

Substance Identifier from the U.S. EPA's Distributed Structure-Searchable Toxicity (DSSTox) database (searchable on the U.S. EPA CompTox Chemicals Dashboard).

10.2.4. Chemical Grade

Grade of chemical.

10.2.5. Chemical Purity

Percent purity or active ingredient.

10.2.6. Chemical Formulation

Formulation of chemical.

10.2.7. Chemical Comment

Chemical formulation term, trade names, synonyms, isomer names.

10.2.8. Chemical Radiolabel

The isotope of a test or carrier chemical.

10.2.9. Chemical Carrier

Solvent used to dissolve toxicant in solution or positive control. Contains all carriers (up to three) and all the associated information (CAS #|Chemical Name|Chemical Grade|Chemical Formulation|Chemical Radiolabel|Chemical Characteristics|Chemical Purity).

10.3. Species Fields

10.3.1. Species ECOTOX Number

Unique number assigned by ECOTOX software.

10.3.2. Species Scientific Name

Currently accepted scientific name (genus, species).

10.3.3. Species Common Name

Species or taxonomic grouping common name(s).

10.3.4. Species NCBI TaxID

Numerical taxonomy identified from National Center for Biotechnology Information (NCBI) Taxonomy Database.

10.3.5. Organism Source

The source from which the test organism was obtained.

10.3.6. Organism Lifestage

Initial test organism lifestage. Lifestage of the organism at the time of measurement is recorded in the Result Sample Unit field.

10.3.7. Organism Age

Initial age of the test organism.

10.3.8. Gender

The sex of the test organisms included in the study. When 'Both', observations may be reported combined or separate by sex; when separate, sex associated with measurement is included in the Result Sample Unit field.

10.3.9. Organism Initial Weight

Initial weight of organism.

10.3.10. Organism Initial Length

Initial length of the organism as measured by the reported Length Type (e.g., Fork length, Shell length, Snout-vent length, Standard length, Total length, Carapace length).

10.3.11. Organism Strain

Author reported strain (e.g., cultivars or hybrids).

10.3.12. Organism Comment

Initial age, weight, length, developmental stage or cell concentration of test organism.

10.3.13. Species Group

Names of predefined group(s) to which a species belongs. These include: Amphibians; Insects/Spiders; Molluscs; Birds; Other Invertebrates; Reptiles; Crustaceans; Mammals; Worms; Fish; Algae; Moss/Hornworts; Fungi; Flowers, Trees, Shrubs, Ferns; Standard Test Species; US Threatened/Endangered Species; US Exotic/Nuisance.

10.3.14. Species Taxonomic Information

Organism classification hierarchy (Kingdom, Phylum/Division, Subphylum, Superclass, Class, Order, Family, Genus, Species, Variety).

10.3.15. Kingdom

Divides all species into two kingdoms (plant or animal). The plant kingdom includes Monera and Fungi species. A taxonomic group (e.g., aquatic community, plankton) that has both plant and animal kingdoms into one result are included in both plant and animal kingdom search. (Search option. Included in output with Species Taxonomic Information.)

10.4. Test Condition Fields

10.4.1. Media Type

Aquatic - Freshwater (FW) tests include those 1) conducted in freshwater, reconstituted water, distilled water, or tap water or 2) the organism habitat is exclusively freshwater. Saltwater (SW) tests include those 1) conducted in natural or artificial seawater,

brackish water, or estuarine water or 2) the organism habitat is exclusively saline.

Note: If a salinity value of four parts per thousand is reported, it is considered a freshwater test.

Terrestrial - Type of exposure media, (e.g., natural or artificial soil, hydroponic, filter paper). If an aqueous exposure is conducted in pore water from a specific soil, the soil parameters in the soil characteristics fields are reported (pH, CEC, OM, etc.). See Appendix L. Exposure Media Terms in the “ECOTOX Terms Appendix” found under the Help section of the website for more information.

10.4.2. Test Location

Aquatic - A natural (Field N) study is an experiment conducted outdoors in a natural water body or in an artificial water body that has a natural bottom substrate and established aquatic communities (e.g., phytoplankton, zooplankton and fish). Outdoor studies conducted in an artificial water body without a natural bottom substrate are considered artificial studies (Field A). If the water body cannot be determined to be natural or artificial it is abstracted as field unknown (Field U). All other studies are considered laboratory (LAB) tests.

Terrestrial - The location or setting in which the experiment was conducted. For example, a natural field study (Field N) is an experiment conducted outdoors in a natural setting. The test organisms are sampled in the wild, e.g., population counts. Outdoor studies conducted in a simulated environment are abstracted as an artificial field study (Field A). Artificial field studies include organisms isolated from their natural environment via an enclosure of some type, e.g., cages or fencing. If the publication does not provide enough information to distinguish between Field A and Field N, then use the term Field U to indicate that the field test type is unknown. Laboratory tests (LAB) are conducted indoors under controlled laboratory conditions.

10.4.3. Study Duration

The Study Duration is the **total time of the study**, excluding pre-treatment times. In cases where the observation time is the only duration reported, it is assumed that the Study Duration is equivalent to the observation time (field: Observed Duration).

For post-exposure effects, Study Duration is the duration of the entire toxicant exposure and post-exposure duration.

In some instances, a biological, or qualitative, time is used, such as study time reported as "until harvest", "growing season" or "after the nth egg has been laid."

Author Reported and Standardized Duration

ECOTOX offers two output options for duration, the duration as the author reports in the publication or duration that is converted to a standard unit (days).

10.4.4. Exposure Duration

The Exposure Duration is the **time of actual exposure to the chemical**. In cases where the observation time is the only duration reported, it is assumed that the Exposure Duration is equivalent to the longest observation time (field: Observed Duration).

For most field studies the Exposure and Study Duration are identical because it is difficult to determine when the exposure ends. For lab studies the Exposure and Study Duration may be different, such as when effect measurements were reported from a post-exposure period. For lab studies with injection, topical, or dietary (e.g., intraperitoneally or by gavage) exposure, Exposure and Study Duration are typically the same.

For a fluctuating or intermittent dosing experiment, the total exposure time is recorded, with exposure times and intervals between dosages reported in the Application Frequency field.

In some instances, a biological, or qualitative, time is used, such as an exposure time reported as "until hatch", "growing season" or "after the nth egg has been laid".

Author Reported and Standardized Duration

ECOTOX offers two output options for duration: the duration as the author reports in the publication or duration that is converted to a standard unit (days).

10.4.5. Exposure Type

The mechanism by which the toxicant was applied.

For aquatic organisms the toxicant exposures are typically through their aquatic surroundings, via diet, injection, in vitro, or on occasion, through multiple routes (e.g., aquatic and diet).

For terrestrial organisms the exposures are typically through diet, injection, topical, in vitro, or environmental routes. On occasion, an exposure may be through multiple routes (e.g., topical and oral).

Exposure types are searched by major exposure groups. However, a more specific exposure type is displayed in your output (e.g., searching on ‘Intercutaneous’ is found under the Injection exposure type).

10.4.6. Habitat

Indicates whether the study was completed in an aquatic or terrestrial environment. For Terrestrial studies, the habitat can either be soil or non-soil. Aquatic studies are all in water (aqua).

10.4.7. Chemical Analysis

Quantitative analysis of water in test chambers or field sites is considered a measured concentration. Concentrations that are not analyzed in test chambers or field sites are considered unmeasured (nominal).

10.4.8. Application Frequency

Author reported frequency of dosing application.

10.4.9. Study Type

Used to identify field simulation studies. Examples of field study types include exposures conducted in a mesocosm, microcosm or enclosure.

10.4.10. Test Type

Test Type is populated when the author(s) describe the Test Method used in the study as ACUTE, CHRONIC, ELS (Early Life Stage), FLC (Full Life Cycle), Generational etc. It is not used to reflect an author(s) incidental use of the terms ‘acute’, ‘chronic’, or any other standard methodology related term. Therefore, Test Type should be abstracted as NR unless a Test Method is provided.

10.4.11. Test Method

Denotes the testing method used (or a modification of) for conducting the toxicity experiment (e.g., ASTM (American Society for Testing and Materials) or OECD (Organization for Economic Cooperation and Development)). If an author does not reference a standard test method but does reference methods that were obtained from other authors, select Other Method (OM) and enter the author(s) and year published in the Test Method Comment field.

10.4.12. Control

Control information for the reported effect may be presented in the text, in a graph, or in table format. ECOTOX does not make assessments whether the controls were satisfactory or insufficient (e.g., replicates run, death of control organisms), but rather documents author reported controls.

10.4.13. Number of Doses

The total number of exposure doses or concentrations, including the control(s), for each independent test design.

10.4.14. Doses

For all aquatic reports and terrestrial *browser viewable*, the individual doses used in the study are summarized here.

For Terrestrial Excel and delimited reports, this data field is not included. Maximum and minimum dose levels are found in the Terrestrial field ‘Dose Max’ and ‘Dose Min.’

10.4.15. Number of Replicates

Number of replicates per treatment.

10.4.16. Experimental Design

Additional study information is included here. For field tests, this could include exposure system dimensions (e.g., pond or lake depth/cage or enclosure size), type of artificial substrate, and physical or chemical water chemistry parameters. For laboratory studies, this could include information about media, test chambers, and number of replicates.

10.4.17. Exposure Sample Number

The initial number of organisms exposed per replicate at each treatment level.

10.4.18. Ionic Fraction

For ionizing substances such as metals, if authors report the concentration based on the ionic form of the compound, this field has the ionic fraction (e.g., organotin as Sn).

10.5. Test Result Parameters

References included in ECOTOX may include multiple toxicity tests and measurements for multiple types of effects, each with one or more associated endpoints (statistical quantification or calculation of the observed effect, e.g., lethal concentration to 50% of test organisms [LC50], no-observed-effect concentration [NOEC], lowest-observed-effect concentration [LOEC]). Within each test (denoted with a Test Number), each unique effect and/or endpoint is captured in a different record (denoted with a Result (Record) Number). For example, exposures to Zinc and Copper are separate tests, and the LC50 for each of these tests will be a separate line (data record).

10.5.1. Test Number

A computer-generated number used to designate each unique test design. A unique test design may be characterized by a new test chemical, test species, test location, or exposure type. Additionally, there are experimental design parameters that will influence a test scenario sufficiently to warrant an independent test number. Such parameters include tests conducted at different test temperatures or conducted during different seasons. There can be many Test Numbers for each ECOTOX Reference Number.

10.5.2. Result (Record) Number

A computer-generated number used to designate each unique result within a Test Number. A separate line is used for each effect or endpoint from either a unique experimental design or within one design scenario for statistically defined effects or endpoints. Each of these lines is designated with a Result Number. If no statistics are used to distinguish endpoints or effects and experimental designs are similar, the data may be combined into one data record. Endpoints always require a discrete line. Effects lacking an author reported endpoint may be combined based on statistical representation by the author. There can be many Result Numbers for each Test Number, and many Test Numbers for each ECOTOX Reference Number (ECOREF Number). Within the Aquatic and Terrestrial databases, each Result Number is a data record.

10.5.3. Endpoint

Endpoint information is abstracted if it is reported by the author. For the purposes of ECOTOX, an endpoint is defined as the quantification of an observed effect obtained through statistics or other means of calculation for the express purpose of comparing equivalent effects (e.g., LC50). Many terrestrial plant tests do not have associated endpoints. Prior to 1996, terrestrial plant database structure allowed only results based on percent change from control.

An asterisk (*) denotes the reported endpoint acronym provided was modified to conform to the standard database acronym terminology. For example, if the author reported a TLM, the endpoint was recorded as an LC50*. The author reported

acronym should appear in EE Remark field.

10.5.4. Effect

Effect information must be provided by the author in order for the test to be included. For ECOTOX purposes, effect is defined as the observation of a response resulting from the action of a chemical stressor (e.g., mortality). The listing of effect measurements can be found by using the Browse Effects index, ECOTOX Terms List or "ECOTOX Terms Appendix" (includes many detailed measurement definitions).

ECOTOX internally categorizes all observed effects under at least one of eleven major effect groups:

Accumulation (ACC) - Process by which chemicals are taken into and stored in the organism. Includes lethal body burden.

Behavior (BEH) - Activity of an organism in response to a stimulus. The Avoidance (AVO) subgroup contains measures of avoidance or attraction. The Feeding Behavior (FDB) subgroup contains measures related to food and consumption and acquisition. The Behavior (BEH) subgroup contains the remaining behavioral measurements. All measurements related to reproductive behavior are listed under the Reproduction effect group.

Biochemistry (BCM) - Biotransformation or metabolism of chemical compounds, modes of toxic action, and biochemical organism responses. The Enzyme(s) (ENZ) subgroup contains measurements of enzymes and enzyme related activity. The Hormone(s) (HRM) subgroup contains measurements of hormones and hormone related activity, and the Biochemistry (BCM) subgroup is comprised of the remaining biochemical measurements including protein levels and expression.

Cellular (CEL) - Changes in structure and chemical composition of cells and tissues in organisms. The Genetics (GEN) subgroup contains measurements of gene expression and damage. The Histology (HIS) subgroup focuses on measurements related to structural changes and the Cell(s) (CEL) subgroup contains the remaining cell and tissue measurements.

Growth (GRO) - Encompasses individual organism weight, length, development, and morphology. The Development (DVP) subgroup includes indicators of development as well as growth measurements during developmental life stages. The Morphology (MPH) subgroup contains measurements of the structure and form of organism parts and the Growth (GRO) subgroup contains measurements of entire organisms at any point in its life cycle.

Mortality (MOR) - Death of individuals or measurements that indicate death.

Physiology (PHY) - Encompasses cell and tissue processes and functions. The Injury (INJ) subgroup contains measurements related to damage. The Immunological (IMM) subgroup contains disease and disorder measurements. The Intoxication (ITX) subgroup contains indicators of intoxication, and the Physiology (PHY) subgroup contains the remaining cell and tissue function measurements.

Population (POP) - Measurements related to the quantification of the number of individuals occupying the same area at a given time.

Reproduction (REP) - Measurements related to the reproductive cycle including reproductive behaviors, offspring count, and reproductive physiology. Offspring development effects are captured in the Development (DVP) subgroup.

Ecosystem (SYS) - Ecosystem processes (PRS) include community structure and function. Includes microbial processes.

Multiple Effect (MLT) – Change in more than one effect when data were reported as one result.

No Effect (NER) – The author reported an endpoint, but not a specific effect. This term will only exist on a data transferred reference (OPP database (Reference number 344)) and is not a searchable Effect term.

10.5.5. Effect Measurement

The specific parameter being measured for the observed effect. For instance, a Growth (GRO) effect, would include specific measurements of weight or length (WGHT or LGTH). An Enzyme (ENZ) effect would include specific measurements of catalase (CTLS) or peroxidase (PODA).

10.5.6. Trend

The observed or measured response (effect measurement) trend as compared to the control is abstracted when textually or graphically reported.

10.5.7. Response Site

A response site or tissue term is used to identify specific body, organ or tissue effect sites for associated effect measurement.

10.5.8. EE_Comment

This field contains additional endpoint and/or effect text as described by the author.

10.5.9. Effect % (Effect Percent)

Effect is reported as a raw percent value or percent change, e.g., percent of the total population or percent increase or decrease. The term "COM" is used to denote several effect measurements or response sites reporting data results as percentages.

Statistical Significance

Statistical analysis as compared to the control(s) in the test.

10.5.10. Statistical Level

The level of significance (e.g., test statistic) is recorded when the author has reported statistical analysis in the test. Terminology for significance level may be presented as: p =, p<, or alpha value. The terminologies are equivalent and are generally in the range of 0.001 to 0.10.

10.5.11. Bioconcentration

The bioconcentration factor (BCF) or bioaccumulation factor (BAF) is the degree to which a chemical can be concentrated in the tissues of an organism in the environment as a result of exposure to chemicals at steady state during the uptake phase. The BCF/BAF is a value which is equal to the concentration of a chemical in one or more tissues of the exposed organism divided

by the average exposure concentration of a chemical in the test. A bioconcentration endpoint is recorded as either wet (or unknown) or as dry weight (BCF and BCFD, respectively). It is usually reported with units of L/kg. If a unit cannot be determined from the information in the paper or it is unitless, RA (ratio) is used for the unit. For Terrestrial Excel and delimited outputs only, BCF or BAF are captured in the Observed Response field.

10.5.12. Steady State

Denotes if the residue/bioconcentration/bioaccumulation data at the time of the result is at steady state.

10.5.13. Concentration Type

Concentrations based on the active ingredient or formulation, or as the total, un-ionized or dissolved concentration, are identified.

10.5.14. Endpoint Assignment

Used to identify the source of the effect or endpoint information as reported specifically by the author (P), or assigned by an ECOTOX reviewer (R)). The reviewer only assigns the endpoint if the author has provided the statistical analysis that support the endpoint.

10.5.15. Concentration/Dose

The concentration or dose reflects either the range of concentrations tested or, if there is an endpoint reported, the concentration associated with the endpoint. The confidence interval or range is recorded when available. An asterisk (*) denotes the concentration has been recalculated from the author's original units to the standard concentration (ug/L) needed for plot view or from the metal compound to the active ionic form.

In certain cases, the water concentration is routinely reported as active form of the test chemical. For metal salts, the concentration is generally expressed as ug ion/L (e.g., HgCl is expressed as Hg+). Since 1998, the data distinguish between the metal compound and the metal ion in the Ion field. Data abstracted prior to this date may have comments regarding ionic fraction in Comment field.

Author Reported and Standardized Concentration

ECOTOX offers two output options for concentrations: the concentration as the author reports in the publication, and (for Aquatic only) the concentration that is converted to a standard unit ratio equivalent to ppm (mg/l, mg/kg bdwt, or mg/kg food), if possible. ECOTOX unit conversion logic can be found here: https://cfpub.epa.gov/ecotox/help.cfm.

10.5.16. Result Sample Number

The sample number reflects the number of organisms used for a specific measurement and endpoint. For example, 40 organisms were used to calculate an LC50. Sample units correspond to the sample number (i.e., the unit on which the measurement is based).

For generational studies and measurements based on the progeny, F1, F2, etc. are noted in the sample unit field.

10.5.17. Observed Duration

The Observed Duration is the **time at which an effect measurement was observed/measured and reported** (for example, a 24-hour LC50). If the observation time is not reported or unable to be explicitly determined, Exposure Duration is recorded with a less than or equal to (<=) symbol.

For post-exposure effects, the recorded observation time will be greater than the Exposure Duration.

Author Reported and Standardized Duration

ECOTOX offers two output options for duration: the duration as the author reports in the publication and or the duration that is converted to a standard unit (days).

10.5.18. Intake Rate

Denotes the amount of food taken by the organism.

10.5.19. Result Percent (%) Dry/Wet Weight

If the effect measurement is based on dry (D) or wet (W) weight basis, it is denoted in this field. If the percent moisture is reported, record the percentage value also (e.g., W75%). In the Aquatic Excel and delimited output, the dry (D) or wet (W) designation is in a separate field: Dry/Wet. In the Terrestrial Excel and delimited output, the dry (D) or wet (W) designation is in a separate field: Media Measurement (wet/dry).

10.5.20. Result Percent Lipid

Percent lipid in the whole organism or response site.

10.5.21. Species Final Weight

Weight of the organism at the time of observation.

10.5.22. Other Effects

Comments regarding other toxicity tests or effects reported in the publication that does not meet ECOTOX minimum data requirements are recorded in this field. Commas separate each distinct term and the text ends with a double slash (//).

10.5.23. Result Comment

Additional information related to the endpoint or effect response. Appendix G contains header terms used to link the comment to a specific ECOTOX field.

10.5.24. General Comment

This field contains additional information about any data field that does not fit in the space provided. A complete list of comment identifiers that link to the associated field is documented in Appendix G: Comment Field Header Names.

10.6. Water Chemistry Parameters (Aquatic only)

These measured values pertain either to the test water chemistry (preferred) or the dilution water chemistry values as defined by the Standard Methods for the Examination of Water and Wastewater (https://www.standardmethods.org/). If it is necessary to report the dilution water chemistry, this is denoted by an asterisk (*).

Alkalinity – Expressed as reported by author.

Calcium – Expressed as reported by author.

Chlorine – Expressed as reported by author.

Conductivity - Expressed as reported by author.

Dissolved Inorganic Carbon – Expressed as reported by author.

Dissolved Oxygen - Expressed as reported by author. A "SAT" term denotes 100% saturation

Hardness - Expressed as reported by author. If the author only reports the terms "hard" or "soft", these terms are recorded.

Humic Acid – Expressed as reported by author.

Organic Carbon Type and Value - Expressed as reported by author as Carbon. (T= total, P= Particulate, D= Dissolved).

pH - pH value.

Potassium – Expressed as reported by author.

Salinity - Expressed as reported by author.

Sodium – Expressed as reported by author.

Sulfate – Expressed as reported by author.

Sulfur – Expressed as reported by author.

Temperature - Expressed as reported by author.

10.7. Outdoor Test Parameters (Field only)

10.7.1. Sub-Habitat Term/Description

A classification of the test study area (e.g., desert, estuarine, lacustrine, tundra). The aquatic field tests include the Cowardin* system level classification to describe major aquatic systems.

*Cowardin, L.M., V.Carter, F.C.Golet and E.T.LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, FWS/OBS-79, 31 p. (https://www.fws.gov/wetlands/documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf)

10.7.2. Sub-Habitat Comment

The author's description of the test study area (e.g., brackish marsh, wooded swamp, boreal forest, citrus orchard).

10.7.3. Latitude/Longitude

The geographic location (latitude and longitude) of the test site.

10.7.4. Substrate Term/Description

The bottom substrate is recorded using standard substrate definitions or as author reports.

10.7.5. Water Depth

Water depth of the experimental system.

10.7.6. Geographic Term

The standardized name based on FIPS (Federal Information Processing Standards) code, of the country, or United States and Canadian state/province where the test was performed is displayed. You can view FIPS documentation at: http://www.itl.nist.gov/fipspubs/fip10-4.htm

10.7.7. Geographic Location

Contains general text about the test site specific geographic identifiers (e.g., lake, river, bay, field station or city) where the study was performed.

10.7.8. Application Type

The method of application of the chemical **for an aquatic species** in a field study.

10.7.9. Application Rate

This field contains the application rate value and the units. If an exposure concentration is not reported, the application rate must be reported. Application rate units may be recalculated only if the denominator is not equal to one (e.g., 5 g/2.5 ac).

10.7.10. Chemical Half-Life

The test chemical half-life in the system.

10.7.11. Application Date/Season

The application date is recorded the time of initial exposure. This field includes the actual date, a partial date, or a season. The format is MO-DA-YR. Examples: 12-01-93, 01-00-75, 00-00-64. If one pond is exposed multiple times, only the first application date is recorded. If the calendar year date is not reported, but a season is, the season (Northern Hemisphere) of initial application of the chemical is reported.

10.8. Terrestrial Only Parameters

10.8.1. Test Comment

Additional information related to methodology or techniques used in the experimental design. This is a concatenated field and can include comments from Experimental Design, Organism Source, Duration, Control, and Other Effects. Appendix G contains header terms used to link the comment to a specific ECOTOX field.

10.8.2. Exposure Comment

Additional information related to dose methodology or techniques used in the test. This includes Dose Comments.

10.8.3. Observed Response Mean/Min/Max

For Terrestrial Excel and delimited outputs only, bioconcentration factor (BCF) or bioaccumulation factor (BAF) data will be recorded in this field. These records are associated with 'Residue' Effect Measurement and 'BCF' or 'BAF' Endpoint. See Bioconcentration definition. For other effects and endpoints in the Terrestrial Excel and delimited outputs, this field repeats the value(s) captured in the concentration field (range of concentrations or the concentration associated with the endpoint). See Concentration/Dose definition.

10.9. Soil Parameters (Terrestrial only)

10.9.1. Temperature

Expressed as reported by author.

10.9.2. Soil Type

The classification name of the natural soil or commercial name of the artificial soil used in the study. If the classification name is not included, the type of soil is recorded using the author's terminology, e.g., forest soil, sandy loam soil, arboreal coniferous soil.

10.9.3. Soil Sand %, Soil Silt %, Soil Clay %

The soil texture is stated using percentages of sand, silt and/or clay. Bentonite, kaolinite, or montmorillonite etc., are reported as clay.

10.9.4. Soil pH

The pH of the test media is recorded. If the pH of the treated media is not presented, but the pH value is stated for the untreated or acclimation media, an asterisk (*) is denoted. If the pH of a specific soil type is not given in the publication, a search is made of the USDA/NRCS National Cooperative Soil Survey (USA) web site (http://soils.usda.gov/) may be found for the specific soil series.

10.9.5. Media Organic Matter

If organic matter is reported for the untreated or acclimation media, it will be displayed with an asterisk (*). If the organic matter of a specific soil type is not provided in the publication, information from the USDA/NRCS National Cooperative Soil Survey (USA) is used for the specific soil series.

10.9.6. Media Moisture

The percentage of moisture in the test media is recorded. If moisture is reported for the untreated or acclimation media, this moisture percentage is recorded and denoted it with an asterisk (*).

10.9.7. Media Cation Exchange Capacity

The media cation exchange capacity is recorded. If the cation exchange capacity is reported for the untreated or acclimation media, this value is denoted with an asterisk.

10.9.8. Soil Dose Measured

The toxicant concentration that was measured in the soil. However, the exposure dose value may or may not reflect the measured values. The Chemical Analysis field will denote if the exposure dose value is based on the measured values.

11. APPENDIX F: INDEPENDENTLY COMPILED DATA FILES

Some independently compiled data sets have been transferred into ECOTOX from external sources. The data sets must meet the ECOTOX data parameter and quality assurance guidelines.

The U.S. EPA Duluth laboratory data set includes the Acute Toxicity of Organic Chemicals file which contains data for a single test species (30-day fathead minnow). The U.S. EPA Office of Toxic Substances is acknowledged for long-term support in the generation of all acute toxicity data for organic chemicals. All test results, including data not available on-line, have been compiled in five volumes titled: Acute Toxicities of Organic Chemicals to Fathead Minnows (*Pimephales promelas*), available from the Center for Lake Superior Environmental Studies, University of Wisconsin, Superior, WI.

International cooperative efforts with the Organization for Economic Cooperation and Development (OECD) and the Commonwealth of Independent States (Borok Institute) were conducted to enhance the review of the international literature. These efforts resulted in digital data files from France, Germany, the Netherlands, and Russia received in the early 1990s and incorporated into ECOTOX.

The Office of Pesticide Programs' Pesticide Ecotoxicity Database (formerly Environmental Effects Database) is a compilation of the toxic effects data for registered pesticides. These data have been reviewed and categorized as acceptable for fulfillment of pesticide registration and re-registration guideline requirements as explained under FIFRA Subdivision E, Parts 158.145 and 158.150. Data for the Pesticide Ecotoxicity Database are drawn from several sources. The major portion of the data is derived from actual Agency reviews of toxicological studies conducted by commercial laboratories and submitted by pesticide companies in support of their products. The U.S. EPA conducts audits of these laboratories on a periodic basis through the U.S. EPA Office of Compliance and Monitoring. A second major source of data entries is the numerous studies conducted by U.S. EPA, USDA, and U.S. FWS laboratories over the last 25 years. The Office of Pesticide Programs is actively updating this database. Updates will be incorporated into ECOTOX on an on-going basis, starting with the acute Honeybee (*Apis mellifera*) and Bumblebee (*Bombus terrestris*) toxicity data (updated in ECOTOX in December 2020).

The U.S. Geological Survey, Biological Resources Division, Columbia Environmental Research Center (CERC) located in Columbia, Missouri (https://www.usgs.gov/centers/cerc) database summarizes the results from aquatic acute toxicity tests conducted by this research facility. The acute toxicity test provides a relative starting point for hazard assessment of contaminants and is required for federal chemical registration programs such as the Federal Insecticide Fungicide Rodenticide Act (PL 80-104) as amended by the Federal Environmental Pesticide Control Act of 1972 (7 U.S.C. 136-136y) and the Toxic Substances Control Act of 1976 (PL 94-469).

The database was initially developed in 1986 by Foster L. Mayer and Mark R. Ellersieck for 4,901 acute toxicity tests toxicity tests conducted by CERC since 1965 with 410 chemicals and 66 species of aquatic animals. A report by Mayer and Ellersieck (1986)

provides an interpretation of the original 4,901 toxicity tests which utilizes various statistical approaches to make taxonomic comparisons, and to assess the degree to which various factors (static versus flow-through, age of test solutions, pH, temperature, water hardness, and diet) affect toxicity (*Manual of Acute Toxicity: Interpretation and Data Base for 410 Chemicals and 66 Species of Freshwater Animals*, F.L. Mayer and M.R. Ellersieck, United States Department of the Interior, U.S. Fish and Wildlife Service, Resource Publication 160, 1986). This publication is commonly referred to as the "Gold Book".

The available data sets, data, institution address and contacts are listed below:

NOTE: The number of records and reference IDs displayed below reflect the contents of each dataset at the time it was imported to Ecotox. The values listed here may not match current Ecotox search results.

Institution Contact Information	Data Summary and Reference Numbers
EPA: Fathead Minnow Acute Toxicity Database (GLTED-Duluth MN) **To obtain hard copies of the University of Wisconsin-Superior (UWS) volumes contact:** University of Wisconsin/ Lake Superior Research Institute PO Box 2000 Superior, WI 54880 Contact: Matt TenEyck E-mail: MTenEyck@uwsuper.edu Phone: 715-394-8160 **For technical information on the database contact:** U.S. EPA/ORD/CCTE/GLTED Contact: Jennifer Olker E-mail: olker.jennifer@epa.gov	5 references (#3217, 12447, 12448, 12858, 12859) 1133 aquatic records
French (OECD-IRCHA) Ecotoxicology Department, INERIS Rue Lavoisier, B.P. 1 F-91710 Vert Le Petit France **Most recent contact:** http://www.ineris.fr/ Contact: Dr. Roger Cabridenc Phone: 33-1-45960956; Fax: 33-1-45960957	13 references (#20, 3397, 3516, 3517, 3518, 3519, 3520, 3521, 5161, 6771, 9170, 10724, 15300) 256 aquatic records

Institution Contact Information	Data Summary and Reference Numbers
German (OECD) Umweltbundesamt, Federal Environmental Agency Dienstgebaude Berlin-Mitte Mauerstrabe 45-52 0-1080 Berlin Germany Wörlitzer Platz 1 06844 Dessau-Roßlau Germany **Most recent contacts:** Telephone: +49-340-2103-0 Fax: +49-340-2103-2285 Email: Gerlinde.knetsch@uba.de or: Dieter Schudoma German Environment Agency Section IV 2.4: Water-hazardous substances/ Ecotoxicology laboratory Schichauweg 58, 12307 Berlin Tel: (+49-30) 8903 4225 Fax: (+49-30) 8903 4233 Email: dieter.schudoma@uba.de	186 references (citation refers to OECDG Database) 10,494 aquatic records 1,873 terrestrial records
Dutch (OECD) National Institute of Public Health and Environmental Protection (RIVM/ACT) PO Box 1, 3720 BA Bilthoven The Netherlands http://rivm.nl/en/ **Most recent contact:** Contact: Dr. Hans Canton E-mail: ecocr@sb615.rivm.nl	17 references (#5180, 5331, 5333, 5336, 5337, 5356, 5367, 5370, 5374, 5375, 5378, 5390, 5400, 5411, 5414, 11039, 11044) 1,992 aquatic records
Russia Borok Institute, Institute for Biology of Inland Waters, Academy of Sciences 152742 Borok, Nekouz, Yaroslavsky Region Russian Republic http://www.ibiw.ru/ **Most recent contact:** Contact: Victor Komov E-mail: vkomov@ibiw.yaroslavl.ru	55 references 257 aquatic records

Institution Contact Information	Data Summary and Reference Numbers
EPA: Office of Pesticides Program Database (OPP) (Pesticide Ecotoxicity Database -formerly Ecological Effects Database) U.S. Environmental Protection Agency Office of Pesticide Programs Environmental Fate and Effects Division, Ecological Effects Branch 401 M St. SW Washington, DC 20460 https://www.epa.gov/pesticide-contacts/office-pesticide-programs-contacts-division-and-topic Contact: Lee Kyle E-mail: Kyle.Lee@epa.gov	Reference #344 16,956 aquatic records 17,681 terrestrial records Reference #184644 (Bee Studies) 4,225 terrestrial records
USGS Acute Toxicity Database (Mayer & Ellersieck, 1986 - commonly referred to as the "Gold Book") Columbia Environmental Research Center U.S. Geological Survey 4200 New Haven Road, Columbia, Missouri 65201 Phone: 573-875-5399 (http://www.cerc.usgs.gov/data/acute/acute.html) Contact: Linda Sappington E-mail: linda_sappington@usgs.gov 11.1.1.1. For data interpretation contact: Center for Computational Toxicology and Exposure U.S. Environmental Protection Agency Great Lakes Toxicology and Ecology Division Duluth, Minnesota 55806 Phone: 218-529-5011 Contact: Dale Hoff E-mail: hoff.dale@epa.gov	1 reference (#6797) 8,761 aquatic records

12. APPENDIX G: COMMENT FIELD HEADER NAMES

12.1. Aquatic Comment Abbreviations

Comment header terms are used in comment data fields e.g., Result Remarks, to link additional data provided to the primary database field e.g., Response Sites. These are typically from historical entries as primary data fields now have dedicated comment data fields.

Header Abbreviation	Associated Field Name
ALK	Alkalinity
AP TY	Application Type
AP SEAS	Application Season
AP DATE	Application Date
AP RATE	Application Rate
AP FREQ	Application Frequency
BCF	Bioconcentration
CARRIER	Carrier or Solvent
CHAR	Chemical Comment
CL	Chlorine Value and Unit
COMPEP	Companion Endpoint
CONC	Concentration
COND	Conductivity
CONTR	Control
DEPTH	Water Depth
DNUM	Number of Doses
DO	Dissolved Oxygen
DOSES	Individual Concentration Value and Unit
ETIME	Exposure Time and Unit
FO	Chemical Formulation
FW, SW	Freshwater/Saltwater Exposure Media
GRADE	Chemical Grade
HAB	Habitat Description
HALF	Half Life
HARD	Hardness

Header Abbreviation	Associated Field Name
HMA	Humic Acid Value and Unit
In EE Comment	Endpt (Endpoint)
In EE Comment	Measurement
In EE Comment	Effect
INTAKE	Food Intake Rate and Unit
LAB, FIELD	Location
LAT	Latitude
LD	Percent Lipid
LEVEL	Statistical Level
LIFESTG	Organism Lifestage
LOC	Location
LONG	Longitude
MSMT	Effect Measurement
NA	Sodium Value and Unit
ORG C	Organic Carbon
PH	pH
POT	Potassium Value and Unit
PURITY	Chemical Purity
RADIO	Chemical Radiolabel
SALIN	Salinity
SAMPN	Sample Number and Unit
SEX	Gender
SIGNIF	Significance
SITE	Response Site
SO4	Sulfate Value and Unit
SOLVCHAR	Chemical Carrier Comment
SOLVFO	Chemical Carrier Formulation
SOLVGRADE	Chemical Carrier Grade
SOLVPURITY	Chemical Carrier Purity
SOURCE	Organism Source
STST	Steady State
STYPE	Study Type

Header Abbreviation	Associated Field Name
SUBSTR	Substrate Comment
SULF	Sulfur Value and Unit
TEMP	Temperature
TESTID	Test Number
TIME	Exposure Time
TREND	Effect Trend
TMETH	Test Method
TYPE	Exposure Type
WTAT	Weight at Time of Result
WTINT	Initial Body Weight

12.2. Terrestrial Comment Abbreviations

Comment header terms are used in comment data fields e.g. Result Remarks, to link additional data provided to the primary database field e.g. Response Sites. These are typically from historical entries as primary data fields now have dedicated comment data fields.

Header Abbreviations	Associated Field Name
ANALYSIS	Chemical Analysis
AP DATE	Application Date
AP FREQ	Application Frequency
AP RATE	Application Rate
AP SEAS	Application Season
CEC	Media Cation Exchange Capacity
CHAR	Chemical Comments
COMPEP	Companion Endpoint
CONCTYPE	Concentration Type
CONTR	Control
DNUM	Number of Doses
DOSE/ DUNIT	Exposure Dose and Unit,
DOSES	Individual Concentrations Value and Unit
DW	Dry or Wet Weight
EDES	Experimental Design

Header Abbreviations	Associated Field Name
EFCT	Effect
EFCT%	Effect Percent
ENDPT	Endpoint Assigned
ETIME	Exposure Duration
FO	Chemical Formulation
GEO	Geographic Term
HABCODE	Habitat Term
HABITAT	Habitat
INTAKE	Intake Rate and Unit
ION	Ionic Fraction
LAT	Latitude
LD	Percent Lipid
LIFESTG/ AGE	Lifestage/Age
LOC	Test Location
LONG	Longitude
MEDIA	Media Type
MOIST	Media Moisture
MSMT	Effect Measurement
OCHAR	Organism Comment
OEF	Other Effects
OM	Media Organic Matter
OTIME	Observation Time
PC, CARRIER	Chemical Name, Type
pH	Media pH
RADIO	Chemical Radiolabel
RSITE	Response Site
RVALUE / RUNIT	Observed Response Value/ Unit
SAMPN/ NUNIT	Sample Number and Unit
SEX	Gender
SIGNIF	Statistical Significance
SOIL	Soil Type

Header Abbreviations	Associated Field Name
SOURCE	Organism Source
STIME	Study Duration
STST	Steady State
STYPE	Study Type
TEMP	Temperature
TEXTURE	Soil Texture
TREND	Effect Trend
TYPE	Exposure Type
TMETH	Test Method
WTAT	Weight at Time of Result
WTINT	Initial Body Weight

13. APPENDIX H: DELIMITED OUTPUT HEADER NAMES

13.1. Aquatic Report Output Fields

A forward slash (/) within a field refers to an associated comment in a separate field. Users should refer to the full publication for proper interpretation.

Note: OP = Operator (>, >=, <. =<, =)

Report Header	Delimited File Header Name	Header Name Definition
Alk. (7 fields)	Alkalinity Mean Op	Alkalinity Mean Operator
	Alkalinity Mean	Alkalinity Mean Value
	Alkalinity Min Op	Alkalinity Minimum Operator
	Alkalinity Min	Alkalinity Minimum Value
	Alkalinity Max Op	Alkalinity Maximum Operator
	Alkalinity Max	Alkalinity Maximum Value
	Alkalinity Units	Alkalinity Units
Appl. Date	Application Date	Application Date
Appl. Freq. (7 fields)	Application Frequency Mean Op	Application Frequency Mean Operator
	Application Frequency Mean	Application Frequency Mean Value
	Application Frequency Min Op	Application Frequency Minimum Operator
	Application Frequency Min	Application Frequency Minimum Value
	Application Frequency Max Op	Application Frequency Maximum Operator
	Application Frequency Max	Application Frequency Maximum Value
	Application Frequency Unit	Application Frequency Unit
Appl. Rate (2 fields)	Application Rate	Application Rate
	Application Rate Units	Application Rate Units
Appl. Seas. (2 fields)	Application Season	Application Season
	Application Season Description	Application Season Description
Appl. Type	Application Type	Application Type
Author	Author	Author

Report Header	Delimited File Header Name	Header Name Definition
BCF (21 fields) *Note*: The Concentration Type determines the fraction measured in BCF 1 and BCF 2.	BCF 1 Value Op	First Bioconcentration Factor Mean Operator
	BCF 1 Value	First Bioconcentration Factor Mean Value
	BCF 1 Min Op	First Bioconcentration Factor Minimum Operator
	BCF 1 Min	First Bioconcentration Factor Minimum Value
	BCF 1 Max Op	First Bioconcentration Factor Maximum Operator
	BCF 1 Max	First Bioconcentration Factor Maximum Value
	BCF 1 Unit	First Bioconcentration Factor Unit
	BCF 2 Value Op	Second Bioconcentration Factor Mean Operator
	BCF 2 Value	Second Bioconcentration Factor Mean
	BCF 2 Min Op	Second Bioconcentration Factor Minimum Operator
	BCF 2 Min	Second Bioconcentration Factor Minimum Value
	BCF 2 Max Op	Second Bioconcentration Factor Maximum Operator
	BCF 2 Max	Second Bioconcentration Factor Maximum Value
	BCF 2 Unit	Second Bioconcentration Factor Unit
	BCF 3 Value Op	Third Bioconcentration Factor Mean Operator
	BCF 3 Value	Third Bioconcentration Factor Mean
	BCF 3 Min Op	Third Bioconcentration Factor Minimum Operator
	BCF 3 Min	Third Bioconcentration Factor Minimum Value
	BCF 3 Max Op	Third Bioconcentration Factor Maximum Operator
	BCF 3 Max	Third Bioconcentration Factor Maximum Value
	BCF 3 Unit	Third Bioconcentration Factor Unit

Report Header	Delimited File Header Name	Header Name Definition
Calcium (7 fields)	Calcium Mean Op	Calcium Mean Operator
	Calcium Mean	Calcium Mean Value
	Calcium Min Op	Calcium Minimum Operator
	Calcium Min	Calcium Minimum Value
	Calcium Max Op	Calcium Maximum Operator
	Calcium Max	Calcium Maximum Value
	Calcium Units	Calcium Units
CAS #	CAS Number	Test Chemical Abstract Services Registry Number
Chem. DTXSID	Chemical DTXSID	Test Chemical DSSTox Substance Identifier
Chem. Anal.	Chemical Analysis	Chemical Analysis
Chemical Carrier	Chemical Carrier	Contains all carriers (up to three) and all the associated information (CAS #|Chemical Name|Chemical Grade|Chemical Formulation|Chemical Radiolabel|Chemical Characteristics|Chemical Purity).
Chem. Comment	Chemical Comment	Test Chemical Comment
Chem. Form.	Chemical Formulation	Chemical Formulation
Chem. Grade	Chemical Grade	Chemical Grade
Chem. Half Life (7 fields)	Half-Life Mean OP	Half-Life Mean Operator
	Half-Life Mean	Half-Life Mean
	Half-Life Min OP	Half-Life Minimum Operator
	Half-Life Min	Half-Life Minimum
	Half-Life Max OP	Half-Life Maximum Operator
	Half-Life Max	Half-Life Maximum
	Half-Life Unit	Half-Life Unit
Chemical	Chemical Name	Chemical Name
Chem. Pur. (6 Fields)	Chemical Purity Mean OP	Chemical Purity Mean Operator
	Chemical Purity Mean (%)	Chemical Purity Mean
	Chemical Purity Min OP	Chemical Purity Minimum Operator
	Chemical Purity Min (%)	Chemical Purity Minimum
	Chemical Purity Max OP	Chemical Purity Maximum Operator
	Chemical Purity Max (%)	Chemical Purity Maximum

Report Header	Delimited File Header Name	Header Name Definition
Chem. Radiolabel	Chemical Radiolabel	Chemical Radiolabel
Chlorine	Chlorine Mean OP	Chlorine Mean Operator
	Chlorine Mean	Chlorine Mean
	Chlorine Min OP	Chlorine Minimum Operator
	Chlorine Min	Chlorine Minimum
	Chlorine Max OP	Chlorine Maximum Operator
	Chlorine Max	Chlorine Max
	Chlorine Units	Chlorine Units
Conc (48 fields) (Author) or (Standardized - mg/L)	Conc 1 Mean Op	First Concentration Mean Operator (Author) or (Standardized - mg/L)
	Conc 1 Mean	First Concentration Mean Value (Author) or (Standardized - mg/L)
	Conc 1 Min Op	First Concentration Minimum Operator (Author) or (Standardized - mg/L)
	Conc 1 Min	First Concentration Minimum Value (Author) or (Standardized - mg/L)
	Conc 1 Max Op	First Concentration Maximum Operator (Author) or (Standardized - mg/L)
	Conc 1 Max	First Concentration Maximum Value (Author) or (Standardized - mg/L)
	Conc 1 Type	First Concentration Type (Author) or (Standardized - mg/L)
	Conc 2 Mean Op	Third Concentration Mean Operator (Author) or (Standardized - mg/L)
	Conc 2 Mean	Third Concentration Mean Value (Author) or (Standardized - mg/L)
	Conc 2 Min Op	Third Concentration Minimum (Author) or (Standardized - mg/L) Operator
	Conc 2 Min	Third Concentration Minimum Value
	Conc 2 Max Op	Third Concentration Maximum Operator (Author) or (Standardized - mg/L)
	Conc 2 Max	Third Concentration Maximum Value (Author) or (Standardized - mg/L)
	Conc 2 Type	Third Concentration Type (Author) or (Standardized - mg/L)
	Conc 3 Mean Op	Third Concentration Mean Operator (Author) or (Standardized - mg/L)

Report Header	Delimited File Header Name	Header Name Definition
	Conc 3 Mean	Third Concentration Mean Value (Author) or (Standardized - mg/L)
	Conc 3 Min Op	Third Concentration Minimum (Author) or (Standardized - mg/L) Operator
	Conc 3 Min	Third Concentration Minimum Value
	Conc 3 Max Op	Third Concentration Maximum Operator (Author) or (Standardized - mg/L)
	Conc 3 Max	Third Concentration Maximum Value (Author) or (Standardized - mg/L)
	Conc 3 Type	Third Concentration Type (Author) or (Standardized - mg/L)
Control	Control	Control
Conductiv. (7 fields)	Conductivity Mean Op	Conductivity Mean Operator
	Conductivity Mean	Conductivity Mean Value
	Conductivity Min Op	Conductivity Minimum Operator
	Conductivity Min	Conductivity Minimum Value
	Conductivity Max Op	Conductivity Maximum Operator
	Conductivity Max	Conductivity Maximum Value
	Conductivity Units	Conductivity Units
D.O. (7 fields)	Dissolved Oxygen Mean Op	Dissolved Oxygen Mean Operator
	Dissolved Oxygen Mean	Dissolved Oxygen Mean Value
	Dissolved Oxygen Min Op	Dissolved Oxygen Minimum Operator
	Dissolved Oxygen Min	Dissolved Oxygen Minimum Value
	Dissolved Oxygen Max Op	Dissolved Oxygen Maximum Operator
	Dissolved Oxygen Max	Dissolved Oxygen Maximum Value
	Dissolved Oxygen Units	Dissolved Oxygen Units
Dissolved Inorganic Carbon (7 fields)	Dissolved Inorganic Carbon Mean Op	Dissolved Inorganic Carbon Mean Operator
	Dissolved Inorganic Carbon Mean	Dissolved Inorganic Carbon Mean Value
	Dissolved Inorganic Carbon Min Op	Dissolved Inorganic Carbon Minimum Operator
	Dissolved Inorganic Carbon Min	Dissolved Inorganic Carbon Minimum Value

Report Header	Delimited File Header Name	Header Name Definition
	Dissolved Inorganic Carbon Max Op	Dissolved Inorganic Carbon Maximum Operator
	Dissolved Inorganic Carbon Max	Dissolved Inorganic Carbon Maximum Value
	Dissolved Inorganic Carbon Units	Dissolved Inorganic Carbon Units
Doses	Doses	Doses
Effect	Effect	Effect
Effect Meas.	Effect Measurement	Effect Measurement
Eff. Percent (6 fields)	Effect Percent Mean Op	Effect Percent Mean Value Operator
	Effect Percent Mean	Effect Percent Mean Value
	Effect Percent Min Op	Effect Percent Minimum Value Operator
	Effect Percent Min	Effect Percent Minimum Value
	Effect Percent Max Op	Effect Percent Maximum Value Operator
	Effect Percent Max	Effect Percent Maximum Value
Endpoint	Endpoint	Endpoint
Endpoint Assign.	Endpoint Assignment	Endpoint Assignment
EE Comment	EE Comment	Effect Endpoint (EE) Comment
Exp. Design	Experimental Design	Experimental Design Comment
Exp. Dur. (14 fields) (Author) or (Days)	Exposure Duration Mean Op	Exposure Duration Mean Operator
	Exposure Duration Mean	Exposure Duration Mean Value
	Exposure Duration Min Op	Exposure Duration Minimum Operator
	Exposure Duration Min	Exposure Duration Minimum Value
	Exposure Duration Max Op	Exposure Duration Maximum Operator
	Exposure Duration Max	Exposure Duration Maximum Value
	Exposure Duration Units	Exposure Duration Units
Exposure Sample Number	Exposure Sample Number	Exposure Sample Number
Exp. Type	Exposure Type	Exposure Type
General Comments	General Comments	General Comments
Geog. Loc	Geographic Location	Geographic Location
Geog. Term (2 fields)	Geographic Term	Geographic Term
	Geographic Term Description	Geographic Term Description
Gender	Gender	Gender

Report Header	Delimited File Header Name	Header Name Definition
Habitat	Habitat	Habitat
Hardness (mg/L) (7 fields)	Hardness Mean Op	Hardness Mean Operator
	Hardness Mean	Hardness Mean Value
	Hardness Min Op	Hardness Minimum Operator
	Hardness Min	Hardness Minimum Value
	Hardness Max Op	Hardness Maximum Operator
	Hardness Max	Hardness Maximum Value
	Hardness Units	Hardness Units
Humic Acid (mg/L) (7 fields)	Humic Acid Mean Op	Humic Acid Mean Operator
	Humic Acid Mean	Humic Acid Mean Value
	Humic Acid Min Op	Humic Acid Minimum Operator
	Humic Acid Min	Humic Acid Minimum Value
	Humic Acid Max Op	Humic Acid Maximum Operator
	Humic Acid Max	Humic Acid Maximum Value
	Humic Acid Units	Humic Acid Units
Intake Rate (7 Fields)	Intake Rate Mean Op	Intake Rate Mean Operator
	Intake Rate Mean	Intake Rate Mean Value
	Intake Rate Min Op	Intake Rate Minimum Operator
	Intake Rate Min	Intake Rate Minimum Value
	Intake Rate Max Op	Intake Rate Maximum Operator
	Intake Rate Max	Intake Rate Maximum Value
	Intake Rate Units	Intake Rate Units
Ion (3 fields)	Ionic Fraction 1	Ionic Fraction 1
	Ionic Fraction 2	Ionic Fraction 2
	Ionic Fraction 3	Ionic Fraction 3
Lat/Long	Latitude/Longitude	Latitude/Longitude
Magnesium (mg/L) (7 fields)	Magnesium Mean Op	Magnesium Mean Operator
	Magnesium Mean	Magnesium Mean Value
	Magnesium Min Op	Magnesium Minimum Operator
	Magnesium Min	Magnesium Minimum Value
	Magnesium Max Op	Magnesium Maximum Operator
	Magnesium Max	Magnesium Maximum Value

Report Header	Delimited File Header Name	Header Name Definition
	Magnesium Units	Magnesium Units
Media Type	Media Type	Media Type
Number of Doses	Number of Doses	Number of Doses
Number of Replicates	Number of Replicates	Number of Replicates
Obs. Dur. (14 fields) (Author) or (Days)	Observed Duration Mean Op	Observed Duration Mean Operator
	Observed Duration Mean	Observed Duration Mean Value
	Observed Duration Min Op	Observed Duration Minimum Operator
	Observed Duration Min	Observed Duration Minimum Value
	Observed Duration Max Op	Observed Duration Maximum Operator
	Observed Duration Max	Observed Duration Maximum Value
	Observed Duration Units	Observed Duration Units
Org. Carb. Type Value (8 fields)	Organic Carbon Mean Op	Organic Carbon Mean Operator
	Organic Carbon Mean	Organic Carbon Mean Value
	Organic Carbon Min Op	Organic Carbon Minimum Operator
	Organic Carbon Min	Organic Carbon Minimum Value
	Organic Carbon Max Op	Organic Carbon Maximum Operator
	Organic Carbon Max	Organic Carbon Maximum
	Organic Carbon Units	Organic Carbon Units
	Organic Carbon Type	Organic Carbon Type
Org. Age (7 fields)	Organism Age Mean Op	Organism Age Mean Operator
	Organism Age Mean	Organism Age Mean
	Organism Age Min Op	Organism Age Minimum Operator
	Organism Age Min	Organism Age Minimum
	Organism Age Max Op	Organism Age Maximum Operator
	Organism Age Max	Organism Age Maximum
	Age Units	Age Units
Org. Comment	Organism Comment	Organism Comment
Species Final Weight (7 fields)	Species Final Weight Mean Op	Species Final Weight Mean Operator
	Species Final Weight Mean	Species Final Weight Mean
	Species Final Weight Min Op	Species Final Weight Minimum Operator

Report Header	Delimited File Header Name	Header Name Definition
	Species Final Weight Min	Species Final Weight Minimum
	Species Final Weight Max Op	Species Final Weight Maximum Operator
	Species Final Weight Max	Species Final Weight Maximum
	Species Final Weight Units	Species Final Weight Units
Organism Initial Length (8 fields)	Organism Initial Length Mean Op	Organism Initial Length Mean Operator
	Organism Initial Length Mean	Organism Initial Length Mean
	Organism Initial Length Min Op	Organism Initial Length Minimum Operator
	Organism Initial Length Min	Organism Initial Length Minimum
	Organism Initial Length Max Op	Organism Initial Length Maximum Operator
	Organism Initial Length Max	Organism Initial Length Max
	Organism Initial Length Type	Organism Initial Length Type
	Organism Initial Length Units	Organism Initial Length Units
Organism Initial Weight (7 fields)	Organism Initial Weight Mean Op	Organism Initial Weight Mean Operator
	Organism Initial Weight Mean	Organism Initial Weight Mean
	Organism Initial Weight Min Op	Organism Initial Weight Minimum Operator
	Organism Initial Weight Min	Organism Initial Weight Minimum
	Organism Initial Weight Max Op	Organism Initial Weight Maximum Operator
	Organism Initial Weight Max	Organism Initial Weight Max
	Organism Initial Weight Units	Organism Initial Weight Units
Org. Lifestg.	Organism Lifestage	Organism Lifestage
Organism Source	Organism Source	Organism Source
Organism Strain	Organism Strain	Organism Strain
Other Effects	Other Effects	Other Effects
pH (6 fields)	pH Mean Op	pH Mean Operator
	pH Mean	pH Mean Value

Report Header	Delimited File Header Name	Header Name Definition
	pH Min Op	pH Minimum Operator
	pH Min	pH Minimum Value
	pH Max Op	pH Maximum Operator
	pH Max	pH Maximum Value
Potassium (7 Fields)	Potassium Mean Op	Potassium Mean Operator
	Potassium Mean	Potassium Mean Value
	Potassium Min Op	Potassium Minimum Operator
	Potassium Min	Potassium Minimum Value
	Potassium Max Op	Potassium Maximum Operator
	Potassium Max	Potassium Maximum Value
	Potassium Units	Potassium Unit
Pub. Year	Publication Year	Publication Year
Ref #	Reference Number	ECOTOX Reference Number
Reference Citation (4 fields)	Author	Author
	Title	Title
	Publication Year	Publication Year
	Source	Source
Resp. Site	Response Site	Response Site
Result Comment	Result Comment	
Result Percent Lipid (6 Fields)	Result Percent Lipid Mean Op	Result Percent Lipid Mean Operator
	Result Percent Lipid Mean	Result Percent Lipid Mean Value
	Result Percent Lipid Min Op	Result Percent Lipid Minimum Operator
	Result Percent Lipid Min	Result Percent Lipid Minimum Value
	Result Percent Lipid Max Op	Result Percent Lipid Maximum Operator
	Result Percent Lipid Max	Result Percent Lipid Maximum Value
Result Number	Result Number	
Result Sample Number and Unit (7 fields)	Result Sample Number Mean Op	Result Sample Number Mean Operator
	Result Sample Number Mean	Result Sample Number Mean Value
	Result Sample Number Min Op	Result Sample Number Minimum Operator
	Result Sample Number Min	Result Sample Number Minimum Value
	Result Sample Number Max Op	Result Sample Number Maximum Operator

Report Header	Delimited File Header Name	Header Name Definition
	Result Sample Number Max	Result Sample Number Maximum Value
	Result Sample Unit	Result Sample Number Unit
Result Percent Dry/Wet Weight (7 fields)	Result Percent Dry/Wet Weight Mean Op	Result Percent Dry/Wet Weight Mean Operator
	Result Percent Dry/Wet Weight Mean	Result Percent Dry/Wet Weight Mean Value
	Result Percent Dry/Wet Weight Min Op	Result Percent Dry/Wet Weight Minimum Operator
	Result Percent Dry/Wet Weight Min	Result Percent Dry/Wet Weight Minimum Value
	Result Percent Dry/Wet Weight Max Op	Result Percent Dry/Wet Weight Maximum Operator
	Result Percent Dry/Wet Weight Max	Result Percent Dry/Wet Weight Maximum Value
	Dry/Wet	Denotes dry or wet weight basis for Result Percent Dry/Wet Weight
Salin. (7 fields)	Salinity Mean Op	Salinity Mean Operator
	Salinity Mean	Salinity Mean Value
	Salinity Min Op	Salinity Minimum Operator
	Salinity Min	Salinity Minimum Value
	Salinity Max Op	Salinity Maximum Operator
	Salinity Max	Salinity Maximum Value
	Salinity Units	Salinity Units
Sig. Level (6 fields)	Significance Level Mean Op	Significance Level Mean Operator
	Significance Level Mean	Significance Level Mean Value
	Significance Level Min Op	Significance Level Minimum Operator

Report Header	Delimited File Header Name	Header Name Definition
	Significance Level Min	Significance Level Minimum Value
	Significance Level Max	Significance Level Maximum Value
	Significance Level Max Op	Significance Level Maximum Operator
Sodium (7 fields)	Sodium Mean Op	Sodium Mean Operator
	Sodium Mean	Sodium Mean Value
	Sodium Min Op	Sodium Minimum Operator
	Sodium Min	Sodium Minimum Value
	Sodium Max Op	Sodium Maximum Operator
	Sodium Max	Sodium Maximum Value
	Sodium Units	Sodium Units
Spec. Common Name	Species Common Name	Species Common Name
Spec. Sci. Name	Species Scientific Name	Species Scientific Name
Species Group	Species Group	Species Group
Species Taxon Info. (10 fields)	Species Kingdom	Species Kingdom
	Species Phylum/Division	Species Phylum/Division
	Species Subphylum	Species Subphylum
	Species Superclass	Species Superclass
	Species Class	Species Class
	Species Order	Species Order
	Species Family	Species Family
	Species Genus	Species Genus
	Species	Species
	Variety	Variety
Spec. Eco #	Species ECOTOX Number	Species ECOTOX Number
Spec. NCBI ID	Species NCBI TaxID	Species Taxonomy ID from NCBI
Stat. Signif.	Statistical Significance	Statistical Significance
Steady State	Steady State	
Study Duration (14 fields) (Author) or (Days)	Study Duration Mean Op	Study Duration Mean Operator
	Study Duration Mean	Study Duration Mean Value
	Study Duration Min Op	Study Duration Minimum Operator

Report Header	Delimited File Header Name	Header Name Definition
	Study Duration Min	Study Duration Minimum Value
	Study Duration Max Op	Study Duration Maximum Operator
	Study Duration Max	Study Duration Maximum Value
	Study Duration Units	Study Duration Units
Study Type	Study Type	Study Type
Sub-Habitat (3 fields)	Sub-Habitat	Sub-Habitat Term
	Sub-Habitat Description	Sub-Habitat Description
	Sub-Habitat Comment	Sub-Habitat Comment
Substr. Term	Substrate Term (field only)	Substrate Term (field only)
Substr. Comments	Substrate Comment (field only)	Substrate Comment (field only)
Sulfate (7 fields)	Sulfate Mean Op	Sulfate Mean Operator
	Sulfate Mean	Sulfate Mean Value
	Sulfate Min Op	Sulfate Minimum Operator
	Sulfate Min	Sulfate Minimum Value
	Sulfate Max Op	Sulfate Maximum Operator
	Sulfate Max	Sulfate Maximum Value
	Sulfate Units	Sulfate Unit
Sulfur (7 fields)	Sulfur Mean Op	Sulfur Mean Operator
	Sulfur Mean	Sulfur Mean Value
	Sulfur Min Op	Sulfur Minimum Operator
	Sulfur Min	Sulfur Minimum Value
	Sulfur Max Op	Sulfur Maximum Operator
	Sulfur Max	Sulfur Maximum Value
	Sulfur Units	Sulfur Units
Temperature (7 fields)	Temperature Mean Op	Temperature Mean Operator
	Temperature Mean	Temperature Mean Value
	Temperature Min Op	Temperature Minimum Operator
	Temperature Min	Temperature Minimum Value
	Temperature Max Op	Temperature Maximum Operator
	Temperature Max	Temperature Maximum Value
	Temperature Units	Temperature Units
Test #	Test Number	Test Number

Report Header	Delimited File Header Name	Header Name Definition
Test Location	Test Location	Test Location
Test Method	Test Method	Test Method
Test Type	Test Type	Test Type
Title	Title	Title of the Publication
Trend	Trend	Trend
Water Depth (7 fields)	Water Depth Mean Op	Water Depth Mean Operator
	Water Depth Mean	Water Depth Mean Value
	Water Depth Min Op	Water Depth Minimum Operator
	Water Depth Min	Water Depth Minimum Value
	Water Depth Max Op	Water Depth Maximum Operator
	Water Depth Max	Water Depth Maximum Value
	Water Depth Units	Water Depth Units

13.2. Terrestrial Delimited Report Output Fields

A forward slash (/) within a field refers to an associated comment in a separate field. Users should review the full publication for proper interpretation.

Note: OP = operator (>, >=, <. =<, =)

Report Header	Delimited File Header Name	Delimited Header Definition
Appl. Date	Application Date	
Appl. Freq. (7 fields)	Application Frequency Mean Op	Application Frequency Mean Operator
	Application Frequency Mean	Application Frequency Mean Value
	Application Frequency Min Op	Application Frequency Minimum Operator
	Application Frequency Min	Application Frequency Minimum Value
	Application Frequency Max Op	Application Frequency Maximum Operator
	Application Frequency Max	Application Frequency Maximum Value
	Application Frequency Unit	Application Frequency Unit
Appl. Rate (2 fields)	Application Rate	Application Rate
	Application Rate Units	Application Rate Units
Appl. Seas. (2 fields)	Application Season	Application Season
	Application Season Description	Application Season Description
Application Type	Application Type	Application Type
	Application Type Description	Application Type Description
Author	Author	Author
BCF/BAF (8 fields) ** BCF/BAF values are located in “Observed Response Mean” field in the Excel/Delimited reports**	Observed Response Mean Op	Bioconcentration Factor Mean Operator
	Observed Response Mean	Bioconcentration Factor Mean Value
	Observed Response Min Op	Bioconcentration Factor Minimum Operator
	Observed Response Min	Bioconcentration Factor Minimum Value
	Observed Response Max Op	Bioconcentration Factor Maximum Operator
	Observed Response Max	Bioconcentration Factor Maximum Value
	Observed Response Value	Bioconcentration Factor Value
	Observed Response Units	Bioconcentration Factor Units

Report Header	Delimited File Header Name	Delimited Header Definition
CAS #	CAS Number	Test Chemical Abstracts Service Registry Number
Chem. DTXSID	Chemical DTXSID	Test Chemical DSSTox Substance Identifier
Chemical Carrier	Chemical Carrier	Contains all carriers (up to three) and all the associated information (CAS #|Chemical Name|Chemical Grade|Chemical Formulation|Chemical Radiolabel|Chemical Characteristics|Chemical Purity).
Chem. Anal.	Chemical Analysis Method	Chemical Analysis Method
Chem. Comment	Chemical Comment	Test Chemical Comment
Chem. Grade	Chemical Grade	Test Chemical Grade
Chem. Form.	Chemical Formulation	Test Chemical Formulation
Chemical Name	Chemical Name	Test Chemical Name
Chemical Purity (6 fields)	Chemical Purity Max Op	Chemical Purity Maximum Operator
	Chemical Purity Max(%)	Chemical Purity Maximum Percentage
	Chemical Purity Mean Op	Chemical Purity Mean Operator
	Chemical Purity Mean(%)	Chemical Purity Mean Percentage
	Chemical Purity Min Op	Chemical Purity Minimum Operator
	Chemical Purity Min(%)	Chemical Purity Minimum Percentage
Chem. Radiolabel	Chemical Radiolabel	Test Chemical Radiolabel
Chem. Half Life (7 fields)	Chemical Half Life Mean OP	Chemical Half Life Mean Operator
	Chemical Half Life Mean	Chemical Half Life Mean
	Chemical Half Life Min Op	Chemical Half Life Minimum Operator
	Chemical Half Life Min	Chemical Half Life Minimum
	Chemical Half Life Max Op	Chemical Half Life Maximum Operator
	Chemical Half Life Max	Chemical Half Life Maximum
	Half Life Unit	Chemical Half Life Unit
Conc (24 fields) (Author) [Excel and Delimited only]	Conc 1 Mean Op (Author)	Concentration 1 Mean Operator
	Conc 1 Mean (Author)	Concentration 1 Mean Value
	Conc 1 Min Op (Author)	Concentration 1 Minimum Operator
	Conc Min 1 (Author)	Concentration 1 Minimum Value
	Conc 1 Max Op (Author)	Concentration 1 Maximum Operator
	Conc 1 Max (Author)	Concentration 1 Maximum Value

Report Header	Delimited File Header Name	Delimited Header Definition
	Conc 1 Units (Author)	Concentration 1 Units
	Conc 1 Type (Author)	Concentration 1 Type
	Conc 2 Mean Op (Author)	Concentration 2 Mean Operator
	Conc 2 Mean (Author)	Concentration 2 Mean Value
	Conc 2 Min Op (Author)	Concentration 2 Minimum Operator
	Conc Min 2 (Author)	Concentration 2 Minimum Value
	Conc 2 Max Op (Author)	Concentration 2 Maximum Operator
	Conc 2 Max (Author)	Concentration 2 Maximum Value
	Conc 2 Units (Author)	Concentration 2 Units
	Conc 2 Type (Author)	Concentration 2 Type
	Conc 3 Mean Op (Author)	Concentration 3 Mean Operator
	Conc 3 Mean (Author)	Concentration 3 Mean Value
	Conc 3 Min Op (Author)	Concentration 3 Minimum Operator
	Conc Min 3 (Author)	Concentration 3 Minimum Value
	Conc 3 Max Op (Author)	Concentration 3 Maximum Operator
	Conc 3 Max (Author)	Concentration 3 Maximum Value
	Conc 3 Units (Author)	Concentration 3 Units
	Conc 3 Type (Author)	Concentration 3 Type
Dose (7 fields)	Dose Mean Op	Dose Mean Operator
	Dose Mean	Dose Mean Value
	Dose Min Op	Dose Minimum Operator
	Dose Min	Dose Minimum Value
	Dose Max Op	Dose Maximum Operator
	Dose Max	Dose Maximum Value
	Dose Units	Dose Units
Control	Control	Control
EE Comment	EE Comment	Effect Endpoint (EE) Comment
Effect	Effect	Effect
Effect Meas.	Effect Measurement	Effect Measurement
Eff. Percent (6 fields)	Effect Percent Mean Op	Effect Percent Mean Value Operator
	Effect Percent Mean	Effect Percent Mean Value
	Effect Percent Min Op	Effect Percent Minimum Value Operator

Report Header	Delimited File Header Name	Delimited Header Definition
	Effect Percent Min	Effect Percent Minimum Value
	Effect Percent Max Op	Effect Percent Maximum Value Operator
	Effect Percent Max	Effect Percent Maximum Value
Endpoint	Endpoint	Endpoint
Endpoint Assign.	Endpoint Assignment	Endpoint Assignment
Experimental Design	Experimental Design	Experimental Design Comment
Exp. Type	Exposure Type	Exposure Type
Exposure Comment	Exposure Comment	Exposure Comment
Exp. Dur (14 fields) (Author or Days)	Exposure Duration Mean Op	Exposure Duration Mean Operator (Author) or (Days)
	Exposure Duration Mean	Exposure Duration Mean Value (Author) or (Days)
	Exposure Duration Min Op	Exposure Duration Minimum Operator (Author) or (Days)
	Exposure Duration Min	Exposure Duration Minimum Value (Author) or (Days)
	Exposure Duration Max Op	Exposure Duration Maximum Operator (Author) or (Days)
	Exposure Duration Max	Exposure Duration Maximum Value (Author) or (Days)
	Exposure Duration Unit	(Author) or (Days)
Exp. Sample Number (6 fields)	Exposure Sample Number Mean Op	Exposure Sample Number Mean Operator (Author) or (Days)
	Exposure Sample Number Mean	Exposure Sample Number Mean Value (Author) or (Days)
	Exposure Sample Number Min Op	Exposure Sample Number Minimum Operator (Author) or (Days)
	Exposure Sample Number Min	Exposure Sample Number Minimum Value (Author) or (Days)
	Exposure Sample Number Max Op	Exposure Sample Number Maximum Operator (Author) or (Days)
	Exposure Sample Number Max	Exposure Sample Number Maximum Value (Author) or (Days)
Gender	Gender	Gender
Gen. Comments	General Comments	General Comments
Geographic Location	Geographic Location	Geographic Location
Geographic Term (2 fields)	Geographic Term	Geographic Term
	Geographic Term Description	Geographic Term Description
Habitat	Habitat	Habitat

Report Header	Delimited File Header Name	Delimited Header Definition
Intake Rate (7 Fields)	Intake Rate Mean Op	Intake Rate Mean Operator
	Intake Rate Mean	Intake Rate Mean Value
	Intake Rate Min Op	Intake Rate Minimum Operator
	Intake Rate Min	Intake Rate Minimum Value
	Intake Rate Max Op	Intake Rate Maximum Operator
	Intake Rate Max	Intake Rate Maximum Value
	Intake Rate Units	Intake Rate Units
Ion (3 fields)	Ionic Fraction 1	Ionic Fraction 1
	Ionic Fraction 2	Ionic Fraction 2
	Ionic Fraction 3	Ionic Fraction 3
Lat/Long (2 fields)	Latitude	Latitude
	Longitude	Longitude
Media CEC (7 fields)	Media CEC Mean Op	Media Cation Exchange Capacity Mean Operator
	Media CEC Mean	Media Cation Exchange Capacity Mean Value
	Media CEC Min Op	Media Cation Exchange Capacity Minimum Operator
	Media CEC Min	Media Cation Exchange Capacity Minimum Value
	Media CEC Max Op	Media Cation Exchange Capacity Maximum Operator
	Media CEC Max	Media Cation Exchange Capacity Maximum Value
	Media CEC Units	Media Cation Exchange Capacity Units
Media Moist. (6 fields)	Media Moisture Mean Op(%)	Media Moisture Mean Operator
	Media Moisture Mean(%)	Media Moisture Mean Value Percent
	Media Moisture Min Op(%)	Media Moisture Minimum Operator
	Media Moisture Min(%)	Media Moisture Minimum Value Percent
	Media Moisture Max Op(%)	Media Moisture Maximum Operator
	Media Moisture Max(%)	Media Moisture Maximum Value Percent
Media Orgnc. Mat. (8 fields)	Media Organic Matter Mean Op	Media Organic Matter Mean Operator
	Media Organic Matter Mean	Media Organic Matter Mean Value
	Media Organic Matter Min Op	Media Organic Matter Minimum Operator

Report Header	Delimited File Header Name	Delimited Header Definition
	Media Organic Matter Min	Media Organic Matter Minimum Value
	Media Organic Matter Max Op	Media Organic Matter Maximum Operator
	Media Organic Matter Max	Media Organic Matter Maximum Value
	Media Organic Matter Type	Media Organic Matter Type
	Media Organic Matter Units	Media Organic Matter Units
Media Type	Media Type	Media Type
Number of Replicates	Number of Replicates	Number of Replicates
Observed Duration (14 fields) (Author or Days)	Observed Duration Mean Op	Observation Duration Mean Operator (Author) or (Days)
	Observed Duration Mean	Observation Duration Mean Value (Author) or (Days)
	Observed Duration Min Op	Observation Duration Minimum Operator (Author) or (Days)
	Observed Duration Min	Observation Duration Minimum Value (Author) or (Days))
	Observed Duration Max Op	Observation Duration Maximum (Author) or (Days)
	Observed Duration Max	Observation Duration Maximum Value (Author) or (Days)
	Observed Duration Unit	(Author) or (Days)
Observed Response (8 Fields) * Includes Terrestrial bioconcentration factor (BCF) and bioaccumulation factor data (BAF)	Observed Response Mean Op	Observed Response Mean Operator
	Observed Response Mean	Observed Response Mean Value
	Observed Response Min Op	Observed Response Minimum Operator
	Observed Response Min	Observed Response Minimum Value
	Observed Response Max Op	Observed Response Maximum Operator
	Observed Response Max	Observed Response Maximum Value
	Observed Response Value	Bioconcentration Factor Value
Number of Doses	Number of Doses	Number of Doses
Org. Comment	Organism Comment	Organism Comment
Org. Age (7 fields)	Organism Age Mean OP	Organism Age Mean Operator

Report Header	Delimited File Header Name	Delimited Header Definition
	Organism Age Mean	Organism Age Mean
	Organism Age Min OP	Organism Age Minimum Operator
	Organism Age Min	Organism Age Minimum
	Organism Age Max OP	Organism Age Maximum Operator
	Organism Age Max	Organism Age Maximum
	Organism Age Units	Organism Age Units
Org. Comment	Organism Comment	Organism Comment
Organism Initial Length (8 fields)	Organism Initial Length Max	Organism Initial Length Maximum
	Organism Initial Length Max Op	Organism Initial Length Maximum Operator
	Organism Initial Length Mean	Organism Initial Length Mean
	Organism Initial Length Mean Op	Organism Initial Length Mean Operator
	Organism Initial Length Min	Organism Initial Length Minimum
	Organism Initial Length Min Op	Organism Initial Length Minimum Operator
	Organism Initial Length Type	Organism Initial Length Type
	Organism Initial Length Units	Organism Initial Length Units
Org. Init. Wt. (7 fields)	Organism Initial Weight Mean OP	Organism Initial Weight Mean Operator
	Organism Initial Weight Mean	Organism Initial Weight Mean
	Organism Initial Weight Min OP	Organism Initial Weight Minimum Operator
	Organism Initial Weight Min	Organism Initial Weight Minimum
	Organism Initial Weight Max OP	Organism Initial Weight Maximum Operator
	Organism Initial Weight Max	Organism Initial Weight Maximum
	Organism Initial Weight Units	Organism Initial Weight Units
Org. Lifestg.	Organism Lifestage	Organism Lifestage
Org. Source	Organism Source	Organism Source
Organism Strain	Organism Strain	Organism Strain
Other Effects	Other Effects	Other Effects
Ref. #	Reference Number	ECOTOX Reference Number

Report Header	Delimited File Header Name	Delimited Header Definition
Reference Citation (4 fields) Click on “References” to obtain full citation	Author	Author
	Title	Title
	Publication Year	Publication Year
	Source	Source
Resp. Site	Response Site	Response Site
Result Comment	Result Comment	Result Comment
Result % Dry/Wet Weight (7 fields)	Result Percent Dry/Wet Weight Mean OP	Result Percent Dry/Wet Weight Mean Operator
	Result Percent Dry/Wet Weight Mean	Result Percent Dry/Wet Weight Mean
	Result Percent Dry/Wet Weight Min OP	Result Percent Dry/Wet Weight Minimum Operator
	Result Percent Dry/Wet Weight Min	Result Percent Dry/Wet Weight Minimum
	Result Percent Dry/Wet Weight Max OP	Result Percent Dry/Wet Weight Maximum Operator
	Result Percent Dry/Wet Weight Max	Result Percent Dry/Wet Weight Maximum
	Media Measurement (wet/dry)	Denotes dry or wet weight basis for Result % Dry/Wet Weight
Result % Lipid (6 fields)	Result Percent Lipid Max	Result Percent Lipid Maximum
	Result Percent Lipid Max Op	Result Percent Lipid Maximum Operator
	Result Percent Lipid Mean	Result Percent Lipid Mean
	Result Percent Lipid Mean Op	Result Percent Lipid Mean Operator
	Result Percent Lipid Min	Result Percent Lipid Minimum
	Result Percent Lipid Min Op	Result Percent Lipid Minimum Operator
Result Rec. Num.	Result Record Number	Result (Record) Number
Result Sample Number and Unit (7 fields)	Result Sample Number Mean Op	Result Sample Number Mean Operator
	Result Sample Number Mean	Result Sample Number Mean Value
	Result Sample Number Min Op	Result Sample Number Minimum Operator
	Result Sample Number Min	Result Sample Number Minimum Value
	Result Sample Number Max Op	Result Sample Number Maximum Operator

Report Header	Delimited File Header Name	Delimited Header Definition
	Result Sample Number Max	Result Sample Number Maximum Value
	Result Sample Unit	Result Sample Number Unit
Result Statistical Method	Result Statistical Method	Result Statistical Method
Sig. Level (6 fields)	Significance Level Max	Significance Level Maximum
	Significance Level Max Op	Significance Level Maximum Operator
	Significance Level Mean	Significance Level Mean
	Significance Level Mean Op	Significance Level Mean Operator
	Significance Level Min	Significance Level Minimum
	Significance Level Min Op	Significance Level Minimum Operator
Soil Dose Meas.	Soil Dose Measured	Soil Does Measured
Soil Clay % (6 fields)	Soil Clay Percent Mean Op	Soil Clay Percent Mean Operator
	Soil Clay Percent Mean	Soil Clay Percent Mean Value
	Soil Clay Percent Min Op	Soil Clay Percent Minimum Operator
	Soil Clay Percent Min	Soil Clay Percent Minimum Value
	Soil Clay Percent Max Op	Soil Clay Percent Maximum Operator
	Soil Clay Percent Max	Soil Clay Percent Maximum Value
Soil Sand % (6 fields)	Soil Sand Percent Mean Op	Soil Sand Percent Mean Operator
	Soil Sand Percent Mean	Soil Sand Percent Mean Value
	Soil Sand Percent Min Op	Soil Sand Percent Minimum Operator
	Soil Sand Percent Min	Soil Sand Percent Minimum Value
	Soil Sand Percent Max Op	Soil Sand Percent Maximum Operator
	Soil Sand Percent Max	Soil Sand Percent Maximum Value
Soil Silt % (6 fields)	Soil Silt Percent Mean Op	Soil Silt Percent Mean Operator
	Soil Silt Percent Mean	Soil Silt Percent Mean Value
	Soil Silt Percent Min Op	Soil Silt Percent Minimum Operator
	Soil Silt Percent Min	Soil Silt Percent Minimum Value
	Soil Silt Percent Max Op	Soil Silt Percent Maximum Operator
	Soil Silt Percent Max	Soil Silt Percent Maximum Value
Soil pH (6 fields)	Soil pH Mean Op	Soil pH Mean Operator
	Soil pH Mean	Soil pH Mean Value
	Soil pH Min Op	Soil pH Minimum Operator

Report Header	Delimited File Header Name	Delimited Header Definition
	Soil pH Min	Soil pH Minimum Value
	Soil pH Max Op	Soil pH Maximum Operator
	Soil pH Max	Soil pH Maximum Value
Soil Type	Soil Type	Soil Type
Source	Source	Bibliographic Source
Spec. Common Name	Species Common Name	Species Common Name
Study Type	Study Type	Study Type
Org. Final Wt (7 fields)	Species Final Weight Mean Op	Species Final Weight Mean Operator
	Species Final Weight Mean	Species Final Weight Mean
	Species Final Weight Min Op	Species Final Weight Minimum Operator
	Species Final Weight Min	Species Final Weight Minimum
	Species Final Weight Max Op	Species Final Weight Maximum Operator
	Species Final Weight Max	Species Final Weight Maximum
	Species Final Weight Units	Species Final Weight Units
Species Group	Species Group	Species Group
Species Taxon Info. (10 fields)	Species Kingdom	Species Kingdom
	Species Phylum/Division	Species Phylum/Division
	Species Sub phylum	Species Sub phylum
	Species Superclass	Species Superclass
	Species Class	Species Class
	Species Order	Species Order
	Species Family	Species Family
	Species Genus	Species Genus
	Species	Species
	Variety	Variety
Spec. Eco #	Species ECOTOX Number	Species ECOTOX Number
Spec. NCBI ID	Species NCBI TaxID	Species Taxonomy ID from NCBI
Spec. Sci. Name	Species Scientific Name	Species Scientific Name
Statistical Significance (2 fields)	Statistical Significance	Statistical Significance
	Statistical Significance Description	Statistical Significance Description

Report Header	Delimited File Header Name	Delimited Header Definition
Steady State	Steady State	Steady State
Study Duration (14 fields) (Author) or (Days)	Study Mean Op	Study Duration Mean Operator
	Study Mean	Study Duration Mean Value
	Study Min Op	Study Duration Minimum Operator
	Study Min	Study Duration Minimum Value
	Study Max Op	Study Duration Maximum Operator
	Study Max	Study Duration Maximum Value
	Study Duration Unit	Study Duration Units
Sub-Habitat (3 fields)	Sub-Habitat	Sub-Habitat Term
	Sub-Habitat Description	Sub-Habitat Description
	Sub-Habitat Comment	Sub-Habitat Comment
Substr. Term	Substrate Term (field only)	Substrate Term (field only)
Substr. Comments	Substrate Comment (field only)	Substrate Comments (field only)
Temperature (7 fields)	Temperature Mean Op	Temperature Mean Operator
	Temperature Mean	Temperature Mean Value
	Temperature Min Op	Temperature Minimum Operator
	Temperature Min	Temperature Minimum Value
	Temperature Max Op	Temperature Maximum Operator
	Temperature Max	Temperature Maximum Value
	Temperature Units	Temperature Units
Test Comments	Test Comments	Test Comments
Test Loc.	Test Location	Test Location
Test #	Test Number	Test Number
Test Method	Test Method	Test Method
Test Type	Test Type	Test Type
Trend	Trend	Trend
Title	Title	Title of Publication
Pub. Year	Year	Publication Year