**ATTACHMENT 2-1. Effects Arrays**

To consistently and efficiently construct Effects Arrays, U.S. EPA’s Office of Pesticide Programs (OPP) Environmental Fate and Effects Division (EFED) developed the Data Array Builder (Version 1.0). The Data Array Builder batch processes all of the available data for a particular taxon, family, or species into graphs that display effects data relative to an exposure gradient from ECOTOX. The Data Array Builder provides users with the flexibility to customize the graphs based on the relationships of interest.

In order to prepare the data for incorporation in the array builder, all lethal and sublethal data from the ‘accepted studies’ ECOTOX database and registrant studies submitted to either EFED or the Health Effects Division (HED) are combined. The data are filtered based on taxon (*e.g.,* mammals, birds, fish, aquatic invertebrates, terrestrial plants). Endpoints are converted, where possible, to a standard set of environmentally relevant units similar to those maintained in EPA’s exposure models (*e.g.,* T-REX). Endpoints that are not associated with a relevant environmental exposure pathway, or are not convertible to standard units due to a lack of information, are removed from the Effects Array but are maintained in the accepted ECOTOX table.

For dose-based avian and mammalian endpoints, toxicity values are normalized for body weight, using the standard body weight classes used in the T-REX model. Mammalian toxicity data are normalized to 15, 35, and 100 g animals, while avian toxicity data are normalized to 20, 100, and 1000 g animals, based on equations found in the *Wildlife* *Exposure Factors Handbook*[[1]](#footnote-1).

Effects codes, defined within ECOTOX and consisting of major and minor effect groups as well as measurement endpoints, are used to arrange the Effects Arrays. The graphical user interface allows the user to select the taxa (and/or a corresponding sub-order), duration of exposure, units, endpoints and results to display on the array. If a NOAEL is selected and there is no corresponding LOAEL reported for the same endpoint and study, it is not reported on the general toxicity array graphs. Such endpoints are included in a specific array within the effects characterization including only studies where no effects were observed at any concentration tested. The array builder also gives the user the option of not reporting duplicate endpoint results. All studies corresponding to registrant studies, which would include data previously reviewed according to OPP guidance, are indicated by red shading of the data point on the array. Data can be sorted based on endpoint results such that the graph is arranged from lowest concentration eliciting an effect to the highest concentration eliciting an effect within a given effect code. The arrays allow the easy identification of critical endpoints or outliers that could be considered for further review.

1. US EPA. 1993. Wildlife Exposure Factors Handbook. Office of Research and Development. U.S. Environmental Protection Agency. Available at: <http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=2799> [↑](#footnote-ref-1)