

Australian & New Zealand Guidelines for Fresh & Marine Water Quality: Transitioning from Burrlioz to (shiny)ssdtools for deriving aquatic ecosystem guideline values for toxicants, including case studies

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For 20+ years, the Burrlioz software has been used in Australia/New Zealand for constructing species sensitivity distributions (SSDs) for the purpose of deriving toxicant guideline values (GVs) for the protection of aquatic ecosystems. While Burrlioz offered flexibility and advantages over other SSD approaches, it nevertheless has suffered from several limitations, as outlined by Fox et al. (2023, *ABEEC* 9: 1–3). Among these are (i) computational issues with convergence, and (ii) inability to fit and compare multiple SSDs.

In 2018, a new SSD program known as *ssdtools* (comprising the R package, *ssdtools*, and an accompanying web-based interface, *shinyssdtools* – collectively referred to as *(shiny)ssdtools*) was developed in Canada. The key feature of *(shiny)ssdtools* is that it employs a technique known as model averaging. In the context of SSD modelling, the approach fits multiple distributions to a (toxicity) dataset, and uses the weights of the fits of each distribution to construct a model-averaged SSD, from which GVs can be estimated. Thus, there is no longer a reliance on just a single distribution that may not provide an adequate representation of the dataset. In 2023, Australian and New Zealand governments approved a transition from the use of Burrlioz to *(shiny)ssdtools* for deriving toxicant GVs.

While Burrlioz has provided a technically defensible approach to deriving toxicant GVs for 20+ years, the benefits offered by transitioning to *(shiny)ssdtools* represents a significant strengthening of the technical underpinning of toxicant GVs for Australia and New Zealand. The current presentation will: (i) detail the collaborative research efforts to refine and improve *(shiny)ssdtools* to make it fit for purpose for Australia/New Zealand, (ii) present several case studies of the application of *(shiny)ssdtools* for deriving GVs, and (iii) outline the details of the project to transition from Burrlioz to *(shiny)ssdtools*.