

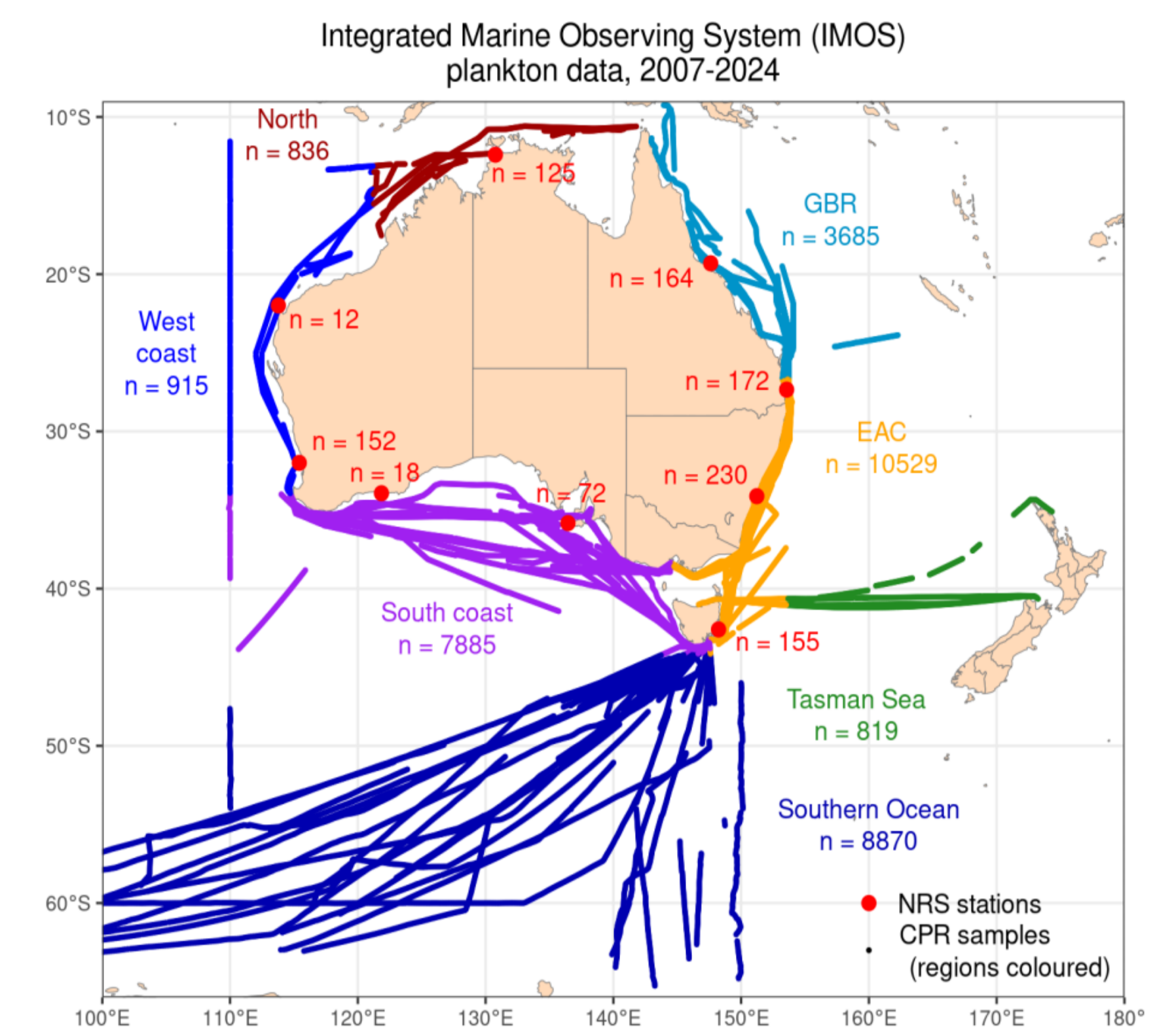
# Developing products to aid taxonomic consistency and rigour in plankton microscopy

Integrated Marine Observing System

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The **Australian Plankton Survey** has continuously collected phytoplankton and zooplankton in Australian waters for the past 15 years as part of the **Integrated Marine Observing System (IMOS)**. We run two plankton observing programs: the **National Reference Stations** and the **Australian Continuous Plankton Recorder Survey**. Plankton time series in Australian waters were traditionally limited to local areas and short durations, with no plankton observing program lasting longer than three years historically. This limited the plankton taxonomic research and information available. We have now developed a suite of taxonomic products that has improved our plankton identification by microscopy and bolstered our data quality control and consistency across our two laboratories and multiple analysts. This ensures that our data – which are continuously uploaded to the Australian Ocean Data Network where they are publicly available for **free** download (<https://shiny.csiro.au/BioOceanObserver/>) – are reliable and robust, allowing long-term and large-scale analyses and comparisons.

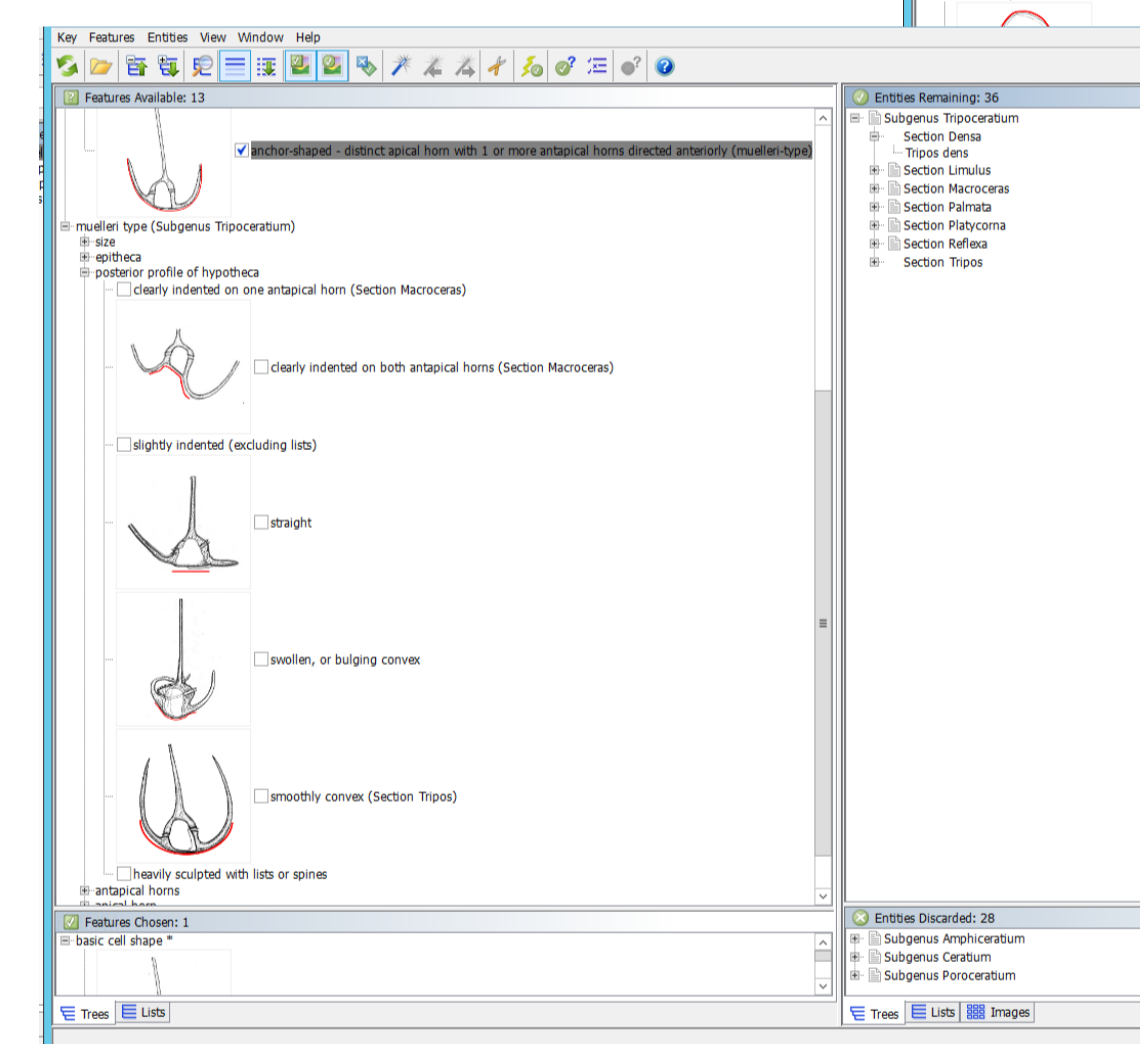
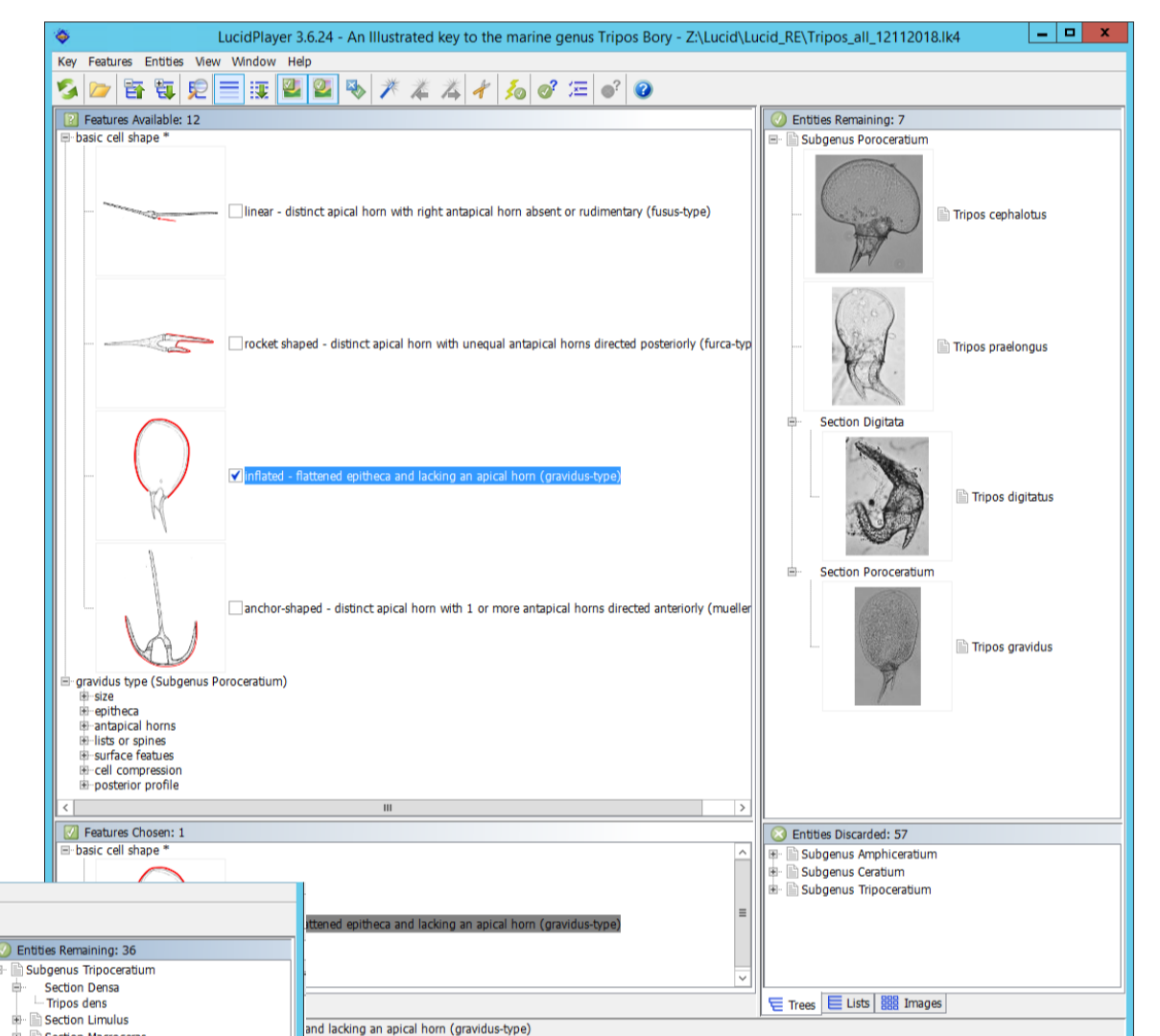


## Species Identification Sheets

The development and use of Species Identification Sheets has been an excellent initial learning tool, beneficial in summarising historical and newly collected information in a quick and easy to access way when in the laboratory. Sheets are also a vital ongoing part of ensuring consistency among multiple analysts and are key resources used for training new analysts. The Sheets are developed on an on-going basis, we use WoRMS for taxonomic verification, and Sheets are reviewed by taxonomic experts. The Sheets are compilations of published information and diagrams, diagnostic tips, as well as images and sizes sourced from our samples collected in Australian waters. The information compiled in the Sheets will be further used to develop interactive taxonomic keys using Lucid Software. The first edition of the Sheets have been published and are available for free at <https://www.imas.utas.edu.au/zooplankton/home>.

## Interactive LUCID Identification and Diagnostic Keys

Lucid provides digital tools for the development of matrix and dichotomous keys, and the production of associated fact sheets and media for keys ([www.lucidcentral.org](http://www.lucidcentral.org)). We are further developing information, data and media that we have already collected into Lucid keys and fact sheets, to streamline identification of specimens in particularly complex or taxonomically diverse groups via tablets adjacent to microscopes. Keys and factsheets are in progress and will be available for free online once published.

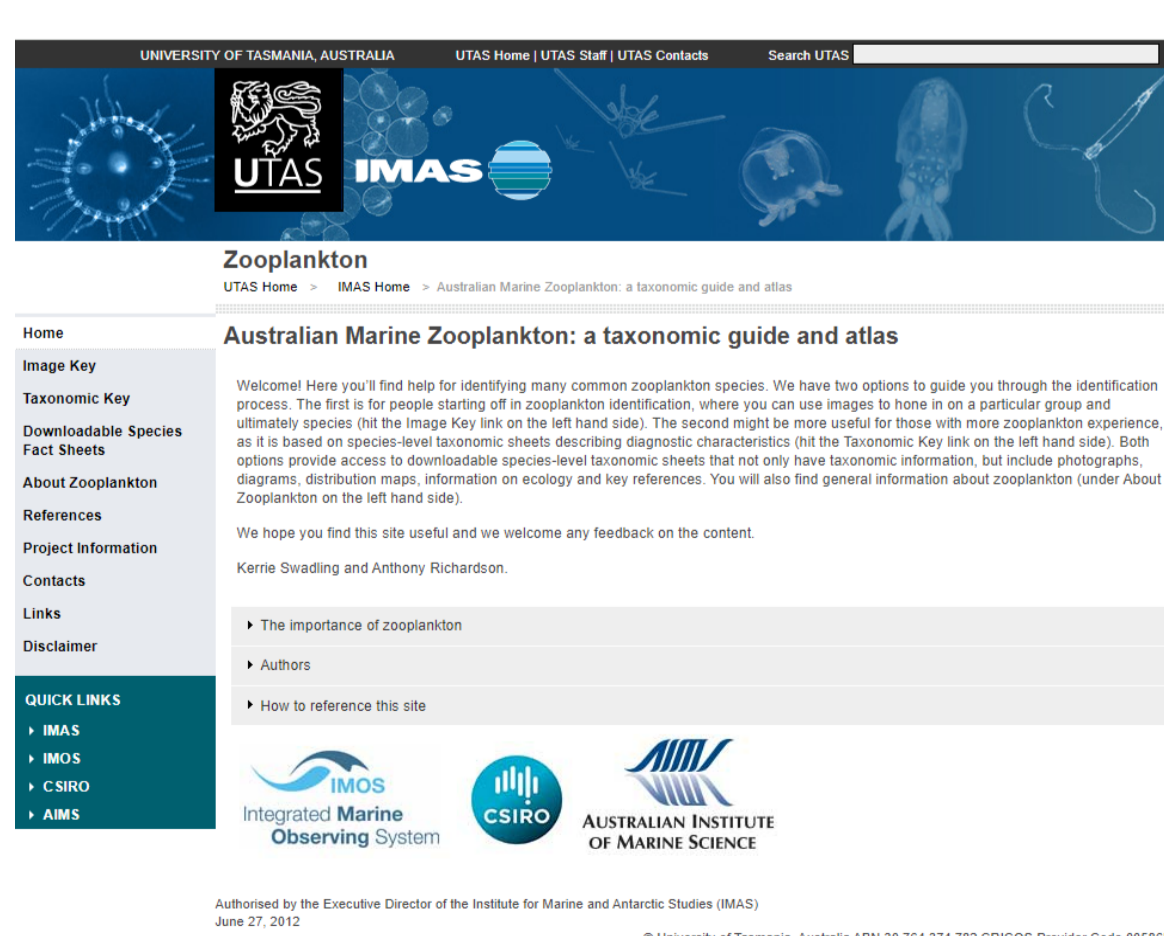


## Genus and Family Summary Sheets

The information developed via our Species Identification Sheets is summarised into targeted and highly used Genus and Family Summary Sheets for both zooplankton and phytoplankton groups. Analysts have found these to be essential parts of our laboratory 'tool-kit', that significantly speed up the identification of specimens in particularly complex or taxonomically diverse groups. Genus and Family sheets will be available for free online once published via LUCID.

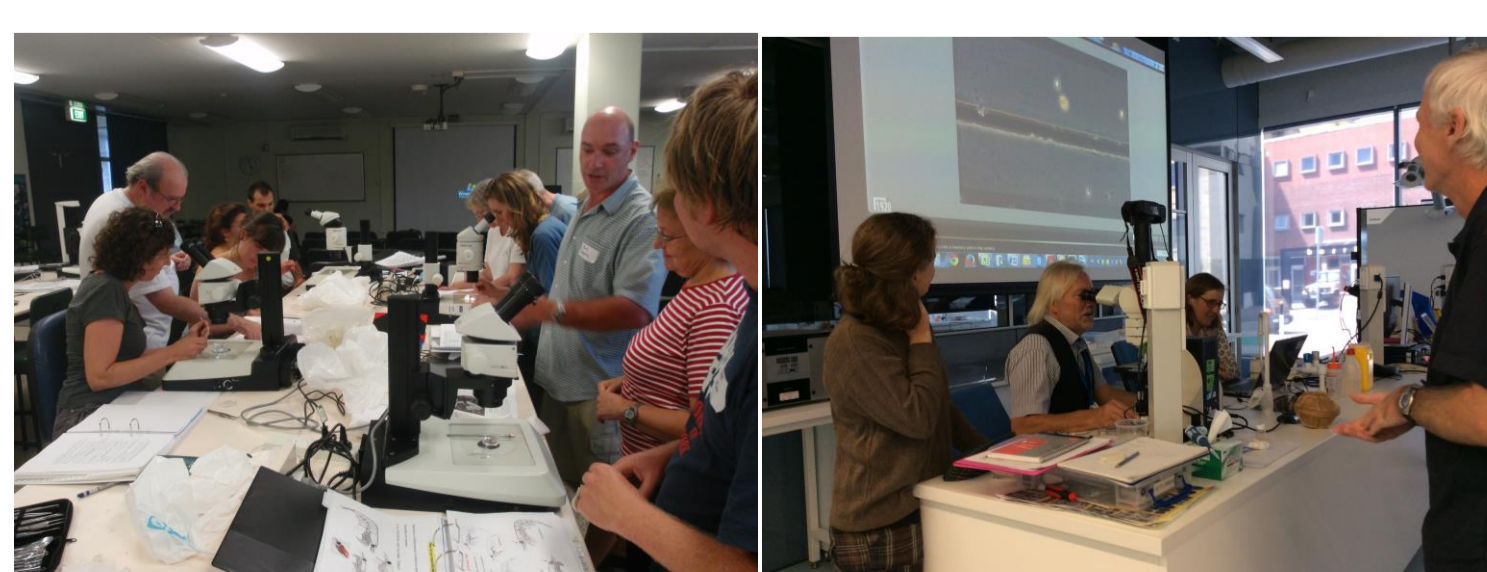
## Australian Zooplankton Atlas

The Australian Zooplankton Atlas contains many of our Species Identification Sheets and other useful information, produced in collaboration with zooplankton experts. Guides are available for free download <https://www.imas.utas.edu.au/zooplankton/home>



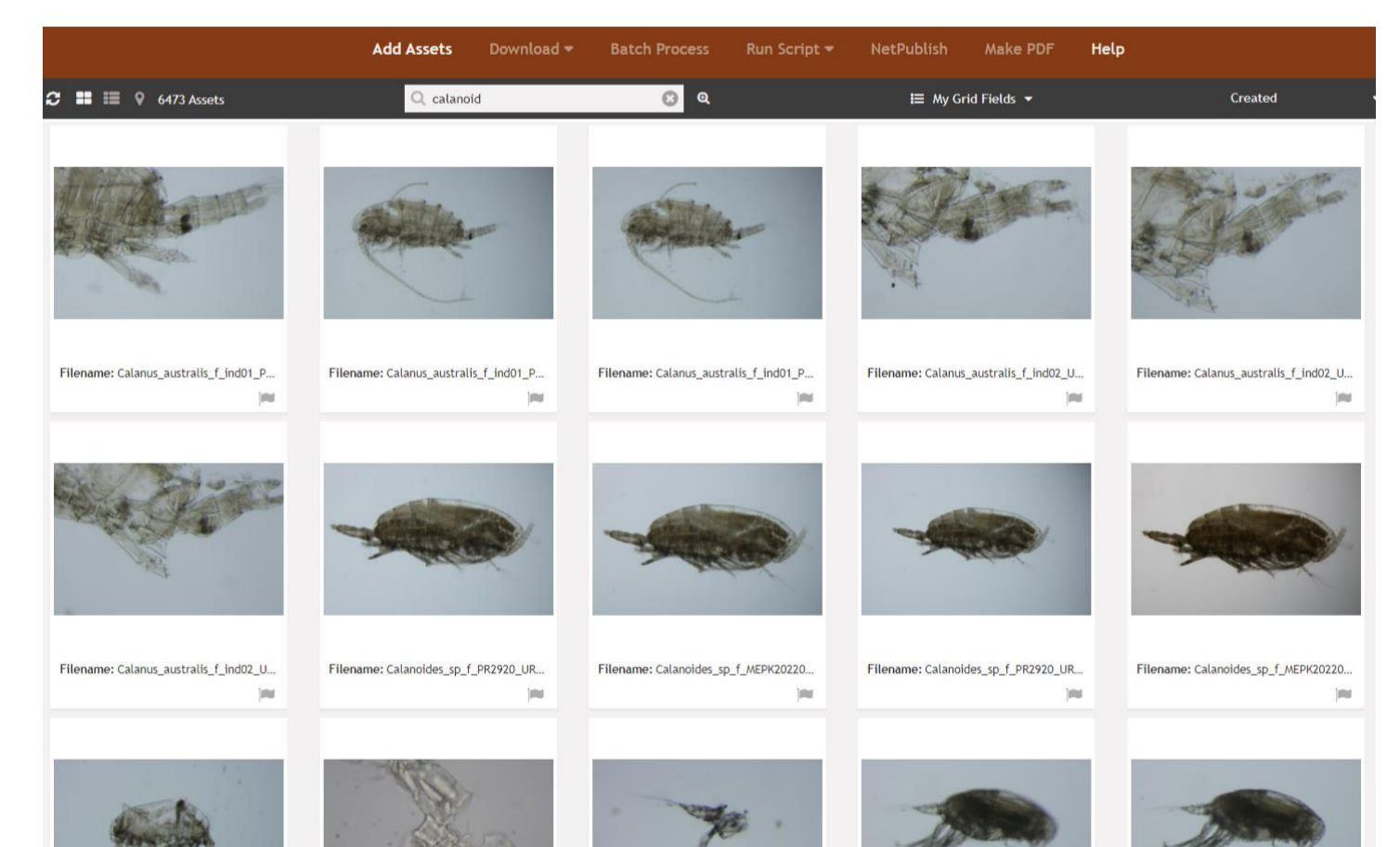
## Taxonomic Workshops & Collaboration

We hold taxonomic workshops with experts for continual internal training as well as to offer learning opportunities for other researchers and students. We collaborate with experts internationally and have been involved in the revision of the taxonomies (led by Prof. Gustaaf Hallegraeff) for the *Tripos* and *Dinophysis* phytoplankton groups.



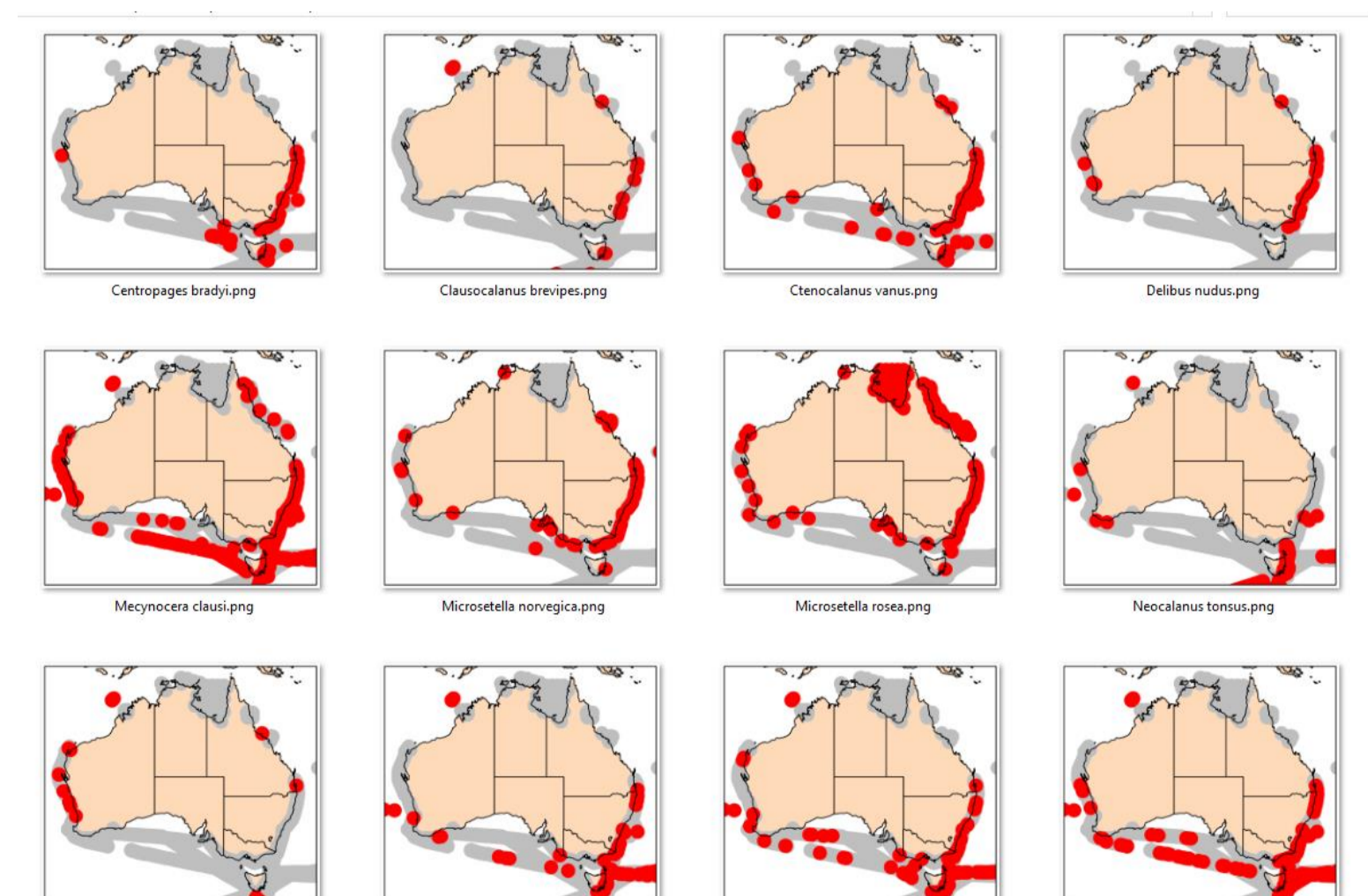
## Image Database

An internal digital image reference collection is continuously maintained for all CPR and NRS phytoplankton and zooplankton species via an Extensis Image Database ([www.extensis.com/portfolio](http://www.extensis.com/portfolio)). This contributes to consistency between analysts and ensures data quality control. We also maintain a physical collection of zooplankton specimens.



## Range Mapping

The date and location of each phytoplankton and zooplankton species identified via NRS and CPR sampling is recorded in a database. Database QC checks and mapping allow us to find 'spurious' entries. Over 15 years of data collection this has allowed us to develop range maps across Australian waters for all recorded species. As of February 2024 we have identified 1,033,388 specimens!



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FOR FURTHER INFORMATION  
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Swadling KM, Slotwinski A, Davies C, Beard J, McKinnon AD, Coman F, Murphy N, Tonks M, Rochester W, Conway DVP, Hsieh GW, Richardson AJ (2013) Australian Marine Zooplankton: a taxonomic guide and atlas. Version 1.0 February 2013.



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