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EcoCommons: Advancing Reproducible and Scalable Ecological Modelling with FAIR Data

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EcoCommons is a national digital infrastructure purpose-built to advance responsible, reproducible, and scalable ecological modelling in the era of FAIR data. It enables researchers, policymakers, and environmental managers to access integrated datasets, run validated modelling workflows, and share reproducible outputs that can inform biodiversity conservation, climate adaptation, and land-use planning. Built through close collaboration between ecological scientists, infrastructure providers, and technical experts, EcoCommons addresses long-standing barriers in environmental modelling. Many researchers face challenges in accessing high-quality data, configuring reproducible workflows, or building interoperable models at scale. EcoCommons responds to these challenges with a robust, cloud-based platform that brings together open data, scalable compute environments, and a curated suite of Jupyter notebooks. These notebooks, developed by domain experts, allow users to undertake complex tasks such as species distribution modelling, climate projections, and ecological forecasting without requiring extensive programming skills.

The platform is designed to serve a broad user base—from advanced coders to those with limited technical experience—by offering guided workflows alongside flexible, customisable modelling environments. This dual approach supports both accessibility and sophistication, enabling individual researchers, government agencies, NGOs, and university educators to conduct modelling that is scientifically rigorous, transparent, and replicable. EcoCommons strongly aligns with FAIR data principles, embedding metadata standards and promoting data provenance throughout its workflows. The platform supports integration with external data repositories, including the Atlas of Living Australia, enabling researchers to connect multiple datasets from different sources and disciplines. By linking data from diverse origins—species observations, climate projections, environmental layers, and more—EcoCommons promotes interdisciplinary collaboration and enhances the quality and scope of ecological insights.

In addition to its technical capabilities, EcoCommons is committed to building a national community of practice around ecological modelling. It provides training resources, reusable code templates, best-practice guidance, and collaborative forums. This helps users improve not only their technical skills but also their understanding of the assumptions, limitations, and implications of different modelling approaches. EcoCommons is more than just a modelling tool—it is a research enabler that supports data-intensive, policy-relevant ecological science. By fostering FAIR data use, reproducible workflows, and cross-sector collaboration, EcoCommons is helping to future-proof Australia's environmental decision-making processes. As pressures on ecosystems intensify, platforms like EcoCommons will be critical for equipping the next generation of researchers and decision-makers with the infrastructure needed to generate robust, timely, and transparent ecological insights.

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