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Harmonising Ecological Data Through Structured Vocabulary Management: The TERN Approach

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The Terrestrial Ecosystem Research Network (TERN) has developed a comprehensive controlled vocabulary management system to address interoperability challenges in ecological data across Australia. Our framework encompasses vocabularies for features of interest, platforms, instrumentation, methods, observable properties, organisations and administrative regions—creating a unified language for diverse ecological datasets.
Challenges in ecological data integration stem from inconsistent terminology across research groups and disciplines. TERN's solution includes a SKOS-based vocabulary architecture that provides persistent identifiers for each concept, making ecological terms discoverable, reusable, and machine-readable. Our system values community input and balances centralised governance with community input through an innovative dual-track approach. This approach involves expert curation via VocBench for internal stakeholders, ensuring the quality and consistency of vocabularies, and structured community contributions via spreadsheet templates processed through automated workflows. These processes allow for the inclusion of diverse perspectives and ensure that the vocabularies are comprehensive and reflective of the entire ecological research community.
By harmonising vocabularies across projects and datasets, and linking them through semantic relationships like SKOS, we enable more sophisticated data analysis and foster collaboration with external partners. This harmonisation significantly enhances data discovery and reveals parameter definitions in the datasets. Our vocabularies provide crucial context for each data point, improving interpretability for cross-disciplinary users and paving the way for exciting discoveries in ecology.
Through publication via Research Vocabulary Australia and implementation in TERN's Data Discovery Portal, we've created a model for ecological data harmonisation that bridges institutional boundaries. Our poster demonstrates how structured vocabulary management transforms fragmented ecological data collections into cohesive, interoperable knowledge resources, sparking a new era of data-driven ecological research. These vocabularies drive harmonisation in Applications such as TERN Data Discovery Portal, EcoPlots, and EcoImages.

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