

Data Model Guideline for researchers

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We acknowledge the Traditional Owners of Country throughout Australia and their continuing connection to and stewardship of land, sea and community. We pay our respects to them and their cultures and to their Ancestors, Elders and future leaders. Our Indigenous research partnerships are a valued and respected component of National Environmental Science Program research.

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1 Introduction

The [Resilient Landscapes Hub \(RLH\)](#), part of the Australian Government's [National Environmental Science Program \(NESP\)](#), delivers research to strengthen the resilience and sustainability of Australia's landscapes and biodiversity. Due to its interdisciplinary nature, the hub produces a wide range of research outputs, from datasets and maps to reports and peer-reviewed papers, stored across multiple institutional and domain-specific repositories. While this distributed approach is necessary given the diversity of the hub's research activities and partners, it can also create challenges in locating, integrating, and reusing data.

In collaboration with the [Australian Research Data Commons \(ARDC\)](#), the RLH is implementing a coordinated research data management approach aligned with the [FAIR principles](#) (Findable, Accessible, Interoperable, Reusable). This approach focuses on improving metadata quality and ensuring consistent use of [Persistent Identifiers \(PIDs\)](#) such as DOI (Digital Object Identifier) for publications and data, ORCID (Open Researcher and Contributor ID) for researchers and ROR (Research Organisation Registry) for organisations. This enables the creation of reliable and connected metadata records that enhance the discoverability and traceability of research outputs.

Applying FAIR principles benefits the research lifecycle (Figure 1) by increasing the visibility, accessibility, and impact of research outputs. As a project progresses, it generates outputs such as papers, models, and datasets. When these outputs are published in a FAIR-aligned repository, they become discoverable and reusable. In addition, the associated metadata can be harvested by [Research Data Australia \(RDA\)](#), making the outputs accessible through the national portal and further enhancing their visibility.

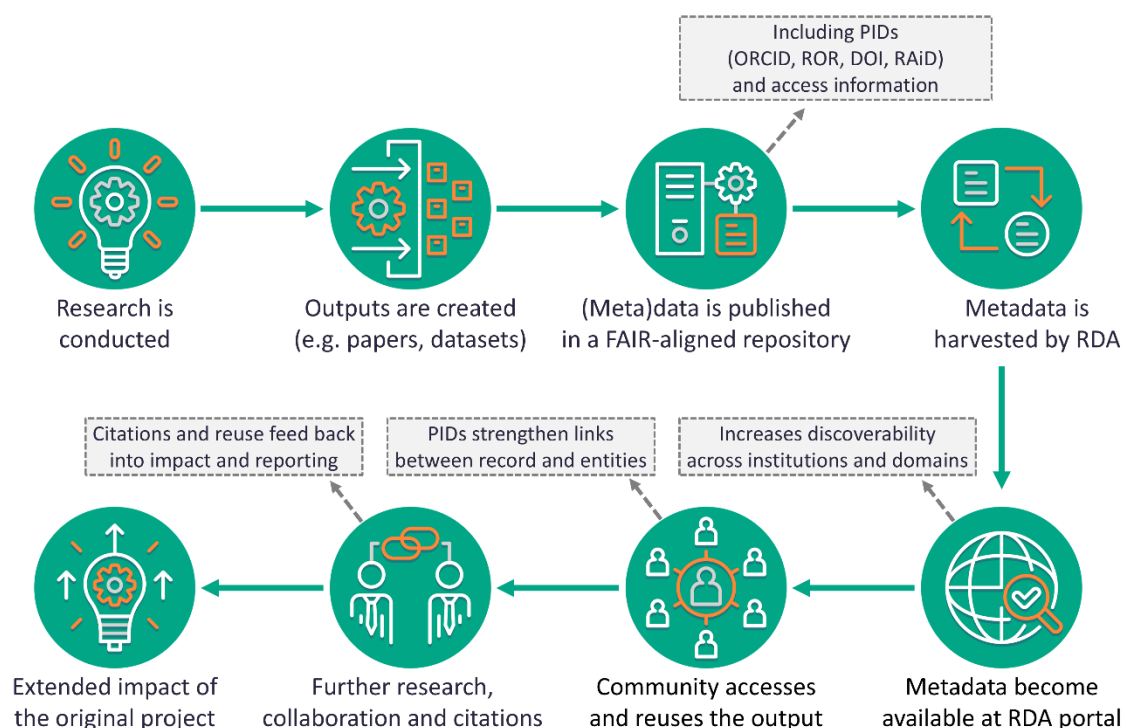


Figure 1 - Lifecycle of research and metadata illustrating how the FAIR framework and PIDs enhance discovery, reuse, and long-term impact of research outputs. (Icons designed by Flat Icons, n.d.)

Through this process, outputs can be accessed and reused by the broader community, leading to new research, collaborations, and more citations. Maintaining strong PID connections between people, organisations, and outputs ensures transparency, reproducibility, and long-term preservation of NESP RLH research.

In addition to FAIR, some research outputs may also require the application of the [CARE principles](#), particularly for projects involving Aboriginal and Torres Strait Islander peoples. These principles ensure that Indigenous rights, interests, and data governance are appropriately considered throughout the research process.

To support the application of these principles and requirements in practice, this guideline is structured in two main parts. [Section 2: Concepts](#) provides an overview of key concepts such as FAIR, CARE, PIDs, and metadata, while [Section 3: Guidelines for storing research outputs online](#) outlines the practical steps required to publish research outputs, including:

- Choosing appropriate repositories.
- Providing complete and high-quality metadata.
- Assigning PIDs, including implementing [Research Activity Identifier \(RAiD\)](#) for project identification.

These steps align with the [NESP Data and Information Guidelines](#), which define the overarching requirements for research outputs. These include that all RLH project outputs must:

- Be stored in an indexable repository.
- Have a persistent identifier.
- Contain a minimum set of metadata.
- Be integrated into RDA.

At the hub level, these requirements are implemented through the *RLH Data Management Strategy*, which defines roles, responsibilities, and processes to support consistent data management and publication practices. These documents establish the framework within which RLH research outputs are managed and shared.

Together, these actions form the foundation of a connected and transparent research ecosystem, as illustrated in Figure 1. By embedding FAIR principles throughout the entire project lifecycle, the hub not only ensures compliance with national standards but also maximises the long-term value of its research. This coordinated approach supports collaboration across institutions, strengthens links between people and outputs, and ultimately enhances the collective impact of the Resilient Landscapes Hub's science.

2 Concepts

This section introduces key concepts that underpin good practices in research data management for projects under the NESP RLH. By understanding data concepts such as FAIR, CARE, PIDs, metadata, orphan data, and repositories, researchers can make informed decisions when storing and sharing their project outputs. Each concept plays a critical role in ensuring that research data is discoverable, accessible, and appropriately managed in line with ethical, cultural, and program requirements.

2.1 FAIR

The FAIR principles (Findable, Accessible, Interoperable, and Reusable) (GO FAIR, n.d.) provide a framework designed to support transparency, collaboration, and the long-term value of research outputs (Figure 2). By making data FAIR, researchers enhance the discoverability of their output, encourage data sharing, and increase opportunities for citation and impact.

The concept of FAIR emerged from a workshop that brought together academic and industry stakeholders to address challenges in data discovery and reuse (Wilkinson et al., 2016). Participants recognised that establishing and broadly adopting a minimal set of community-agreed principles and practices would enable stakeholders to find, access, integrate, reuse, and cite the vast amounts of data produced by modern, data-intensive research more efficiently. The workshop concluded with a preliminary draft of core principles, which were later refined into the FAIR Guiding Principles. These principles state that all research outputs should be FAIR for both humans and machines.

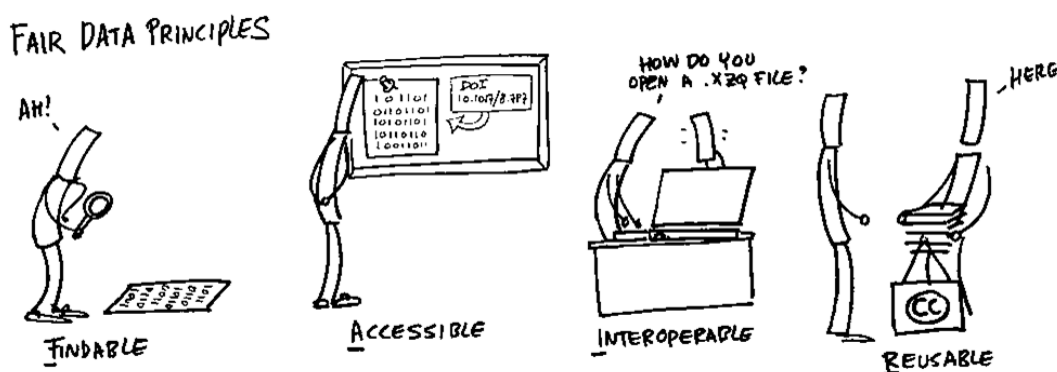


Figure 2 – Illustration of the FAIR Data Principles (GitBook Bot et al., 2018)

FAIR can be summarised as follows (European Commission Expert Group on FAIR Data, 2018):

Findable

- Data and metadata must have a PID, such as DOI or Handle.
- Data should include rich, descriptive metadata.
- Metadata must be registered or indexed in a searchable resource.

Accessible

- Metadata (and data, if permitted) must be retrievable via the unique identifier.

- Access should be open, free, and universally implemented.
- Metadata should remain accessible even if the data is not.

Interoperable

- Metadata and data should follow recognised standards and vocabularies.
- Using identifiers to link and describe connections with other data, metadata, and information.

Reusable

- A clear licence must specify conditions for reuse.
- Metadata should include provenance information, explaining how the data was collected and processed.

It is important to note that making data FAIR does not mean that all data must be openly available. FAIR principles clearly distinguish data and metadata, allowing their application even in cases where the data cannot be openly published due to sensitivity or confidentiality; in such cases, publishing rich metadata provides a high degree of FAIRness (Wilkinson et al., 2016).

Key benefits of making data FAIR include the following (ARDC, 2025):

- Maximising the potential of data assets.
- Increasing the visibility and citation of research.
- Improving research reproducibility and reliability.
- Aligning with international standards and best practices.
- Attracting new partnerships across research, business, policy, and community sectors.
- Enabling new research questions to be explored.
- Achieving greater impact from research.

Applying the FAIR principles maximises the long-term value of research outputs by increasing visibility, improving reproducibility and reliability, supporting collaboration across sectors, and enabling new research questions to be addressed.

2.2 CARE

The CARE principles were designed to complement the FAIR Principles and support the inclusion of Indigenous Peoples in data processes that strengthen Indigenous control over discovery, access, use, reuse, and attribution in contemporary data landscapes.

Recognising the challenge of protecting Indigenous rights and promoting open data, these principles were developed following a workshop convened by the International Indigenous Data Sovereignty Interest Group within the [Research Data Alliance](#) (Carroll et al., 2020). This Indigenous-led workshop brought together Indigenous people, academics, and practitioners to draft principles for Indigenous data governance. Participants concluded that existing frameworks primarily focused on data-centric principles and that there was a need for a framework emphasising people- and purpose-oriented principles. This led to the development of the CARE Principles, centred on Collective benefit, Authority to control, Responsibility, and Ethics.

When working with data generated by, about, or for Aboriginal and Torres Strait Islander peoples, the CARE principles must be applied alongside FAIR (Figure 3) to address aspects of equity, governance,

and ethics that FAIR alone does not cover, ensuring that Indigenous Peoples' rights and interests in data are recognised and respected throughout the data lifecycle.



Figure 3 - Be FAIR and CARE when using Indigenous data (GIDA, n.d.)

The CARE principles are defined as follows (Jennings et al., 2023):

Collective benefit

- Data should support inclusive development and equitable outcomes for Indigenous Peoples and enhance governance and civic engagement.

Authority to control

- Indigenous rights and interests in data must be recognised.
- Indigenous communities should have authority over how their data is used and governed.

Responsibility

- Data use must support Indigenous self-determination and collective benefit.
- It should build capacity, foster relationships, and reflect Indigenous worldviews.

Ethics

- Data practices must minimise harm and maximise benefit for Indigenous Peoples.
- All stages of data lifecycle should be guided by principles of justice and future-oriented use.

Applying these principles means Indigenous Peoples have the right to decide how and when their data is collected, analysed, accessed, and used. Indigenous Peoples should also have access to their own data, which may be hosted online. Careful planning is required to ensure that storage and access arrangements meet cultural and ethical obligations.

2.3 Persistent Identifiers (PIDs)

Persistent Identifiers (PIDs) are unique, stable references assigned to digital or physical objects, such as research articles, datasets, people, or organisations, which ensure these items can always be

reliably found, cited, and linked, even if their location or other details change (Cousijn et al., 2021). PIDs are essential for making information FAIR, and for maintaining long-term access and trust in digital resources.

With the growth of data collection, there has also been an increase in sharing research with the broader community, enabling access, reproducibility, and proper citation of the original work. The use of PIDs supports these practices by providing stable and long-lasting, reliable links to research outputs.

There are numerous benefits to using PIDs. For researchers, PIDs reduce the risk of attribution errors by ensuring that resources are correctly linked to the appropriate individual through identifiers such as ORCID. For organisations, PIDs facilitate more efficient monitoring of research outputs by using ROR to identify organisations and DOIs to identify publications (Meadows et al., 2019). The [NESP Data and information guidelines](#) highlight that, where possible, all hub outputs should be assigned a PID.

The most used PIDs in research are:

Open Researcher and Contributor ID (ORCID)

- ORCID is a persistent digital identifier created and maintained by individual researchers to uniquely distinguish them from others and link their contributions across multiple systems. It ensures accurate attribution of research outputs and recognition of each researcher's work.
- More information: [ORCID and Persistent Identifiers](#)
- Example: <https://orcid.org/0000-0003-3650-3374>

Digital Object Identifier (DOI)

- A DOI is a globally recognised persistent identifier assigned by repositories or publishers to digital research outputs such as papers, datasets, or reports. It provides a permanent and citable link ensuring long-term accessibility and reliable referencing.
- More information: [ARDC DOI Service](#)
- Example: <https://doi.org/10.5281/zenodo.10656276>

Research Activity Identifier (RAiD)

- RAiD is a persistent identifier created and managed by authorised institutions, such as NESP, to identify and track research projects and activities. It connects people, organisations, and outputs under a single project identifier throughout the research lifecycle.
- More information: [RAiD – Research Activity Identifier Service](#)
- Example: <https://raid.org/10.71821/ffc970c8>

Research Organisation Registry (ROR)

- ROR is a global registry that assigns PIDs to research organisations. Managed by authorised institutional representatives, it provides a standardised way to reference organisations, improving discoverability and attribution of institutional contributions.
- More information: [About ROR](#)
- Example: <https://ror.org/047272k79>

To better illustrate how PIDs connect different research entities, the diagram below (Figure 4) shows the relationships among researchers, organisations, research projects, and research outputs, along with the specific PIDs used to identify each.

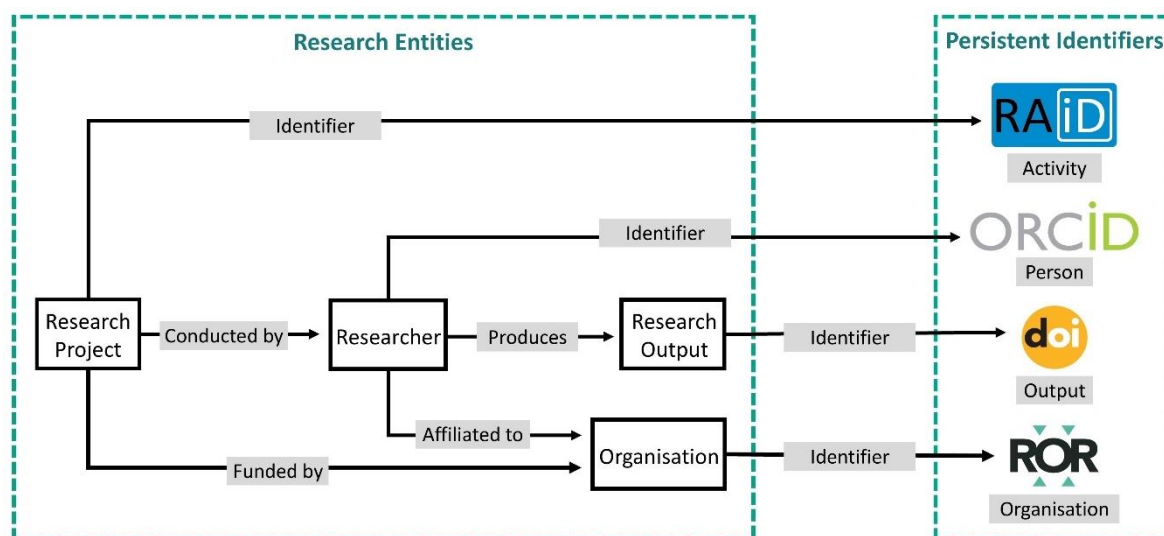


Figure 4 - PID relationships across entities in a research project.

Using all relevant PIDs within metadata records strengthens the connections between datasets, publications, contributors and projects. This practice improves discoverability, enables accurate attribution and supports compliance with best-practice data management for NESP funded research.

2.4 Metadata

Metadata is often described as “data about data” (Figure 5), providing information about a data’s characteristics, including its format, location and access conditions (Ulrich et al., 2022). It serves as a formal, standardised way to define and describe information, enabling discovery, understanding, and reuse, and to communicate the existence and context of a project to a broad audience, including collaborators, funders, and other stakeholders.

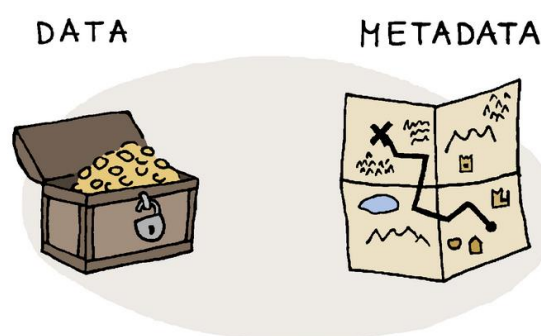


Figure 5 - Illustrative example highlighting the relationship between data and metadata (Kononow, n.d.)

Metadata can be categorised into several types, including structural, descriptive, and administrative (Ailakhu, 2025). Structural metadata explains how data is organised and shows the relationships between the components of an object. Descriptive metadata contains details that help users locate and identify resources, such as titles, authors, and keywords. Administrative metadata includes key information needed to manage resources, for example, creation dates, rights details, and preservation instructions.

Researchers typically create descriptive and administrative metadata by completing the submission form provided by their chosen repository, which usually includes fields such as title, description, and access conditions. Once submitted, the record may be reviewed by a university librarian or repository manager before being published. When manual metadata creation is necessary, referring to the [AS/NZS ISO 19115.1:2015 Metadata Standard](#) can be helpful, and many institutions also offer templates and support for manual entry.

For mediated or restricted outputs, providing metadata is essential. It can describe the resource, outline access conditions, and provide instructions for requesting access, making the output discoverable while maintaining appropriate access protections. Some repositories allow publishing metadata without uploading the output, which is particularly useful when ethical, cultural, or legal constraints apply.

Providing rich metadata increases the visibility and accessibility of outputs. When combined with PIDs, it enables reliable connections to authors, projects, and institutions, aligns with the FAIR principles, ensures compliance with NESP's data management requirements, and supports the long-term impact of hub research.

2.5 Orphan data

The term orphan data can vary in meaning depending on context, but it generally refers to data that is unlinked, unmaintained, or not easily accessible or usable.

Data becomes unlinked when it is not properly associated with related resources (e.g., publications, instruments, and projects) or when the original resource is no longer available. This reduces discoverability and limits others' ability to understand or reproduce the research. Using PIDs for datasets, publications, tools, and projects helps prevent this issue by creating a network of reliable links across research components (Cousijn et al., 2021).

Data may also be considered unusable or inaccessible if it is not stored in a searchable, persistent repository. In some cases, data is stored in internal systems with limited access, such as local drives, cloud storage, or institutional intranets, which do not meet best-practice standards. To address this, outputs should be deposited, or migrated, to a suitable repository that supports preservation, discoverability, and access control. Even when the data itself cannot be made openly available, metadata should still be published to indicate the dataset's existence, location, and access conditions.

2.6 Repository

A repository is an online platform for storing research outputs, such as datasets, publications, code, and other materials. The main purpose is to ensure that research outputs are properly managed, discoverable, and accessible to others. Repositories implement systematic data stewardship practices that foster the collection, curation, preservation, long-term availability, dissemination, and access of scientific outputs (Assante et al., 2016).

The repository should comply with the FAIR principles, supporting the verification and reproducibility of results and enabling new analyses and discoveries (Götz, 2023). This means that the repository must include the minimum required metadata fields and be searchable and indexable.

There are three main types of repositories commonly used by researchers:

Generalist repositories: these host a variety of research outputs from any discipline. Examples include [Zenodo](#) and [Figshare](#), which can host a wide range of research outputs (e.g., datasets, papers, and presentations) across disciplines. Another example is [Dryad](#), which accepts only datasets and requires that they be linked to a published article, ensuring strong connections between data and peer-reviewed publications.

Institutional repositories: managed by universities or research organisations to store and showcase the scholarly outputs of their staff and students, including conference papers and datasets. They provide a primary means of self-archiving, increasing accessibility and citation rates, and reducing reliance on commercial publishers. However, institutional repositories may face limitations, including uneven adoption across disciplines, varying researcher engagement, and sustainability challenges related to funding and long-term maintenance (Bashir et al., 2022).

Subject-specific repositories: designed to serve the needs of particular disciplines or research communities, such as genomics, ecology, or social sciences. They follow community standards and implement tailored metadata and curation practices, thereby improving interoperability and reusability. Their main limitations include uneven coverage across fields and reliance on ongoing community and funding support (Pampel et al., 2013).

Selecting an appropriate repository ensures that data generated by NESP RLH projects align with institutional policies, meet funder requirements, and can be effectively integrated into national and international data infrastructures. For practical guidance on choosing the most suitable repository, see [Section 3 - Step two: Choose a repository](#). By depositing outputs in trusted repositories that support interoperability and persistent linking, researchers contribute to a cohesive network of accessible environmental data, reinforcing the collective impact and legacy of the hub's research.

2.7 Research Data Australia (RDA)

[Research Data Australia \(RDA\)](#) is a national discovery portal that aggregates metadata from more than 100 online repositories, providing a centralised platform for finding, accessing, and reusing research data (Kethers et al., 2010). RDA itself does not store datasets; instead, it harvests metadata from institutional, domain-specific and government repositories.

The [NESP Data and Information Guidelines](#) encourage the contribution of descriptive metadata to RDA. When research outputs are deposited in a suitable repository and include appropriate PIDs, their metadata is harvested by RDA, significantly increasing their discoverability and potential for reuse. This process ensures that outputs are indexed and accessible through search mechanisms.

RDA is developing dedicated pages for each NESP hub, showcasing associated projects and datasets. These pages will be created and maintained by the RDA team, but their content depends entirely on the quality and completeness of the metadata provided by researchers and institutions.

Through the collection of metadata across diverse research-related entities, RDA provides an integrated view of Australia's research landscape. These entities include (Kethers et al., 2010):

- **Collections:** groups of related physical or digital materials, such as datasets or samples.
- **Parties:** people and organisations responsible for creating, managing, or funding research.
- **Activities:** research processes or projects that take place over a defined period and generate outputs, such as experiments, surveys, or fieldwork.

- **Services:** platforms or tools that allow users to access or interact with research data, such as data portals, APIs, or visualisation dashboards.

By linking these elements, RDA builds an integrated network of research information. For instance, connecting a dataset (*collection*) to its creators (*parties*) and the project (*activity*) that produced it. This interconnected structure helps users discover, understand, and reuse research outputs across disciplines and institutions.

3 Guidelines for storing research outputs online

The following steps (Figure 6) outline the process that RLH researchers must follow when preparing and publishing research outputs. The workflow ensures that all outputs meet NESP data requirements, defined in the [NESP Data and Information Guidelines](#), aligning with the [FAIR](#) and [CARE](#) principles.

For outputs such as datasets, code, software, and surveys, researchers should follow the publication steps described in this guideline. These include selecting an appropriate repository, completing the required metadata fields, and uploading or updating the output according to repository-specific processes. Detailed guidance for each of these steps is provided in the following sections.

For outputs such as papers and reports, researchers should follow journal procedures or communication team guidelines, where applicable, regarding how and where to publish. They should also follow Steps One and Five of this guideline, which highlight that these outputs must go through the product submission process.

When publishing, researchers must ensure that metadata records are accurate, complete, and properly linked to [persistent identifiers \(PIDs\)](#), in line with hub guidance. Any access restrictions must be clearly documented in the metadata, including the reason for restricted access and, where appropriate, instructions for requesting access. After publication, relevant details (such as DOI and status) must be recorded in the project's Output Management Plan (OMP).

If clarification is required, researchers should contact the [Data Wrangler or Admin team](#) for support.

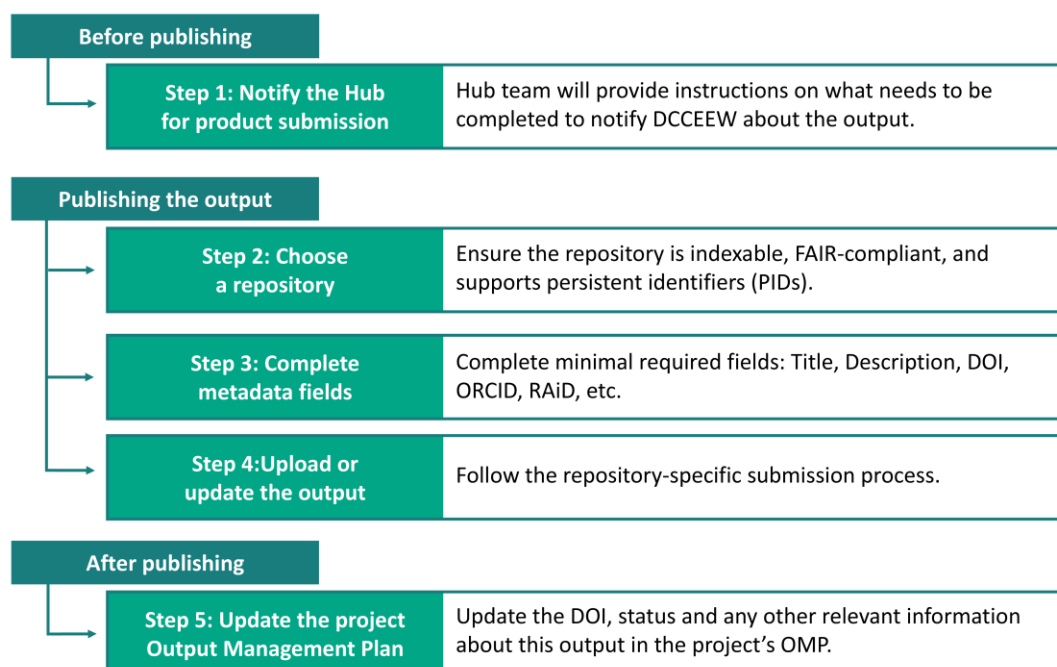


Figure 6 - Overview of the key steps required to publish research outputs.

3.1 Step one: Notify the hub for Product Submission

All outputs produced by the hub need to be sent to DCCEEW through the product submission process, as outlined in the NESP Data Management Strategy, where the department needs to be notified about any upcoming outputs in advance.

Researchers must notify the hub [Admin team](#) of any accepted paper or output before it is published. The hub team will then provide guidance and initiate the NESP Product Submission Process, as outlined in the *NESP Data Management Strategy*, ensuring that DCCEEW is notified in advance and can review outputs where required.

3.2 Step two: Choose a repository

The selection of an appropriate [repository](#) is a critical step in ensuring that research outputs are managed, discoverable, and accessible. This supports FAIR data practices and enables long-term preservation and reuse.

Researchers should follow any contractual obligations when determining which repository to use. In most cases, this will be the repository affiliated with the project's lead institution. Where no repository is specified in the contract, researchers may select the most appropriate repository for their outputs. Cloud storage platforms such as OneDrive or Google Drive are not considered suitable repositories, as they are intended only for file storage and collaboration during the research process.

[Table 1: Repository name and considerations](#) outlines repositories associated with the RLH that have already been assessed, along with relevant considerations. Researchers should review these considerations to determine whether they may impact their outputs.

If a researcher wishes to use a repository not listed in the table, this may indicate that the repository does not meet the hub's requirements or has not yet been assessed. In such cases, researchers should, where possible, select a repository from the list, deposit at least the metadata in one of the listed repositories, or contact the [Data Wrangler](#) to discuss an appropriate solution.

3.3 Step three: Required Metadata fields

[Metadata](#) should describe the nature and purpose of the data, the methods used to generate it, definitions of key terms, data quality and limitations, provenance information, licensing conditions, and links to relevant reports or publications.

Where access to the output is restricted, the responsible data custodian must ensure that metadata remains publicly available, clearly describes the output, provides an explanation for the access restrictions, and includes contact information.

A minimum set of metadata fields, as outlined in [Table 2: Metadata fields and their description](#), must be completed when publishing an output to ensure that the output is FAIR, improves research visibility, and meets NESP program requirements. Field names may vary slightly between repositories, and additional fields may be required depending on repository-specific requirements. Researchers are not required to complete a separate metadata template, as each repository or institution provides its own submission interface.

3.3.1 Instructions for the inclusion of RAiD in the metadata

As RAiD is a relatively recent initiative, most repositories do not yet provide a dedicated metadata field for its inclusion. Therefore, researchers are required to manually include it in their metadata record.

Each project has an assigned RAiD, which is created by the Data Wrangler and provided as a persistent link. Researchers must identify the correct link for their project in [Table 3: RAiDs for NESP RLH projects](#) and consult [Table 4: RAiD Implementation by Repository](#) to locate their chosen repository and follow the specific instructions to determine in which field the RAiD should be inserted, as the exact field may vary between repositories.

Where a repository does not currently support its inclusion, researchers should contact the [Data Wrangler](#) to coordinate an appropriate solution.

3.4 Step four: Upload or Update the output

After completing the metadata, researchers must follow their institution-specific process to submit the output and its associated metadata. This stage represents a crucial part of the data lifecycle, as making research data and metadata publicly available enhances their visibility, accessibility, and long-term value.

Once deposited, the metadata record will receive a DOI and can be harvested by [RDA](#), making it accessible through the national discovery portal. The DOI can also be provided to the journal, where required, to fulfil the paper's data publication requirements. This ensures that the broader research community can easily locate and access the data supporting the publication or project.

For outputs published prior to this guideline, researchers should update the record to include the RAiD and, where necessary, enrich the metadata. Some repositories require that modifications be requested through the university team; this information can be found in [Table 1: Repository name and considerations](#).

If further assistance is needed, researchers should contact the [Data Wrangler](#) for support.

3.5 Step five: Update Output Management Plan

Once the output is published, researchers must update the project's Output Management Plan (OMP) with the repository name, DOI, and any other relevant information, and notify the hub [Admin Team](#). Maintaining an accurate and up-to-date Output Management Plan supports milestone reporting, enables consistent tracking within the hub, and provides a transparent record of research outputs.

After receiving the updated information, the hub will notify DCCEEW that the output is publicly available and provide the DOI as part of the NESP Product Submission Process.

The hub team will also update the project's RAiD record to include the output in the list of Related Objects. This ensures that the RAiD contains not only information about the project but also links to the project's research outputs.

Table 1: Repository name and considerations

Repository name	Details
Atlas of Living Australia (ALA)	Repository link: ALA user guides Contact: support@ala.org.au • Moderated Submission and Update Process: In most cases, researchers do not publish datasets directly and submissions are managed by the ALA data manager. However, automation workflows can be established by agreement, allowing researchers to submit or update datasets directly where appropriate • Sensitive Data Access Process: Restricted access to data is supported through approved mechanisms (e.g. RASD-S or equivalent). Access conditions and any data sensitivity considerations should be clearly documented in the metadata description.
Charles Darwin University (CDU)	Repository link: CDU Library Contact: Contact CDU • PID Integration Process - ORCID: It is not possible to add contributors who are not affiliated with CDU.
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Repository link: Collection Development Plan Contact: researchdataservices@csiro.au • PID Integration Process - ORCID: It is not possible to add contributors who are not affiliated with CSIRO.
Curtin University	Repository link: Curtin Research Data Collection Contact: ResearchData@curtin.edu.au • No specific considerations regarding upload, update, or PID inclusion.
Flinders University	Repository link: Research data Contact: Library research query • Temporal Information: It is not possible to enter date coverage directly; this information should be included in the description.
Griffith University	Repository link: Share and Archive Guidelines Contact: library@griffith.edu.au • Indirect Submission Process: Researchers cannot publish directly; the university team must manage the submission. • Moderated Update Process: Researchers cannot make changes directly; updates must be requested through the university contact listed. • PID Integration Process - ORCID: It is not possible to add contributors who are not affiliated with Griffith.
James Cook University (JCU)	Repository link: Research Data and Information Management Contact: Contact Library • Moderated Update Process: Researchers cannot make changes directly; updates must be requested through the university contact listed. • External Data Deposit: If the output is stored in a non-JCU repository, the university must be informed and provided with the repository name and resource URL.

	• PID Integration Process - ORCID: It is not possible to add ORCID identifiers directly; however, they can be included in “Related website” and “Related identifier URL”. • PID Integration Process - ROR: It is not possible to add ROR identifiers directly; however, they can be included in “Related website” and “Related identifier URL”.
La Trobe University (LTU)	Repository link: Research Data Finder Contact: repository@latrobe.edu.au • Select correct group: Researchers need to choose the NESP group when submitting to Opal. It is nested under the open data group.
Queensland University of Technology (QUT)	Repository link: Opal – Open Access Resources Contact: researchdatafinder@qut.edu.au • Moderated Update Process: Researchers cannot make changes directly; updates must be requested through the university contact listed.
University of New England (UNE)	Repository link: Research UNE (RUNE) Contact: rune@une.edu.au • Moderated Update Process: Researchers cannot make changes directly; updates must be requested through the university contact listed.
University of Newcastle (UoN)	Repository link: Open Research Newcastle Contact: Support with open research systems Considerations are still being defined. Please contact the Data Wrangler to confirm requirements prior to publishing.
University of Queensland (UQ)	Repository link: Publishing dataset guide Contact: data@library.uq.edu.au • Moderated Update Process: Researchers cannot make changes directly; updates must be requested through the university contact listed. • PID Integration Process - ROR: It is not possible to add ROR identifiers directly; however, they can be included in the “Additional notes” field if other organisations are involved. • PID Integration Process - ORCID: It is not possible to add ORCID for contributors who are not affiliated with the university network; however, names can still be included.
University of Southern Queensland (UniSQ)	Repository link: UniSQ RISE Research Repository Contact: research.repository@unisq.edu.au Considerations are still being defined. Please contact the Data Wrangler to confirm requirements prior to publishing.
University of Tasmania (UTAS)	Repository link: UTAS Research Repository Contact: research.repository@utas.edu.au Considerations are still being defined. Please contact the Data Wrangler to confirm requirements prior to publishing.
University of Western Australia (UWA)	Repository link: UWA Profiles and Research Repository Support Contact information: help-repository@uwa.edu.au • Moderated Update Process: Researchers cannot make changes directly; updates must be requested through the university contact listed.

	• PID Integration Process - ORCID: It is not possible to add contributors who are not affiliated with the university network.
Western Sydney University (WSU)	Repository link: Research Outputs Repository Guidelines Contact: Contact form • No specific considerations regarding upload, update, or PID inclusion.

Table 2: Metadata fields and their description

Field Name	Description of the field
Title	A descriptive title for the output. Helps identify the dataset or product.
Description	Provides context for the output, including its origin, purpose and potential usage. Include any access restrictions here, if applicable.
DOI	Digital Object Identifier, usually generated by the repository.
Collaborators/ Researchers/ People	All contributors to the output, including individuals, organisational units or group authors. Include names and ORCIDs where possible.
Contact person	The person authorised to provide access or respond to enquiries about the output.
Organisation	The organisation affiliated with the output. This field is often prefilled by the repository.
Funding	Information about the project funding.
Restriction/ Visibility	Specifies the output's access level (e.g., open, restricted). If additional access information cannot be included in this field, include it in the description.
Spatial extent (where applicable)	The geographic coverage of the data. May include a shapefile or coordinates delineating the study area.
Temporal coverage	The time range covered by the dataset (e.g., animal records from 1980–2010).
RAiD	Research Activity Identifier. PID that links the output to the project and to the Resilient Landscapes Hub (RLH). There is not yet a specific field for this — see instructions in section 3.3.1 Instructions for the inclusion of RAiD in the metadata.

Table 3: RAiDs for NESP RLH projects

Project Title	RAiD URL
1.1 - Solutions science for resilient landscapes	https://raid.org/10.71613/983725c0
1.2 - Strengthening resilience to threatening processes and extreme events	https://raid.org/10.71613/50b45047
1.3 - Restoring and recovering landscape resilience	https://raid.org/10.71613/7e52bcb2
1.4 - Socioeconomic insights for resilient landscapes	https://raid.org/10.71613/4fdfa241
1.5 - Monitoring resilient landscapes	https://raid.org/10.71613/32d0b221
1.6 - Indigenous knowledge and managing the Indigenous estate	https://raid.org/10.71613/217dac28

1.7 - Cross-cutting initiative research: Threatened and migratory species and threatened ecological communities	https://raid.org/10.71613/5c8afe90
1.8 - Qld threatened lizard survey	https://raid.org/10.71613/a8b04a41
2.1 - Assessing risks to the environment from water-resource development in northern Australia, using north Queensland as a case study	https://raid.org/10.71613/dad7b616
2.2 - Best-practice management of feral cats and red foxes	https://raid.org/10.71613/18ae7426
2.3 - Using integrated data analysis to assess regional transferability	https://raid.org/10.71613/8ca07c4e
2.4 - National overview of monitoring frameworks and tools for Ramsar sites	https://raid.org/10.71613/10c9226b
2.5 - Addressing Kakadu's strategic research needs	https://raid.org/10.71613/96718277
2.6 - Protecting threatened species in safe havens	https://raid.org/10.71613/eb5454cb
2.7 - Research to support the management of priority desert threatened species	https://raid.org/10.71613/65b180be
3.1 - Supporting the strategic management of invasive grasses	https://raid.org/10.71613/3b85d964
3.2 - Planning for catchment resilience and threatened-species recovery from extreme events in the Mary River	https://raid.org/10.71613/6b4f8e78
3.3 - Enhancing the resilience of urban rivers: informing the regional restoration of the Djarlgaroo Beelieer	https://raid.org/10.71613/21c79cbc
3.4 - Guiding the strategic management of freshwater fish	https://raid.org/10.71613/aada5117
3.5 - Ecological and Indigenous values of south-western Australian rivers	https://raid.org/10.71613/28897bde
3.6 - Methods for mapping areas important for biodiversity	https://raid.org/10.71613/4d44fa34
3.7 - Managing and monitoring resilience in Australia's national parks	https://raid.org/10.71613/7f8c9d0d
3.8 - Developing an Indigenous ranger monitoring platform	https://raid.org/10.71613/b47ed545
3.9 - Trialling detection dogs as a novel method for finding threatened reptiles	https://raid.org/10.71613/29ab9752
3.10 - Assessing the impacts of myrtle rust on forest dynamics and function	https://raid.org/10.71613/e5fdac2d
3.11 - Predators in priority places	https://raid.org/10.71613/57f0a024
3.12 - Best-practice fox control in Booderee National Park	https://raid.org/10.71613/f61605c7
3.13 - Supporting Indigenous fire management through collaborative socio-ecological partnerships	https://raid.org/10.71613/b671acac
3.14 - Identifying and creating safer situations for wildlife within large, unfenced landscapes	https://raid.org/10.71613/a176ea50
3.15 - Developing a national Indigenous environmental research network	https://raid.org/10.71613/afb0f7ec
3.16 - Recognising culturally significant entities	https://raid.org/10.71613/83e5b771
3.17 - Improving environmental outcomes on conserved and managed lands	https://raid.org/10.71613/8c7fe77a
3.18 - Enhancing climate-adaptation responses in regional natural resource management planning by incorporating resilience investment	https://raid.org/10.71613/069f639b

3.19 - Climate-resilient landscapes: an adaptation case study in NSW's Northern Rivers region	https://raid.org/10.71613/c576a6f5
3.20 - Ecology and conservation of the Christmas Island giant gecko	https://raid.org/10.71613/64d77f35
3.21 - Ecology and conservation of the Christmas Island goshawk and hawk-owl	https://raid.org/10.71613/9e1b9bd7
3.22 - Rewilding Norfolk: closing management knowledge gaps for faunal restoration on islands	https://raid.org/10.71613/7abb71bd
4.1 - The use and impacts of wet-season burning in tropical savannas	https://raid.org/10.71613/4fbb3466
4.2 - Measuring the impact of changing fire and drought regimes in the Greater Blue Mountains World Heritage Area	https://raid.org/10.71613/d7e9e8f6
4.3 - Improved detection of non-native freshwater fish species in northern Australia	https://raid.org/10.71613/6574b603
4.4 - Improved methods to detect and protect arid-zone groundwater-dependent ecosystems	https://raid.org/10.71613/6ea3cb28
4.5 - Restoration by design: Improving biodiversity outcomes from Australia's restoration investments	https://raid.org/10.71613/2c042f91
4.6 - Managing and monitoring for improved biodiversity outcomes using state-and-transition models	https://raid.org/10.71613/19a9646a
4.7 - Identifying biodiversity and bush-tucker hotspots for targeted management	https://raid.org/10.71613/c14eeca7
4.8 - Assessing fish species composition in the southern Gulf of Carpentaria, and links with cultural knowledge	https://raid.org/10.71613/e89b3198
4.9 - Developing an Indigenous wetland monitoring and management toolkit	https://raid.org/10.71613/bafdc35e
4.10 - What does success look like? Factors resulting in positive outcomes for Landcare and threatened species recovery team projects	https://raid.org/10.71613/cb7edd48
4.11 - Developing a culturally relevant framework for climate adaptation and resilient landscapes	https://raid.org/10.71613/c5d316f0
4.12 - Predicting dangerous heat events for spectacled flying-foxes	https://raid.org/10.71613/9e65429b
4.13 - Contributing to the recovery of threatened species and priority places	https://raid.org/10.71613/003bdaa1
5.1 - Environmental economic accounting - developing and trialling approaches for accounting to ensure respectful inclusion of First Nations knowledges	https://raid.org/10.71613/e39d74c5
5.2 - Adapt Land & Sea – a cross hub biodiversity adaptation knowledge platform	https://raid.org/10.71613/28de5711
5.3 - PeatSense: Improving condition monitoring and management of endangered alpine peatlands in the Australian Alps	https://raid.org/10.71613/6730e064
5.4 - Conservation and recovery actions for rare and threatened Wet Tropics freshwater fish	https://raid.org/10.71613/3bfafb51
5.5 - Enhancing climate resilience of vertebrate communities in the Fitz-Stirlings	https://raid.org/10.71613/60a9ce60
5.6 - Mapping and monitoring persistent pools using remote sensing to support river resilience	https://raid.org/10.71613/86e95be1

5.7 - Understanding the ongoing decline of a threatened arid mesopredator the kowari (<i>Dasyuroides byrnei</i>)	https://raid.org/10.71613/9e71d6b7
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Table 4: RAiD Implementation by Repository

Repository name	Instructions / Notes
Atlas of Living Australia (ALA)	Refer to the instructions below
Charles Darwin University (CDU)	Repository currently cannot accommodate RAiD. Please contact the Data Wrangler to confirm requirements prior to publishing.
Commonwealth Scientific and Industrial Research Organisation (CSIRO)	Refer to the instructions below
Curtin University	Refer to the instructions below
Flinders University	Refer to the instructions below
Griffith University	Refer to the instructions below
James Cook University (JCU)	Refer to the instructions below
La Trobe University (LTU)	Refer to the instructions below
Queensland University of Technology (QUT)	Refer to the instructions below
University of New England (UNE)	Refer to the instructions below
University of Newcastle (UoN)	Repository currently cannot accommodate RAiD. Please contact the Data Wrangler to confirm requirements prior to publishing.
University of Queensland (UQ)	Refer to the instructions below
University of Southern Queensland (Unisq)	Repository currently cannot accommodate RAiD. Please contact the Data Wrangler to confirm requirements prior to publishing.
University of Tasmania (UTAS)	Repository currently cannot accommodate RAiD. Please contact the Data Wrangler to confirm requirements prior to publishing.
University of Western Australia (UWA)	Refer to the instructions below
Western Sydney University (WSU)	Refer to the instructions below

Atlas of Living Australia (ALA)

RAiD implementation

RAiD field	Section: External Identifiers Values: - Source: RAiD - Identifier: RAiD - URL: [RAiD link]
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RAiD instructions

When completing the word document provided by ALA to submit the output:

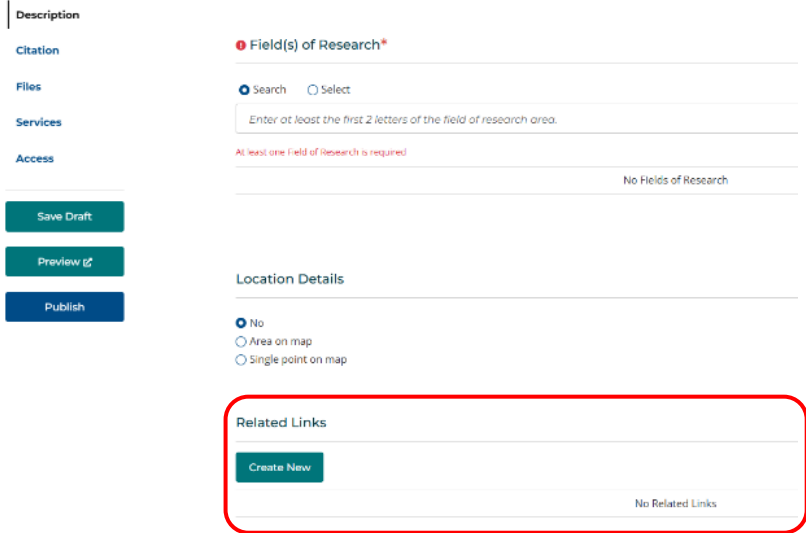
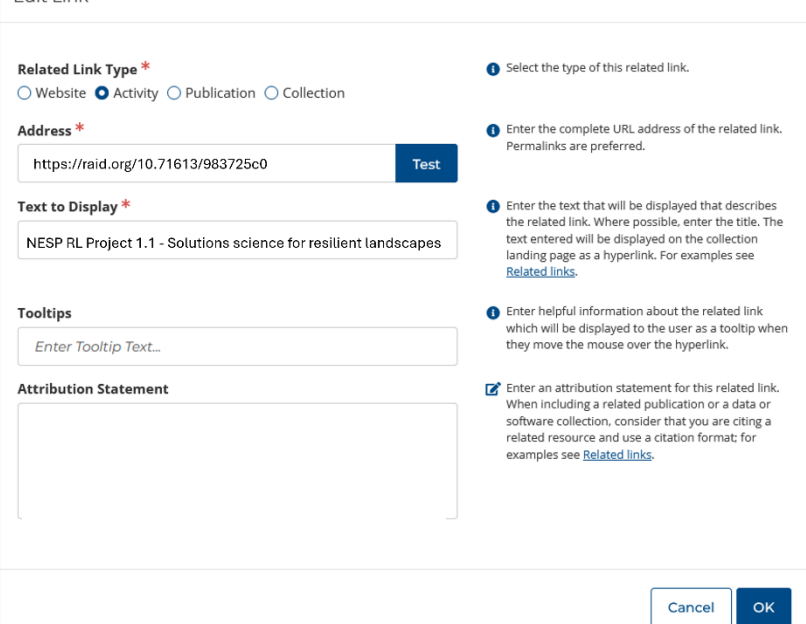
- Go to the bottom of the document to External Identifiers section
- Complete the table as:
 - o In Source and Identifier fields insert the word RAiD
 - o In URL field insert the RAiD link of the project.

External Identifiers (multiple is fine)

Source	Identifier	URL

Commonwealth Scientific and Industrial Research Organisation (CSIRO)

RAiD implementation

RAiD field	Section: Related links > Create New Values: - Address: [RAiD link] - Text to display: [RAiD Title]
RAiD instructions When uploading the output: - Select Description tab - Scroll down to Related Links section - Click the Create New button	 The screenshot shows the 'Create New' interface for a Related Link. On the left, there are tabs for Description, Citation, Files, Services, and Access. Below these are buttons for 'Save Draft', 'Preview', and 'Publish'. The main area is titled 'Field(s) of Research*' and contains a search bar with a 'Search' button and a 'Select' button. Below the search bar is a text input field with the placeholder 'Enter at least the first 2 letters of the field of research area.' and a red error message 'At least one field of research is required'. Below this is a section for 'Location Details' with radio buttons for 'No', 'Area on map', and 'Single point on map'. At the bottom, there is a 'Related Links' section with a 'Create New' button and the text 'No Related Links'.
In the new box that appears: - In Related Link Type select Activity - In Address field insert the RAiD link for the project - In the Text to Display field, copy the title from the RAiD page or enter it using the following format: NESP RL Project <Project ID> - <Project Name>	 The screenshot shows the 'Edit Link' interface. It has a 'Related Link Type' section with radio buttons for 'Website', 'Activity' (selected), 'Publication', and 'Collection'. Below this is an 'Address' field with the text 'https://raid.org/10.71613/983725c0' and a 'Test' button. The 'Text to Display' field contains 'NESP RL Project 1.1 - Solutions science for resilient landscapes'. There is also a 'Tooltips' field with the placeholder 'Enter Tooltip Text...'. At the bottom, there is an 'Attribution Statement' field. On the right side, there are numbered instructions: 1. Select the type of this related link. 2. Enter the complete URL address of the related link. Permalinks are preferred. 3. Enter the text that will be displayed that describes the related link. Where possible, enter the title. The text entered will be displayed on the collection landing page as a hyperlink. For examples see Related links. 4. Enter helpful information about the related link which will be displayed to the user as a tooltip when they move the mouse over the hyperlink. 5. Enter an attribution statement for this related link. When including a related publication or a data or software collection, consider that you are citing a related resource and use a citation format; for examples see Related links. At the bottom right, there are 'Cancel' and 'OK' buttons.

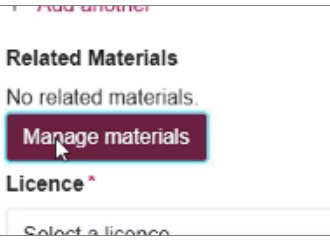
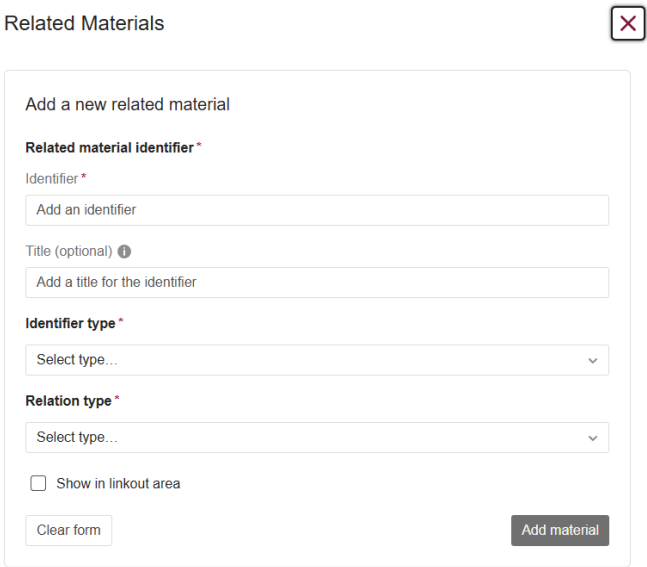
Curtin University

RAiD implementation

RAiD field	Field: "Please give a brief description of how and when this data was created/collected" Values: - Text: "This dataset is related to RAiD: [RAiD link]"
RAiD instructions	
In the submission form:	
- In the field "Please give a brief description of how and when this data was created/collected" - Include the text "This dataset is related to RAiD: [RAiD link]" - With the RAiD link for your project	

Flinders University

RAiD implementation

RAiD field	Section: Related Materials > Manage materials Values: - Identifier: [RAiD link] - Title: [RAiD title] - Identifier type: URL - Related type: is derived from
RAiD instructions	
When uploading the output:	
In the new box that appears:	

Griffith University

RAiD implementation

RAiD field	Section: Related item(s) Value: [RAiD link]
RAiD instructions	
When completing the word document provided by Griffith to submit the output:	
- Scroll to the bottom to the Related item(s) section	
- Insert the RAiD link of the project	

James Cook University (JCU)

RAiD implementation

RAiD field	Tab: Related resources Section: Related metadata Values: - Name: [RAiD title] - URL: [RAiD link] - Notes: RAiD
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RAiD instructions

When uploading the output:

- Select Related resources tab
- Scroll down to Related data section
- In Name field insert the project title from the RAiD page or enter it using the following format:
NESP RL Project <Project ID> - <Project Name>
- In URL field insert the RAiD link of the project
- In Notes field insert the word RAiD.

Publish: Data Publication

Specify related entities that contextualise the data

Related publications

Name: URL: Notes:

Related websites

Name: URL: Notes:

Related metadata e.g., codebooks, standards, schemas, classifications, vocabularies, ontologies

Name: URL: Notes:

Related data

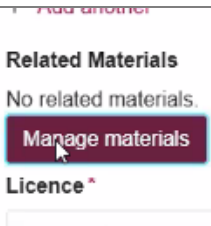
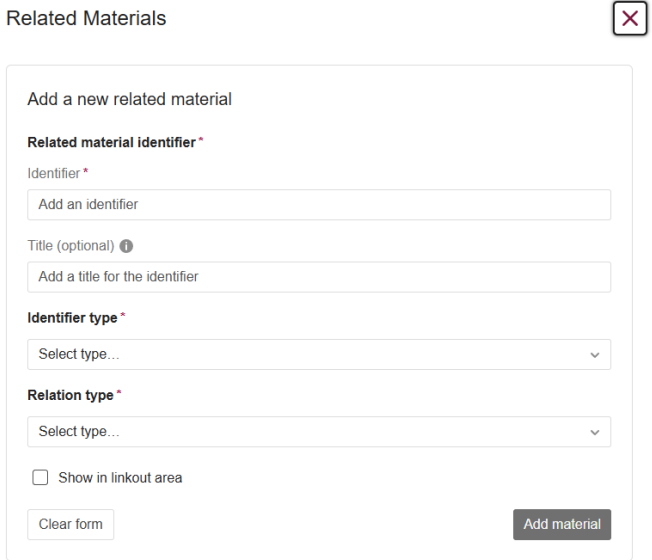
Name: URL: Notes:

Related services

Name: URL: Notes:

La Trobe University (LTU)

RAiD implementation

RAiD field	Section: Related Materials > Manage materials Values: - Identifier: [RAiD link] - Title: [RAiD title] - Identifier type: URL - Related type: is derived from
RAiD instructions	 The screenshot shows the 'Related Materials' section with the text 'No related materials.' and a prominent blue 'Manage materials' button. Below it is a 'Licence' dropdown menu.
In the new box that appears: - In Identifier field insert the RAiD link for the project - In Title field insert the project title from the RAiD page or enter it using the following format: NESP RL Project <Project ID> - <Project Name> - In Identifier type field select URL - In Relation type field select “is derived from”.	 The screenshot shows a form titled 'Add a new related material' with a close button (X) in the top right corner. The form contains the following fields: Related material identifier * - Identifier * (text input with placeholder 'Add an identifier') - Title (optional) ⓘ (text input with placeholder 'Add a title for the identifier') Identifier type * (dropdown menu with 'Select type...' option) Relation type * (dropdown menu with 'Select type...' option) ☐ Show in linkout area - Clear form button - Add material button

Queensland University of Technology (QUT)

RAiD implementation

RAiD field	Field: Related Information Values: - Link: [RAiD link] - Text to display: RAiD
RAiD instructions When uploading the output: - Scroll down to 13.Related information section - In Link field insert the RAiD link of the project - In Text to display field insert the word RAiD.	
13. Related information + Link: Text to display: Submit QUT Guidance Provide links to any related information e.g. online news article, industry partner website, collaborators' website, publications (use 'Publications' field for publications listed in QUT ePrints or elsewhere), data dictionaries, methodology, software or software configuration, models, workflows, etc.	

University of New England (UNE)

RAiD implementation

RAiD field	Field: Other Link Values: - Other Link: [RAiD link]
RAiD instructions When uploading the output: - Scroll down to Other Link section - In Other Link field insert the RAiD link of the project	
Other Link Publisher/Associated Link ▾ Other Link  Enter any other associated links for this research output. For example, a link to the publisher's website or a direct link to the research output, where a DOI does not exist. + Add more	

University of Queensland (UQ)

RAiD implementation

RAiD field	From UQRDM to eSpace Section: Dataset details Values: - Additional notes to be added to the metadata: [RAiD link] Inserting manually in eSpace Section: Additional information Values: - Additional information: [RAiD link]
RAiD instructions	Publish your dataset 1 Dataset details 2 Dataset contact and creators 3 Folder selection 4 Access Dataset details Please provide public metadata to accompany your dataset on UQ eSpace. Comprehensive metadata is required for discovery, access and reuse of the dataset being described. Select metadata from your UQRDM project record to ensure accuracy and completeness. Any edits or additions to the information below will not replace the existing information. Project name * UQRDM training Project description * This record is used for UQRDM training, where demonstration and exercises will be conducted, training record and shared. We would like to invite as many librarians or any library staff who needs to practice. There is one storage allocation set up at the start of this project, for everyone to store any project related data more storage allocation can be set up but for best practice data management, there should be a group discussion and document the decision here. Dataset name * Dataset description * 0 of 500 required minimum characters Field of research codes * 3102 - Bioinformatics and computational biology Begin typing a field of research code to search Type of data Related eSpace publications and datasets Additional notes to be added to the metadata
When inserting data manually in eSpace: - Scroll down to Notes section - In Additional notes field insert the RAiD link of the project	Notes Additional notes Additional notes (public) B I U A Internal notes

University of Western Australia (UWA)

RAiD implementation

RAiD field	Section: Links > Add Link Values: - Web address (URL): [RAiD link]
RAiD instructions	When uploading the output: Scroll down to the Links section and click Add link. In the new box that appears: - Paste the RAiD link for the project into the Web address (URL) field. - Leave Text to display field and Description field empty. - Under Link type, select RAiD. Links Add link... Edit link Link information Web address (URL) * https://raid.org/10.71613/dad7b616 Example: www.example.com or http://www.example.com Text to display Description Link type RAiD Cancel Update

Western Sydney University (WSU)

RAiD implementation

RAiD field

Section: Supplements > Related website

Values:

- Name: RAiD
- URI: [RAiD link]

RAiD instructions

When uploading the output:

- Select Supplements tab
- Scroll down to Related website section
- In Name field insert the word RAiD
- In URI field insert the RAiD link of the project

[Start](#)
[Specify coverage](#)
[Select data](#)
[Supplements](#)
[License](#)
[Citation](#)
[Submit](#)
[Reviewer](#)
[Permissions](#)

Specify related entities that contextualise the data

Related publications

NameDifferent mycorrhizal fungal commiURIhttps://doi.org/10.1016/j.rhisph.20Notes

Related website

NameURINotes

Related metadata (including standards, codebooks, vocabularies, thesauri, ontologies)

NameURINotes



4 Contact information

Role (in NESP context)	Contact information
Hub Leader	Michael Douglas michael.douglas@uwa.gov.au 0408 467 000
Senior Indigenous Facilitator & Deputy Hub Leader	Stephen van Leeuwen stephen.vanleeuwen@curtin.edu.au 0429 105 140
Senior Coordinator / Data Wrangler	Aline Andrade aline.desouzaandrade@uwa.edu.au
Communication Manager	Aleta Johnston aleta.johnston@uwa.edu.au
Admin team	nesp-rlh-admin@uwa.edu.au

5 Related materials

Below are key resources that provide further information on:

FAIR

- [FAIR Data Webinar Playlist \(YouTube\)](#)
- [ARDC FAIR Resource Hub](#)
- [FAIR Data Self-Assessment Tool](#): an online tool to help assess whether data meets FAIR standards. It provides explanations and scores for each step.

CARE

- [IDN Metadata Entry Form](#): developed by the Indigenous Data Network, this tool helps assess whether data aligns with FAIR and CARE principles and identifies areas for improvement.
- [Accelerate Your HASS and Indigenous Research – ARDC](#): a collection of tools to support Humanities, Arts, Social Sciences and Indigenous research.

Persistent Identifiers (PIDs)

- [Australian National Persistent Identifier \(PID\) Strategy 2024](#)

Metadata

- [Metadata Validator Tool](#): validates XML files against metadata standards.
- [ARDC Metadata Guide](#)

National Environmental Science Program

- [Data and information guidelines](#)

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