New Zealand Organisms Register

Supporting the Business Case

Prepared By	Aaron Wilton and Christine Harper Landcare Research
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NZOR
New Zealand Organisms Register

1 Purpose

We are seeking the investment of $308k per annum for 3 years to further develop and maintain the New Zealand Organisms Register (NZOR) as an essential national infrastructure for New Zealand.

NZOR is critical to effective operational, regulatory and policy decision making for biosecurity, new organisms regulation and operations, conservation and environmental management.

This paper aims to support the development of an internal business case for future funding for NZOR by each of the collaborating government agencies.

2 Overview

- NZOR is a collaboration which provides a common, national point of access to scientific names and key taxonomic data.
- NZOR provides important benefits to users in that it provides nationally consistent, traceable, defensible and up-to-date information on taxa present in New Zealand, as well as those most likely to cause risk if they arrive. NZOR provides authoritative, standards-based online taxonomic names and information in a format that is searchable and downloadable. It is designed to remove the significant duplication and cost associated with *independently* updating the various databases of species and species names used by the New Zealand government sector by providing regular (potentially daily) automatic updates, while still enabling each in-house database to reflect specific information needs and modifications.
- Importantly, NZOR is 'federated' which means taxonomic information is harvested, and shared, from a number of contributing sources. This is an important design feature: It means that all authoritative sources of information can be drawn upon for use in a 'national one stop shop' approach, but it also offers important risk mitigation benefits in that NZ's biosecurity and new organisms operations (in particular) are not dependent on a single system – there are therefore no key failure points. Even if NZOR 'goes down', the contributing authoritative sources remain usable, and as up-to-date as the time of the last NZOR automatic update.
- NZOR is currently hosted by Landcare Research on behalf of the original collaborating agencies. Investment in the development and maintenance of NZOR was provided by the original collaborating agencies. However, this ceased once the original contract ended, although some investment was continued by Landcare Research until 2015, and one year's funding has been provided in 2015/16 as an interim measure until a longer-term solution can be found.
- Financial support is required to develop and maintain the core NZOR service to meet current and future operational needs for biosecurity and new organisms regulation and operations, conservation and environmental management. While to date NZOR has been 'populated' with taxonomic names and data primarily from Landcare Research's Collections (with a subsequent focus on land-based plant species), NZOR is able to work with any taxonomic names and information across the marine,freshwater and land domains.

- This document provides high-level material to support the development of individual agency business cases to sustain and further develop NZOR infrastructure. Should future funding be secured, it has been agreed that newgovernance arrangements will be put in place to reflect the need of funding agencies to ensure NZOR meets national priorities, and the new funding will begoverned by a new MOU setting out the roles, responsibilities and expectations of each contributing party.

3 Introduction

- Scientific names are the index to all biological information. They provide the essential entry point for accessing and communicating data about our living world. However, scientific names are subject to change as knowledge of taxa (from kingdom through to species and below), and their relationships to one another, improves through research.
- Access to an authoritative source of scientific names (and associated information) is therefore an essential resource, not only to accurately access, manage and retreeve information about New Zealand species, but also to accurately interpret this information for real-world decision-making.
- The need for authoritative and efficiently organised information on species will only increase as New Zealand gains access to more and more biological data made available by the drive towards open data, and as biosecurity risk and conservation priorities grow in urgencyand importance. This includes important decisions on whether organisms are new in New Zealand, or not.

3.1 Background

- In 2005 a workshop of key NZ stakeholders identified the need, and developed a vision, for a shared catalogue of taxonomic names. (https://www.biodiversity.govt.nz/pdfs/TFBIS_Taxonomic_Names_Workshop_Report_for_SSC.pdf)

- A scoping study was undertaken with TFBIS funding in 2007 (https://www.biodiversity.govt.nz/pdfs/NZOR_scope.pdf) resulting in a project to develop a platform with support of TFBIS funding from 2009 to 2012. The TFBIS funded project developed the technical infrastructure and a governance structure that reflected the joint ownership and collaborative nature of NZOR.

- In December 2015 stakeholders recognised the need to help maintain NZOR, and funding has been contributed by MPI, MfE and DOC until June 2016 to enable deferred maintenance activity to be undertaken.

- Stakeholders have recognised the role of NZOR and support the need for a long term funding solution. (Steering Group meeting March 2016)

- A MOU for the ongoing development and maintenance of NZOR is currently being discussed by existing stakeholders.

- The NZOR platform provides an infrastructure to aggregate and integrate scientific and taxonomic data. It provides
    - a single point of authority for scientific names for NZ
    - access to scientific and vernacular names, synonymies, biostatus (i.e., origin and occurrence information) and the literature associated with these data.
    - data services that enable consumers to download and intergrate the data and information systems
- NZOR is a collaboration between Consumers – those needing the information – and Providers – those generating and managing the information, focussing on the operational needs of the consumers. .

Vision for NZOR

"An accurate, authoritative, complete and continuously updated catalogue of taxonomic names of all New Zealand biota and other taxa of importance to the New Zealand community. This catalogue will be electronically available through one or more portals, and will be directly integrated into biodiversity and biosecurity systems used by central government ministries, departments, and agencies, local government, research institutes, NGOs and the wider community.

The catalogue will be maintained by experts in each taxonomic group, and quality will be controlled through a formal peer review process. The catalogue will be based on internationally agreed standards and will include full consensus, alternate and historical synonymy and will link to information from other sources on aspects such as threats, ecology, distribution, use, biostatus, published material, keys for identification, and all collections, observation and survey data. The lists will contain all names irrespective of taxonomic status and will provide rankings of reliability including transparent access to provenance of data, and the ability to filter by quality and currency."

Anon (2005) Taxonomic Names and Associated Databases.

4 Strategic Case for NZOR

4.1 Strategic Context

- New Zealand's economy is built on the success of its primary industries which are largely biologically based – the production of food and fibre for export and domestic markets. New Zealand, through government agencies and industry sector bodies, seeks to reduce the risk to

those industries and to export markets for primary products through strategic planning and co-operation (Foot and Mouth / GIA's)

- New Zealand is recognised as a global biodiversity hot spot with significant numbers and variety of unique indigenous species and high numbers of species under threat of extinction.
- Reliance on the natural environment and reputation for environmental stewardship contributes to the success of New Zealand's developing tourism industry.
- The consequences of biosecurity decision-making at the border and across the landscape are critical to New Zealand's productive economy and reputation. Access to authoritative and up-to-date information sources is essential for effective decision-making where knowledge changes rapidly and the complexity and range of threats continues to increase.
- A number of government, research and industry organisations share responsibilities for the delivery of biosecurity and conservation (biodiversity) outcomes, including the development and funding of underpinning science and infrastructure. Cross-government initiatives (such as the NRS Directors Information Group) are becoming well organised and have a good understanding of joint priorities, but lack the mandate to provide direct funding for infrastructure required by the whole sector.
- New Zealand is a signatory to a number of multilateral agreements (such as IPBES and CBD) and organisations (such as GBIF) which create international obligations around biodiversity management.
- The Royal Society of New Zealand recently reported on "The National Taxonomic Collections in New Zealand" (ref?) and recommended *"...that a whole-of-systems approach must be taken to interconnect providers, custodians, practitioners, stakeholders, and end-users"* . The report endorsed the establishment of a federated bio-data infrastructure in which NZOR plays a key integrating role.

4.2 The Need for Investment in NZOR

- There is a need for high quality and consistent data management and sharing of biological data (including taxonomic data) to meet operational, policy, regulatory and research needs. Many of these needs are time-sensitive – for example, understanding the risk of potential new taxa found either at the border, or in the country.
- A number of agencies are duplicating effort to manage and update taxonomic information they hold- sometimes with multiple systems within one agency. Multiple systems are not synchronised across New Zealand at present, and this can lead to conflicting information and advice. An authoritative, 'one stop shop' access point to species information for New Zealand is urgently needed to reducecost, and ensure more effective decision-making for biosecurity, new organisms, conservation and resource management outcomes.

- Expertise in taxonomy and nomenclature is a specialist skill that is dispersed among several organisations. NZOR provides a single access point to information these specialists create and manage.

- International taxonomy initiatives, while important, unfortunately do not cover NZ taxa adequately. Nor do they offer the level of accuracy or integration of New Zealand-specific information that is needed. They also lack the potential to adapt information and database format to meet the critical information needs of key operational agencies in New Zealand. NZOR does provide these abilities.

- The "ownership" of NZOR infrastructure is also shared; no single agency has to own or fund NZOR to secure the important public good benefits NZOR provides across the New Zealand government system. NZOR provides a cost-effective way of ensuring that everyone has access to the information that is needed without each agency having to fund this alone.

4.3 Stakeholders in NZOR

The objective of this document is to make the case for medium-term, stable funding to sustain NZOR as a functional,operational tool for New Zealand agencies to use, and continue to develop the NZOR system for benefit of all.

Key current and potential users of NZOR (and their primary uses) are listed below-

- MPI- biosecurity [as lead agency in the New Zealand biosecurity system]
- DOC- conservation, land management, environmental reporting
- Regional Councils – biosecurity, land management, conservation and environmental reporting
- EPA/HSNO – new organism approvals and environmental protection
- MfE / StatsNZ – State of the Environment reporting
- The science sector which relies on taxonomic information for research and problem-solving, including across all biologically-based National Science Challenges
- Te Papa and other museums – research and public education
- Infrastructure and Economic Development - RMA consenting processes, impact assessments and other resource management processes.

Other secondary beneficiaries include:

- Education
- Maori
- Citizen science (e.g., NatureWatch)

Current and future key data providers for NZOR are:

- Landcare Research (current provider, dynamic data set)
- NIWA (current provider, static data set)
- Te Papa and other museums (future provider)
- International registers (e.g. Index Fungorum)
- Ministry for Primary Industries

5 The Economic Case for NZOR

- A single instance of a biosecurity incursion more rapidly identified and managed, or market access approved for agricultural produce would prove the value of NZOR at a national level. NZOR as an integrated part of the biosecurity and market access systems is unlikely to be the "hero" in the outcome, but none-the-less will have played a critical underpinning role.
- Costs in the system which would be reduced with NZOR are difficult to quantify or aggregate across organisations. Most significantly, however, NZOR will reduce:-
  - Staff time / resources spent on multiple database management
  - Staff time in searching multiple data-bases and seeking clarification where information is contradictory
- For example: DOC report that the use of NZOR has already reduced cost and improved quality of information in their Species Threat Classification process.
- A key argument for the economic benefit of NZOR can be made from avoided costs – the costs of incursion response; weed, pest and disease management if the species establishes in New Zealand and cannot be eradicated; the cost on tourism and primary production of incursions (particularly those with high reputational impact, such as foot and mouth disease or similar). In addition, the avoided costs of market access closures (and the costs of having to reopen such markets) are significant but only quantifiable through examples of where costs have not been able to be avoided.

5.1 What are the options?

1. Status Quo (do nothing). NZOR will cease to function and agencies / end-users will rely on their own taxonomic resources, continue to duplicate efforts and create potentially dangerous ambiguity.
2. Sustain and Develop NZOR. NZOR will expand its data feeds to meet operational needs of the clients, comply with data standards. Governance will steer the priorities and direction of development.

3. International alternatives: NZOR is an innovative concept designed to meet NZ needs. There are currently no other examples of similar approaches taken in other countries. However there are other initiatives that may be of benefit to NZOR in the future, and engagement with these (e.g., under option 2) is recommended.

A commercial off-the-shelf solution for the delivery and maintenance of NZOR is not available in New Zealand, and if it were, it would be unlikely to meet user requirements.

Summary of Risks / Costs and Benefits

Option	Outcome	Risks / Costs	Potential Benefits
1	**Without a functional NZOR** **(Status Quo)**	Ambiguity of data - data is not up to date; data is not readily shared or updated among agencies. Investigations / decisions take longer and opportunities for fast response are lost Each agency investing in systems to cover all circumstances. If individual agency system 'goes down' it may be difficult to access an appropriate back up. Costs high across the NZ system – each agency is potentially duplicating activity to update data.	As per current arrangements.
2	**With a fully functional NZOR**	Each agency investing in core purpose systems and in shared infrastructure. But as costs are shared for NZOR, cost/benefit ratio improves from the status quo.	Data is up to date; data readily accessible, readily shared and updated automatically on a regular basis. Agencies can 'tailor' their own version of the data as needed. Agencies can rely on shared infrastructure rather than own systems. Gaps in national data arenow clear and prioritisation decisions can be made. Reduction in time for operational decisions / investigations, etc. Support and recognition of underpinning research(ers).

5.2 What needs to be funded and how?

To sustain NZOR at a level where it delivers on its promise to the stakeholding organisations the following on-going activities are required.

- Governance*
- Content management
    - Data content
        - NZOR generated content
        - Management of content by NZ Provider*
        - International sources
    - Management of provision mechanisms, quality control and automation
- NZOR Platform
    - Maintenance and support of core infrastructure
    - Periodic Review to ensure technical and strategic alignment
    - Enhancement and extension of functionality to meet operational needs
- Adoption
    - Institutional integration with NZOR**

*The collaborative approach suggests that governance and NZ provision of data content can largely be in-kind contributions from stakeholder organisations.

** Specific adoption and integration projects should be funded separately by the sponsoring organisation.

Opportunities to secure additional research funding through MBIE funding rounds, National Science Challenges or international opportunities and platforms (such as GBIF) will continue to be sought.

6. Implementation of NZOR

A Steering Group for NZOR was established throughout the development project phases and this group has committed to continue and develop this role as NZOR transitions to an operational phase. Participation in the Steering Group may change as new needs arise, but the core involvement of MPI, MfE, EPA, DoC and Regional councils, as key consumers, is secure.

Landcare Research has a track record in the establishment and delivery of innovative platforms for biological data sharing, dissemination and integration. Landcare Research led the development of NZOR and are active in taxonomic research and data management and biodiversity data standards.

- Biological data and services that deliver that data (NZOR etc) to government and other end-users largely serve the public good. Landcare Research is a leading proponent of open data and supporter of NZGOAL..

Indicative Costs

NZOR Costs	Indicative Costs	Source of funding
Core		
• Governance	(not estimated)	In kind
• Project Management	$20k	Requested
• NZOR data content	$108k	Requested
• NZOR platform (including IT environment)	$107k	Requested
• User Support	$23k	Requested
• Continuous improvement	$50K	Requested
As required		
• Register new data sources	$15-44K per source	Requested
• User Integration*	(not estimated)	In kind
Provider data management	(not estimated)	In kind

We note that toward the end of the 3 year period for which funding is requested, a strategic review would need to be undertaken to assess performance, delivery and benefits of the second phase of NZOR. The expectation is that all contributing parties, including Landcare Research, would share the costs of the review process.We also note that at this point an assessment of any technology upgrades would also need to be assessed for NZOR, and potentially also for contributing agencies for their own contributing information sources/databases.

We note that the table above does not include the cost of any user engagement and/or promotional activities; international standards development, or the strategic review mentioned above.

* User integration includes any activity by the consuming agency to enable integration with NZOR. These may range for data quality and cleansing activities through to changes in the agencies information system. This business case does not address these changes.