Terrestrial and Freshwater Biodiversity Information System (TFBIS) Programme
Application for Funding
Application Form 1 – Projects under $80,000

PART 1: APPLICANT DETAILS	
Project Leader *Please enclose a current C.V.*	CV attached (Appendix 1)
Full Name	Aaron Wilton – **on behalf of the New Zealand National Herbarium Network**
Designation	Herbarium Information System Committee (HISCOM) Chair of the Council of Heads of Australasian Herbaria (CHAH); representative of the New Zealand National Herbarium Network (NZNHN) on HISCOM
Agency/Organisation	Landcare Research
Postal Address	PO BOX 69040, Lincoln
Physical Address	Gerald St, Lincoln
Phone- DDI	(03) 321 9838
Phone – Cell	(021) 689 315
Email	wiltona@landcareresearch.co.nz
Manager of Project Leader	
Full Name	**Ilse Breitwieser**
Designation	• Science Portfolio Leader, Defining Land Biota • Executive member of CHAH; representative of the New Zealand National Herbarium Network (NZNHN) on CHAH
Phone	(03) 321 9621
Email	breitwieseri@landcareresearch.co.nz
Organisation website	www.landcareresearch.co.nz

PART 2: SUMMARY OF PROJECT DETAILS	
Project Title	**Improving the quality of data in the NZVH**
Synopsis of Project (max 100 words)	The New Zealand Virtual Herbarium (NZVH) provides users with access to data from c. 750,000 collections in 11 herbaria. However, about 10% of records contain errors, and this project will significantly improve data quality.
	The project will use the NZVH cache to detect and report data quality issues to data custodians (20% of project). Herbaria will correct their own data, and improved data will be available to the NZVH following subsequent uploads (80%).
	Data quality issues to be addressed include data not complying with data standards (e.g. data entry errors), and georeference inaccuracies (e.g. land-based records plotting in the sea).

Total Amount Requested (GST excl.)	$79,000 ex GST

Anticipated Start and Completion Dates	
Start Date	1 July 2013
Completion Date	30 May 2014

PART 3: ***TFBIS STRATEGY GOAL AND ACTION AREA***		
Please indicate which Action Areas in the TFBIS Strategy[1] this project contributes to and explain how the project will contribute to these.		
Goal	*Action Area*	*Describe how the project will contribute to each Action Area*
1	**1.3 Develop and propagate standards for data storage, curation and exchange**	- The first step of the project will be to identify data in the NZVH cache that have incorrect geocodes or are not complying with data standards - The second step will be to inform data custodians of the errors or non-compliant data, and for them to improve - the quality of data stored in their herbaria, and - the ability to provide data that semantically match data standards.
2		
3	**3.1 Expose existing data and information sources for improved access**	- The project will improve the quality of data presented through NZVH, and permit improved access. Correct data are more likely to be discovered and be applicable to the user's search criteria. - High quality data that conform with standards will make data interpretation and analysis easier.

Of the TFBIS Strategy Goals (1-5), which goal do you feel is the most significant/relevant for your project?	**3**

PART 4A: ***PROJECT OUTPUT[2]***	
What is the end product of this project? Including	Improved reliability and accuracy of specimen data that are accessed through the NZVH or combined 'Australasian Virtual Herbarium '(ANZVH).

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[1]The TFBIS Strategy document is available here. The Goals and Action Areas are listed on Page 26.
[2] **All TFBIS Programme projects are required to be publicly and freely available**, except where reasons preclude this as specified in Government policies and legislation. Any proposal that does not provide for open access to data and information/products should be discussed with the Programme Manager prior to submitting an application.

(a) what is the format? *(b) what organisation will host the output?*	• The NZVH is currently hosted by Landcare Research; however, it has been agreed by the Council of Heads of Australasian Herbaria (CHAH) and the NZNHN that the Australian Virtual Herbarium (AVH) and NZVH need to be amalgamated. When that occurs, the NZVH data will continue to be harvested by Landcare Research, and then uploaded to the Atlas of Living Australia (ALA) for presentation in the 'Australasian' VH.
How does the product or service of this project link with other data systems and how complimentary are they?	• The integration of the NZVH with the AVH to form ANZVH will address many nomenclatural data issues through integration with the New Zealand Organism Register (NZOR). • NZNHN intends that NZVH data will be accessible to other networks such as GBIF. • The project will improve data quality of specimen data information that will be available for a potential wider NZ biodiversity information infrastructure.
If possible describe the way the project fits in with other sector priority setting processes and reflects those priorities.	**NZ Biodiversity Strategy** **Objective 9.5 Share Information and best practice** a) Develop resources and systems that promote the consolidation and sharing of information about indigenous biodiversity and hands-on biodiversity management. **Objective 1.1 Protecting indigenous habitats and ecosystems** g) Develop and strengthen information systems to increase access by local authorities, iwi and hapū, sector groups, communities and landowners to indigenous biodiversity survey and ecosystem data and information about indigenous biodiversity management priorities and protection mechanisms. **Objective 4.1 Conservation of New Zealand's genetic resources** a) Develop a collaborative strategy to manage New Zealand's genetic resources (from both introduced and indigenous species) iii) managing information about collections of genetic resources. **Objective 8.1 Community awareness and involvement** a) Make information about biodiversity available to people and communities, relevant to their local environments (that is, on the extent and management needs of ecosystems, habitats and native species), to enable them to make decisions and take action to support the conservation and sustainable use of biodiversity. This project will strengthen the coordinated approach that started with the development of the NZVH to improve quality of herbarium specimen data.
Which data collection,	• NZVH data exchange and storage are based on

storage and/or exchange standards will be used?	ABCD/HISPID5 and Darwin Core standards.

PART 4B: ***BENEFITS OF PROJECT***	
Describe what user groups will use the output of your project (include the approx. size of the group)	*Explain the difference it will make to that group including (a) how will their work be effected and (b) how often they will use it.*
	Herbarium data are used for a wide range of biodiversity and biosecurity management projects, as well as for research and other tasks carried out by many different end-users. However, end-users currently have two concerns: that not all specimens of NZ herbaria are databased and that there are quite a number of specimens with potential data errors. This project deals with the latter because potential data errors can be detected and reported most efficiently by analysing the combined dataset, rather than repeating this independently for each herbarium. Twenty percent of the funding will be used centrally to identify errors or non-compliant data, and 80% by individual herbaria for correcting the errors.
Group 1 biodiversity and biosecurity managers and scientists	Improving the quality of the data will enable end-users to
	1) find records that correctly match their search criteria;
	2) have increased confidence in the quality of the data for decision-making processes and research;
	3) have access to an increased number of usable records by converting erroneous records (e.g. land-based records appearing in the sea) into accurate plots.

Note: *You are required to identify two potential users who should complete and forward the 'Independent Supporters Form' direct to TFBIS@doc.govt.nz.*
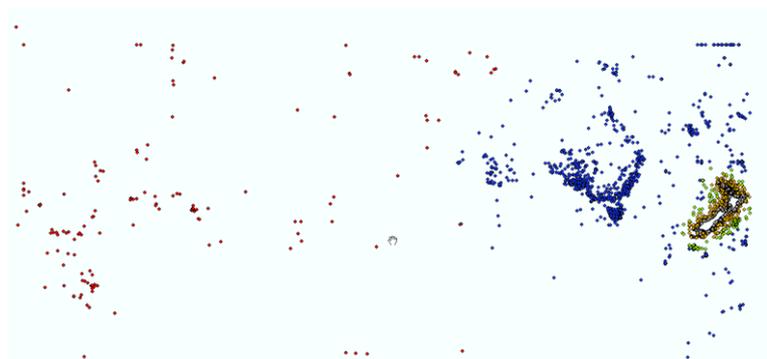
PART 4C: ***USER NEEDS AND PUBLICITY***	
What consultation/ preparatory work has already been completed?	Some preliminary analyses have been done on part of the data to determine potential quality issues that may have to be addressed. An example is provided below from the NZVH cache. This shows records with the value 'New Zealand' in the country field, but that fall outside the New Zealand coastline when they are mapped. This may result from incorrect coding of the country or errors in georeferencing.

	Figure 1: 'New Zealand' records from the NZVH that fall outside the New Zealand coastline (only part of Southern Hemisphere depicted)
How will you consult with and ensure involvement with end users throughout the project?	N/A
How will you ensure people know about the project output on completion of the project including communications, marketing, promotion and awareness-raising for new systems?	• Press release by NZNHN (distributed by member organisations) • If the related TFBIS application for funding to amalgamate the NZVH into the AVH is successful, there is functionality within the AVH system to create a 'news' item on the portal • Notification to general users through Te Papa's blog site and popular publications
Will your user groups need training? How will you provide this?	No

PART 4D: *RISKS*	
Outcome Risk	None identified
Operational Risk	Low – multi-agency project inherently containing an element of risk. However, all herbaria made commitments to meet time frames, and other obligations, prior to submission of this proposal
Adverse Effects	None identified
Socio-Political Risk	None identified
Legal Risk	None identified

PART 4E: *PROJECT MEASUREMENT*	
How will you measure the success of your project upon completion?	The participating herbaria are able to improve the quality of data they curate, and provide these data to the NZVH.
What will be the output/outcome 'new environment' that will illustrate that your project has achieved its aims?	The NZVH will make higher quality data accessible to end-users.

PART 4F: *LONG TERM SUSTAINABILITY/ONGOING MAINTENANCE*	
What are the expected	Nil

ongoing maintenance costs for the project?	
What organisation will be responsible for the ongoing maintenance costs and how will these be met?	N/A This project deliberately requires data to be updated in the individual custodial systems; these systems are maintained as core business by each of the herbaria.
Who is responsible for the governance once the TFBIS project is completed? Who will be the custodian of the end product?	N/A Data are the responsibility of the participating organisations; however, the NZVH is overseen by the NZNHN, to which all contributing herbaria belong.
How will the issue of data storage, safe-keeping, backup and security be addressed?	N/A Data are the responsibility of the participating organisations.
How will you obtain and respond to ongoing feedback and input from the targeted user groups?	Feedback from end-users on data quality issues is encouraged. Herbaria will continue to respond to these issues as their funding permits.

PART 5: *PROJECT IMPLEMENTATION*

Briefly describe how this project will be carried out.	1. Data in the NZVH Cache will be analysed to detect data quality issues. These will include:
	
	   a. Data not complying with data standards (e.g. data entered into, or provided in, incorrect fields)
	
	   b. Records with georeference data that fall outside the coastline
	
	   c. Records with georeference data that fall inside the coastline, but where there is a discrepancy between a stated geographic region (e.g. ecological district or province) and the region provided, by classifying the georeference point with a GIS.
	
	2. The results of these analyses will be provided to each herbarium.
	
	3. Herbaria will check and correct the data as necessary within their institutional systems then provide an update to the NZVH.
	
	It is expected that the analysis will form c. 20% of the work for the project, with the majority of the work (c. 80%) being spent in updating the data. We expect to distribute the funding for updating the data according to the number of records contributed by each herbarium (see table below).
	
	<table><tr><th>Herbarium</th><th>% of total funding</th></tr><tr><td>AK</td><td>23</td></tr><tr><td>CANU</td><td>2</td></tr><tr><td>CHR</td><td>21</td></tr></table>

	LINC	1
	MPN	2
	NZFRI	2
	OTA	1
	PDD	8
	UNITEC	1
	WAIK	1
	WELT	18
	TOTAL	**80**

Who are the key team members, their organisation and position, their role in the project and a brief description of their relevant qualifications and experience?	• Aaron Wilton (Landcare Research, Biodiversity Informatics) – undertake outlier analysis; provide advice to herbaria to resolve data quality issues • Ilse Breitwieser, Landcare Research, Portfolio Leader Defining Land Biota, member of CHAH executive and NZNHN governance group: Project Sponsor. Ilse Breitwieser has led Landcare Research plant systematics and the Defining Land Biota OBI (now Defining Land Biota portfolio) since 1995. • Philip Edgar (Te Papa) – provide advice to herbaria to resolve data quality issues

Please identify the main milestones in implementing this project. You should identify at least one milestone per payment and give the expected timing for these.	**Milestone[3]**	**Expected time from start in months**	**Suggested payment**
	Milestone 1: Signing of contract	0	$25,000
	Milestone 2: Reports distributed to herbaria	1	$15,000
	Milestone 3: Updated data loaded into NZVH	10	$25,000
	Milestone 4: Completion of project and submission of Final Report	11	$14,000

PART 6: SUMMARY OF FUNDING REQUESTED AND OTHER CONTRIBUTIONS				
	TFBIS Programme Funding Requested ($000 GST excl.)			
	YEAR 1	**YEAR 2**	**YEAR 3**	**TOTAL**
Personnel (wages/salaries)	79			79
Rental and Leasing of Equipment and Space				
Consultants and Contractors				
Purchase of Equipment				

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[3] *These milestones and payments will be used to guide the preparation of the contract in the case of successful applications. However, they can be changed in contract negotiations and it is not guaranteed that payments can/will be made as requested. Payments are made on completion of the relevant milestones and submissions of a progress report.*

(including hardware and software)				
Travel and Accommodation				
Financial/Legal Expenses				
Training, such as production of system manuals and documentation to workshops and in person training sessions				
Promotion and Awareness				
Feedback				
Dissemination Costs				
Other 1 (specify)				
Other 2 (specify)				
TOTAL TFBIS funding	79			79

Comment on any potential for competitive tendering on any of the items listed above.	Nil

	Other Contributions Pledged			
	($000 GST excl.)			
	YEAR 1	YEAR 2	YEAR 3	TOTAL
Cash Contributions (list both organisation and amount)				
In Kind Contributions (list both organisation and amount)	See below			
TOTAL Other Contributions				

Note any conditions made to be able to access these other contributions	
What other funding opportunities have been investigated – comment on why your organisation cannot fund the project.	Herbaria will correct data as encountered but they don't have existing funding to systematically search for incorrect data.

PART 7: INDEPENDENT SUPPORTERS

Provide the details of two independent supporters of your project. They are to complete the 'Independent Supporters Form' available on our website and at the end of this application form.

Independent Supporter 1	
Full Name	Dr Tim Martin
Designation	Senior Ecologist
Agency/Organisation	Wildland Consultants
Postal Address	PO Box 46 299, Herne Bay, Auckland 1011, New Zealand
Phone	0508 945 369 Extn 321; Mobile: 021 443 336
Email	tim.martin@wildlands.co.nz
Involvement in the project, i.e. end-user, collaborator, will be/is part of the user group	End-user

Independent Supporter 2	
Full Name	Carol West
Designation	Manager Terrestrial Ecosystems
Agency/Organisation	Department of Conservation
Postal Address	PO Box 10 420, Wellington 6143
Phone	(04) 471 3258
Email	cwest@doc.govt.nz
Involvement in the project, i.e. end-user, collaborator, will be/is part of the user group	End-user

Independent Supporter 3	
Full Name	Geoff Ridley
Designation	Principal Scientist / Biology
Agency/Organisation	Environmental Protection Authority
Postal Address	Private Bag 63002, Wellington 6140
Phone	(04) 916 2426; DDI (04) 474 5457
Email	Geoff.Ridley@epa.govt.nz
Involvement in the project, i.e. end-user, collaborator, will be/is part of the user group	End-user

Appendix 1

New Zealand RS&T Curriculum Vitae

1a. Personal details					
Full name	Dr	Aaron		Wilton	
Present position		Business Analyst, Biodiversity Informatics Allan Herbarium Database Manager			
Organisation/Employer		Landcare Research			
Contact Address		PO Box 69040, Lincoln			
				Post code	7640
Work telephone		(03) 321 9645	**Mobile**		
Email		wiltona@landcareresearch.co.nz			
Personal website (if applicable)		http://			

1b. Academic qualifications	
1998	PhD, Botany, University of Canterbury
1993	BSc (Hons), Botany, University of Canterbury

1c. Professional positions held	
2005–	Business Analyst, Landcare Research, Lincoln
2000–2009	Manager of the Allan Herbarium, Landcare Research, Lincoln
2000–	Database Manager for Allan Herbarium, Landcare Research, Lincoln
1997–2000	Plant systematist, Landcare Research, Lincoln

1d. Present research/professional specialities

- Biodiversity Informatics: Biodiversity database development and integration including Global Compositae Checklist, Collection Information System, New Zealand Virtual Herbarium, New Zealand Organism Register
- Plant Systematics: Revision of New Zealand *Luzula* (Juncaceae) species

1e. Total years' research experience	15 years

1f. Professional distinctions and memberships (including honours, prizes, scholarships, boards or governance roles, etc.)

- Member: Chair of Herbarium Information Systems Committee, Australia
- Member: Atlas of Living Australia Technical Advisory Group

1g. Total number of *peer-reviewed* publications and patents	Journal articles	Books, book chapters, books edited	Conference proceedings	Patents

2a. Relevant research publications and dissemination
Peer-reviewed journal articles in the last 5 years
FitzJohn RG, Armstrong TT, Newstrom LN, **Wilton AD,** Cochrane M 2007. Hybridisation within *Brassica* and allied genera: evaluation of potential for transgene escape. Euphytica 158: 209–230.
Armstrong TT, FitzJohn RG, Newstrom LE, **Wilton AD** 2005. Transgene escape: what potential for crop-wild hybridisation? Molecular Ecology 14: 2111–2132.
Kirschner J, **Wilton AD** 2002. New Zealand *Luzula*. In: Kirschner J ed. Species Plantarum:

Juncaceae Part I. Australian Biological Resources Study, Australia (for the International Organization for Plant Information). Heenan PB, de Lange PJ, **Wilton AD** 2001. *Sophora* (Fabaceae) in New Zealand: taxonomy, distribution, and biogeography. New Zealand Journal of Botany 39: 17–53. **Wilton AD,** Breitwieser I 2000. Composition of the New Zealand seed plant flora. New Zealand Journal of Botany 38: 537–549.	
Peer-reviewed books, book chapters, books edited	
Beever RE, de Menna M, Johnston PR, Pennycook SR, Cooper JA, **Wilton AD** 2012. Phylum Ascomycota: yeasts, sac fungi, truffles, and kin. In: Dennis DP ed. New Zealand inventory of biodiversity Volume 3 Kingdoms Bacteria Protozoa, Chromista, Plantae, Fungi. Christchurch, Canterbury University Press. Pp. 528–563. Breitwieser I, Garnock-Jones PJ, **Wilton AD** 2012. New Zealand seed plants. In: Dennis DP ed. New Zealand inventory of biodiversity Volume 3 Kingdoms Bacteria Protozoa, Chromista, Plantae, Fungi. Christchurch, Canterbury University Press. Pp. 528–563.	
Refereed conference proceedings	
Patents	
Other forms of dissemination (reports for clients, technical reports, popular press, etc)	
Newstrom LE, Armstrong T, Robertson AW, Lee WG, Heenan PB, Peltzer D, **Wilton AD**, Fitzjohn RG, Breitwieser I, Glenny D 2003. Environmental risks to the New Zealand Flora from transgenic crops: the role of gene flow. Landcare Research Report LC0203/065. (http://www.landcareresearch.co.nz/research/biocons/geneflow/report.asp)	

2b. Previous research work

Research Title	Principal outcome	Principal end-user and contact
eFlora	Development of a dynamic, continually updated electronically-based Flora for New Zealand (ongoing). This next-generation Flora of New Zealand aims to provide access to information on our flora to a wide range of users, and in a variety of formats.	Biodiversity and biosecurity managers, researchers, general public
New Zealand Virtual Herbarium	Lead the development of the New Zealand Virtual Herbarium to provide public access to specimen data from 11 New Zealand herbaria in a single portal.	Biodiversity and biosecurity managers, researchers, general public
New Zealand Organisms Register	Member of team that implemented the NZOR infrastructure. This infrastructure aggregates nomenclatural and taxonomic information from different sources, to provide users, whether people or other information systems, with a single, authoritative source of this information for New Zealand.	

2c. Describe the commercial, social or environmental impact of your previous research work

Information system and products:
Informatics leader for implementation of the following websites:
- Electronic *Flora of New Zealand* – www.nzflora.info
- *Flora of New Zealand* Series – http://floraseries.landcareresearch.co.nz
- Ngā Tipu o Aotearoa – New Zealand plants – http://nzflora.landcareresearch.co.nz
- NZ Fungi2 – http://nzfungi2.landcareresearch.co.nz

Project manager and business analyst for the development of the following information systems developed within Landcare Research:
- Collection Information System – for the management of specimen data associated with five nationally significant collections
- Names Database – for the management of nomenclatural and taxonomic information
- Image System – an image management system that stores images and associated metadata, and makes them available to other information systems and the Web.
- Annotation System – a descriptive text authoring tool
- Metadata System
- New Zealand Biosafety Database

2d. Demonstration of relationships with end-users
- Business Analyst for New Zealand Organisms Register
- Business and Data Analyst for Global Compositae Checklist
- Project Manager for the New Zealand Virtual Herbarium
- Project Coordinator for release of the Australian Virtual Herbarium based on the Atlas of Living Australia infrastructure

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