NVS ANNUAL REPORT FOR THE 2007–08 YEAR

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1. Number of new records accessed

A total of 84 new data sets were added electronically to NVS in 2007–08 (to 30 June 2007; Fig. 1a) with a total of 4867 plots added (Fig. 1b). Major providers of data (Fig. 1a) and types of data (Fig. 1b) are shown over the past 5 years. The increase in the total number of plots added over 2006–07 is due principally to incorporation of large numbers of reconnaissance (relevé) plots from programmes undertaken by Landcare Research, funded mainly by FRST or DOC. A significant inclusion of new electronic data is from 49 permanent transects (each 210 × 20 m) established in the late 1950s – early 1960s in forests throughout the central North island and many remeasured 4 – 5 times since into the 2000s (incorporation as electronic data funded by TFBIS).

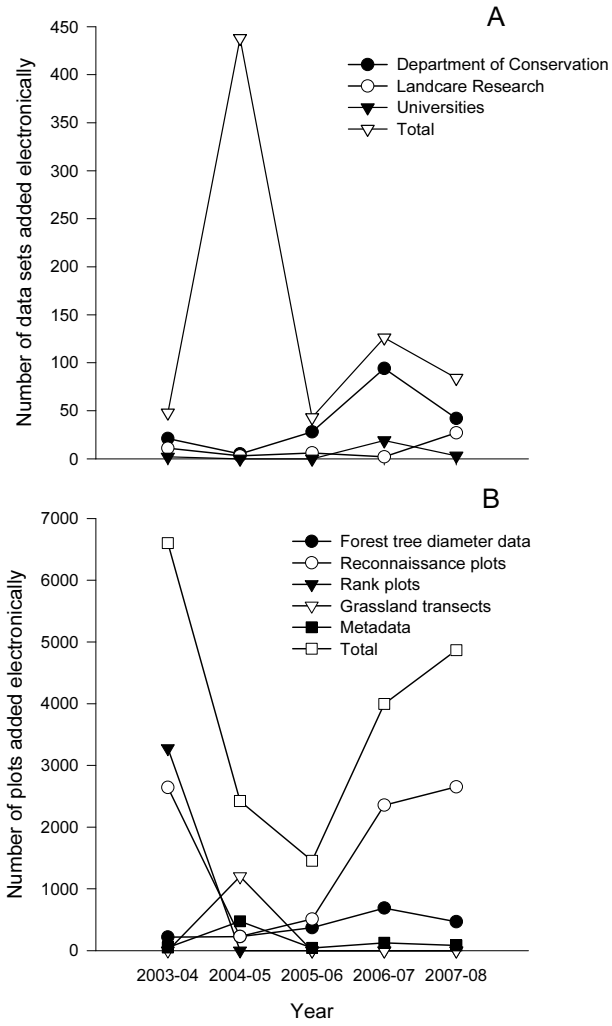

Fig 1. (A) Number of data sets included electronically in the National Vegetation Survey databank per year for the past five years; total and from two major data users. (B) Number of vegetation plots included electronically in the National Vegetation Survey databank per year for the past five years; total and of four major data types.

Since October 2006 it has been Standard Operating Procedure in the Department of Conservation for NVS to be the repository for all standard vegetation data collected by the Department, hence there is a steady addition from field surveys. The total number of data sets from the Department added during 2007–08 was less than in 2006–07 because last year a large amount of backlog data was added (funded by TFBIS) – a process now complete.

All the data collected under the auspices of the New Zealand Carbon Monitoring System (NZCMS) is now archived in NVS. The primary focus of the NZCMS is to monitor carbon sequestration rates, but plant biodiversity information is also collected. Permanent plots were established on an 8-km^2 grid across the areas mapped as indigenous forest (6.25 million hectares) and shrubland (2.65 million hectare) by the 1996/97 version of the Land Cover Database (LCDB1). Where pre-existing plots occurred within 4 km of a grid point, they were used to make maximum use of previous efforts.

2. Significant revisions of data

We have back-corrected tree tags in ~250 NVS permanent plots to match the identifiers used when they were remeasured as part of the National Carbon Monitoring System. This will allow longitudinal assessments of tree growth and mortality and how they affect carbon storage to be assessed.

We have continued to identify and correct errors in recording of tags, species, and tree diameters and add subplot information to permanent forest plot data. This work builds on an initiative begun in 2005–06; a three year project 'Tests of competition theory in forests using neighbourhood modelling', funded by the National Environmental Research Council (NERC) of the United Kingdom and Landcare Research.

3. Maintenance and development activities

A software tool to allow data entry and validation of locally held datasets has been developed, tested by LCR and DOC staff and is now available on the NVS website http://nvs.landcareresearch.co.nz/as the uppermost item in the "What's new" section as "NVS lite tool". The linked web page contains a description of the software and its benefits, a link to the user manual, a link to allow users to download the software, and a link to upload data captured using the software into the NVS databank.
NVS Lite is a purpose built Windows tool for entering vegetation data compatible with the NVS databank and accepts data collected using the NVS standard forest monitoring (i.e. permanent 20-m × 20-m plots) and vegetation inventory (i.e. relevé or recce plot) methods.

4. Web statistics

From 1 July 2007 to 30 June 2008, the NVS web site (http://nvs.landcareresearch.co.nz) was hit 249,953 times. This was a 3% decrease compared with the number of times the web site was hit the previous year but this is best seen as similar use over the past two years compared with much lower levels previously (i.e., in 2005–06 the web site was hit 133 784 times). Of the current year's hits that could be traced to origin 24.5 % were from New Zealand, 50.6 % were from North America and 3.76 % were from Europe. Various documents are available to download from the NVS web site and during 2007–08 17,420 documents, listed in Table 1, were downloaded.

Table 1 Number of downloads of documents available on the NVS web site during 2004–05 (compiled using Funnel Web).

Document	Number of downloads
Grassland survey manual	3484
Reconnaissance plot manual [1]	3679
Forest permanent plot manual [1]	3505
Field guide to use of GPS	926
Maintaining biodiversity information (Wiser *et al*. 2001. *New Zealand Journal of Ecology*)	659
An assessment of the quality of data stored in the National Vegetation Survey database (reprint of Landcare Research contract report)	254
Reconnaissance plot pro-forma data sheet [1]	356
Forest tree diameter plot pro-forma data sheet(nvsstemdiam (233) and stemdiam (13) [1]	195
Forest seedling plot pro-forma data sheet [1]	279

[1] Combined total for previous and updated (2007) manuals.

A major point of entry for obtaining information and data stored in NVS is by means of the GBIF (Global Biodiversity Information Facility) website. In particular, this portal allows users to obtain information on the spatial occurrence of taxa. Between 1 July 2007 and 16 June 2008, there were 3145 searches for species occurrence data in NVS (access to 5374497 records) and 223 downloads of species occurrence data (for 608199 records in NVS) using the GBIF website. In the same period, there were 290 uses of interactive map sites of NVS data (species occurrences within plot-based records) through the GBIF website (monthly downloads ranged from 13 to 42 per month).

An increasing number of organisations are now providing links to the NVS website as a resource for vegetation data, as a provider of information on vegetation monitoring, and as a NZ government conservation resource. These include libraries (e.g. Lincoln University) and NGOs (e.g. West Coast Blue Penguin Trust, Sanctuaries of NZ, Royal Forest and Bird Protection Society).

5. Data sharing agreements and data exchange

Twenty-three Landcare Research surveys will be migrated from access level 2 (approval required before distribution) to access level 1 (public domain) in July 2008. This is the first stage of a process to contact all level 2 dataset owners to review and update contact and access details.

As a result of our April 2007 workshop in the USA, two draft vegetation data exchange schema were produced by workshop participants, Martin Kleikamp and Miquel Caceras in October 2007. We sponsored a follow-up workshop this year

where a draft exchange schema was finalised. This will be presented at a meeting in October 2008 of Biodiversity Information Standards (TDWG), an international not-for-profit group that develops standards and protocols for sharing biodiversity data.

6. Bulk data requests

A total of 52 requests for NVS data and metadata were made during 2007–08 (Fig. 2a) and a total of 1605 data sets were supplied (Fig. 2b), an 87% increase over 2006–07. The principal agencies from which there were requests for data (Fig. 2a) and number of data sets supplied (Fig. 2b) are shown over the past 5 years. The major agencies requesting data (Department of Conservation, Landcare Research, and university staff and students) have made similar numbers of requests over recent years.

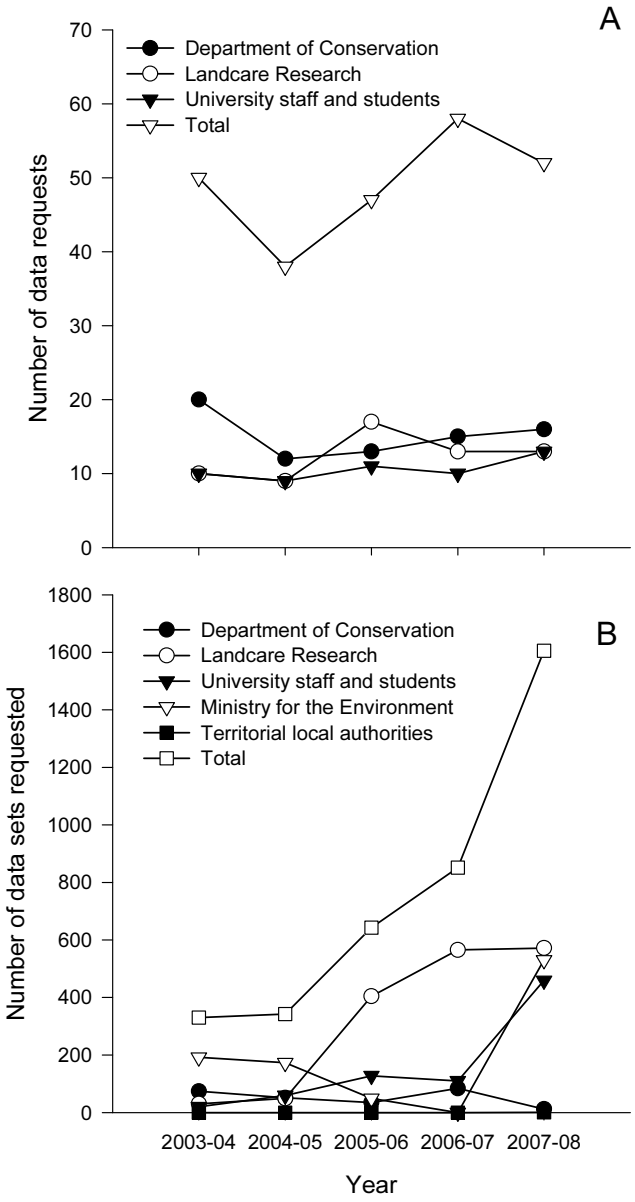

Fig 2. (A) Number of requests for data from the National Vegetation Survey databank per year for the past five years; total and from three major data users. (B) Number of requests for data from the National Vegetation Survey databank per year for the past five years; total and from five major data users.

Bulk data requests have increasingly become a feature of NVS use over the past three years. The MfE made bulk data requests during 2007–08 (Fig. 2b) to provide information on historic change in forests to support data from the Carbon Monitoring System. Large data requests during 2007–08 included permanent forest plot data, requested by staff of Landcare Research to:

- support aspects of the Department of Conservation's "Inventory and Monitoring" project;
- assist the investigation "Does environmental representation indicate species security?" (Cross-departmental Research Pool Project #2, administered by the Department of Conservation).

7. Publications directly associated with the NVS databank

Two key publications associated with the NVS databank, production of which was funded by the Department of Conservation, were updated manuals for standard collection of vegetation data. Both are available as bound volumes on waterproof paper suitable for use in field conditions and as documents to download on the NVS web site and supplant previous versions:

Hurst JM, Allen RB 2007. *The Recce method for describing New Zealand vegetation – field protocols*. Landcare Research, Lincoln.

Hurst JM, Allen RB 2007. *A permanent plot method for monitoring indigenous forests – field protocols*. Landcare Research, Lincoln.

The following publications during 2007–08 used data derived from the NVS databank:

Delmiglio C. 2008. The incidence and phylogenetic analysis of viruses infecting New Zealand's native grasses. PhD thesis, University of Auckland.

Dodd, MB, Power, IL. 2007. Recovery of tawa-dominated forest fragments in the Rotorua Basin, New Zealand, after cessation of livestock grazing. *Ecological Management and Restoration 8*: 208–217.

Gravuer K, Sullivan JJ, Williams PA, Duncan RP 2008. Strong human association with plant invasion success for *Trifolium* introductions to New Zealand. *Proceedings of the National Academy of Sciences of the USA 105*, 6344–6349.

Phillips, SJ, Dudik, M. 2008. Modeling of species distributions with Maxent: new extensions and a comprehensive evaluation. *Ecography* 31: 161–175.

Russo SE, Wiser SK, Coomes DA 2007. Growth-size scaling relationships of woody plant species differ from predictions of the Metabolic Ecology Model. *Ecology Letters 10*: 889–901.

Walker, S, Price, R, Stephens, RTT. 2008. An index of risk as a measure of biodiversity conservation achieved through land reform. *Conservation Biology* 22: 48–59.

Wardle DA, Bellingham PJ, Fukami T, Mulder CPH 2007. Promotion of ecosystem carbon sequestration by invasive predators. *Biology Letters 3*, 479–482.

Wardle DA, Wiser SK, Allen RB, Doherty JE, Bonner KI, Williamson WM 2008. Aboveground and belowground effects of single tree removals after forty years in a New Zealand temperate rainforest. *Ecology 89*, 1232–1245.

Wardle DA, Wiser SK, Allen RB, Doherty J 2007. Ecological impact of single tree removal in native forest. *Indigena* November issue.

Wiser SK, Baker G, Benecke U 2007. Regeneration of red and silver beech: How important is the size of harvested area. *New Zealand Journal of Forestry* August: 31–36.
Wiser SK, Buxton RP 2008. Context matters: matrix vegetation influences native and exotic species composition on habitat islands. *Ecology 89*, 380–391.

8. Conservation Outcomes

In its 2006 Annual Report DOC reported on two indicators using a case-study approach:

- Changes in size-class structure of selected indigenous dominants in particular places within forests on conservation land.
- Changes in representation of specific species or functional groups in particular places within forests on conservation land.

This demonstrated that where consistent national data collection standards were applied (all data were sourced from NVS), both indicators can deliver useful information and report on the current status and trends in native forests at local and national scales. In DOC's 2007–08 Statement of Corporate intent they plan to implement this work to present trends in the make-up of forests, which can show the influence that pests have, (e.g., preventing the growth of palatable, by continuing to improve its ability to report on changes in the size-class structure of forests and representation of specific species or functional groups (such as species preferred by deer and possums) using information drawn from the NVS databank.

9. Other significant developments

When the NVS Software Development project was funded by TFBIS, the Steering Committee, in recommending the project be approved, expressed the view that the previously funded User Needs Report (2004/05) provided clear confirmation of sector engagement/involvement and rationale for the project's priority. While this precursor report necessitated a moderate investment ($25,000) by the TFBIS Programme and did mean a time lag before implementation, it has provided Landcare Research with a clear "pathway" to follow and the TFBIS Programme the confidence that the investment is both a priority and well thought through. As a consequence, TFBIS has adopted this two-stage approach for future large projects and this will be strongly featured in the revised TFBIS strategy document which is about to be released.

Two important new databases have been modelled on the database system used for NVS. The first is the New Zealand Pollen database, being developed by Landcare Research that will hold data from pollen cores taken throughout New Zealand. Because it is based on the NVS modelled, data on past and current distributions of plants in NZ will be able to be readily compared. The second is DOC's metadata system for all of their biodiversity inventory and monitoring projects. This was jointly developed by LCR and DOC (funded by TFBIS) based on the metadata system developed for NVS database.

NVS data was used for comparative analyses by an international working group (26 scientists from 9 countries) at the (US) National Center for Ecological Analysis and Synthesis (NCEAS) investigating the use of presence only data in predicting species distributions. Plant distributions from the NVS database were combined with plant records from the Allan herbarium to provide one of the six regional datasets used in this international comparison. The NVS data was recognised as one of the best international datasets for investigating plant distributions.

In August 2007, we hosted a delegation from the Thai Ministry of Natural Resources and Environment. As part of the negotiation of a free trade agreement between NZ and Thailand, MfE are looking at environmental partnership between the two countries that will eventually lead to commercial work for NZ. The delegation was very interested in biodiversity management systems, so visited Landcare to get a better understanding of our systems with special emphasis on the NVS databank. After the visit, the delegation acknowledged that NZ has developed some excellent systems to manage biodiversity information and plan to identify specific areas they are keen to pursue collaboratively in the future.

We gave a presentation about the NVS databank to the Aoraki Conservation Board in June 2008.

Appendix 1. Listing of new electronic data sets incorporated into NVS, July 2007 – June 2008.

Anchor Island 2007: Diameter, understorey, recce
Atuanui Ecomonitoring 2002–2003: Diameter, understorey, recce
Benmore Range Grasslands 1980: Metadata
Black Forest Grasslands (Ross Stream) 1993: Metadata
Chatham Id – South East Island 2002–2004: Diameter, understorey
Chatham Id – Tuku Bush 2005: Diameter, understorey, recce
Coromandel Exclosures 1994: Diameter, understorey, recce
Coromandel Exclosures 2005: Diameter, understorey, recce
Coromandel Peninsula Project 2005–2006: Diameter, understorey, recce
Craigieburn 2007: Diameter
Dense Podocarp Habitat Classification 2005–06: Diameter, recce
Diadem and Otematata Grasslands (Waitaki Basin) 1979: Metadata
Eastern Waitaki Grassland 1973–74: Metadata
Ebex – Hinewai 2005: Diameter, recce
Ebex – Norsewood 2004: Diameter, recce
Ebex Audit – Coatbridge 2007: Diameter, recce
Ebex Audit – Conway 2006: Diameter, recce
Ebex Audit – Kakariki 2007: Recce
Ebex Audit – Long Gully Station 2007: Recce
Ebex Audit – Longspur 2007: Recce
Harper Avoca 2004: Understorey, recce
Hawkdun PNAP survey 1991: Recce
Hihitahi Forest Sanctuary 2004: Diameter, understorey, recce
Hillersden Ecological District PNAP survey 2002–03: Recce
How long – Ikawhenua Range 1997: Recce
How long – Matemateaonga 1996–04: Recce
How long – Richmond Range 1997–03: Recce
Kaimanawa/Rangitikei 1999–00: Diameter, understorey, recce
Kapiti Island Seedlings 1999: Miscellaneous
Lookout Range Granite Sand Plains 2008: Recce
Mataitai Ecomonitoring 2002–2003: Diameter, understorey, recce
Moeatoa Exclosures 2006: Diameter, understorey, recce
Molesworth 2007: Transect, recce
Motuoapa Peninsula Wainuia Clarki Survey 2006: Recce
Mt Aspiring Survey Slides (associated with Aspiring 1977–78 Grassland): Metadata
Murchison Mts Excl 2004: Diameter, understorey, recce
Nihoniho Exclosure 2007: Diameter, understorey, recce
North Island Ecological Transects Establishment 1957–64
North Island Ecological Transects –1st Remeasurement 1959–62: Forest transect
North Island Ecological Transects – 2nd Remeasurement 1961–64: Forest transect
North Island Ecological Transects – 3rd Remeasurement 1966–67: Forest transect
North Island Ecological Transects – 4th Remeasurement 1971: Forest transect
North Island Ecological Transects – 5th Remeasurement 1982–84: Forest transect
North Island Ecological Transects – 6th Remeasurement 1997–2006: Forest transect
North Island Ecological Transects – 7th Remeasurement 2006–2007: Forest transect
Northern Kaimai–Mamaku Forest Park 2006: Diameter, understorey, recce
Off Shore Islands (North Island) 2004: Diameter, recce
Ohope Scenic Reserve Forest Health Assessment (FHA) 2007: Diameter, understorey, recce
Paparoa Exclosures 2003: Recce
Pastoral Lease Tenure Review Survey 2002–2007: Recce
Pastoral Lease Tenure Review Survey 1996: Recce

Port Hills Bellbird 2007: Recce
Pureora Mountain Plots 1981–82: Recce
Rangitaiki Frost flat Habitat Inventory 2006: Recce
Rangitikei PNAP: Doc Reserves 1993–94: Metadata
Raukumara Exclosures 2002: Diameter, understorey
Rocky Hills 1996: Diameter, understorey, recce
Rocky Hills and Rewa Bush 2005: Diameter, understorey, recce
Ruahine Exclosures – Alphabet Exclosure 2007: Diameter, understorey, recce
Ruahine Exclosures – Triangle Exclosures 1999: Diameter, understorey, recce
Stewart Island Exclosures 2007: Diameter, understorey, recce
Tangarakau Scenic Reserve 2006: Diameter, understorey, recce
Te Puru Stream 1982: Recce
Urewera, South 1986–87: Diameter, understorey
Waimakariri Survey 1960/61: Metadata
Waipapa 1980: Recce
Waitaanga Exclosure Plots 2002–03: Diameter, understorey, recce
Waitaanga Exclosure Plots 2007: Diameter, understorey, recce
Waitutu Exclosures 1998: Diameter, understorey, recce
Whakapapa Island Habitat Inventory 2006–07: Diameter, understorey, recce
Whanganui Nat. Park 20 X 20 & Excl 2008: Diameter, understorey, recce
Whareorino Exclosures 2006: Diameter, understorey, recce
Woodhill 2000: Diameter, understorey, recce