

NVS ANNUAL REPORT FOR THE 2004-05 YEAR

Compiled by Michelle Breach, Peter Bellingham, Nick Spencer and Susan Wiser, Landcare Research, Lincoln

Developments of the National Vegetation Survey (NVS) databank

The National Vegetation Survey (NVS) databank has secured increased funding for a 12-year plan of development and improvement from 2005–06. This results from funding of the “Ecosystem Resilience” Outcome-based Investment (OBI) by the Public Good Science and Technology (PGS&T) fund. Funding for this OBI, led by Dr Rob Allen of Landcare Research, was secured during 2004–05. Dr Susan Wiser will oversee future development of NVS within this OBI. The increase in funding of NVS over current levels will support the maintenance and curation of NVS as well as new research associated with NVS. Measures of achievement required to demonstrate the success of this funding include at least a 20% increase in NVS use, measured through web statistics of document downloads, data deposits and retrievals by 2017. Additionally plots within NVS will be used by 2017 as the basis of 3 new national-scale applications for understanding forest dynamics, herbivore impacts and weed invasions

Additional support from the PGS&T fund was approved as a one-off allocation over 2 years to support database development. This funding will support development of the system described in a report: “Facilitating data entry and retrieval from a national biodiversity database – the National Vegetation Survey databank example” (Burrows *et al.* 2004). This report is based on a questionnaire sent during 2003–04 to a range of biodiversity practitioners in New Zealand who summarise and analyse data from the NVS databank. Responses to this questionnaire served to inform NVS database designers how software developments could best serve future needs. Responses were summarised and used as the basis for selecting the design of new NVS-specific analysis packages.

Strong support from end-users, especially the Department of Conservation (DOC), was a key element in securing long-term funding to support NVS. An example of how DOC envisages NVS will support their ability to demonstrate achievement is seen in its statement of intent for 2005–2008: “To present trends in the make-up of forests, which can show what influence pests have (e.g., preventing the growth of palatable plants), the Department will report on changes in the size-class structure of forests. This information will be drawn from the National Vegetation Survey databank, and will reported five-yearly”.

The NVS databank is being recognised increasingly internationally as an outstanding repository of vegetation data. A key strength lies in its inclusion of many repeated measurements of vegetation so that long-term trends can be detected. This strength was highlighted in a successful proposal funded during 2004–05 by the UK Natural Environment Research Council to a team of British and Landcare Research scientists. This research project will examine long-term records of tree growth and mortality from repeated measurements of tagged individuals within plots – data that can be interpreted at a large range of spatial scales. Part of this investment will be to apply a stringent level of quality control with the result that the data sets used in this project will be of an exceptionally high standard, available for other users. International, as well as national, awareness of NVS has also been enhanced through provision of NVS data (notably species distributions) through the

Global Biodiversity Information Facility (GBIF) node (<http://www.gbif.org.nz/moreinfo.html>).

The New Zealand Terrestrial and Freshwater Biodiversity Information Fund (TFBIS) programme has continued to support and enhance NVS. TFBIS supported the user-needs analysis described earlier (Burrows *et al.* 2004). During 2004–05, in collaboration between Landcare Research and DTZ, long-term data records from montane grasslands throughout the eastern South Island were secured as metadata records and hard copies for NVS with TFBIS support. During 2005–06 a project funded by TFBIS will address securing in NVS data sets from outstanding New Zealand ecologists. New TFBIS funds have been secured for 2005–06 to enable evaluation of the best alpine vegetation datasets in NVS.

The NVS databank is the repository for indigenous vegetation data collected since 2002 for the national Carbon Monitoring System (CMS), funded by the Ministry for the Environment (MfE). The MfE has not chosen to invest in NVS to analyse these data for above-ground carbon storage. However Landcare Research had already invested in development of a data model to determine carbon stored in indigenous forests and shrublands and this has been offered to MfE. The emissions and biodiversity carbon offset scheme (EBEX21) has developed a biomass calculation tool that connects directly with NVS as a secure data archive housing EBEX site assessment data, applies available biomass estimation formulae, and outputs summary results. Development of the tool was completed as a Landcare Research NSOF project.

Requests for data from the National Vegetation Survey (NVS) databank

Thirty-eight requests for original NVS data or ancillary documentation were received between July 2004 and June 2005 (Fig. 1a). Most of the data requests were from the Department of Conservation, although the trend was down from earlier years (Fig. 1a). Requests for data from staff of Landcare Research and from University staff and students (both from within New Zealand and internationally) made up most of the other data requests. Most data requests were for original plot data (electronic files in ASCII and MS Excel formats, and photocopies of original plot sheets) and ancillary metadata. A number of synthetic data requests were also received, e.g. for species occurrence across a wide range of individual data sets. Such requests are now addressed quite readily by the NVS data curator.

342 data sets were requested from the NVS databank in 2004–05, comparable with the level of the past 4 years (Fig. 1b). Over the past two years most requests have been from the Ministry for the Environment to support the CMS. There has been a decline in the number of data sets requested by the Department of Conservation over the past three years (Fig. 1b).

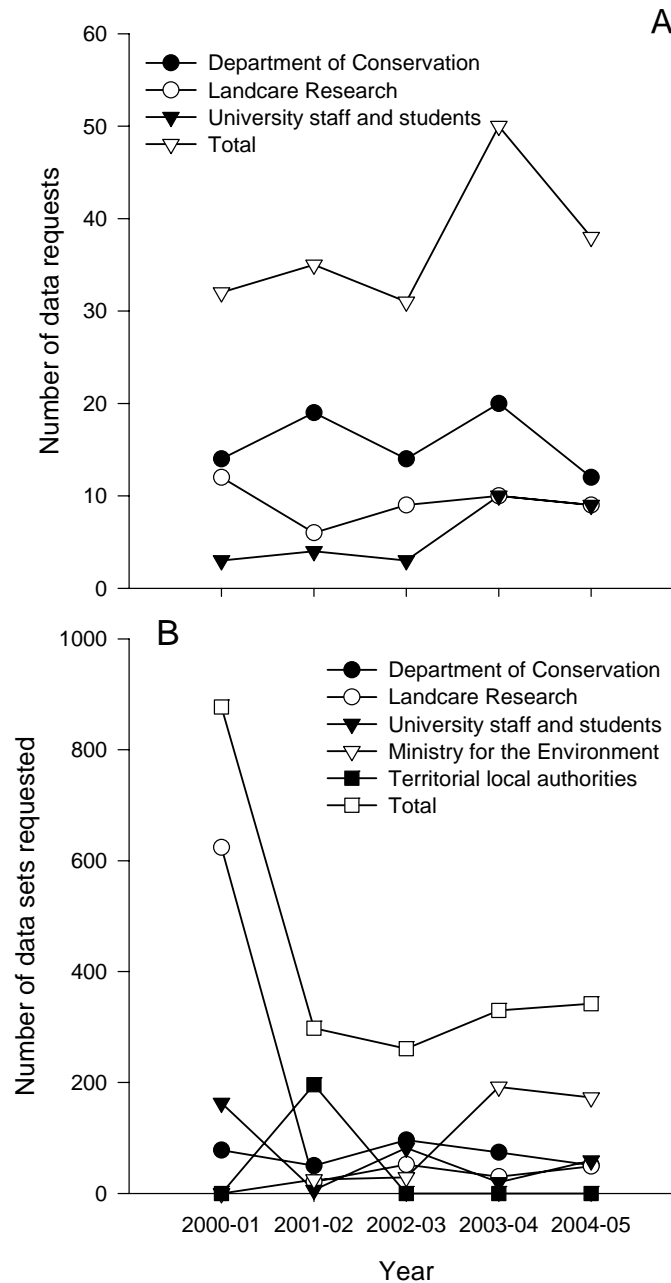


Fig 1. (A) Number of requests for data from the National Vegetation Survey databank per year for the past five years; total and from three major data users. (B) Number of requests for data from the National Vegetation Survey databank per year for the past five years; total and from five major data users.

Web statistics

From 1 July 2004 to 30 June 2005, the NVS web site (<http://nvs.landcareresearch.co.nz>) was hit 5225 times. Of hits on the NVS web site 41.3% were from New Zealand sources, with the next most frequent sources from Australia (11.9%), the United States (10.7%), the United Kingdom (3.9%) and Canada (2.5%).

Of an annual total of 18 351 hits on individual pages within the NVS web site, metadata

forms that inform browsers about individual data sets (when, where, how data were collected and by whom, how many plots, etc.) were by far the most frequently sought (32.9% of all page visits). Unsurprisingly the index page to the site was viewed frequently (19.4% of all page visits). Pages that describe the NVS databank received 5.6% of all page visits, and the page describing guided search tools for data was also viewed frequently (6.1%). Detail about field techniques, manuals and field forms constituted 8.4% of page visits. Pages containing information about NVS data standards constituted 2.0% of visits, and pages to facilitate data requests from NVS 1.8% of visits. Pages with information on protocols for use of NVS data and proprietary ownership of data received 1.4% of all page visits. Various documents are available to download from the NVS web site and during 2004–05 and 473 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 Livestats.net, Deepmetrix Corporation).

Document	Number of hits
Field guide to use of GPS	123
Forest permanent plot manual	72
Reconnaissance plot manual	72
Reconnaissance plot pro-forma data sheet	62
Forest tree diameter plot pro-forma data sheet	47
Forest seedling plot pro-forma data sheet	35
Grassland survey manual	24
An assessment of the quality of data stored in the National Vegetation Survey database (reprint of Landcare Research contract report)	23
Data standard guidelines for improving the quality of permanent plot data archived in the National Vegetation Survey database (reprint of Landcare Research contract report)	15
Total	473

New data incorporated into NVS

A total of 438 new data sets were incorporated as electronic versions into NVS between July 2004 and June 2005 (Fig. 2a). 476 files of updated metadata relating to these and existing data files were also incorporated. A listing of new data sets incorporated as electronic copy into NVS is given in Appendix 1. The number of new data sets included in NVS during 2004–05 was substantially greater than in the previous four years (Fig. 2a) because it was augmented by the inclusion of 429 data sets from DTZ from montane grassland communities, a project funded by the TFBIS fund. While these data are provisionally included electronically in NVS (Fig. 2a) they are not yet generally available electronically, hence are not included in the baseline NVS statistics (Table 2). The number of data sets supplied to NVS by DOC, historically a major supplier of data sets to NVS, has declined over the last three years.

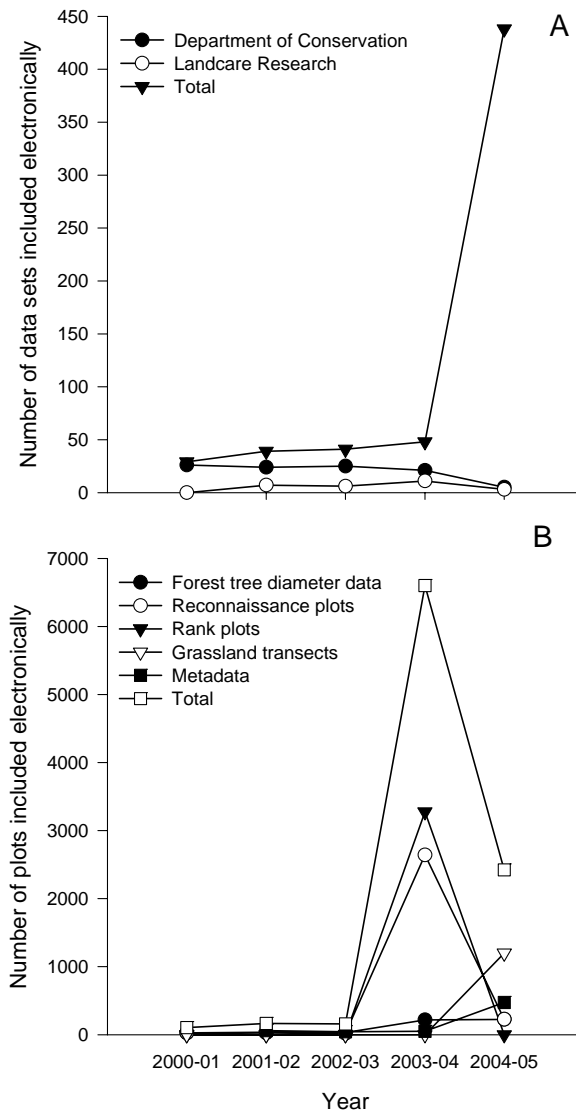


Fig 2. (A) Number of data sets included electronically in the National Vegetation Survey databank per year for the past five years; total and from two major data users. (B) Number of vegetation plots included electronically in the National Vegetation Survey databank per year for the past five years; total and of four major data types.

A total of 2423 plots were included electronically in NVS during 2004–05 (Fig. 2b). The grassland transects from DTZ, the inclusion of which was funded by the TFBIS programme, comprised nearly half of the total. Trends in the kinds of plots included in NVS over the past five years are erratic (Fig. 2b). This is because during 2002–05 the TFBIS programme has funded the inclusion of some large and nationally important data sets. Some of these are historic data sets, e.g. the large number of rank plots in 2003–04: these were data from surveys conducted by H.D. Wilson, included with TFBIS programme funds. Trends in inclusion of core NVS data sets (Table 2) have been constant over the past five years.

Extension and awareness

Staff connected with NVS had a central role in development of DOC’s “Biodiversity inventory and monitoring” programme. Reliance on data in NVS and future contribution of

data to NVS are prominent in several indicators that are being developed in the programme.

Dr Aaron Wilton and Nick Spencer presented a review of the NSOF Database Integration Project to the Landcare Research board and senior managers in November 2004. NVS featured as one of the examples of what has been achieved.

Publications in which NVS data were used

- Bellingham, P.J.; Peltzer, D.A.; Walker, L.R. 2005. Contrasting impacts of a native and an invasive exotic shrub on flood-plain succession. *Journal of Vegetation Science* 16: 135–142.
- Coomes, D.A.; Allen, R.B.; Bently, W.A.; Burrows, L.E.; Canham, C.D.; Fagan, L.; Forsyth, D.M.; Gaxiola-Alcantar, A.; Parfitt, R.L.; Ruscoe, W.A.; Wardle, D.A.; Wilson, D.J.; Wright, E.F. 2005. The hare, the tortoise, and the crocodile: the ecology of angiosperm dominance, conifer persistence and fern filtering. *Journal of Ecology*. (In Press)
- Husheer, S.W.; Frampton, C.M. 2005. Fallow deer impacts on Wakatipu beech forest. *New Zealand Journal of Ecology* 29: 83–94
- Lloyd, K.M.; Wilson, J.B.; Lee, W.G. 2003. Correlates of geographic range size in New Zealand *Chionochloa* (Poaceae) species. *Journal of Biogeography* 30: 1751–1761.
- Renner, M.A.M. (2003). *Mnioloma fuscum* (Marchantiopsida: Calypogeiaceae), an unexpected addition to the indigenous flora of New Zealand. *Journal of Bryology* 25: 287–291.*
- Renner, M.A.M., Glenn D (2003). A new *Cheilolejeuna* Marchantiopsida: Lejeuneaceae from montane forests in New Zealand. *Journal of Bryology* 25: 169–174.*

*Both papers based on specimens collected as part of the CMS, with data lodged in NVS databank.

Contract reports:

- Burrows, L.; Cooper, J., Wiser, S., Spencer, N. 2004. Facilitating data entry and retrieval from a national biodiversity database – the National Vegetation Survey databank example. Landcare Research Contract Report. Prepared for Terrestrial and Freshwater Biodiversity Information System Programme.
<http://nvs.landcareresearch.co.nz/html/NVSUserNeedsTFBISReport.pdf>.

Conference presentations:

- Spencer, N.; Wiser, S. 2004. “Metadata management for New Zealand’s national vegetation plot databank”. (talk and demonstration). 47th Annual Meeting of the International Association of Vegetation Science, July 18-23, 2004.
- Wiser, S.; Buxton, R. 2004. “Considerations for inventory and monitoring of plant biodiversity in rare ecosystems”. Invited speaker in the symposium “Monitoring as a tool to inform national and international agreements and policies” New Zealand Ecological Society Annual Conference, Invercargill, New Zealand. 29 Aug. -5 Sept. 2004.

NVS statistics: a 2004–05 baseline

A key measure of the success of NVS funding over the next 12 years rests on demonstration of increases in data storage and use. Key statistics of numbers of data sets in NVS including those available electronically are listed in Table 2.

Table 2. Listing of major data categories and data types in the National Vegetation Survey databank with tallies of numbers of data sets and of records within plots (correct at 29 July 2005).

Data category	Data type	Tally	Notes
NVS Metadata	All data sets listed	2853	Excludes CMS data sets (see below)
	Available electronically	2146	
Core NVS datasets	Total	2146	All electronically available data, excluding CMS data.
	Diameter	585	
	Sapling	422	
	Seedling	461	
	Recce	675	Includes Protected Natural Areas programme data
	Rank abundance	3	H.D. Wilson data sets
	Number of plots	75,424	Count of all distinct plot observation (includes repeat observations)
	Tree diameters records in permanent plots	1,311,998	Count of all stem observations (individual \times plot \times survey)
	Tree diameters records in ecological transects	9654	Count of all stem observations
	Tree sapling records in permanent plots	337,703	Count of all saplings with a count (species \times subplot \times plot \times survey)
Tree seedling records in permanent plots	1,227,740	Count of all seedlings with a count (species \times subplot \times plot \times survey)	
Individual species records in reconnaissance plots	1,565,482	Count of all species with a plot occurrence (species \times plot \times survey)	
Individual species records in rank abundance plots	89,205	Count of all species observations with ranks (species \times subplot \times plot \times survey)	
Grassland Data			None available electronically
Plots			
DTZ data			

Scott Height Frequency

Miscellaneous datasets	Total	217	Total number of miscellaneous datasets in NVS by type. Most do not have electronic datasets available.
	Misc	52	
	Obscure methodology	2	
	Pellet line data	10	
	Point centre quarter	2	
	Possum browse	2	
	Distance	8	
	Foliar Browse Index	8	
	Ring	80	
	Biomass	24	
	Height Intercept	29	

CMS Metadata (datasets)			Total number of datasets in CMS by type. All have electronic datasets available.
	Diameter	13	
	Recce	7	
	Seedling	7	
	Sapling	7	
	Continuous shrub	7	
	Discrete Shrub	7	
	Understorey Nonvascular	6	
	Woody Debris	7	
	Number of plots	438	
	Tree diameters records in permanent plots	53,199	
	Tree sapling records in permanent plots	55,609	
	Tree seedling records in permanent plots	20,142	
	Individual species records in reconnaissance plots	26,750	
	Individual cryptogam species records in reconnaissance plots	8147	
	Shrub records in continuous cover plots	912	
	Shrub records in discrete cover plots	6703	
	Coarse woody debris records	7402	

Appendix 1. Listing of new data sets incorporated as electronic copies into NVS, July 2004 – June 2005.

Aorangi-Kawakawa Exclosure 1981 Recce, Diameter, Understorey (plot sheets)
Aorangi-Kawakawa Exclosure 1997 Diameter, Understorey (plot sheets)
Aorangi-Pararaki Exclosure 1982 Recce, Diameter, Understorey (plot sheets)
Aorangi-Pararaki Exclosure 1997 Diameter, Understorey (plot sheets)
Aorangi-Stonewall Exclosure 1985 Recce, Diameter, Understorey (plot sheets)
Aorangi-Tauanui Exclosure 1983 Recce, Diameter, Understorey (plot sheets)
Aorangi-Turanganui Exclosure 1987 Recce, Diameter, Understorey (plot sheets)
Aorangi-Waihora Exclosure 1984 Recce, Diameter, Understorey (plot sheets)
Aorangi-Washpool Exclosure 1986 Recce, Diameter, Understorey (plot sheets)
Aorangi-Washpool Exclosure 1997 Diameter, Understorey (plot sheets)
Blue Mountain Exclosures 2003-2004 Recce, Diameter, Understorey and text file
Eastern Princess Mountains 1975 text file updated.
Eastern Princess Mountains 1982 text file updated.
Egmont, Mount 1976-77 text file updated.
Egmont, Mount 1985 text file updated.
Egmont, Mount 2000-01 text file updated.
Fiordland North 1975-76 text file updated.
Fiordland North 1984-85 text file updated.
Fiordland North 1998 text file updated.
Great Island (Three Kings Islands) 1982-83 Diameter, text file.
Hurunui South 2001-02 Soil data (electronic and hard copy).
Kaimanawa North 1979-80 text file.
Kaimanawa North 1987-88 text file.
Kakahu Bush 2002 Recce, Diameter, Understorey
Karangarua/Copland (Westland National Park) 2004 Recce, Diameter, Understorey.
Kaweka (Cathy Allan plots) 2001 text file updated.
Kaweka 1981-82 text file updated.
Kaweka 1998-2000 text file updated.
Longsound 1977 text file updated.
Nelson, North West 1981-82 text file.
Offshore Islands (North Island) 2004 Recce, Diameter (plots added)
Peel Forest Sycamore Management Study 2002 text file.
Peel Forest Sycamore Management Study 2003 Recce, Diameter, text file.
Pirongia 1979 text file updated.
Pirongia 1987 text file updated.
Pirongia 1999 text file updated.
Puketi Forest 2003 Recce, Diameter, Understorey, text file.
Pureora South Exclosures 1987 text file.
Pureora South Exclosures 1996 text file updated.
Raparapahoe Stream Exclosures 1994 text file updated.
Raparapahoe Stream Exclosures 2000 text file updated.
Raukumara 1982 text file.
Roaring Lion/Beautiful Rivers 1986 text file.
Secretary Island 1975 text file.
Secretary Island 1988 text file (updated).
Secretary Island 2003-04 Recce, Diameter, Understorey, text file.

Tararua 1974-75 text file.
Tararua 1984-85 text file updated.
Tararua 1996 text file.
Tararua 1998-99 text file.
Turnbulls Bush 2003 Recce, Diameter, Understorey and text file, Turnbulls Bush 2003 (1 plot added, text file updated).
Urewera South 1981-82 text file.
Urewera South 1986-87 text file.
Urewera/Waikare 1980-81 text file.
Urewera/Waikare 1985-86 text file.
Wairau South Bank 1972-76 text file updated.
Wairau South Bank 1982-86 text file updated.
Waitutu 1978-79 text file updated.
Waitutu 1996-98 text file updated.
Wakamarina 1984-85 text file.
Windward 1981 text file updated.

Monitoring data from the pastoral lease lands of the South Island have been deposited into NVS. The data collected by a number of organisations over a long period of time have been held by DTZ NZ Ltd. In total 429 datasets from grassland transects on ~140 properties have been amalgamated. Hardcopies of all original data and some electronic data has been transferred along with detailed metadata on each dataset.