

Dryland Intermediate Outcome Newsletter #1

December 23, 2005

We are nearly six months into our 8-year FRS&T-funded 'Dryland IO', the Christmas break is upon us, and it is time I got a regular newsletter underway to tell you all what we've been up to. I'll try to provide a six-monthly updates!

First, thank you again for contributing earlier this year to our July 2005 contract report "Research needs for the conservation of dryland biodiversity – a scoping report" by Susan Walker, Geoff Rogers, Grant Norbury, Theo Stephens and Bill Lee (Landcare Research Contract Report: LC0405/150). The consultation and synthesis process behind this report revealed a wide range of questions that researchers must address if we are to halt dryland biodiversity decline over the next decade. It will be a major challenge to win the funding and focus the skills to do it (see Table 6 on p. 47 of the report). Please let me know if you have not received a copy of the report, or would like another (either hard or pdf).

Planning the Dryland IO

The Dryland IO aims to reverse biodiversity decline in drylands "through increased indigenous woody species dominance and security of threatened biota, and greater appreciation of their value". Larry Burrows, Deb Wilson, Adrian Monks and I have held a series of planning meetings to determine how to go about this, and where we should start. Colin O'Donnell, Geoff Rogers, Mandy Tocher and Theo Stephens (DOC RD&I) assisted us, together with Bill Lee, Mark Smale, Colin Meurk, Grant Norbury (Landcare Research), and Ellen Cieraad (University of Amsterdam).

Researchers also undertook three four-day familiarisation field trips (see below!) and a variety of shorter field visits to broaden our understanding of the variety of ecosystems and seral states the dryland zone holds – and it is a very wide and challenging variety! Thank you so much for facilitating these visits and interpreting what we were seeing.



Dryland researchers Larry, Adrian, Susan, Ellen and Deb - a lunch stop in the Wither Hills

Draft Strategy

Through this planning process, we came up with a three strand strategy for the Dryland IO (outlined in Fig. 1, below). It links the three elements required to achieve our desired outcome.

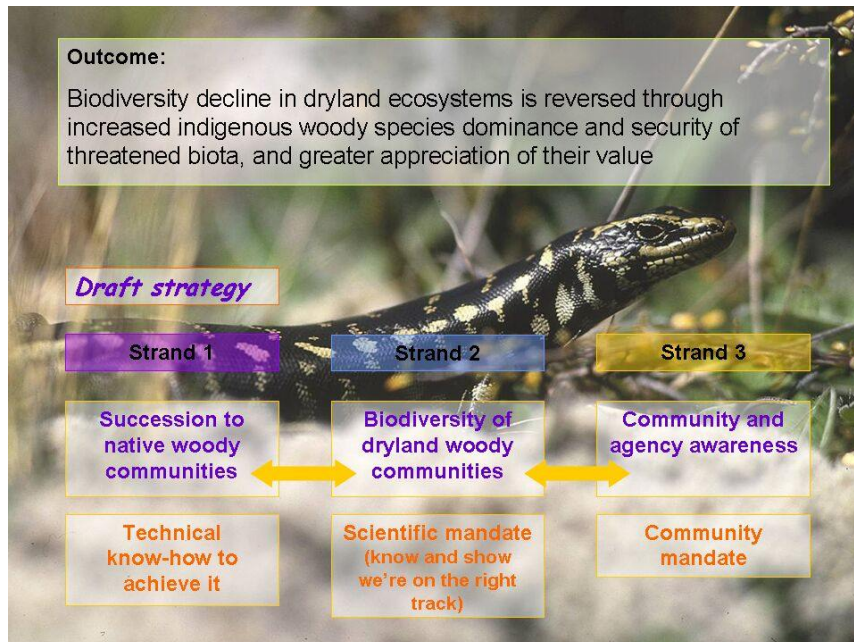


Fig 1: Dryland IO Outcome and research strategy

Strand 1: Succession to native woody communities

The research questions driving Strand 1 are:

- What are the limitations to succession to native woody communities across the dryland zone? and
- What practicable, broad-scale solutions can be developed and implemented to overcome these?

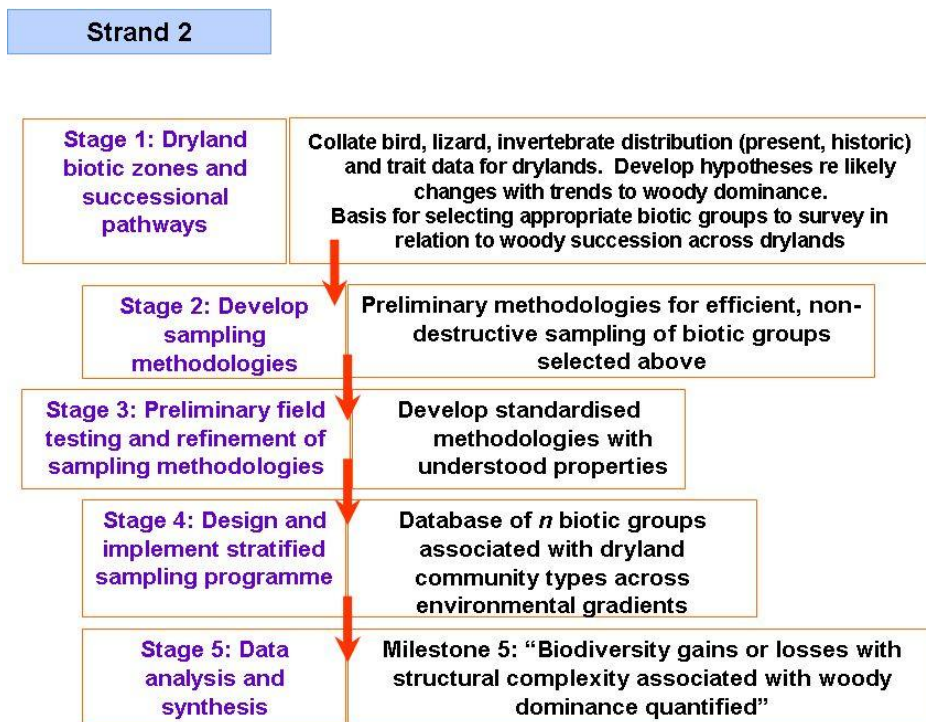
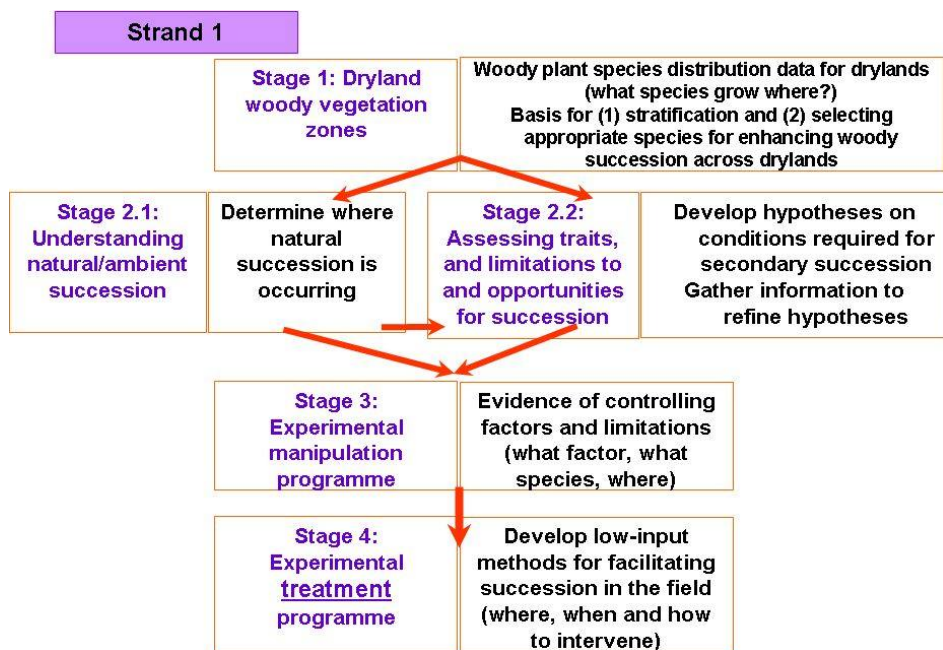
We aim to develop the technical know-how to achieve restoration at broad scales. The work will involve collation of existing data, field studies, determination of traits, and experiments (See Stage 1 flow diagram on next page).

Strand 2 Biodiversity of dryland woody communities

The research question driving Strand 2 is:

- What are the benefits and drawbacks of woody succession for native biodiversity in drylands?

We need to answer this question because our work in Strand 1 is based on the assumptions that emerging woody communities will significantly improve habitat, food, and refuge for indigenous species, minimise conservation intervention required to maintain threatened species, restore more natural ecosystem processes and/or enhance resistance to exotic invasion. These assumptions are as yet largely untested in New Zealand. The goal of the work (see Strand 2 flow diagram next page) is to demonstrate gains and losses associated with woody dominance, and hence test that we're on the right track in Strand 1. However the "stories" (knowledge, data, understanding and arguments) that will accrue from the work will feed directly into the third Strand (Strand 3: Community and agency awareness).



Strand 3 Community and agency awareness

Our goal in Strand 3 is "Improved public appreciation, translating into policy and operational initiatives that improve representation and management of dryland biodiversity". To achieve this, we must integrate research and communication programmes with our partners from the outset. We must also set up systems and media pathways for researchers within the IO so that we effectively transfer biodiversity understanding to the right people, within agencies or community groups, and/or private individuals. To help us get this right, Grant Norbury will lead a project (co-funded by DOC) to consult, strategise and plan. He will be consulting widely in the coming six months.

Work in progress

Strand 1

Ellen Cieraad has spent 7 weeks with us at Landcare Research, Lincoln, working with the Dryland IO on a studentship that completes her Masters degree through the University of Amsterdam. She just this week completed her report: “The role of species interactions in a grassland-woodland transition: a literature review”. The review scans international research on woody successions, highlighting the role and importance of plant-plant facilitation across stress and succession gradients, and providing, as we’d hoped, a great conceptual guide for Strand 1 research! Ellen also covers some of the benefits of increased woodiness, and how shrubs enhance ecosystem services (e.g. water storage and yield). We would like to make her review widely available once it has been duly marked (early next year), and hope she will publish parts of it.

Larry Burrows, assisted by Colin Meurk, is coordinating the compilation of a traits database for dryland plant species that will help to identify species suitable for low-input restoration experiments.

My focus over the last weeks, with much help from Mark Smale and student Nigel King, has been the compilation of available existing spatial data on woody species distributions in drylands. We aim to produce improved potential natural woody vegetation maps for New Zealand drylands, and to determine what woody successions are naturally occurring, and where. This will in turn provide an improved basis for stratifying our experimental work. We are searching PNA and other miscellaneous surveys, herbarium records, Bioweb, etc, and have received a great deal of generous and patient help from IO partners such as DOC, QEII, and Marlborough District Council, and the data administrators of Bioweb, NVS and herbaria. Thank you!! With expert help from Robbie Price (Landcare Research, Hamilton) in January we plan to build a single dryland spatial database to support the Dryland IO research. This should hold existing and future dryland biodiversity distribution data for fauna as well as flora, enabling us to efficiently query and analyse dryland ecological data from multiple sources.

Adrian Monks has completed a discussion document that outlines options for a pilot experimental programme, commencing this autumn. He has also started analysing meteorological data, focusing on extreme events and implications for germination and seedling establishment (partly in collaboration with Colin Meurk and Larry Burrows). He envisages this will contribute to a model of dryland seedling establishment incorporating stochastic dryland climate variation, based on actual historic dryland met. data.

Strand 2

Spatial modelling to map the past, present known, and potential distributions of dryland lizards is underway, led by Mandy Tocher, assisted by Adrian Monks and Jake Overton.

Deb Wilson has commenced developing recommendations for sampling dryland common lizards, ground invertebrates, and structurally complex plant communities. The work this summer involves Landcare Research technicians Gary McElrea, Peter Lei and Richard Heyward, and students Robin Wiedemer, Marcia Green and Ryan Clark, in a partnership with GAOS (the Grand and Otago Skink Recovery Programme – James Reardon and his team) and the dryland component of the FRS&T-funded Multiple Pest Dynamics research Project (Andrea Byrom and Grant Norbury). The team is evaluating the utility of ACOs (artificial cover objects) for determining abundance of common lizards in dryland habitats, and the utility of pine discs for sampling dryland invertebrate occupancy.

Colin O’Donnell will work with us next winter to systematically develop the basis for selecting appropriate biotic groups to survey in relation to woody succession across drylands, and develop hypotheses regarding likely changes with trends to woody dominance.

Strand 3

Grant Norbury, with Dryland IO-aligned co-funding from DOC, is planning a programme of participatory community science projects and science transfer activities in drylands. We will also continue to working alongside operational teams in agencies to reach their goals, and to take all opportunities to engage formally and informally with agency plans and policy.

Partnerships

We look forward to working in partnership with Marlborough District Council's exceptional Significant Natural Areas (SNA) Project towards the outcome of improved protection of natural areas on private land in Marlborough. A pilot partnership project will generate a potential woody vegetation map for dryland Marlborough (a specific subset of our spatial data collation project; see Strand 1, above). The Council will use the map in their SNA programme to further inform and engage landowners in the protection of their natural areas. The Council's consultant, Paul Millen, will work with us (i) to liaise with private landowners who may be willing to grant permission for this use of data from their properties, and (ii) with the Council's consultant ecologists, who will assist the IO with expert local knowledge.

I have already mentioned our developing partnerships with DOC's GAOS and the dryland component of the Multiple Pests Dynamics project. Strand 2 work so far this year has also benefited from work by two summer students funded by the FRS&T funded Pests in Landscapes project.

Celebrations

On 4 November nine critically endangered Otago skinks were welcomed home to the Alexandra Basin for the first time in 30 years since their local extinction. The ceremony also formally launched the Central Otago Ecological Trust (COET), chaired by Grant Norbury in a private capacity. COET is raising funds to establish the nation's first dryland sanctuary. They will erect a predator-proof fence around a 22ha Mokomoko sanctuary near Alexandra, in order to reintroduce Otago skinks and other locally extinct species such as Duvaucel's gecko. The event was a partnership between COET, DOC and Landcare Research. Guests of honour included the Prime Minister Helen Clark, the Attorney General, David Parker, the Assoc Minister for Conservation, Mahara Oteroa, the Otago MP, the Central Otago District Mayor, and members from 5 runanga o Ngai Tahu. A wide cross section of the community attended. The skinks are now housed in specially-built enclosures in Alexandra. They attract visitors every day, and are proving great flagships for dryland conservation issues.



The Prime Minister welcomes a dryland icon – an Otago skink - back to Alexandra

Proposals supported

The Dryland IO has supported the preparation of two TFBIS proposals (for submission in the January 06 round) that will enhance the Dryland IO. The first is Trent Bell's proposed online website encyclopaedia of New Zealand lizards. This will provide the one-stop information source desperately needed to improve understanding of dryland lizard diversity and stimulate awareness of their conservation needs. There are great potential synergies between Trent's proposal and our desire to build a community data entry website for dryland lizards in the IO. The second bid is Mark Smale's proposal for survey and inventory of North Island dryland forest, most of which remains only as small fragments, whose composition is very poorly known. If funded, Mark's proposal will plug a highly important gap in dryland biodiversity data. We are holding thumbs that both proposals succeed!

Publications and documents July-December 2006

- Geoff Rogers, Susan Walker and Bill Lee's *Science for Conservation* 258 "The role of disturbance in dryland New Zealand: past and present" has just been released. The web link is <http://www.doc.govt.nz/Publications/004~Science-and-Research/Science-for-Conservation/089~2005.asp>. In this paper, we examine the proposition that disturbance, in the ecological sense, is necessary for persistence and recovery of rare-plant habitats in open vegetation of dry eastern New Zealand. We discuss how a predominant pre-settlement regime of disturbance by large browsing birds, and seed dispersal and pollination by birds, bats, geckos and skinks, has been replaced by one dominated by humans and their activities, plus a mostly mammalian fauna with novel modes of herbivory and different consequences for ecosystem function
- Susan Walker, Geoff Rogers, Grant Norbury, Theo Stephens and Bill Lee (2005). Research needs for the conservation of dryland biodiversity – a scoping report. Landcare Research Contract Report: LC0405/150. It's available on request from me!

Thanks!

Landcare Research researchers in the Dryland IO are enormously grateful for the support and assistance we have received in the work so far. Covenantors (the owners of Haupouri Station, the Liebenows of Mahana Station, the owners of Awahiwi Station, and the MacLarens of Ahi Paku Station) and Regional Reps (Marie Taylor and David Marsh) from the QEII National Trust, DOC Area Offices (Ken Mills - Onga Onga and Gary Foster - Masterton), and John MacLennan, were wonderfully hospitable and helpful on our North Island familiarisation trip. Marieke Lettink, Jim Ward, Jan Clayton-Greene, Steve Cranwell, Cathy Jones, Simon Moore, Mike Morissey, Kennedy Lange, Nick Head, Phillip Grove, Grant Norbury, and John Hunt gave every assistance with field visits in the South Island. Theo Stephens, John Barkla, Clayson Howell, Simon Moore, Jan Clayton-Greene, Cathy Jones, Shannel Courtney, Phillip Simpson, Colin Meurk, Jake Overton, Susan Wiser, Aaron Wilton, Jane Cruikshank and Hazel Broadbent patiently helped with our numerous requests for data and information. We thank James Reardon and the GAOS team for facilitating our work at Macraes and for consistently top feedback into the research. DOC RD&I scientists Colin O'Donnell, Geoff Rogers, Mandy Tocher and Theo Stephens have put invaluable time and thought into the planning and shaping of the IO, and many others have readily shared their ideas, methods, and experience. We also warmly thank Paul Millen, Ian Shapcott and Richard Keyes for getting our partnership with Marlborough District Council off to a great start.

Susan Walker, Landcare Research, Private Bag 1930, Dunedin

Tel: 03 479 9750, Fax 03 477 5232 Email: walkers@landcareresearch.co.nz