



# BEST Symposium

## Summary

**1 May 2019**  
**National Library**  
**Wellington**

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**About this summary** This summary is a compilation of the workshop notes from the Biodiversity and Ecosystem Services symposium hosted by the MBIE BEST programme research team at the National Library, Wellington held on 1 May 2019.

**Participants** A list of workshop participants is included in **Appendix Two**.

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**Agenda** The table below sets out the Symposium agenda

Time	Session
9.00am	Tea/coffee/registration
9.15am	<b>Welcome &amp; overview of the day</b>
9.40 am	<b>What is the BEST programme?</b> – purpose & highlights of the programme <i>Suzie Greenhalgh, Manaaki Whenua Landcare Research</i>
10.00am	<b>Reflective plenary: Audience use and understanding of ecosystem services and biodiversity to underpin their decisions</b>
10.30pm	Morning Tea
11.00	<b>Session 1: Ecosystem service – landcover relationships</b> <i>Jason Tylianakis and Carla Gómez-Creutzberg, University of Canterbury</i>
<b>12:00</b>	<b>Session 2: Te weu o te kaitiaki – The roots of the guardian</b> <i>Phil Lyver, Manaaki Whenua Landcare Research</i>
1:00 pm	Lunch
2:00pm	<b>Session 3: Biodiversity and farm planning</b> <i>Alec Mackay, AgResearch and Fleur Maseyk, The Catalyst Group</i>
3:00pm	<b>Session 4: Ecosystem services in decision making – learnings from 2 catchment processes</b> <i>Suzie Greenhalgh, Manaaki Whenua Landcare Research</i>
4:00pm	<b>Closing plenary: what would you do differently tomorrow?</b>
4:25pm	<b>Closing remarks</b>
4:30pm	Forum ends

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**Aim of the Symposium**

- To share and discuss the findings from four workstream areas within the Manaaki Whenua – Landcare Research-led BEST research programme (Building Biodiversity into an Ecosystem Service-based approach for Resource Management)
- To identify from this work, the implications, opportunities and next steps for incorporating biodiversity and ecosystems services into day-to-day decision making.
- By the close of the Symposium, we hope each participant will have identified at least one application from the research in respect of biodiversity and ecosystem services for their work area, along with the initial steps and support needed to achieve this.

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# Workshop Notes

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## Session 1: Ecosystem service – landcover relationships

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### **Ecosystem service – landcover relationships**

The session was presented by Carla Gómez-Creutzberg, with support from Jason Tylianakis of the University of Canterbury.

Working in eight breakout groups, participants recapped the topics traversed, and the areas for which the findings affirmed their own understanding. Participants then addressed the following questions:

*What was a surprise?*

*How and to what area of your work could you apply this knowledge?*

*What else would you need to more easily use information like this in your work?*

The compiled responses to these questions are detailed below.

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### **What was a surprise?**

Aspects that were reported as a surprise were:

#### *Provision of Ecosystem services*

- Monoculture/food production provide ecosystem services
- Native forests don't provide all ecosystem services
- Low-producing grassland producing some services similar to indigenous forest
- Comparatively low value of indigenous forest for ethical and spiritual values
- Low producing grassland provided similar ecosystem services to forest cover
- Productive grassland was the only land cover that had been compared to all other land covers included in the assessment
- Native forest and low production grassland were clustered together in terms of similarities in provision of ecosystem services

#### *Gaps*

- Flat topography versus rolling topography versus soil types (suitabilities) were not included
- Many unexpected gaps in data with some land covers and ecosystem services
- Not identifying limitations between stocks and services, i.e. these are not inter-tradeable.
- A number of gaps that signals areas of potential future research
- Very little data on traditional ecological knowledge

### *Other*

- We can alter the natural environment to improve ecosystem service performance
  - Landcover could be a surrogate for biodiversity at the broad scale
  - State/condition of land cover is going to influence the provision of ecosystem services, e.g. organic production versus not organic
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### **How and to what area of your work could you apply this knowledge?** *Management and decisions*

- In the management of resources that are linked to each other
- To support land use decisions, especially where resources are depleted
- Use to see potential impacts on LUC (land use capability) scenarios (e.g. low producing grassland to trees)
- Use to promote resilient landscapes, e.g. impacts lots of trees (what are we gaining and what are we losing)
- Use to convince people downstream of what the impacts are of decisions
- Need more intergenerational thinking. This may help work through what are the landcovers and where should they go
- Application to farm-level management/informing restoration strategies
- Understanding what the effects are on Ecosystem Services of an individual organisation
- To support landscape thinking where environmental and financial sustainability are important to understand regional tradeoffs and long term thinking and planning
- Farm plans/spatial planning → use to help move services and land uses around the landscape
- Implications of land use change at landscape scale, e.g.
  - Land urbanisation
  - Irrigation – for storage of water on a property
  - Plantation forestry and erosion

### *Policy*

- Should/can be translated into regulations/implementation
- Look at broader effects on ecosystem services of single-issue policies (e.g. what happens when all land users in an area move to trees such as One Billion Trees programme)

### *Engagement and communications*

- We need to persuade developers of the value of ecosystem services and sustainability
- Useful tool for communication or for decision making
- Educating decision-makers on the relationship of ecosystem process and biodiversity
- To stimulate decisions of the impacts of decisions, e.g. conversations about dairy conversions
- Helps (demonstrate) recognise the value of remnants and the functions they provide (don't destroy these remnants to maximise another service)

- To better explain ecosystem function which is not well understood (value of a mosaic in the landscape)
- To educate people on the values/services flowing from different land covers
- To discuss what ecosystem services orchards provide and the effect of surrounding land on the flow of services

#### *Research*

- Scenario modelling (for catchments) – and discussions trade-offs between ecosystem services

#### *Other*

- To support landscape thinking where environmental and financial sustainability are important to understand regional tradeoffs and long-term thinking and planning
- We need more landscape thinking and how to manage landscapes, e.g. for erosion
- To compare long term land protection versus capital gains
- Statistics putting together ecosystem services accounts
  - Trying to understand complex interactions for final basket of services
  - Spatial aspect still difficult to consider

#### **What else would you need to more easily use information like this in your work?**

##### *Additional information and data*

- Traditional ecological knowledge (i.e. including mātauranga Māori)
- Putting a value on ecosystem services (e.g. CBA (cost-benefit analysis) is complex)
- More information about scale (both geographic and social scales)
- Guidance on appropriate scales
- Further disaggregation of indigenous systems to show their value for landowners
- Application in an urban area. Could we improve well-being by getting a mosaic in urban space and therefore get multiple services
- Need for a more ‘nuanced’ typology around land-covers (with within class variability)
- Need to tighten up description of links between “biodiversity” and “ecosystems services”
- A more detailed matrix of selected groups or individual ecosystem services or land use
- Need national level data
- Better understanding spatial effects
- Data on historic land use change
- More information on abiotic factors and soil data
- Finer scale data especially at farm scale/property level
- More detail on other land use covers (e.g. wetlands) and the underlying land resource (i.e. soils), slope and the interaction with cover and biodiversity

- Analysis is quite high-level so information on who benefits and where would be helpful
- More information on whether it is possible/feasible to aggregate the numbers into a single number (e.g. like the Living Standard Framework). If not possible, how could we communicate the information more easily
- More insights into how to account for different values that individuals may hold
- Insights into how the matrix may change between regions/landscapes would be helpful
- Clarification if it is possible to take account of spatial effects, e.g. interactions in a multi-functional landscape
- More information on how to use the matrix

*Linking to tools and frameworks*

- Bringing in the spatial modelling component and linking it to existing models
- Knowledge to aggregate this information for initiatives like the Living Standards Framework

*Policy and perception changes*

- Changes in policy landscape
- Separate NPS (national policy statement) on ecosystem processes as it doesn't always align with biodiversity
- Ensure there is a focus on ecosystem processes
- Because of differences in the 'value' people have it is hard to get a common belief. Therefore, we need a way to articulate these values and show what land covers provide in terms of ecosystem services

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## Session 2: Te weu o te kaitiaki – The roots of the guardian

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### Te weu o te kaitiaki – The roots of the guardian

The session was presented by Phil Lyver (Manaaki Whenua – Landcare Research), with support from Puke Timoti (Tuhoe Tuawhenua Trust)

Working as a plenary, participants checked understanding of words and terminology and recapped the topics covered. Some key words included:

**Whakapapa:** the interconnectedness between all elements of the living and non-living realms. It refers to the tangible and intangible genealogical connections, relationships, and linkages between the natural environment and the cosmological domain)

**Mauri:** the representativeness and condition of the relationships and responsibilities between elements of whakapapa; it also denotes the interconnectedness and appropriate sequential order of elements within whakapapa)

**Mana:** authority, prestige, agency

**Ihi:** a measure of the vitality of mauri and mana of the environment and tangata whenua.

**Tapu:** (closely aligned to wairua) something that is set apart, sacred, or forbidden with an untouchable quality. It has innate qualities drawing those from its origins within whakapapa. The application of tapu places animate or inanimate objects under restriction, therefore often imbuing those objects with mana or a greater level of reverence. The function of tapu was to provide boundaries and protect the mana and mauri of a place, object, time, species, person, or people

**Ahikaaroa:** important for identity, having a place to stand, and for the mandate to make decisions at a place and for people)

Participants then addressed the following questions:

*How does your organisation currently support and enable the relationship and connection that tangata whenua have with their environments?*

*Regional councils*

- Via co-design and co-management
- Have specific committees – Māori committee and regional policy group
- Local hapu engagement
- Through policy direction. Looking at Mātauranga Māori and how to integrate through all council business
- Committees consist of local Māori and they provide their aspirations and needs. They work as a partner in the process (e.g. Canterbury Water Management Strategy)

*Universities*

- Through culturally responsible teaching practice. This may be still a little aspirational. Have specialists to help teach Pacific and Māori students

*What new approaches from the presentation could you apply?*

- Ecological baselines: There is great value in understanding historic ecological baselines' or 'reference ecosystems' as they can provide insights into what a restored population or ecosystems could potentially look like. These ecological baselines are helpful for a) understanding the scale of losses or creeping degradation, and b) consider what can be done/needs to be done over what timeframe to improve desired outcomes
- The issue of shifting ecosystem baselines recognises that how communities perceive the health and condition of an ecosystem can be affected inter-generationally. Restoration or environmental management projects should think about this issue when considering how they measure their 'restored' habitats. For example, a 'large' kereru flock was 300 birds for a kaumātua, 50 birds for a middle-aged person, 5 birds for a young person
- This means mainland islands such as 'Maungatautari' are critical to reset the baseline, as are memories of our eldest people. Areas that



have been rehabilitated (with pictures and data of what they used to be like) are also really important to show the outcomes of interventions and beneficial 'halo' effect and to understand limitations

*What might get in the way of applying this (these)? And what could you do to overcome these barriers?*

#### *Relationships*

- To foster the new relationships with Māori organisations:
  - Need a diversity of staff to honour these relationships
  - Need to value relationships for real (not as a tick box exercise)
  - Need to extend relationship through the whole organization
- Longevity of relationship
  - Engage with Māori organisations on multiple issues at the same time. Don't meet with them on separate issues; try to get efficiencies in engagement (and be realistic about timeframes)

#### *Policy*

- Impacts of policy
  - The impact of water allocation, e.g. the grandparenting water allocation approach disadvantages undeveloped iwi land. Other approaches could be better
  - Existing uses and the fact they are provided for as a right in statutory plans means that those uses have lots of power. This means longer term solutions/approaches which may be more sustainable solutions are more difficult to implement
- Mauri and holistic nature of Phil's approach is helpful, but this can be lost in the planning process

#### *Capacity*

- Capacity – time to engage by Māori is currently very limited
  - With regional councils, engagement seems more ad hoc and on issues when needed
  - Regional councils need to give effect to the Treaty as well
- Regional councils are lacking in terms of their approaches and mechanisms for engaging tangata whenua

#### *Other*

- Determine the linkages between economic development and mauri. What are the trade-offs that communities might have to consider, e.g. the ability to source wild foods
  - Ecosystem service markets may be a solution, e.g. pay for ecosystems services from the land)

- Knowing Marae/Iwi/Trust structure so can go to right place for the various issues/questions

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## Session 3: Biodiversity and Farm Planning

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### **Biodiversity and Farm Planning**

Presented by Alec Mackay, AgResearch, with support from Fleur Maseyk, The Catalyst Group. Working in caucus areas in break-out groups, participants recapped the topics covered, and identified aspects with which they connected and that concerned them. Following this, participants addressed the following questions:

*Given what you have heard about the need to have integrated farm planning, what are the implications for us when:*

- *developing national level policy?*
- *developing regional level policy?*
- *working with natural resource management decision makers?*

*Thinking about your sector/role, what can we do individually and collectively to:*

- i) promote integrated farm planning (farm plans that include biodiversity) and*
- ii) facilitate implementation of integrated farm planning? (e.g. government/industry discourse on farm environmental plans)*

*What support will we need to do this?*

The compiled responses to these questions in relation to each of the three focus areas are set out below.

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### **National-level policy**

Responses to the questions above for national-level policy:

*Data/resource needs*

- Need vegetation mapping of pre and post 1990 forest
- Need additional farm planning resources for rural professionals, e.g. how to link across riparian/freshwater quality to benefits for biodiversity
- Ability to track trends and direction of travel, e.g. using tools like Overseer but there is not one available for biodiversity
- Tools to measure and link impacts of farming methods to the environment, e.g. for water quality and biodiversity
- There is a need to bridge the gap with science through more applied research and demonstration cases for good plans
- Establish baselines and what good, better and different biodiversity would look like
- Develop new understandings of how farms link to landscape diversity
- Helpful to have mapping services available to all farmers

#### *Available resources*

- Many industry groups already have farm plans (e.g. Dairy NZ/Beef and Lamb/Deer: LEP (Local Environmental Plan); and Horticulture has GAP (New Zealand Good Agricultural Practice). They all have the same building blocks:
  - What is the farm resource?
  - What is needed?
  - How do you manage the resources you have?

#### *Policy levers*

- Incentives to promote integrated farm planning are needed. Perhaps the Common Agricultural Policy in EU could be a suitable model to follow
- Consider social aspects in any policy, e.g. aesthetic values of the workplace which could link to health policies
- What is the potential to have private reserves that are not in perpetuity?
- More incentives to take land out of production

#### *Policy development processes*

- Recognise there are two aspects required for planning: farm- and catchment-level plans
- Policy needs to understand how farmers and farms work and how the policy may work on a farm. This understanding could be facilitated through field trips by policy people to farms
- During policy development and implementation recognize value of alternative benefits
- Don't penalise landowners who have voluntarily already made improvements or Māori landowners who may not yet have 'developed' to the extent of others

#### *Knowledge transfer and communication*

- Guidance and extension services are needed to let farmers know about it and then support them as they undertake integrated plans
- A single message from science and government is needed
- Farmers learn best from farmers

#### *Implementation*

- Enforcement of existing policy, e.g. Wildlife Act
- Better oversight of the biodiversity parts of plans: 'lost is lost' for some biodiversity
- More technical capacity to develop integrated farm plans. Currently there is a shortage of rural professionals

#### *Other*

- Beef & Lamb – 25% of biodiversity is on their farms. Farmers must associate with and have some values for biodiversity
- Advocates need to raise concerns, e.g. poor/inaccurate mapping
- Remember there are long collective memories of SNA (Significant Natural Areas) balls-up

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**Regional-level policy**

Responses to the questions above for regional-level policy:

*Policy and plans*

- National targets for all aspects of biodiversity and land-use types would help the development of regional policy and plans
- With many different types of farm plans it is confusing as they are all slightly different. Central government should standardize the basis of all farm environmental plans
- District plans can be really important for maintaining/increasing biodiversity (need to avoid impacts not protect); however, there is little guidance on when and where to 'avoid'
- Policy and plans should consider how to promote/protect the rarer (low land) biodiversity on private lands
- Regional policy should identify the different ecosystems, where they are and where they were
- Plans should develop integrated catchment plans (soil, water and biodiversity)
- Policy and plans should take risk-based approach to where and what to manage differently within a farm
- Start with those areas where have overlapping aim with protecting biodiversity (e.g. carbon sequestration) and other potential economic benefits
- Regional councils are often about prioritise – incentivise – regulate. However, they don't tend to do the incentivise step very well. Perhaps there is some scope for incentivising/paying farmers compensation for their contribution, especially often don't do something because they can't afford it

*Institutions*

- There are often internal conflicts within regional councils. This often results in tension within the council, e.g. where there are different priorities between biodiversity vs economic/regional development. To be effective in this space needs a cohesive, whole-of-organisation approach
- To integrate properly we need to connect across all parts of the Council and then across all stakeholders. This is needed to promote and facilitate integrated farm and catchment planning

*Monitoring*

- Need better monitoring to see how successful biodiversity policy has been
- Need outcome monitoring, not how much you 'kill'.
- Improve compliance with existing policy and plans

*Implementation*

- Promote integrated farm plans through biodiversity strategies, including getting a commitment at the sector level
- All councils incorporate biodiversity and ecosystem services into their farm plan and land management approaches

- Being able to demonstrate to landowners where they fit in the regional/catchment picture will better facilitate the development of integrated farm plans
- There are resourcing challenges where there is not enough staff to support farm plan development (let alone integrated farm plans) and then to audit the plans. There is some risk with the same organisation doing farm plan development and auditing them

*Other*

- One implication is that when protecting biodiversity/restore biodiversity there may be other unexpected ramifications (e.g. what happens to flooding and water tables and the effects on them)

**Natural resource manager decision making**

Responses to the questions above for the natural resource manager:

*Tools and resources*

- To roll out integrated farm plans practitioners/resource managers will need:
  - examples of ecosystem services and their multiple benefits
  - an understanding of what is happening at the regional scale and connectivity between ecosystems across the region
  - good information of the land resources of each farm
- Make integrated farm planning easy!! (and attractive)
- Have easily accessible and useable resources (e.g. tools and templates) to help land managers make decisions. Include both positive and negative aspects
- Develop a cross-agency scorecard to show how an integrated farm plan may meet the different requirements of different agencies (or even sections within the same agency)
- Address gaps in knowledge, e.g. traditional knowledge, integration.

*Engagement and communication*

- Profile success stories around the benefits of integrated farm planning. However, these stories should consider heterogeneity in both ecosystem service flows and landscapes
- Demonstrate how integrated farm planning can add value to the land managers' business
- During implementation be aware of the industry/target the group being engaged and ensure messaging is appropriate for that group
- Use terminology that land managers understand and can relate to
- Establish forums to allow land managers, councils, industry and researchers to engage effectively around integrated farm plans with the aim of finding common ground around look and feel of the farm plans and appropriate engagement strategies. Providing opportunities for these groups to present at farm days could also be beneficial

*Implementation*

- Use other community members and farmers as champions and to promote integrated farm planning. This will help spread the message of the need for this kind of planning more quickly

- Build stronger relationships and trust with landowners. Ask these landowners to provide examples that can share with others. Once you get one person starting to develop an integrated farm plan in an area then others are likely to also start moving
- Have less central government involvement during the implementation phase
- During implementation have greater cooperation between council and industry
- Focus on ecosystem service flows rather than environmental issues when rolling out integrated farm planning
- Remember some flexibility is required during implementation to meet the specific needs of the farmer

*Other*

- Identify policies that work against each other in the context of contradictory signals for an integrated farm plan and resolve these
- Regulation is a necessary but only for the laggards are regulation should not be the primary way to drive change, in this case the development of integrated farm plans

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## Session 4: Ecosystem services in decision making – learnings from two catchment processes

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**Ecosystem services in decision making – learnings from 2 catchment processes**

This session was presented by Suzie Greenhalgh, Manaaki Whenua – Landcare Research. Working as a plenary, to recap key aspects from the case studies, likes, and concerns, participants reflected on:

*What were some of the implications for their jobs from what they had heard about the processes?*

*What were some things you were going to do tomorrow based on what you they had heard?*

**Likes and concerns about the catchment processes**

*What participants liked about the catchment processes:*

- Breaking out the costs of different options so that landowners could see where the cost were and also for them to understand what they could do to reduce those costs from their perspective
- The catchment process in the Mangapiko brought together different areas of council with different KPIs (key performance indicators) enabling them to interact and try things they would not normally do (e.g. change approach to willow clearance and stream restoration)
- The Rangitaiki catchment was a largely forested catchment rather than a ‘trashed’ catchment
- The two processes dealt with different scales with one case looking at what the benefits were to farmers

*Some of the concerns about the catchment processes:*

- How transferable such a process may be to areas such as peri-urban areas
- Corporate agribusinesses are not individual farmers and not sure how you would get optimal outcomes when a farm is managed from afar. So, we may not get the same kind of outcomes where there are more corporate farming operations
- Potential costs of running these types of catchment processes

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**Implications for your job and what will you do tomorrow**

Implications for the jobs of participants:

- That participatory processes can be used for more than just water issues
- That these kinds of processes can work across scales
- The need to be more explicit about ecosystem services (many people do it but just don't talk about it)
- You can use ecosystem services and catchment processes to see the broader benefits of land management
- The challenge is resources, not necessarily the willingness
- Need to know what data is needed to track biodiversity, believe we need more specificity on what aspects of biodiversity is being talked about
- Need to work out how farm environmental plans (FEPs) are being used (it is not a compliance tool). We shouldn't expect all FEPs to be the same

Actions participants identified they could/should take on board immediately:

- Use consistent terminology
- Try to bring ecosystem services into the biodiversity protection story (but still looks like we need more data/info to help tell that story)
- Try to apply the Māori worldview more broadly. We often look at things from an environmental perspective, but we need to think more from a worldview perspective

## Appendix One: Research team

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### Research Team contact details:

#### Manaaki Whenua Landcare Research

Suzie Greenhalgh – Programme lead; specialises in environmental policy, decision-making and ecosystem services.

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Philip Lyver – Māori researcher/Kaiarataki; specialises in the interface ecological science between Traditional Ecological Knowledge.

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Lara Taylor – specialises in the articulation and use of Māori values to guide policy development.

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Fraser Morgan – specialises in spatial agent-based modelling.

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Robyn Simcock – specialises in reconstructing New Zealand ecology in working landscapes to deliver ecosystems services.

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Ben Wiercinski – specialises in understanding agriculture technology and best practice adoption.

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#### Scion

Eckehard Brockerhoff – specialises in biodiversity and ecosystem service relationships in production landscapes.

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#### University of Canterbury – School of Biological Sciences

Jason Tylianakis – specialist in ecosystem services and their response to land-use practices at different scales.

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Carla Gómez-Creutzberg (PhD Student) – specialises in landscape planning of ecosystem services.

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Laureline Rossignaud (PhD Student) – specialises in biodiversity and ecosystem services in relation to land use and surrounding land covers

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**University of Auckland – School of Environment**

George Perry – specialises in developing/evaluating empirically informed spatial simulation models of ecosystem change past and present.

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Breanna Powers (PhD Student) – specialises in ecosystem services and land-use and cover change modelling in multi-functional landscapes.

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**Catalyst Group**

Fleur Maseyk – specialises in regional policy development for the protection of indigenous biodiversity.

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**Tuhoe Tuawhenua Trust**

Puke Timoti – Māori researcher/kairangaha; specialises in mātauranga Māori.

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## Appendix Two: Symposium Participant List

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<b>Attendee</b>	<b>Organisation</b>
Alec Mackay	AgResearch
Althea Francis	Ministry for the Environment
Andrea Brandon	Ministry for the Environment
Aprille Gillon	Greater Wellington Regional Council
Astrid van Meeuwen-Dijkgraaf	Wildland Consultants Ltd
Ben Wiercinski	Manaaki Whenua–Landcare Research
Brad Howlett	Plant & Food Research
Breana Powers	University of Auckland
Carl McGuinness	The Nature Conservancy
Carla Gomez-Creutzberg	University of Canterbury
Charlie Clark	Stats NZ
Cordelia Woodhouse	Environmental Defence Society
David Hicks	Environment Southland
Don Vattala	Environment Canterbury
Eckehard Brockerhoff	Scion
Eduardo Villouta Stengl	DOC
Dr Femi Olubode-Awosola	Waikato Regional Council
Fleur Maseyk	The Catalyst Group
Fraser Morgan	Manaaki Whenua – Landcare Research
George Perry	University of Auckland
Graham Sevicke-Jones	Manaaki Whenua – Landcare Research
Heidi Irion	Ministry for the Environment
Jacqui Todd	Plant & Food Research
Jamie Steer	Greater Wellington Regional Council
Jason Tylianakis	University of Canterbury
Jo Fagan	Greater Wellington Regional Council
Justin McCarthy	Greater Wellington Regional Council
Kate McAlpine	Department of Conservation
Katherine Short	Terra Moana
Lara Taylor	Manaaki Whenua – Landcare Research
Laureline Rossingnaud	University of Canterbury
Lucy Baker	Greater Wellington Regional Council
Mark Mitchell	Hawke’s Bay Regional Council
Matthew Vare	Waikato Regional Council
Melanie Davidson	Plant & Food Research
Michelle Rush	Participatory Techniques Limited
Mike Harré	Biosecurity New Zealand
Owen Spearpoint	Greater Wellington Regional Council
Pen Tucker	Horizons Regional Council
Peter Bellingham	Manaaki Whenua – Landcare Research

Phil Lyver	Manaaki Whenua – Landcare Research
Puke Timoti	Tuhoe Tuawhenua Trust
Rachael Brown	Otago Regional Council
Robyn Simcock	Manaaki Whenua – Landcare Research
Roger Uys	Greater Wellington Regional Council
Samantha Hill	Auckland Council
Sophie Hale	Motu Research
Steve Smith	Ministry for the Environment
Susan-Jane Owen	Department of Conservation
Suzie Greenhalgh	Manaaki Whenua – Landcare Research
Tamsin Rees	Manaaki Whenua – Landcare Research
Tanya Cornwell	DairyNZ
Tarryn Wyman	Greater Wellington Regional Council
Tom Corser	Ministry for Primary Industries
Tom Kay	Forest & Bird
Victoria Lamb	Beef + Lamb NZ

## Appendix Three: BEST programme overview

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~ BEST ~

### **Building biodiversity into an ecosystem service-based approach for resource management**

Nature provides many services that underpin New Zealand's economy: nutrients and water for primary production, aesthetic and recreation services for tourism, and decreased risk of natural hazards such as flooding. For Māori, elements of ecosystems and their linkages form the basis of whakapapa and kaitiakitanga principles and support customary foods important for health and well-being.

Managing ecosystems well will boost the productivity and value of NZ's environment-based industries. However, development and intensification of land use results in changes to ecosystem services and biodiversity.

Our research is to help land managers make more informed natural resource management decisions that preserve options for future resource use and enhance the value derived from NZ's landscapes. We have developed new knowledge, tools and approaches, including cultural, to better understand how biodiversity and ecosystem services underpin human well-being and provide evidence of how human activities impact on biodiversity and modify ecosystem services. We have developed and applied new processes built around ecosystem service concepts to enhance natural resource management.

Through our research we have engaged primary industry, Māori, communities, and regional and central government agencies in participatory case studies to explore biodiversity and ecosystem service relationships and incorporate their thinking into refined modelling tools and decision-making processes.

Our research brings together a broad base of expertise (ecologists to economists) from CRIs (Landcare Research, AgResearch, Scion) and universities (Canterbury, Auckland), with collaborations with researchers in England, Germany and France.

#### **Research Overview**

Our research focuses on three research areas:

- *Linking biodiversity, ecosystem services and land cover*: Using existing studies through meta-analysis to identify relationships between land cover and ecosystem services and bringing together scientific knowledge and Mātauranga Māori (Māori traditional) knowledge to develop bi-cultural indicators of biodiversity and ecosystem services.
- *Exploring alternate future landscapes and landscape change*: Developing the modelling capability to represent the spatial dynamics of biodiversity, ecosystem services, and human behaviour by integrating a suite of models that represents different elements of landscape change.
- *Integrating biodiversity and ecosystem services into decisions*: Working with land and water managers to help them identify their dependency and any positive and negative impacts on native biodiversity and the flow of ecosystem services from their decisions. This involves developing a participatory decision-making framework focused on biodiversity and the flow of ecosystem services within a landscape.

## Research highlights and relevant contacts

Research area	Contact details
<b><i>Ecosystem services &amp; decision-making</i></b>	
BEST ecosystem service assessment framework	Suzie Greenhalgh: GreenhalghS@landcareresearch.co.nz Estelle Dominati: Estelle.Dominati@agresearch.co.nz Alec Mackay: alec.mackay@agresearch.co.nz
Rangitaiki land use scenarios participatory process	Suzie Greenhalgh: GreenhalghS@landcareresearch.co.nz Estelle Dominati: Estelle.Dominati@agresearch.co.nz Alec Mackay: alec.mackay@agresearch.co.nz Fraser Morgan: morganf@landcareresearch.co.nz
Mangapiko biodiversity restoration participatory process	Suzie Greenhalgh: GreenhalghS@landcareresearch.co.nz Robyn Simcock: simcockr@landcareresearch.co.nz Estelle Dominati: Estelle.Dominati@agresearch.co.nz
<b><i>Māori, biodiversity &amp; ecosystem services</i></b>	
Tūhoe Tuawhenua worldview framework and environmental conservation Biocultural indicators for forests, forest monitoring, Māori values and forest ecosystem service mapping,	Phil Lyver: lyverp@landcareresearch.co.nz Puke Timoti: puketimoti@gmail.com
<b><i>Land cover, biodiversity &amp; ecosystem services</i></b>	
Relationship between land cover and ecosystem services	Carla Gómez-Creutzberg: cgomezcre@gmail.com Jason Tylianakis: jason.tylianakis@canterbury.ac.nz
Pollination and biological control ecosystem services	Laureline Rossignaud: laureline.rossignaud@pg.canterbury.ac.nz Ecki Brockerhoff: eckehard.brockerhoff@scionresearch.com
<b><i>Modelling</i></b>	
Agent-based Rural Land Use NZ (ARLUNZ) model (farmer behaviour + economics)	Fraser Morgan: morganf@landcareresearch.co.nz
Ecosystem service pollination model	Bre Powers: bpow072@aucklanduni.ac.nz George Perry: george.perry@auckland.ac.nz
<b><i>Farming, biodiversity &amp; ecosystem services</i></b>	
Farm plans: Integrated farm planning and incorporating biodiversity in farm plans	Alec Mackay: alec.mackay@agresearch.co.nz Fleur Maseyk: fleur@thecatalystgroup.co.nz Estelle Dominati: Estelle.Dominati@agresearch.co.nz Suzie Greenhalgh: GreenhalghS@landcareresearch.co.nz Robyn Simcock: simcockr@landcareresearch.co.nz
Farmer perspectives of ecosystem service benefits of riparian margins	Fleur Maseyk: fleur@thecatalystgroup.co.nz Alec Mackay: alec.mackay@agresearch.co.nz Estelle Dominati: Estelle.Dominati@agresearch.co.nz

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[www.landcareresearch.co.nz/science/portfolios/enhancing-policy-effectiveness/best](http://www.landcareresearch.co.nz/science/portfolios/enhancing-policy-effectiveness/best)

## Appendix Four: Links to the PPT presentations / Research Summaries

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The BEST Symposium PowerPoint presentations/research summaries are available on the BEST Symposium website (<https://www.landcareresearch.co.nz/about/news/events/best-symposium>), but the individual links are also available below:

### **Session 1: Ecosystem service – landcover relationships**

*Jason Tylianakis and Carla Gómez, University of Canterbury*

### **Session 2: Te weu o te kaitiaki – The roots of the guardian**

*Phil Lyver, Manaaki Whenua Landcare Research and Puke Timoti, Tuhoe Tuawhenua Trust*

### **Session 3: Biodiversity and farm planning**

*Alec Mackay, AgResearch and Fleur Maseyk, The Catalyst Group*

### **Session 4: Ecosystem services in decision making – learnings from 2 catchment processes**

*Suzie Greenhalgh, Manaaki Whenua Landcare Research*