



## MAPPING OUT NZ FORESTRY'S FUTURE

At Scion, our Geospatial Team has a range of GIS skills and capability from spatial analysis, statistics through to modelling. These skills and capability are employed on a number of cross-disciplinary projects. This document highlights what we can offer to research projects at Scion.

Our team has access to a massive volume of data and tools that can be used to address complex research questions.

For New Zealand, we have data on:

- soils, slope and aspect
- land use capability
- erosion risk
- property boundaries and values
- census data
- vegetation over time
- climate and daily weather (including frost free and growing degree days)
- climate change predictions
- land and river ecological areas - and much more

### Data + tools = new data

Geospatial tools add value to existing data and statistical models. We can create models that give results across a land surface, allowing more powerful insights than graphs or empirical results. Dozens of map surfaces can be created for a single forest stand or for New Zealand as a whole. Each surface (or layer of information) can be turned on or off to explore relationships between data (for example, mean air temperature and wood density).

There are a number of new applications of spatial data that we have developed at Scion. These include:

- national productivity for radiata pine, cypresses and redwood

- habitat replacement for indigenous forest loss
- potential new forest sites
- wood quality predictions
- carbon sequestration rates and change in productivity from climate change
- spatial economic surfaces (maps) include cost surfaces for planting and harvest roading
- least-cost roads to connect forests with existing roads and costs to ports or sawmills

### Recent highlights of the Scion Geospatial Team include:

- Mapping locations and productivity for future forests in New Zealand, also under climate change
- Modelling future biomass supply for bioenergy from existing and potential plantations
- Radiata Pine Nutritional Atlas, and a decision support system for nutrition including deficiency mapping, foliar sample planning and fertiliser planning
- Determining land area suitable for reversion to native forests
- Predicting carbon stocks - includes spatial predictions from LiDAR metrics
- Montreal Process Indicator research such as fragmentation of forests

## ANDREW DUNNINGHAM

Phone: 5376, Room 929

### GIS Skills

- ArcGIS
- Programming
- Database
- Remote sensing

### Capabilities

- Spatial analysis and modelling
- GIS programming
- Arc server
- Data management
- Hyperspectral remote sensing

### Current projects

- Scion data management
- Hyperspectral remote sensing

## BARBARA HOCK

Phone: 5434, Room 936

### GIS Skills

- ArcGIS and related programming languages
- Google Earth (Pro and SketchUp)
- Fragstats, Map Comparison Kit and other GIS-related software

### Capabilities

- Spatial analysis, statistics and modelling
- Geostatistics (e.g. kriging)
- Analysis of roading networks
- Producing Atlas-quality maps
- Spatial analysis and modelling, network analysis, geostatics, visualisations

### Current projects

- Visualisations for GIS
- Forest productivity surfaces
- Biomass supply model upgrades
- Rotorua catchment case study - land-based decision making

## DUNCAN HARRISON

Phone: 5848, Room 932

### GIS Skills

- ArcGIS
- Grass GIS
- Model builder and AML programming language (ArcGIS programming)
- Python for GIS

### Capabilities

- Modelling of data that identifies or predicts process which can then be visualised spatially with the creation of map layers.
- Manipulation of different projections and coordinate systems.
- Analysis of networks, identification of quickest/cheapest/shortest routes.
- Query and Identification of spatial relationships.
- Creation of cartographic maps.

### Current projects

- Using SPIF, an experimental GIS/economic programme, in conjunction with ArcMap10 to estimate the economic potential of land identified for future planted forests throughout New Zealand.
- Scion data management

### Geospatial Team:

*left to right -*  
Duncan Harrison  
Andrew Dunningham  
Marie Heaphy  
Barbara Hock



## MARIE HEAPHY

Phone: 5554, Room 933

### GIS Skills

- ArcGIS
- Model builder
- Python
- Fusion

### Capabilities

- Cartographic map creation
- Geospatial Analysis
- Data extraction, analysis and visual display

### Current project

- Using REC (River classification) and LCDBII (Landcover database II) layers in ArcGIS to align regional and national water quality monitoring sites in New Zealand. The aim is to determine if plantation forests are correctly represented, identify gaps in water quality monitoring programme that could be included in national and regional reporting.

## THOMAS PAUL

Phone: 5653, Room 938B

### GIS Skills

- ArcGIS
- A bit of Model builder
- A bit Python
- Fusion
- Database development
- Google Earth Pro

### Capabilities

- Spatial analysis and modelling
- Cartographic mapping
- Data extraction, analysis and visual display

### Current project

- Model development to predict the spread of conifers based on their traits and the environment. Using inventory data (LUCAS) to estimate national carbon stocks accurately and unbiased and to quantify the effects of the environment on growth.



### CONTACT

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