Reconstructing eastern Otago's natural forest communities: by Ralf Ohlemüller & J. Bastow Wilson

When European settlers arrived in Dunedin in 1848, the hills were largely covered in forest. The settlers' logging in the first few decades was so efficient that now only fragments remain, and it is difficult to tell what the 1848 forest cover would have been like. This was not the first impact of humans on the landscape. Large parts of Otago's landscape were modified by the arrival of Polynesian people at about 1000 yr. B.P., and their use of fire.

This means that the present day distribution of these forest communities does not reflect their potential distribution. The top of Maungatua for example, now covered by snow tussock, is climatically perfectly suitable for silver beech, yet at present it is found only in gullies on the southeast-facing slopes of the range. The largest remnant of native forest is in the Silverstream area. Tall broadleaved forest is the dominant forest community type there, but there are also isolated stands of kaikawaka (*Libocedrus bidwillii*) and silver beech (*Nothofagus menziesii*). Quite large areas of pure silver beech or silver beech/broadleaved are on the southern flanks of the Maungatua Range and in the Waipori Falls area. There are some smaller podocarp/broadleaved remnants near Taieri Mouth which include rimu (*Dacrydium cupressinum*) and the occasional silver beech tree.

We are currently working on a project aiming to make a map of the potential distribution of natural forest communities in the greater Dunedin area. The study area comprises a coastal band of about 50 km to the north (Shag Point) and south (Tokomairiro River mouth) and about 20 km inland of Dunedin (across the Maungatua range): a land area of about 187,000 ha. The highest point in the study area is the summit of the Maungatua range at 895 m a.s.l.

We identified areas of indigenous forest vegetation, on a 20m x 20m scale, using satellite images from 1999. Within these areas we are currently sampling randomly-placed plots. The vegetation of each will then be assigned to a particular community type based on presence/absence of vascular plant species.

For each site we are also measuring environmental conditions: slope, aspect, landform, soil type and deriving other site information from maps (*e.g.* distance to sea) and climatic models (temperature, rainfall, solar radiation, evaporation, degree growing days, *etc.*).

Finally we shall use the vegetation/environment relationships in these indigenous forest remnants to predict the potential forest community types on sites that have been cleared. For this, we will be using a spatial model which is based on case-based Artificial Intelligence methods. We shall feed the results into a Geographical Information System, to produce a map of the potential natural forest vegetation of eastern Otago.

We hope that the map will provide a basis for assessing the present forest remnants, and for planning the management of them to keep them in close-to-natural condition. The map will also provide firm guidance for restoration plans, showing what type of forest would have occurred on a site intended for restoration, and what it would be appropriate to plant there. We believe local authorities, the Department of Conservation, and local community restoration groups will find the map a sound basis for their plans.

We are always looking for some volunteer field helpers for this project. This is a great opportunity if you would like to get to know your backyard forests a bit better and participate in sampling some forest plots. If you are interested in helping with this project please contact Ralf (ph: 03-479 5981, e-mail: ralf.ohlemueller@planta.otago.ac.nz)