



Between mountains and the Tasman Sea, along a narrow coastal plain, Southern South Westland is the last stronghold of kahikatea forest; Ohinemaka forest. Photo: I.R. Platt — N.Z. Forest Service

to shrubs, such as *Coprosma propinqua* which provide shelter for the seedlings of kahikatea.

Very dense stands with more than 200 trees to the hectare may develop on the silt terraces. Good examples occur in Ohinetamatea forest, along the bank of the Karangarua river in Hunts Beach forest, and to the south in the Ohinemaka forest. Further flooding and silt deposition can rejuvenate these stands. A new wave of kahikatea regeneration can establish amidst the flood-damaged forests. On better drained sites, where young kahikatea have difficulty competing against an understory of hardwoods, low volume stands develop which feature scattered large kahikatea. Forest of this sort lies between the meanders of the Ohinetamatea River.

Unfortunately, the expansion of farming on the river flats means that few new stands of kahikatea can now develop. Grazing maintains the grass sward, preventing regeneration. This is leading to a gradual diminution of the kahikatea forest estate.

If undisturbed by floods, rimu slowly enters the alluvial kahikatea forests leading ultimately to a rimu-dominant forest. But this only happens on sites where the water table is low enough to permit root mats to cover the forest floor. Unlike rimu seedlings, the fertility-demanding kahikatea seedlings are unable to establish in the root mat and are pushed out as the areas of bare silt or mud diminishes and as soil nutrient levels decline over time. Ohinemaka forest contains excellent examples of these successional sequences.

The floating forests

If the water table is high and nutrients are brought in by inflowing water, the alluvial stands may develop into dense kahikatea swamp forests. Such forests can also develop from the gradual colonisation of fertile flax swamps. The premier swamp forests are those of Hunts Beach and Mataketake forest.

Open water covers much of the swamp forest floor especially after heavy rain. These forests grow on layers of deep peaty ooze. Interlocking root systems form a platform over the ooze or even over flowing water, resulting in a truly floating forest.

Few other forest trees can cope with these wet conditions. While kamahi may be common in the swamp forests, the trees are rather spindly. The understory vegetation may be abundant. Sprawling masses of Kie-Kie are a feature of coastal kahikatea forest and, in places, huge colonies of the flax-like *Astelia grandis* can give the swamp forest a very distinctive appearance.

These swamp forests regenerate freely. Kahikatea's spongy rootlets seem to enable it to move oxygen downwards so that its roots can function in waterlogged conditions. This ability enables kahikatea to exploit a regeneration niche unavailable to other trees: the often inundated areas of bare mud on the forest floor. Its seedlings establish around the margins of the mud pools or on debris, such as tree branches or punga trunks, that fall into the pools. Seedlings germinating on the debris may survive if they reach a sufficient size before the debris rots away. This is a brilliant regeneration strategy as the seedlings avoid root competition from other plants and the young kahikatea can grow up to the canopy in the light wells that usually exist above the pools. All stages of the regeneration cycle can be seen in the mature swamp forests — dispelling once and for all the forester's myth that these are single crop forests.

The kahikatea forests have recently been investigated by scientists and foresters in a \$6 million research effort initiated by the Forest Service with the aim of allowing "balanced decisions" over the southern South Westland forests, wetlands and mountainlands. One of the outcomes of this massive research effort has been a recommendation from Forest Service and Lands and Survey scientists for reservation of all remaining kahikatea forest areas (Stengs and Comrie 1987).

Haven for fish and birds

South Westland's kahikatea forests are a rich wildlife habitat, all year round. In good seed years there is also a massive influx of fruit-eating birds into the forest. Mature kahikatea trees are commonly also laden with heavily fruiting epiphyte species and are emergent from an understory of nectar and berry-producing hardwoods, so the whole forest is of immense value for native birds. Standing dead kahikatea are also immensely attractive for both insectivorous birds and as nest sites. For several birds South Westland's lowland forests are an important winter refuge. Numbers of silver-eyes, bellbirds, fantails, tuis and pigeons increase three to four fold in winter com-

