

*The Moawhango (Maori: many moa) region, sandwiched between the Tongariro volcanoes and the encircling Kaimanawa, Kaweka and Ruahine Ranges, is a region of major biogeographic significance. Why are so many South Island upland herbs found only in the Moawhango intermontane basins and nearby regions in the North Island? For some reason 150 or so plants shun the ostensibly suitable habitats south of the central Ruahines in the North Island. All these coincident plant distributions are too numerous to explain away as the result of chance long distance dispersal.*

If biogeography raises awareness of the Moawhango, the landscapes are just as compelling. Pictorially these landscapes have their closest affinities with the Matiri Plateau in Northwest Nelson and parts of the Central Otago block mountains. Moawhango landforms are a series of montane – subalpine sandstone plateaux cut by deep river valleys. Most sandstone blocks are capped by high fertility limestone that also outcrops as erosion resistant verandas in escarpment walls. Next in the sequence of geological life is a two-metre deep mantle of andesitic ash deposited by westwind drift from the Tongariro volcanic eruptions since the last glaciation some 14,000 years ago. This brown ash has blanketed the region, smoothing the contours and producing gentle relief patterns.

### First fire then discing:

The impact of Polynesian and European fires is indelibly imprinted on these landscapes. An extensive mixed kaikawaka and beech forest that once dominated the uplifted plateaux has been reduced to just peripheral remnants by early Polynesian fires stretching from Waiouru to the Northwest Ruahines.

Moreover, as vegetation healed from this period of burning 5-600 years ago, a further period of ecologically pernicious firing awaited, with the arrival of European pastoralism. Shrub-tussock successions recovering from Polynesian fires were converted to homogeneous red tussocklands. European fires carried well through the highly inflammable *Dracophyllum*, mountain toatoa and red tussock. However, as shrubland fuel loads were lower the ensuing incineration only lapped at the fringes of forest pockets. So the distribution patterns of forests we see today are much as prehistoric Polynesian travellers would have viewed on cross-country sorties. A popular route from Karioi and Moawhango traversed the plateaux to Kuripapango and on to Napier. The Taihape-Napier road alignment logically follows this trail through the Gentle Annie saddle separating the Kaweka and Ruahine ranges.

*Top: Makirikiri tarns – site of special plants near Aorangi on the Mangaohane Plateau. The bog pine-dominated shrubs on the island are all that remain of the pre-Polynesian vegetation, protected from fire by the tarn. In the background, the mist-shrouded marine sediment, Te Rakaunuiakura, marks the border with the Ruahine State Forest Park. Photo: Quentin Christie.*

*Bottom: Secreted away east of the Desert Road in army territory, the intermontane basins of the Moawhango River are home to a number of disjunct upland plants. Valley basins are mantled in Taupo pumice. Photo: Quentin Christie, Soil Bureau, DSIR.*

*Inset: Myosotis Sp. (M. pygmaea var. glauca) restricted to the upper Moawhango headwaters, is cryptically camouflaged against river alluvium. Photo: Geoff Rogers.*

Much of this red tussockland heritage has disappeared under plough and disc in the last 15 years, marking the pinnacle of subsidised land conversion. Highly productive ryegrass and clover replaced red and hard tussockland. The conversion programme clawed its way up to a staggering 4,000 feet — the winter snowline. Successful pasture establishment demands heavy superphosphate applications to correct the inherently low calcium and phosphate levels in these andesitic ash soils. With the removal of Land Development Encouragement Loans the tussockland conversion machinery is now in cold storage. What remains of the natural landscapes?

Tucked away in remote corners are landscapes largely unaffected by farming. At diametrically opposite ends of the district, the Waiouru Military Reserve and the Mangaohane Plateau in the Northwest Ruahines have landscapes rich in natural values. Other landscapes offer a pleasant blend of natural elements and productive pasture and are no less pleasing to the eye. Whereas the traveller on the Taihape-Napier highway 15 years past was flanked by undulating red-tussock vistas, today one must focus to infinity on surrounding ranges to see landscapes rich in natural features.

### Non-forest habitats

Although ubiquitous kaikawaka forest with scattered enclaves of beech blanketed the plateaux, three other habitats are inherently hostile to forest. Broad, shallow concave basins have sufficiently high water tables to form peat bogs and tarns. Secondly, in deep wide river valleys, cold air drainage and unstable stream levees also support open vegetation. The third non-forest site is cliff faces, dominant in greywacke river gorges.

These habitats are important for two main reasons. Firstly they functioned as sources for shrub and tussock species colonising the deforested plateaux. Secondly, as sites of the biogeographically special plants, they preserve, albeit precariously, the assemblage of herbs and grasses found only in the Moawhango and nowhere else in the North Island.

Three species are endemic: a low shrub *Loagania depressa* has been found only once in 1845 north in Waiouru by William Colenso, the first Pakeha to visit the region; the others are a tiny buttercup and a biddibid.

A secretive group of eight species found in the Moawhango River headwaters in the Waiouru Military Reserve have a markedly disjunct distribution: they occur in the South Island but nowhere else in the North Island. The grass *Argostis imbecilla* grows east of the Desert Road and in Otago. Seasonally arid stream levees and very low "bowling green" like turfs are the favoured habitats. Some 1800 years ago the Taupo Pumice eruption inundated these inter-

montane basins with a choking blanket of pumice. Consequently such habitats are now very restricted and the status of these North Island distributions is therefore realistically described as precarious.

### Curious appearances

A further seven species from the Mangaohane Plateau just east of Aorangi mountain also occur nowhere else in the North Island. Here, peat bogs, stream and tarn margins and damp, periodically flooded depressions are the specialist habitats. These plants include the eyebright, *Euphrasia disperma* which spreads through sphagnum moss on the raised margins of tarns at Reporoa Bog and Makirikiri Tarns.

It curiously appears again in central Westland e.g. Denniston Plateau. *Ourisia modesta* is known from only one shaded stream bank at Ruahine Corner, and is recorded at Goulard Downs (Northwest Nelson), Lake Alabaster (Fiordland) and on Stewart Island. These special plants in concert with some 70 other mainly non-forest species are confined to the central North Island mountains north of Cook Strait. Sixty other slightly more widespread species have southern North Island limits in the central North Island mountains. To what can we ascribe these strange distribution patterns?

Could these plants have jumped the lower North Island in a migration north from the South Island? The usual seed dispersal methods are wind and birds. Why then do suitable areas between the South Island and Moawhango not support these species? We may search for historical explanations. Pleistocene glaciation is out as only confined alpine peaks in the Tararuas and Tongariro mountains supported glaciers. Two geological upheavals have, however, obliterated old lower North Island landmasses in the last eight million years.

### Tectonic upheaval

Geologists believe much of the lower North Island was submerged below sea level in the late Miocene-Pliocene, 8-2 million years ago. Land eventually re-emerged and an intensive period of tectonic upheaval, resulting in the uplift of the Tararua and Ruahine Ranges, started 1 million years ago. The biogeography suggests the central North Island region, including parts of the Moawhango and northern Ruahines, escaped marine inundation and acted as centres of biotic survival. Even if refugia existed in the region of the Tararuas the latter period of mountain building has acted as the "last straw", as habitats of these old landmass plants do not exist there today.

### Biogeography and Conservation

The Protected Natural Areas programme seeks to preserve the best of what remains of our natural ecosystems and landscapes. Some urgency should be accorded the Moawhango District. Only one private scenic reserve and half of Hihitahi State Forest