

## **Summary:**

The pre-human landscape has always been a shifting mosaic of vegetation; bush has not always dominated. There have been prolonged periods of low native biodiversity.

The role of Polynesian settlers in the destruction of bush has been exaggerated.

## **Establishing a pre-human baseline:**

East Coast lake cores note an increase in storm surge sediment after about 600BP (1350 AD), an increase in charcoal and a transition to vegetation dominated by bracken fern<sup>i</sup>. Although Wilmshurst points out that fire was common pre 600BP<sup>ii</sup>, she accepts the traditional explanation that the fires producing this charcoal were caused by Polynesian settlers. More accurate modern analysis of radiocarbon data has moved the date of Polynesian settlement to 700BP (that is 100-200 years more recent than was thought)<sup>iii</sup>. If we assume a founding party of 250 people (five canoes) and a rapid population growth of 1.5%, then by 600BP there would be 1100 people in the whole of NZ. By 540BP, when Wilmshurst notes that bracken reached its peak, there would have been only 2700 people. It seems unlikely that this small population, settled predominantly in coastal regions would be responsible for “the loss of about half the native forest cover”<sup>iv</sup>.

Patrick Grant<sup>v</sup> documents several periods of intense gales, resulting in wind throw in HB forests. In particular he documents the Waihere Period 550-670BP which was followed by the much drier, cooler Sporer Minimum. After periods of extensive damage, forest fires are more likely for a period of many decades<sup>vi</sup>. Fires started by lightning strike, especially of standing dead wood are well documented, especially in the ranges. Then driven by hot dry NW winds, fires are capable of destroying large areas of wind damaged forest, especially if large areas of highly combustible bracken already existed due to previous fires. The drier climate of the Sporer Minimum would mean that bracken would become a stable climax ecosystem<sup>vii</sup>. Wilmshurst says “After deforestation in Hawke's Bay, bracken dominated the landscape for about 500 years, until the time of European settlement in the mid-1800s”. Although no other natural change of anywhere near this size occurs in the pollen record over the 7000 years, we know from the buried kauri forests of Waiharara that large scale forest destruction has occurred in NZ more than once. It is probable, that at later dates, Polynesian fires helped to maintain bracken dominance during wetter periods, especially after the Maunder minimum (230BP). Therefore, we must acknowledge that natural processes were responsible for a substantial amount of deforestation and subsequent bracken fern dominance in the 500 years to 1850AD.

## **Post-European settlement:**

I deal here with sheep and beef farming: the predominant land use ( along with plantation forestry) on most of our hill land. From the above it is almost certain that the effect of European agriculture on native biodiversity came on top of a period of 500 years of low native biodiversity due to on most of the east coast of both islands bracken fern dominated landscapes. ( excluding the ranges that are predominantly in native vegetation today)

The period from early 1800s to WWII was dominated by a pastoral farming regime that maintained poorer quality pastures by repeated burning.<sup>viii</sup> It would appear that a bracken fern dominated landscape was transformed into pasture that was continually “reverting” to manuka and fern. As pointed out by Guthrie Smith, The manuka was a new feature of some fern based ecosystems, only appearing after the compaction of pumice soils by sheep. Early Film footage in the NZ film archive from this period shows a farm landscape with many less trees (both European and native) than there are today

From the 1950s until mid-1980s denser pastures were established with the use of aerial topdressing and better animal control using a lot more fences. Unfortunately a wave of development and intensification was supported by hugely increased returns from the Korean wool boom (1951), followed by a series of government support packages culminating in the Land Development Encouragement loans (1978). Much of the development was ill conceived.

After the 1980s there was a renewed interest in planting trees in pasture land and some land was totally retired<sup>ix</sup>; native reserves such as those promoted by QEII proliferated. This period coincided with a huge focus on farming a smaller base of land efficiently. Sheep and beef farm area decreased by 28% 1990-2016. There was no more wasteful expansion and intensification. Permanent pastures on the land that is farmed have been enhanced under greatly improved management and stocking rates fell by about 30%<sup>x</sup>.

### Conclusions:

When contemplating the level of native biodiversity in our current landscape it is important to be informed by the pre-human baseline. **While it is true that most of sub-alpine NZ was covered by native bush at some time; it is not true that all our land was in bush all the time.** We already have vast areas of native vegetation in the conservation estate. We should target areas containing ecosystems that are under represented, such as low land bush & wetlands. But for the main let’s look after the area we already have properly before seeking to add more of the same.

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<sup>i</sup> Wilmshurst, J, Wilmshurst, J, ‘2000 year history of vegetation and landscape change in Hawke's Bay, North Island, New Zealand’, University of Canterbury (1995).

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Also Orpin, A, et al, ‘Holocene sedimentary record from Lake Tutira: A template for upland watershed erosion proximal to the Waipaoa Sedimentary System northeastern New Zealand’, *Marine Geology*: April 2010 (DOI: 10.1016/j.margeo.2009.10.022)

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<sup>ii</sup> Wilmshurst, J, *ibid*, abstract p1 “Natural fires have not previously been considered as a primary cause of forest disturbance in the North Island during the late Holocene, but the results show forests were disturbed frequently by lightning-strike fires associated with cyclic and episodic droughts, and with volcanic eruptions.”

<sup>iii</sup> Matisso-Smith, L, (January 2017) ‘The Human Landscape: Population Origins, Settlement and Impact of Human Arrival in Aotearoa/New Zealand’ contrast this with data available for Wilmshurst in 1995: “New Zealand was first settled by

Polynesians c. 900-800 BP” (McGlone *et al.* 1994) : If date of settlement was 900BP, then population would be 22,000 to 53,000 over the 60 year period of forest burning.

<sup>iv</sup> Masters, S.E., Holloway, J.T. and McKelvey, P.J. (1957) ‘The National Forest Survey of New Zealand 1955. Vol 1. The Indigenous Forest Resources of New Zealand’. *Wellington: Government Printer.*

<sup>v</sup> Grant, P J, (1996) ‘H B Forests of yesterday’

<sup>vi</sup> Grant, P J, *ibid* : Immediately afterwards due to dry leaves; after a decade or so, due to rotted sap wood, for a long period after that, even if previous fires have occurred (as in Noreswood fire of 1888) due to rotted heart wood.

<sup>vii</sup> Wilmshurst, J, *ibid*, p111: “Even without repeated burning, bracken colonies can be maintained indefinitely if soils are dry, as forest seedlings cannot establish under its canopy (Partridge, 1990)”

<sup>viii</sup> Wilmshurst, J, *ibid*, p115 quoting from Guthrie Smith.

<sup>ix</sup> Wilmshurst, J, *ibid*, p18 90% of the Tutira catchment was pasture in 1986

<sup>x</sup> beef+lamb Economic Farm service: From 1990 to 2018 sheep and beef farming stock tallies fell in half and area farmed reduced by 28%. 92% of the product was still produced.