

New Zealand Numbers from Nearly Nowhere: 80,000 to 100,000 Māori circa 1769



THE CONVENTIONAL WISDOM in New Zealand history is that from 1769 until 1840 Māori depopulation was small in comparison to most other regions of post-Colombian European expansion. It was also small compared to Māori depopulation in the post-1840 period. In this narrative, prior to mass British colonization of New Zealand, low Māori population densities and a lack of any effective connection between Māori population concentrations ensured that the few new high-mortality European diseases which managed a cross the vast oceanic *cordon sanitaire* surrounding New Zealand were localized to a small number of zones of high direct contact with European shipping. Furthermore, any warfare-driven depopulation associated with introduction of European musket technology was greatly exaggerated by unnamed local missionaries and British Resident James Busby, captured by a ‘fatal impact’ zeitgeist and wishing for New Zealand to be annexed by Britain.

This narrative was initiated in J.M.R. Owen’s article in the first edition of *The Oxford History of New Zealand*.¹ Owen’s view was given numbers by demographer Ian Pool.² It has also been endorsed in James Belich’s and Michael King’s general histories of New Zealand.³ Most recently it has been accepted by Atholl Anderson, Judith Binney and Aroha Harris’s recent general history of the Māori people, New Zealand’s official encyclopaedia *Te Ara* and by other historians of the contact-era period.⁴

The most cited works on Māori contact-era demographics in which quantitative evidence has been advanced for the above population positions are those of Pool. During the 1960s a broad pattern for low Pacific contact-era indigenous population estimates, from which Pool’s New Zealand versions follow, was established by Australian demographer Norma McArthur’s influential book *Island Populations of the Pacific*.⁵ Table 1 shows that Pool has become increasingly McArthurian over time, slashing his 1977 mid-estimate of the contact-era Māori population by one-third, from 150,000 to 100,000 in his 1991 book, and paring it back further by 10% to 90,000 in his 2015 book.

Table 1 also shows another interesting feature — a narrowing of Pool’s plausible range around the 1769 Māori mid-point population estimate over time — from between 125,000 and 175,000 Māori in 1977, the range being 33% of the mid-point estimate of 150,000, to 80,000 to 100,000 Māori in

2015, the range being 22% of the mid-point estimate of 90,000. The narrower range implies a growing confidence in precision of the plummeting mid-point estimates. The reasons for the large reductions in estimates of the Māori contact-era population over time and the smaller range of plausible estimates are obscure. No credible new evidence is brought to bear to justify these two trends, nor are any new methods applied to existing material to generate new conclusions.⁶

Year of Estimate	Population Estimate
1977	125,000–175,000
1991	100,000, range much above 110,000–115,000 ‘impossible’
2015	90,000, range 80,000–100,000

Table 1: Declining Estimates of the Contact-era Māori Population, 1977–2015⁷

By way of contrast, and largely unremarked upon by New Zealand scholars, international research into contact-era demography of other indigenous Pacific populations has moved in the opposite direction to the MacArthurian minimalism of the 1960s and 1970s. Previous estimates of contact-era Pacific populations in, for example, Hawaii, Tahiti, the Marquesas, Samoa and New Caledonia (which has been employed as the closest Pacific analogy to New Zealand in this context, having as it does a much larger land area than other Pacific Islands, excepting New Zealand), have all been revised upwards, often considerably.⁸ There has been a lively debate, for example, on these matters in Hawaii, with a divergence in views of just how much upward revision is empirically justified.⁹

So, exceptional New Zealand has become even more exceptional, and more certain regarding its exceptionalism. New Zealand exceptionalism, in any form, is always a proposition warranting serious investigation.

This article begins such a task by critically examining the methods which have been used to determine the size and range of plausible sizes of the contact-era Māori population and hence the extent of the subsequent depopulation. The first method has been to use an estimate of the contact-era population attributed to James Cook. The second method — retrodiction — works backwards from the first reliable Māori census population figure to contact. The third method — prediction — works forward from the arrival to New Zealand of the ancestors of Māori to contact.¹⁰ How robust are contact-era population conclusions arising out of application of these three methods?

The 'Cook' Estimate

The estimate of the contact-era Māori population often mentioned in the literature is the Cook estimate of 100,000 Māori in 1769. In a good example of the rhetorical function to which Cook's estimate is put, Pool writes that 'Cook's estimate (100,000) was carefully reasoned, but still no more than a guess. My [retrodiction] estimate confirmed his number'.¹¹ Elsewhere, Pool and Tahu Kukutai offer a further example: 'Of the many estimates made by European observers, British navigator James Cook's 1769 suggestion of 100,000 Māori is the most realistic. It fits with feasible growth rates, using a range of likely Māori settlement dates and founding population numbers drawn from paleontological evidence.'¹²

These claims are factually incorrect. The estimate was not Cook's, it did not receive his seal of approval and it was not made in 1769. The estimate was published in a 1778 book authored by Johann Forster, the naturalist aboard the *Resolution* on Cook's second expedition. Forster's significant direct observation of Māori was brief, in Dusky and Queen Charlotte sounds in the South Island, both far away from major Māori population centres in the top half of the North Island. These facts have been around for many decades. It is possible that the Great Navigator's imprimatur is being inaccurately employed to give other estimates an unmerited gravitas.

Forster's analysis reads in its entirety: 'The Southern isle of New-Zeeland has very few inhabitants; but the Northernmost, according to the accounts we had from Capt. Cook, and from what we saw in some few places, as we passed by, is much better peopled, nay, in some spots very populous; therefore allowing 100,000 souls to both isles, we rather think our estimate to fall short of the true population.'¹³

Forster's estimate does not suggest 100,000 Māori as a best point estimate, but as a round figure at the lower end of likelihood. As to the quality of the accounts that he had from Cook, and others on the second voyage who had experienced the first, it is worth noting that Forster was one of the least popular men aboard the *Resolution*. Consequently the amount and quality of information more experienced people aboard shared with him is likely to have been low.

Forster also separately made an estimate of the size of the Māori population of the South Island, which has received less attention: 'their numbers are few, and that though their country be very little inferior in size to one moiety [i.e. one half] of Ireland, hardly 2000 inhabitants are found on this great extent of land.'¹⁴ Forster considerably under-estimated the land area of the South Island by a factor of almost four, as it is nearly twice the size of Ireland (151,000 compared with 84,000 square kilometres). Additionally, he

probably significantly under-estimated the South Island Māori population in 1769, as the 1858 official government census counted 2500 Māori there, and a careful reconstruction of the Ngāi Tahu population, excluding other Māori populations in the upper South Island, places that tribe alone at about 5000 strong in 1828.¹⁵ Forster's inaccuracies regarding the South Island and its Māori population do not inspire confidence in his New Zealand-wide guess.

As well as having the existing body of published secondary information following Cook's voyages available to them for consultation, later visitors had greater direct knowledge of the populous coastal northern parts of New Zealand than did Forster. They also made population estimates, some guesses like Forster's and others based on some sort of rough method. Their estimates are vastly different from Forster's.

Missionaries on the *Royal Admiral*, which visited the Hauraki region in 1801, put the number of Māori at 'many hundred thousand', and another missionary, William Ellis, after visiting the Bay of Islands in 1816, placed the Māori population at half a million or more.¹⁶ D'Urville, who saw much more of New Zealand than Forster, similarly guessed half a million in 1827.¹⁷ Following a visit of some weeks to the Bay of Islands, which included an inland trip, and to the Thames areas in the latter part of 1814 and early 1815, John Liddiard Nicholas guessed there were about 150,000 Māori.¹⁸ Joel Polack, a widely travelled European trader with years of experience living in New Zealand and a decent knowledge of the Māori language, had something approaching a method: 'The whole number we have calculated, from data furnished to us by some chiefs who had accompanied E'ongi [Hongi Hika] to his wars, and who actually circumnavigated the North Island [probably around 1820], after stopping at almost every coast village on their route, is about (in round numbers) 130,000 people.'¹⁹

The first New Zealand — or rather North Island — population estimate which was based on a detailed credible method by someone with personal experience of populous inland areas and an ability to obtain information in the Māori language was that of missionary William Williams, in 1834. He was making the estimate following decades of contact and probable population decline, and with an information base several orders of magnitude stronger than Forster. Following a personal journey through the Waikato and into the East Cape–Poverty Bay region in 1834–1835, Williams estimated the Māori population of the North Island, divided up by eight different areas, at 106,000.²⁰ His main method of estimation was using local Māori 'census' information on numbers of fighting men, which were then multiplied up to give an overall population estimate: 'we may form some idea of the actual state of the population, by the census the Natives give [of numbers

of fighting men], in which we rarely find them yield to exaggeration The whole number of men, therefore ... multiplied by 3, will perhaps give the total, including women and children'.²¹ The paucity of missionary knowledge about the South Island is reflected in Williams's overall New Zealand-wide Māori population estimate of about 200,000.

This wide range of estimates, all of which are higher than 100,000, is indicative of the substantial upward margins of plausibility — measured in hundreds of thousands — surrounding Forster's Māori population guess.

Retrodiction

Potentially more useful as a method for divining the size of the contact-era Māori population than Forster's contact-era guess is the retrodiction method. Retrodiction takes Māori population figures from the 1858 national Māori census (or another base figure considered reliable, sometimes being the 1874 census) and works population numbers backwards through time to, say, 1769. Retrodiction does so using assumptions about rates of annual population decline over nearly nine decades. The approach applies an average rate of decline over all the years, or differing rates for sub-periods.²² Pool describes this retrodiction method as 'the more robust' of the various alternatives.²³

A major challenge with retrodiction is that it requires serious empirical anchoring of the key parameter — the average rate of Māori population decline back from 1858 to 1769. Pool has a relatively good quantitative estimate for the rate of decline back from 1858 to 1844, taken from a quality Waikato longitudinal census for 1844 to 1858,²⁴ but nothing solid to use to retrodict the preceding 75 years to 1769.

To overcome this information void, in his 1991 book Pool takes an apparently better documented rate of decline of Moriori of 0.4% in the Chatham Islands over the period 1791–1835. Pool applies this figure to New Zealand from 1858 back to 1769 to support a figure for the contact-era Māori population of about 100,000.²⁵ Unfortunately for the utility of this exercise, his calculated Chatham Islands rate of decline is based on incorrect numbers for both the 1791 and 1835 Moriori populations. The 1835 end date population comes from a retrospective Moriori nominal census of 1861 which named 1663 Moriori people alive in 1835.²⁶ The same document also mentions that there were roughly a further 300 children alive in 1835 whose names were not recalled, giving a total of about 2000 Moriori in 1835.²⁷ To derive the apparent 0.4% rate of decline, the first figure for 1835 — the 1663 named people without the estimate of those with forgotten names — is then compared to an apparent 1791 Moriori population estimate of 2000. However, this 1791 estimate, described by Pool as 'more reliable than [estimates] for

the [New Zealand] mainland' and made by 'voyagers who rediscovered the islands in 1791' (British sailors on the HMS *Chatham*), does not exist.²⁸ The Chatham expedition made no estimate of the Moriori population. Even if they had, the fact the British spent half a day on the relatively large island, failed to circumnavigate it and barely left the beach means that any 1791 Moriori population estimate would have been even less reliable than Forster's New Zealand-wide guess.

Pool's Moriori rate of decline provides no evidence for informing a New Zealand-wide Māori population retrodiction between 1840 and 1769. He has nothing else as an empirical anchor for his chosen pre-1840 rate of decline. Discussing retrodiction as a method of estimating Pacific Island contact-era populations, archaeologist Patrick Kirch concludes that its application is a circular exercise in assuming what needs to be proven.²⁹ The New Zealand application of retrodiction methods cannot escape the same devastating criticism.

The Plausible Retrodiction Range

Pool's retrodiction takes a range of estimates based on the 1858 and 1874 national Māori census figures and works them back to 1840. His 1858 range is 56,049 (from the actual census figure) to 59,000 Māori (a figure based on upward adjustments to the census, because of evidence of under-counts in certain areas, made by Nancy Pearce).³⁰ His best estimate is Pearce's 59,000 Māori. The best estimate is retrodicted to 1840, based on a 1.7% annual rate of decline recorded in the Waikato longitudinal census between 1844 and 1858. His retrodiction gives a point estimate of 80,000 Māori in 1840. It is combined with a plausible high of 90,000 and a plausible low of 70,000 — a range of 20,000 Māori. It is unclear how the plausible range is arrived at.³¹ But to retrodict to a Māori population of 70,000 people in 1840 from 56,000 in 1858 requires an annual rate of decline of 1.2% or 0.5 percentage points below the mid-point decline of 1.7%. To retrodict 90,000 people in 1840 from 59,000 in 1858 requires a rate of decline of 2.4%, 0.7 percentage points over the mid-point.³²

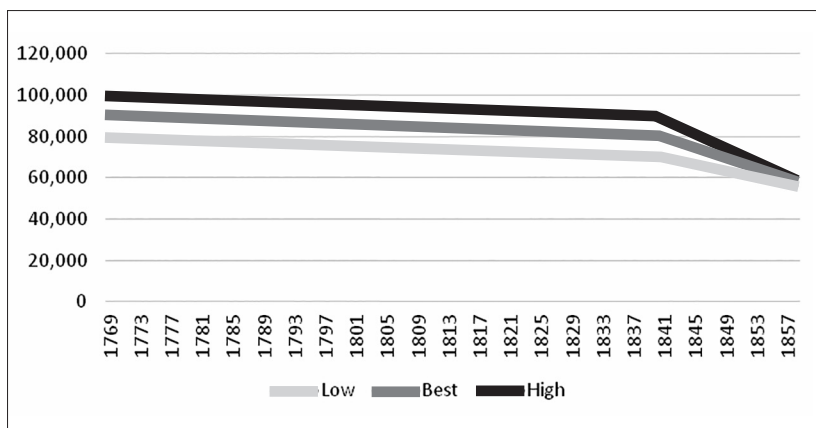


Figure 1: Pool's Range of Māori Population Retrodiction Estimates Pre-1840

By way of contrast, in his retrodiction for the preceding seven decades back from 1840, *no* further gap opens in Pool's range of plausible Māori population estimates (see Figure 1). In 1769 the best point estimate is 90,000. The plausible range remains at 20,000 Māori.³³ In other words, Māori population decline is known, with perfect certainty, to average 0.2% per annum from all plausible 1840 populations. The application of elementary logic suggests that if one accepts a range of estimated plausible rates of decline between 1858 and 1840, and hence a widening range of plausible estimates as one moves backwards into an uncertain past, there must also be a range of plausible rates of decline before 1840, further uncertainty accumulating between 1840 and 1769, and a further widening of the plausible range.

Suppose, conservatively, that the plausible range of annual decline around the 'best' rate is the same over 1769–1840 as Pool has chosen for the 1840–1858 period (that is to say, 0.5 percentage points below and 0.7 percentage points above the best guess pre-1840 annual rate of decline). The resulting retrodiction cone of plausibility is shown in Figure 2. Note that because Pool's best guess rate of decline is so low, this plausible range includes the possibility that the Māori population was smaller in 1769 than in 1840. The plausible range derived from this assumption is approximately +70,000/-30,000 Māori around the 90,000 estimate in 1769, a range which obviously is not terribly precise. It is, however, intellectually far more defensible than Pool's stated range of +/-10,000.

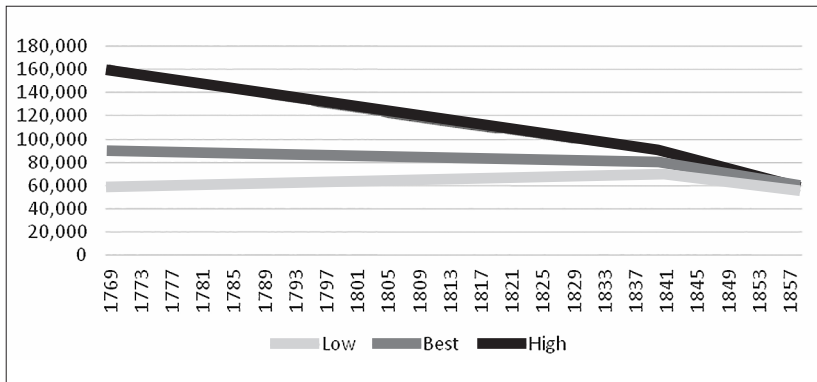


Figure 2: The Plausible Cone Around “Best” Maori Population Estimates if Retrodiction Parameter Uncertainty is the Same Before as After 1840

However, even this widened cone of plausibility in Figure 2 is too narrow. Logic suggests that there must be a *greater* width in the range of plausible retrodiction rates of decline in the pre-1840 period than after. And that width should be *growing* as one retrodicts further back in time. The reason for the greater width in plausible decline rates is that there is vastly more in the way of contemporary historical observation, both quantitative and qualitative, of the Māori population over the 1840 to 1858 period on which to base retrodictions than over the earlier 1769 to 1840 period. Additionally, within the earlier period, the further one heads back towards 1769, the less information is available, and hence the wider must be the plausible retrodiction rate. For example, almost nothing is known of Māori population dynamics in the 1769–1814 period.

Thus, in addition to lacking any evidential anchor for the pre-1840 mid-point rate of decline, Pool’s retrodiction method also logically offers little in the way of precision in estimation of the plausible Māori population range in 1769.

Prediction

The prediction method forecasts the Māori population forward from their first arrival in New Zealand, based on three key parameters. These are the arrival date of Māori in New Zealand, the size of the founder population and the prehistoric population growth rate.³⁴

Compared to the 89-year retrodiction horizon, a half millennia long (or longer) prediction horizon inevitably gives rise to a much wider range of

plausible population numbers in 1769. Additionally, like the retrodiction model, the prediction model has the information challenge of parameter selection. But the prediction model is less parsimonious. It has two additional parameters to get wrong. Additional parameters inevitably further enlarge the plausible prediction-based population range in 1769.

A population foundation date of 1230–1280 AD is now supported by much (but not all) of the academic literature.³⁵ However, even a 50-year difference in founding dates may make large differences to an end population prediction, depending on further assumptions about the underlying population growth processes (it will matter if the underlying model is exponential growth, but less so if it is density-dependent logistic growth).

In terms of foundation size, geneticists have estimated the plausible size of the Māori female founder population somewhere between 50 and 230 women.³⁶ The high population estimate which would result from using these numbers is therefore nearly five times the size of the low estimate, which is practically uninformative. Even more problematically, the geneticists' estimates of numbers of founder females rely on a contact-era Māori population estimate of 100,000 for their very construction. Thus, they cannot be used as an input for an independent estimate of the contact-era population.

Another big unknown of the prediction method is the growth path, and its pattern over time as the population grew to 1769. Minimalists have employed low growth rates, based on low apparent growth rates in prehistoric Eurasian populations.³⁷ This perspective of low Māori prehistoric growth rates is problematic. Humans did not live in New Zealand prior to Māori arrival. The population density faced by newly arriving people, unlike that faced by other prehistoric human populations for which there is apparent growth information, was effectively zero. Second, human beings were new organisms in New Zealand. The flora and fauna had evolved in their absence, and there were many more ecological niches of readily exploitable nutrients allowing for rapid human population expansion than there were for other groups of prehistoric humans; for example, in Africa and Eurasia, where flora and fauna had co-evolved in the presence of a human apex predator for hundreds of thousands of years.

Evidence suggests historically recorded population growth rates for Pacific Islands with small founder or near-founder populations could be exceptionally high and sustained. On resource-constrained 4.6 square kilometre Pitcairn Island, population growth averaged 3% over 66 years between 1790 and 1856. This growth rate was achieved despite an initial period of slow growth associated with murder and suicide, and another period of slow growth in 1831 as the community was temporarily relocated to

Tahiti and suffered serious epidemic disease. High growth was also achieved despite the existence of imported strains of highly infectious tuberculosis and influenza, diseases that founder Māori populations did not face.³⁸ Finally, Pitcairn was not virgin territory for a human apex predator; a Polynesian population had previously inhabited the island.

The equally tiny and similarly resource-constrained 5.5 square kilometre island of Nukunonu in the Tokelau Islands gives another example, considered to be 'the closest real case equivalent of a Polynesian founding population'.³⁹ Following an 1863 population collapse caused by depredations of a Peruvian slave ship, the population on Nukunonu grew at an average 4.4% per year for 20 years. Clearly, Polynesian (or part-Polynesian) analogues for island founder populations could generate very high growth rates, and the low growth rates of prehistoric Eurasian populations may be of little applicability.

Arguments for rapid Māori prehistoric population growth run up against another problem: skeletal evidence showing that prehistoric Māori female fertility rates were too low and mortality, as indicated by a relatively low average adult age at death, too high to generate rapid population growth.⁴⁰

This low-fertility finding has always been puzzling. There was no genetic barrier to high Māori fertility, since by 1900 Māori fertility rates were high, and high Māori fertility rates were observed during the middle of the nineteenth century, once infertility, probably due to European-derived sexually transmitted disease, is factored out.⁴¹ Nor, given the high population growth rates recorded for Pitcairn and Nukunonu, does there seem to have been any overwhelming environmental barrier in New Zealand to high population growth from foundation. Equally, archaeological findings of a low average adult age at death have been difficult to reconcile with numbers of apparently elderly Māori observed in contemporary accounts of early European explorers.

However, recent reviews of literature on using skeletal remains to estimate either female fertility or adult age at death suggest a strong scepticism that this evidence can determine either variable in a manner approaching acceptable reliability.⁴² Accepting the conclusions from these reviews enables reconciliation of archaeological demography with information from historical demography.

The overall conclusion of this examination of the prediction method is that, because of uncertainties in the three key parameters and the long 500-plus-year forecast horizon, the plausible population range arising is so broad as to be practically meaningless for the purposes of independently informing on the size of a contact-era Māori population. Just about any figure can be plausibly illustrated by clever selection of possible parameters.

Evidence on the Pre-1840 Effects of Disease and War

The qualitative choice of a low retrodiction decline parameter is defended by two core supporting propositions: the first on the localization of imported European disease to a few relatively unimportant coastal shipping contact zones prior to the 1850s; and the second on the minimal effects of warfare on depopulation over the first half of the nineteenth century.⁴³ What is the evidence for these two propositions?

The claim of a lack of widespread epidemic disease in New Zealand before the 1850s is a commendably strong one, as it is falsifiable. But contrary to the minimalist paradigm, there were widespread epidemics in New Zealand prior to the 1850s and indeed the 1840s. For one example, there is considerable evidence of a widespread high-mortality epidemic across the North Island and into the South Island, typically named as ‘*rewharewha*’, circa 1810. This evidence is preserved in nineteenth-century and twentieth-century Māori accounts, and accounts collected from Māori informants, within personal memory of the events, by experienced but not contemporary European observers.⁴⁴

For a second example, there is also considerable evidence of widespread influenza amongst Māori in late 1838 and early-to-mid-1839, recorded in contemporary European accounts. The areas where the epidemic is recorded include the Bay of Islands, Kaitiāia, Kaipara, Hauraki, Tauranga, Rotorua, Taupo, Poverty Bay, Waikato (Kāwhia), Kapiti and the Chatham Islands — in other words, many areas well outside main European shipping contact zones.⁴⁵

These twin examples comprehensively falsify the assertion that imported European diseases were confined to discrete coastal zones of high shipping contact prior to 1840. Other diseases associated with depopulation in the international literature and known to be present in New Zealand pre-1840, such as syphilis and tuberculosis, were certainly capable of making exactly the same journey outside high contact shipping zones.

What about war deaths? There are a wide variety of recent estimates of the impacts of pre-1840 war on the Māori population. Over the 71-year period from 1769 to 1840, Angela Ballara estimates 20,000 dead from ‘violence in war or from the consequences of migration, including periods of malnutrition’ or fewer than 300 deaths per year on average. Her number is based on taking Pool’s 1991 estimate of population decline between 1769 and 1840 of 30,000 and arbitrarily doubling it ‘to be on the safe side’. In other words, her estimate of war deaths is actually derived from a minimalist depopulation number, and thus cannot be used to independently support it. She conflates this assumed population decline with deaths. Ballara then suggests that most of these

60,000 'deaths' were because of epidemics, infant mortality and 'reduced fertility'. Of course, reduced fertility is not a cause of death, though it may be a cause of depopulation via suppressing births. Finally, she concludes that war deaths were therefore 'perhaps' 20,000. Ballara's definition of deaths due to the indirect consequences of war is also brief and narrow.⁴⁶

James Belich places Māori deaths in what he describes as the Musket Wars at 'perhaps about' 20,000 people. Belich implies the Musket Wars began about 1818 but he notes uncertainty about when in the 1830s they ended, the end defined as being when tribal warfare reverted to pre-musket war levels of mortality. His number is about the same as Ballara's, but measured over a much shorter period, perhaps fewer than 20 years compared to her 71 years. By way of further contrast, Ballara's 20,000 dead includes mortality in all wars — not just Belich's deaths in wars involving guns with abnormally high levels of mortality. Unlike Ballara, Belich mentions no method. It is unclear whether the figure is of those directly killed in battle, or includes indirect deaths. Belich ridicules missionary estimates of up to '80,000 killed' in warfare, indicating that this figure would have left 'few Maori alive', given his precise estimate of 86,000 Māori in 1769.⁴⁷ However, the 80,000 number, which S. Percy Smith attributes to the missionaries (Smith's book is the only place where this number can be found — a missionary version is not retrievable), seems to be for population decline, not deaths.⁴⁸ The high figure (again, method-less) reported by Smith and attributed to the missionaries simply reflects a belief in a much higher contact-era population than Belich's 86,000 Māori.

Demographers Pool and Kukutai place the number of Māori deaths 'directly or indirectly' due to war between 1810 and 1840 at 700 per year on average, or 21,000 in total. While their number is roughly the same as Belich's, their 30-year window is about a decade longer, and their focus seems to be all war deaths, not just Belich's abnormal Musket War deaths. Thus, their estimates of annual war losses are much lower. No method is offered behind the calculation. No definition is made of what is included as direct or indirect deaths. Elsewhere, Pool defines indirect deaths as those due to disruption of normal economic activities and general dislocation making the population more susceptible to disease.⁴⁹ It is unclear whether his definition of indirect deaths includes an estimation, for example, of those eventually dying from wounds, the post-battle deaths of war captives and the elevated suicide rates of women following the killing of their husbands, all of which were potentially significant indirect causes of mortality from Māori warfare during the period.

Pool and Kukutai's only relevant reference in this context is to Pool's 1991 book. This book surveys extant estimates of direct and indirect Māori

deaths due to war, ranging from 30,000 to 80,000 over sub-periods between 1769 and 1840, none of which are based on any method and, if they include indirect deaths, offer no clear definition of it. It is noteworthy that this surveyed range *excludes* Pool and Kukutai's 21,000 death estimate. Pool suggests, without evidence, that these summarized extant estimates are biased upwards by observer prejudice. Finally, Pool suggests that Harrison Wright's figures should be given greater credence, while at no point stating Wright's overall number.⁵⁰ Pool's 1977 book goes into somewhat greater detail, providing a summary of some extant estimates of war deaths by other writers. Again, he concludes Wright's figures are the most accurate. In this case Pool provides Wright's figures — 30,000 to 40,000 deaths over the 1820 to 1840 period.⁵¹ Wright's estimate also lacks a method and does not indicate whether indirect deaths are included.⁵² His figures equate to between 1500 and 2000 deaths per year on average, double or more the annual average of Pool and Kukutai. Hence Pool and Kukutai's figures have no evidential foundation, and are indeed inconsistent with Pool's stated support for Wright's number.

All the numbers on estimated Māori war deaths over the period lack an acceptable intellectual foundation. They are innocent of a coherent method, weak on definitions of what they purport to enumerate and cover varying or even indeterminate periods. Where they can be made roughly comparable, the numbers arrived at are wildly different, with deaths ranging from 300 to between 1500 and 2000 people per annum. They cannot, therefore, be used to support notions of low population loss due to warfare.

Discussion

The figures of a 1769 Māori population of 80,000 to 100,000 strong, derived from apparent triangulation by independent use of the three approaches discussed above and representing the conventional wisdom in New Zealand history, have no robust evidence in their favour. Additionally, the supplementary supporting arguments that *widespread* disease and warfare definitively played no role (disease) or a minor role (warfare) in reducing the Māori population up to 1840 also have little evidence in their favour. In a serious sense, existing contact-era Māori population estimates and associated ranges are indeed New Zealand numbers from nearly nowhere.⁵³ Thus evidence for New Zealand Māori depopulation exceptionalism in a Pacific context is best described as exceptionally weak.

Epistemologically, rather than constituting a serious effort to answer the question of Māori population size at contact and consequent depopulation, the numbers arising from the three methods dissected above can be more accurately seen as being used to quantitatively *illustrate* an *a priori* set of

beliefs on post-contact Māori depopulation. What is more, shifts in *a priori* beliefs, rather than improvements in evidence and methods, appear to have driven the downward revision in the estimates and the growing confidence in the range of plausible estimates.

That the existing models and evidence can make no contribution to accurately estimating the size of the Māori population circa 1769, and any subsequent depopulation to 1840, is problematic for those interested in developing an intellectually satisfactory understanding of New Zealand's pre- and post-contact demographic, social and economic history. New methods, better evidence and greater critical intellectual rigour are required.⁵⁴ In the interim, claims about the size of the contact-era Māori population, the rapidity of any depopulation to the 1840s and any post-1850s acceleration in Māori depopulation should be considered with a caution reflecting the striking weaknesses in the existing evidence.

SIMON CHAPPLE

Victoria University of Wellington

NOTES

1 J.M.R. Owens, 'New Zealand Before Annexation', in W.H. Oliver and B.R. Williams, eds, *The Oxford History of New Zealand*, Clarendon Press, Wellington, 1981, pp.41, 44–45, 49–50.

2 Ian Pool, *Te Iwi Maori: A New Zealand Population Past, Present and Predicted*, Auckland University Press, Auckland, 1991, p.46.

3 James Belich, *Making Peoples: A History of the New Zealanders from Polynesian Settlement to the End of the Nineteenth Century*, Allen Lane, Auckland, 1996, pp.175–6 and Michael King, *Penguin History of New Zealand*, Penguin, Auckland, 2003, pp.149–50.

4 Atholl Anderson, Judith Binney and Aroha Harris, *Tangata Whenua: An Illustrated History*, Bridget Williams Books, Wellington, 2014, pp.123, 172, 200; Ian Pool and Tahu Kukutai, 'Taupori Maori — Maori Population Change — Population changes 1769–1840', *Te Ara — The Encyclopedia of New Zealand*, <http://www.TeAra.govt.nz/en/taupori-maori-maori-population-change/page-1> (accessed 5 November 2016), and Vincent O'Malley, *The Meeting Place: Māori and Pākehā Encounters, 1642–1840*, Auckland University Press, Auckland, 2012, pp.210–11.

5 Norma McArthur, *Island Populations of the Pacific*, Australian National University Press, Canberra, 1968, and Patrick Kirch and Jean-Louis Rallu, 'Long-Term Demographic Evolution in the Pacific Islands. Issues, Debates and Challenges', in Patrick Kirch and Jean-Louis Rallu, eds, *The Growth and Collapse of Pacific Island Societies: Archaeological and Demographic Perspectives*, University of Hawaii Press, Honolulu, 2007, pp.3–4.

6 Ian Pool, *Colonization and Development in New Zealand between 1769 and 1900: The Seeds of Rangiatea*, Springer, Cham, 2015, p.175 states that his revisions arise from new information. It is unclear what this new information is. Elsewhere he describes having 'reworked' data, but again does not disclose new information or new methods, if any, which drove the reworking (p.154).

7 Pool, *The Maori Population of New Zealand 1769–1971*, Auckland University Press, Auckland, 1977, p.208, Pool, *Te Iwi Maori*, pp.57, 237, and Pool, *Colonization and Development in New Zealand*, Table 11.1, p.204.

8 David E. Stannard, *Before the Horror: The Population of Hawai'i on the eve of Western Contact*, Social Science Research Unit, University of Hawaii, Honolulu, 1989; Jean-Louis Rallu, 'Pre- and Post-contact Population in Island Polynesia', in Kirch and Rallu, eds, *The Growth and Collapse of Pacific Island Societies*, pp.15–34; Roger Green, 'Protohistoric Samoan Population', in Kirch and Rallu, eds, *The Growth and Collapse of Pacific Island Societies*, pp.203–31; Christophe Sand, Jacques Bole and A. Quetcho, 'What were the Real Numbers? The Question of Pre-contact Population Densities in New Caledonia', in Kirch and Rallu, eds, *The Growth and Collapse of Pacific Island Societies*, pp.306–25.

9 For example, Tom Dye, 'Population Trends in Hawai'i Before 1778', *Hawaiian Journal of History*, 28 (1994), pp.1–20; Andrew F. Bushnell, '"The Horror" Reconsidered: An Evaluation of the Historical Evidence for Population Decline in Hawaii, 1778–1803', *Pacific Studies*, 16, 3 (1993), pp.115–61, and Ross Cordy, 'Reconstructing Hawaiian Population at European Contact. Three Regional Case Studies', in Kirch and Rallu, eds, *The Growth and Collapse of Pacific Island Societies*, pp.108–28.

10 New Zealand archaeologists have also used the carrying capacity method; for example, Wilfred Shawcross, 'Ethnographic Economics and the Study of Population in Prehistoric New Zealand: Viewed through Archaeology', *Mankind*, 7, 4 (1970), pp.279–91. This method is based on the Malthusian notion that observed populations expand up to the limits of subsistence. This approach has fallen out of favour, partly due to a very large number of productivity assumptions which necessarily underlie estimation of sustainable subsistence populations, and

partly because human choices, rather than simply resource limitations, are now considered as being a significant influence on population size.

- 11 Pool, *Colonization and Development in New Zealand*, p.154.
- 12 Pool and Kukutai, 'Taupori Maori'.
- 13 Johann Reinhold Forster, Nicholas Thomas, Harriet Guest and Michael Dettelbach, *Observations Made during a Voyage Round the World*, University of Hawaii Press, Honolulu, 2003 [1778], pp.224–5.
- 14 Forster, *Observations*, p.207.
- 15 F.D. Fenton, *Observations on the Aboriginal Inhabitants of New Zealand*, Auckland, 1859; Atholl Anderson, *The Welcome of Strangers: An Ethnohistory of Southern Maori AD 1650–1850*, University of Otago Press, Dunedin, 1998, pp.196–8.
- 16 Anne Salmond, *Between Worlds. Early Exchanges Between Maori and Europeans 1773–1815*, Viking, Auckland, 1997, footnote 32, p.539.
- 17 Jules-Sébastien-César Dumont D'Urville, *New Zealand, 1826–1827, from the French of Dumont D'Urville: An English Translation of the Voyage de l'Astrolabe in New Zealand Waters*, Wingfield Press, Wellington, 1950, p.195.
- 18 John Liddiard Nicholas, *Narrative of a Voyage to New Zealand: Performed in the Years 1814 and 1815 in Company with the Rev. Samuel Marsden*, Black and Son, London, 1817, volume 2, pp.90–91.
- 19 Joel Polack, *Manners and Customs of the New Zealanders*, James Madden & Co., London, 1840, volume 2, p.91.
- 20 Williams's letter, quoted by Dandeson Coates, Evidence to the New Zealand Select Committee, 14 May 1838, *Great Britain Parliamentary Papers on New Zealand 1837–40*, p.180.
- 21 Quote is from *Missionary Register*, 1834, p.546. Williams's multiplier of three is approximately consistent with total population/adult male ratios emerging from regional censuses of Māori from the 1840s. Similar approaches, but with sometimes higher multipliers, were commonly used in other areas of European expansion to estimate indigenous populations. A multiplier of 4 or 5 was sometimes used in Canada. For example, in his introduction to the 1871 Census of Canada, the pioneer Canadian demographer Taché made estimates of Indian populations based on warrior numbers given in Sir William Johnson's 1763 memo to the Lords of Trade, multiplying Johnson's warriors by five (see <http://www.statcan.gc.ca/pub/98-187-x/4151278-eng.htm>).
- 22 See Pool, *The Maori Population*, pp.194–5, 208; Pool, *Te Iwi Maori*, pp.53–57; Pool, *Colonization and Development in New Zealand*, pp.154–7.
- 23 Pool, *Colonization and Development in New Zealand*, p.156.
- 24 Pool, *Te Iwi Maori*, p.55. Fenton, *Observations on the Aboriginal Inhabitants of New Zealand*, Table II.
- 25 Pool, *Te Iwi Maori*, pp.39, 57.
- 26 Michael King, *Mori Mori: A People Rediscovered*, Viking, Auckland, 2000, p.63.
- 27 Alexander Shand, 'The Occupation of the Chatham Islands by the Maoris in 1835. Part I – The Migration of Ngatiawa to the Chatham Islands', *The Journal of the Polynesian Society* (JPS), 1, 3 (1892), pp.154–63.
- 28 Pool, *Te Iwi Maori*, pp.39, 57.
- 29 Kirch, 'Methods, Measures, and Models in Pacific Paleodemography', in Kirch and Rallu, eds, *The Growth and Collapse of Pacific Island Societies*, p.326.
- 30 Nancy Pearce, 'The Size and Location of the Maori population, 1857–96, A Statistical Study', MA thesis, Victoria University College, 1952.
- 31 Pool, *Colonization and Development in New Zealand*, Table 11.1, p.204. In his 1991 book, *Te Iwi Maori*, Pool's plausible Māori population range for 1858 is wider (why the range

narrows in the 2015 book is unexplained), being 56,000 to 62,000 (p.61). As Pool's 1991 upper and lower bounds of plausible Māori populations for 1840 are the same as in his 2015 book, *Colonization and Development in New Zealand* (see pp.55, 58), the same qualitative trend of a broadening cone of plausible population counts is implied as retrodiction works backward to 1840. However, the plausible cone will widen less rapidly.

32 In terms of this decline of 2.4%, it is noteworthy that Pool, *Te Iwi Maori*, p.55 previously described a national Māori annual rate of decline between 1840 and 1858 exceeding 2% per annum as "impossible". As with the best guess rate of decline pre-1840, the range of rates of decline used back to 1840 have no apparent empirical foundation. However, to give Pool's estimates the most favourable run for their money, they are taken as informative here.

33 Pool, *Colonization and Development in New Zealand*, Table 11.1, p.204.

34 Pool, *Te Iwi Maori*, pp.37–40; Pool, *Colonization and Development in New Zealand*, pp.154–5. The prediction method is not employed in Pool's 1977 book, *The Maori Population*, and its utility is also down-played in Pool's 2015 book, *Colonization and Development in New Zealand*.

35 Anderson, Binney and Harris, *Tangata Whenua*, pp.34–36.

36 R.P. Murray-McIntosh, B.J. Scrimshaw, P.J. Hatfield and D. Penny, 'Testing Migration Patterns and Estimating Founding Population Size in Polynesia by using Human mtDNA Sequences', *Proceedings National Academy of Science*, 95, 15 (1998), pp.9047–52; Adele Whyte, Stephen J. Marshall and Geoffrey K. Chambers, 'Human Evolution in Polynesia', *Human Biology*, 77, 2 (2005), pp.157–77.

37 Pool, *Te Iwi Maori*, pp.37, 40; Pool, *Colonization and Development in New Zealand*, p.174.

38 W.F. Refshauge and R. J. Walsh, 'Pitcairn Island: Fertility and Population Growth, 1790–1856', *Annals of Human Biology*, 8, 4 (1981), pp.303–12.

39 Maureen Molloy and Judith Huntsman, 'Population Regeneration in Tokelau: The Case of Nukunonu', *JPS*, 105, 1 (1996), pp.41–61.

40 Evidence summarized in Douglas G. Sutton, 'Maori Demographic Change, 1769–1840: The Inner Workings of a Picturesque but Illogical Simile', *JPS*, 95, 3 (1986), pp.291–339.

41 Fenton, *Observations*, Table 4, p.22.

42 Douglas H. Ubelaker and Jade S. De La Paz, 'Skeletal Indicators of Pregnancy and Parturition: A Historical Review', *Journal of Forensic Sciences*, 57, (2012), pp.866–72. Isabelle Séguy and Luc Buchet, *Handbook of Palaeodemography*, Springer, New York, 2014, pp.45–47.

43 Belich, *Making Peoples*, pp.175–6; King, *Penguin History*, pp.149–50; Pool, *Te Iwi Maori*, pp.46, 238; Pool, *Colonization and Development in New Zealand*, pp.129–43.

44 Unnamed Māori informants possibly in the south Manukau (Awhitu) in James Hamlin, 'On the Mythology of the New Zealanders', *Tasmanian Journal*, 1 (1842), pp.254–64, 342–58; Wikiriwhi Hautonga in Hauraki in 1870 in the Native Land Court records in Caroline Phillips, *Waitohu Journeys: The Archaeology of 400 years of Māori Settlement*, Auckland University Press, Auckland, 2000, p.64; various Arawa testimony recorded in Native Land Court records in D.M. Stafford, *Landmarks of Te Arawa. Volume 1: Rotorua*, Reed, Auckland, 1994, pp.34, 49, 90–91, 136, 145–6; Richard Taylor, *A Leaf from the Natural History of New Zealand*, Robert Stokes, Wellington, 1848, p.86; Te Korenga (or Kerehoma) Tu-whawhakia in S. Percy Smith, 'Some Whanganui Historical Notes', *JPS*, 14, 3 (1905), pp.131–58; Melchizedec Te Motu in southern Hawke's Bay in William Colenso, entry dated 20 July 1852, *Journals*, volumes 1–3, MS-0582-0585, Alexander Turnbull Library; Petera Kahutia from Tūranga in *Te Karere Maori*, 30 September 1859, pp.5–6; Waretini Tuainuku in Horowhenua in Walter Buller, 'The Story of Papaitonga', *Transactions and Proceedings of the New Zealand Institute*, 26, (1893), pp.572–83; George McDonnal from Rangitāne in Marlborough in the northern South Island in W.H. Skinner, 'Ancient Maori Canals. Marlborough, NZ', *JPS*, 21, 3 (1912), pp.105–8.

45 J.M.R. Owens, 'Missionary Medicine and Maori Health: The Record of the Wesleyan Mission to New Zealand before 1840', *JPS*, 81, 4 (1972), pp.418–36; Peter Adams, *Fatal Necessity: British Intervention in New Zealand, 1830–1847*, Bridget Williams Books, Wellington, 2013, p.40; Brian T. Byrne, *The Unknown Kaipara: Five Aspects of its History 1250–1875*, T.B. Byrne, Auckland, 2002, p.84; Paul Monin, *This is My Place: Hauraki Contested, 1769–1875*, Bridget Williams Books, Wellington, 2001, p.166; John Carne Bidwill, *Rambles in New Zealand*, W.S. Orr, London, 1841, pp.10, 23, 35; William Williams in Frances Porter, ed., *The Turanga Journals, 1840–1850: Letters and Journals of William and Jane Williams, Missionaries to Poverty Bay*, Price Milburn for Victoria University Press, Wellington, 1974, p.66; Robert McNab, *The Old Whaling Days: A History of Southern New Zealand from 1830 to 1840*, Whitcome and Tombs, Wellington, 1913, p.338; Gilbert Mair, 'Notes on the Chatham Islands and their Inhabitants', *Transactions and Proceedings of the New Zealand Institute*, 3 (1870), pp.111–13.

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47 Belich, *Making Peoples*, p.178.

48 S. Percy Smith, *Maori Wars of the Nineteenth Century: The Struggle of the Northern against the Southern Maori Tribes prior to the Colonisation of New Zealand in 1840*, Whitcomb & Tombs, Christchurch, London, 1910, p.18.

49 Pool and Kukutai, 'Taupori Maori'; Pool, *Colonization and Development in New Zealand*, p.130.

50 Pool, *Te Iwi Maori*, p.44.

51 Pool, *The Maori Population*, Table 5.4, p.134.

52 Harrison M. Wright, *New Zealand, 1769–1840: Early Years of Western Contact*, Harvard University Press, Cambridge, 1959, p.102.

53 The phrase 'numbers from nowhere', used in a similar depopulation context, originates with David P. Henige, *Numbers from Nowhere: The American Indian Contact Population Debate*, Norman, Oklahoma, 1998.

54 A Marsden Fund research project announced in 2016 apparently aims to address the questions of 'the timing, magnitude, and causes of [Māori population] decline' post-1769. See <http://www.royalsociety.org.nz/2016/11/03/counting-our-tupuna-in-aotearoa-new-zealand/>. The stated method — a three-generation family reconstruction of population of one Waikato hapū over the peak years of colonization — is not on the face of it a research design able to address timing, magnitude and causes of post-contact Māori population decline. It lacks a country-wide coverage of the Māori population, sufficient temporal reach back to 1769 and an ability to encompass extinct iwi, hapū and whānau lines.