

Introduction to Northland

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Northland's current features could be what other regions develop in the future. Northland's climate now could be what other regions climate will be like in the future. Northland also provides an example of how to respond to the need for research and information when institutional knowledge is lost. Every region likes to think it's unique in any number of aspects and Northland is no exception and with some justification. Earlier proceedings of Northland Grassland conferences held in 1953, 1967, 1985 and 1996 highlight some of these features. However, like other regions, the issues affecting Northland farming not only reflect the consequences of soil and climate interactions and their impacts on the wider environment, but also the current economic situation impacting our ability to research these issues.

Geography

Northland includes three District Councils (Far North, Whangarei and Kaipara) and the Northland Regional

Table 1 Types of land cover and proportion of total land use in Northland (Source: NRC web page, MAF Landcover Database).

Land cover	Hectares	% of total
Planted Forest	133,000	10.5
Indigenous Forest	245,700	19.4
Shrubland	153,700	12.1
Pastoral	677,700	53.4
Mangrove	14,300	1.1
Tussock	0	0
Horticultural	5,000	0.4
Inland Water	7,200	0.6
Inland Wetland	5,000	0.4
Coastal Wetland	2,600	0.2
Bare Ground	2,000	0.16
Coastal Sands	17,600	1.4
Mines & Dumps	200	0.02
Urban Areas	5,300	0.42
Urban Open Spaces	300	0.02
Total	1,269,600	

Council (NRC). Rodney District Council, which is north of Auckland, is not included in the Regional Council area although it overlaps in its geology and as a farming district.

Northland is a long narrow peninsula with 3200 km of coastline, nowhere more than 40 km from the sea, and it is roughly 500 km from North Cape to Auckland; this means nowhere is typical. Thus, each part has its own microclimate. The highest point is 781 m a. s. l. For example, my own farm is approximately 15 km (direct line) inland, in a hill country area which is 45 m at its lowest to 160 m highest point, and I prefer to describe it as broken country as opposed to hill country. Pastoral land is only 53% of Northland with indigenous cover and shrubland at 31.5% and planted forests occupying 10.5% (Table 1). The rivers are predominately short-run reflecting our narrow peninsula. After heavy rain everything is quickly flushed out to sea.

In a State of Environment Monitoring Report, the NRC had measured current water quality for the bacterium E.coli in freshwater recreational sites; 21% were consistently unsafe, 32% were safe unless after heavy rain and 48% of sites were consistently safe. No site met quality guidelines for drinking water. For nutrient enrichment the NRC reported 71% of sites did not meet guidelines for reactive phosphorous and 38% for nitrogen, the highest levels for both being

Figure 1 Northland allochthon (Source: Institute of GNS, Geology of Kaitia Area (1996)).

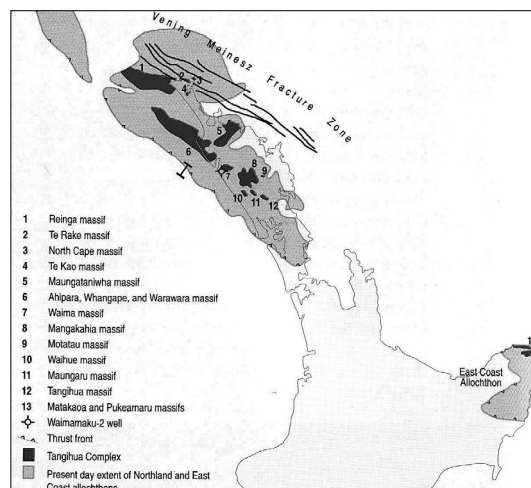
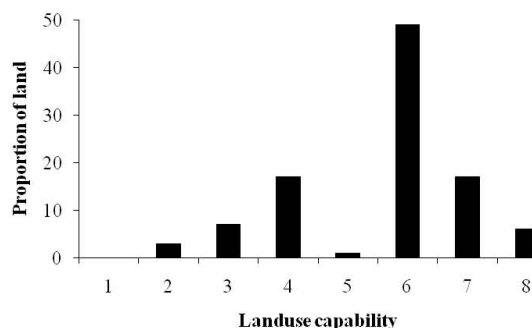


Table 2 Average monthly rainfall (mm) on the author's beef farm at Broadwood near Kaitiāia.

Years	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1990-1997	78	73	106	97	145	179	198	206	168	115	89	92	1,545
1998 -2009	109	92	92	115	160	184	223	152	107	144	122	117	1,617

Figure 2 Land capability in Northland (1-2 = flat land; 6-8 = hilly).

in pastoral catchments. However, some of the worst catchments have lowered nutrient content and improved water clarity.

Climate

Northland's mean annual rainfall varies from lows of 990 mm on coastal sites to 2785 mm on high (500 m a. s. l.) inland sites. Rainfall is consistent throughout the year as shown by my farm's monthly averages (Table 2). Note the 31% increase in summer (December, January, February) rain since 1998, spring staying the same while autumn was up and winter was down 5%, respectively. A new understanding of our weather was provided by the identification of the Interdecadal Pacific Oscillation (IPO) or the Pacific Decadal Oscillation (PDO). It oscillates every 20-30 years, producing wetter summers since 1998. The previous cycle started in the late seventies featuring a number of droughts and my return to the farm!

Since the beginning of 1998, the highest rainfall on my farm was in July 1998 at over 500 mm and the lowest was 17 mm in January 2009, which was a worry. Last year after a wet autumn, July had 25 rain days and August 20, which made conditions extremely difficult to manage. Tropical cyclones can skew these averages but we haven't had one in some time. However, high rainfall events do occur regularly in Northland with devastating results but they are not necessarily widespread. Warm moist air is brought down from the Tropics by a depression. These can be only 2 km wide so neighbouring farms do not receive the event.

Temperatures on my veranda very rarely exceed

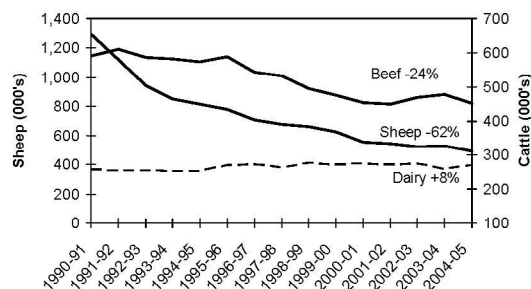
30°C in summer and usually range from 26-28°C. Temperature can drop to 0°C in winter but only for about an hour on a particular day and usually sits around 14-17°C. Soil temperatures vary from 10°C in winter to highs of 28°C in summer.

Soils

There are good descriptions of Northland soils in previous NZ Grassland Association proceedings. I also found C. During's 'Fertilisers and Soils in NZ Farming' a good information source in my early years of farming. Recommendations for fertilising are now being individualised with 'Overseer' nutrient budgeting and nutrient management plans, although I doubt the latter has high uptake in Northland at this stage.

What is new to our understanding of Northland soils is that Northland is the result of a massive slip that occurred 23 million years ago while under the sea called the Northland allochthon (Fig. 1). Campbell & Hutchings (2007) describe this phenomenon as "A series of slicesthat slid down, one on top of the other, to form a pile about 4 km thick." Interestingly, older rock ended up on top of younger rock and this moved several hundred km in a southwesterly direction. The East Coast of the North Island was part of this movement before it was split away by the faultline that caused Auckland and the Bay of Plenty to form. Tectonic activity in Northland also caused volcanoes to push through the slices to add volcanic soils to the mix.

The development of our soils is best described by Taylor & Sutherland (1953) "Under the warm, moist climate the rocks weather rapidly to form clays which differ according to the kind of rock. These clays in turn tend to become leached under the heavy rainfall, a process which has been intensified or retarded according to the particular type of native vegetation." I grew up hearing Puriri (broadleaf) country was 'strong' country whereas kauri soils (podzols) leached by the acid litter were 'poorer.' Currie (1985) stated "There are 255 different soil types mapped...." Farms can contain a number of them and mine has only two, but I've heard of some having 12. The problems arise when each responds differently to grazing pressure during wet periods. Taylor & Sutherland (1953) identified this issue ".....farming problems may be said to lie in adjusting to these conditions. Methods of farming evolved for the cooler, lighter-textured, better aerated,

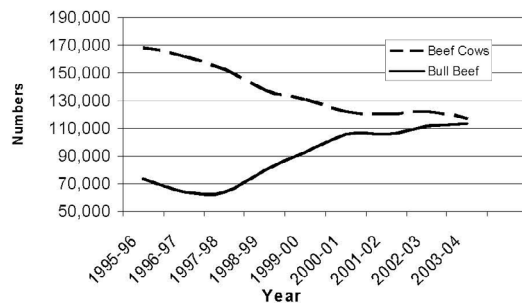
Figure 3 Regional trends in Northland stock numbers (Meat & Wool New Zealand Economic Service).

and quicker draining soils of the temperate regions". This is possibly the reason for the NRC Monitoring report showing a higher percentage of sites not meeting guidelines for phosphate rather than nitrogen, the phosphate being bound to sediment as it is washed off with disturbed topsoil. Another factor, highlighted in Fig. 2, is the high percentage of Class 6 land or how hilly Northland actually is. Also, the lack of Classes 1 and 2 or flat land.

Pastures

It's difficult to come to the North and not talk about subtropical grasses, especially kikuyu (*Pennisetum clandestinum*). Others such as paspalum (*Paspalum dilatatum*) and carpet grass (*Axonopus affinis*) aren't an issue as much as is kikuyu. Although paspalum has been knocked around by black beetle (*Heteronychus arator*), it has not returned to the dominant levels seen in the 1960s. Perennial (*Lolium perenne*) and annual (*Lolium multiflorum*) ryegrasses are present, both making complimentary companions for kikuyu. Ryegrasses struggle to compete with kikuyu on north facing hillsides and a common complaint is their lack of persistence.

My experience with kikuyu is that it is very slow to establish on low fertility hills and it prefers a northerly aspect. On a hill paddock with a NE aspect it has been growing vigorously for 30 years, but on part of the same paddock with a SE aspect it is not present. Kikuyu spread in Northland is described in Murray Jaggar's and Bruce Paton's papers in this publication. Kikuyu is also the future for regions to our south as the drought in the Waikato 2008 showed clear green signs of kikuyu establishment where active control measures are not used. Well managed kikuyu pastures can have 5-10% of dry matter as kikuyu in late winter /spring, but as much as 90% in autumn. Management of kikuyu is the key rather than eradication if spread is 50% of the farm area or there is no access to extremely large funds. It is not uncommon to see rushes growing on hill

Figure 4 Change in cattle numbers in Northland.

sides, more so on sheep farms, reflecting the consistent rainfall. In summer, in large parts of Northland, pastoral areas are covered in the white flowers of carrot weed, a general term covering parsley dropwort (*Oenanthe pimpinelloides*) and wild carrot (*Daucus carota*) amongst others. If the pasture has the purple hue of pennyroyal (*Mentha pulegium*), this reflects pasture damage the previous winter or spring.

Stock

On a stock unit basis Northland has 50% dairy, 40% beef, 9% sheep and 1% other. The decline in sheep and beef stock numbers (Fig. 3) reflects the drop in pastoral land area as forestry and life-style blocks have increased from 1990/91 – 2004/05. The change in cattle stock numbers (Fig. 4) with a drop in breeding cow numbers and a rise in bull beef reflects not only the perceived higher profitability of bulls but intensification which has implications for sedimentation. The lower stocking rate on sheep, beef and dairy farms in Northland (Figs. 5 and 6), I believe, reflects the soils capability rather than the farmers.

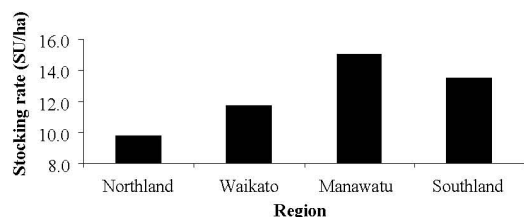
Northland Research and Information Transfer

In 1983 there were an estimated 37 permanent staff involved in pastoral research and extension. In 2005 there were two. This is a huge loss of institutional knowledge and capability from the pastoral sector in Northland and impacts on the research that is Northland specific. Also, it creates the danger of farmers replicating what has been done, wasting scarce resources. So what have we done about it?

We established a group from across the pastoral sectors to make sure that each sector was informed about activities of others. This is called the Northland Agricultural Forum (NAF) and works as one of Enterprise Northland's Development Groups.

Then with M & WZ Fitt funding we commissioned a catalogue of published research. This was called

Figure 5 Regional differences in stocking rate on sheep and beef farms (MAF data 2004/05).



Farmer Information Service and is available published on the website www.enterprisenorthland.co.nz/dev_groups/pastoral

Stock takes were prepared from these catalogues, with help from the Sustainable Farming Fund (SFF), and popular summaries published and distributed.

Annual Conferences have been run for last 4 years initially based on information from these stock takes.

At the first Conference, a workshop was held for farmers to identify and rank research needs for Northland. This information was combined with other needs assessments such as M & WNZ surveys to produce Northland research needs. This information was distributed to research providers and funders. These were also the basis of determining content of subsequent Conferences. Again this is available on the website.

We documented archives held by AgResearch of unpublished Northland work and this is available on the website referred to above.

Currently, 2009, we have another Information Needs survey underway, with support from Northland Sheep and Beef Council and the Sustainable Farming Fund (SFF), keeping the information up to date with farmer needs. This is also clarifies what farmers need to know as opposed to research needs.

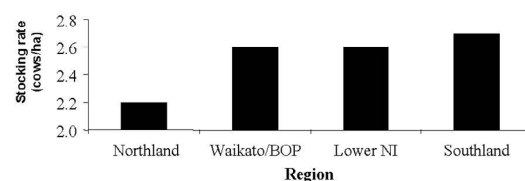
NAF also has a site at the Northland Field days to provide a marquee for research and information providers.

Groups of farmers have asked consultants and scientists to deal with issues as they have arisen, including clover pests, webworm, pasture pugging, and a Clover300 group that looked at clover persistence and nitrogen fixation in Northland; monitor farms and discussion groups are also used to highlight current farming issues. Two others groupings in particular are worth mentioning:

Kikuyu Action Group (KAG)

In 1999, the KAG was established with Murray Jagger as Chairman. With Dr Wayne Andrews on board, this group began informing farmers on how to optimise management of kikuyu pastures. This work, essentially by dairy farmers, was also of great interest to sheep and

Figure 6 Regional differences in stocking rate on dairy farms (MAF data 2004/05).



beef farmers, highlighting the need for NAF. Kikuyu field days attracted good attendances from farmers across sectors. Posters describing the activities of the KAG are to be presented at this conference and papers are available on the website.

Northland Dairy Development Trust

The Westpac Northland Dairy Development Trust (NDDT) is a joint venture between the Northland Agricultural Research Farm and Fonterra, supported by DairyNZ with Westpac as the key sponsor. The NDDT has had a demonstration farm at Dargaville for some time, well before Fonterra was established, and now has another at the Fonterra Jordan Valley Farm near Whangarei. Current work compares the economics of dairy farming on ryegrass versus mulched kikuyu and unmulched kikuyu - a first for Northland. Other work in progress compares sowing rates for ryegrasses into kikuyu pastures and feed comparisons in response to local farmers needs, providing a good vehicle for collaborative work.

The Future

The future is not what is going to be, but how we respond to it and shape it. We make the future, but we need information and research to do it! My farming motto is "If I look after tomorrow today will look after itself."

ACKNOWLEDGEMENT

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REFERENCES

- Campbell, H.; Hutchings, G. 2007. In search of ancient New Zealand. Penguin, North Shore NZ, GNS Science NZ. 186 pp.
- Currie, J.D. 1985. Grassland farming in Northland. *Proceedings of the New Zealand Grassland Association* 47: 11-17.
- Taylor, N.H.; Sutherland, C.F.1953. Soils of North Auckland. *Proceedings of the New Zealand Grassland Association* 15: 25-38.