the state of our environment

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Gisborne 2007 and 2008

Land and Soil

Principal findings

- A rule inserted into the Combined Regional Land and District Plan (2006) requiring tree-cover on the worst eroding land is already engendering erosion-control measures
- There are now 25 new privately owned poplar and willow pole nurseries in Gisborne District, established in 2007 and 2008, as a response to increasing demand for planting material and paucity of supply
- Nine Aforestation Grants Scheme applications have been approved
- There has been a marked downturn in new forestry planting, and increased uptake of indigenous reversion, using the ECFP
- Severe drought persisted in some parts of the district the entire two years of this reporting period. Sheep numbers are significantly down; meanwhile the number of dairy grazers has doubled.

plan in place outlining the remaining stages of planting, which must then be completed by 2021.

Notified in December 2006, Plan Variation 176 defines severely erosion-prone land within Gisborne District that requires establishment and maintenance of suitable tree cover, including land suitable only for indigenous revegetation, and not for productive use. It also contains Overlay 3A maps showing where the land is. Overlay 3A[1] land fits within the category of "target land" under the East Coast Forestry Project (ECFP)[2], therefore funding can be obtained from this source towards the required revegetation.

Sustainable land management in Gisborne District

The purpose of the Combined Regional Land and District Plan (2006) is to assist the Council in sustainably managing the natural and physical resources within Gisborne District under the Resource Management Act 1991.

The biggest challenge to sustainable management in Gisborne District is the fact that our soft underlying rock types and steep topography make for potentially severe soil erosion and high sediment and gravel loads in many of our rivers.

Over a quarter of land within Gisborne District has or is susceptible to severe erosion, including large-scale gully erosion, earthflows and deep-seated slumps. That's not counting 'typical' surface soil slips that are common in the District after very heavy downpours.

It is this combination of factors that makes Gisborne's situation unique, and we have a scheme, unique in New Zealand, to address severe erosion.

The Sustainable Hill Country Project

The goal of the Project is to ensure landowners establish suitable vegetation cover on all identified severely erosion-prone land by 2011, or have a works

Above: A hill slope well planted with poplars and willows, which would otherwise be susceptible to slip, gully and slump erosion.

1. Classed as the worst eroding land in Gisborne District, it comprises land defined in the text descriptions of Land Use Capability Units (1st ed. NZLRI) VIIe12–16,18 and 20, VIIIe 1–6; and (2nd ed. NZLRI) VIIe18–19, VIIe21–25, and VIIIe2–9. 2. Administered by the Ministry of Agriculture and Forestry (MAF).

Above: Severe gully erosion in mudstone country. Unless treated, this erosion will accelerate. Suitable treatment is now a requirement under Plan Variation 176.

What sort of tree cover?

For the worst gullies, with little or no topsoil, and for severe earth flows, a prescribed forest-planting regime using Pinus radiata is often the best treatment. However pines are by no means the only option. Poplar and willow pole planting and fencing-and-reversion options where appropriate and approved by the Council's District Conservator will also be applicable.

Certainly the trend on the East Coast is increasing uptake of the option of indigenous reversion on target land using the ECFP.

In some cases, land outside of that mapped as 3A will also need treatment, to ensure effective erosion control.

Above: Blanket aforestation using *Pinus radiata* is often the best solution on very steep, severely erosion-prone land, and is often a more sustainable option than pastoral farming.

Additional remedial works that fall outside of ECFP criteria (such as drainage, debris dams or contouring) may be required and would have to be funded by the landowner.

Works plans are tailored to suit erosion types, size, degree of current activity, slope and specific features of the site. A variety of measures and planting regimes may be used, and a staged approach may be planned in order to spread costs and labour requirements.

Guidelines for pole spacing

The Council and Ministry of Agriculture and Forestry recognised the need for agreed planting and spacing guidelines for pole planting to ensure effective erosion-control. A workshop in December 2006, brought together practising soil conservators and researchers with collective knowledge of the performance of poplars and willows in mitigating different forms of erosion.

The resulting publication "Poplar and Willow Planting on Land Overlay 3A, Gisborne, East Coast region" was published in 2007 and is available through the soil conservation section of council, and online at:

www.maf.govt.nz/forestry/east-coast-forestry/ecfp-08-workshop/

Above: Erosion prone land suitable for fencing and reversion, since there is already indigenous vegetation up slope of the severe gully, providing a seed source.

Above: A great example of a site-specific solution to gully erosion: the most severe, "gray" areas (3A) have been fenced off planted with closely spaced pines. Willow and poplar planting outside the fenced area enhance the stability of the soil by extending out into watercourses that feed the main gully.

The report will enable a consistent approach to spaced pole-planting regimes, especially on 3A land, and therefore facilitate applications to the ECFP for funding.

This unique combination of the ECFP incentive and Resource Management Act rule ensure only effective soil conservation solutions will be promoted to landowners. They will be required to fully implement their works plan, and maintain the required tree cover. Doing nothing is no longer an option (except where physically imposible to plant, for instance near-vertical river gorges).

Afforestation Grants Scheme

The Aforestation Grants Scheme (AGS) is an initiative under the government climate change package, announced December 2006, to increase the area of carbon-sequestering new forest in New Zealand. Half of the $50 million package will be available through ten regional councils, including Gisborne District Council[3]. Carbon sequestration is not core council business, however new forests will have important co-benefits of interest to Council: in reducing soil erosion and nutrient runoff, reducing flood peaks, and potentially enhancing biodiversity. These criteria will be part of the ranking applied to grant applications.

The minimum block size for AGS eligibility is five hectares, and can be made up of multiple areas of at least one hectare each, so it will be particularly suited to planting smaller blocks, and offers a possible alternative funding source for planting overlay 3A land. Nine AGS applications to MAF, approved in 2008, attracted an average grant rate of $1,829 per hectare. Stocking rates of a minimum of 750 stems per hectare are required, and the government retains any carbon credits generated.

The AGS cannot be used in conjunction with ECFP funding on the same piece of land, but may be an option for planting land adjacent to 3A areas, in order to achieve optimum erosion control.

The Poplar Pole Nursery Project

The Soil Conservation section of Council initiated the Project in response to the ever-increasing demand for poplars, which has traditionally outstripped the supply capacity of the Council's small Waerenga-o-Kuri nursery, and is poised to increase further now poles can be eligible for East Coast Forestry Project funding as part of the Sustainable Hill Country Project.

The Conservation Division obtained funding from MAF's Sustainable Farming Fund in 2005 to encourage more farmers to become self-sufficient in poles for farm planting. By 2008 some unprecedented successes had been chalked up.

Sustainable Farming Funds helped start the first dozen nurseries, trialed and established the best weed-control programme, held field-days to promote best practice in spray and harvest protocols, and published a booklet entitled "Poplar nursery establishment and management best practices".

By 2007 there were fifteen new nurseries with initial weed control completed and stool material in the ground (stools are the stumps from which the poles can be later harvested). Crow's nest and Veronese were the poplar clones of choice, as both varieties have a proven track record for survival in Gisborne District.

The toughest lesson learned was that failure to complete weed control in a timely manner lead to very poor survival of planted cuttings/stools, and in two cases complete failure of the crop.

However, the Project gained significant momentum and by the end of 2008, there were twenty-five "new" nurseries including twenty-one on-farm and four privately-owned commercial nurseries, of which two 2,500-stool nurseries were established by non-farmers, for the express purpose of supplying poles for sale.

Thirteen of twenty-five new nurseries were established outside of the Sustainable Farming Fund, including the large Ingleby Station nursery, Waikura Valley, in which 3,000 stools were planted in each of 2007, 2008 (and will also be planted in 2009).

3. The other 50% will be available through MAF as a competitive tender scheme.

Above: Bed preparation is an essential part of the nursery-establishment process.

Above: Timely weed control can also make-or-break a nursery.

The new nurseries will make a significant difference to the supply of pole material for soil conservation works in the ensuing seasons.

Poplar and willow harvest and planting tallies 2007-08

	3m (A & B) poles		1m poplar stakes		0.5m poplar nursery stakes	
Source of poles	2007	2008	2007	2008	2007	2008
Waerenga-o-kuri (GDC)	2,350 poplar 200 willow	2,965 poplar 845 willow	300 poplar	-	10,055 poplar	4,410 poplar 825 willow
Wairoa nurseries	1,750 poplar 400 willow	2,260 poplar 715 willow	-	-	5,700 poplar	-
Farm nursery and self-harvest	2,400 poplar 2,275 willow	2,550 poplar 525 willow	-	490 poplar 750 willow	1,075 poplar	1,250 poplar
Totals	**6,500 poplar 2,875 willow**	**7775 poplar 2,085 willow**	**300 poplar**	**490 poplar 750 willow**	**16,830 poplar**	**5,660 poplar 825 willow**

Explanation of pole grades

A and B poles are the 3m large and medium diameter poles respectively. These can be planted directly in the paddock, protected by a plastic sleeve. Both grades can be established in the presence of sheep, but cattle must be excluded for the first five years where B poles are used.

Stakes of 1m length are used to establish willows and poplars in areas from which stock are excluded, including riparian planting in forestry blocks to protect stream banks from erosion throughout the forestry establishment/harvest/replant cycle.

Nursery stakes, 0.5m long, are used for nursery establishment, and will become the stools from which poles can be later harvested.

Willow sawfly update

The influence of willow sawfly has been minor in recent years. This follows several years in the early nineties when sawfly severely defoliated willows, and many people gave up planting them.

In Hawke's Bay where willows are a mainstay of river- and stop bank stabilisation, willow fatalities were reported, and serious riverbank erosion followed even moderate flood events. The situation for willows appeared to be dire.

However, during the summers of 2007 and 2008 defoliation has been minimal. Willows have been seen with thinning to the crown and chewed leaves at the extremities of branches, but certainly not entirely stripped as they were in the three or four seasons following the arrival of this pest in the District.

One theory is that after the original population boom-and-bust, sawfly numbers have settled to an equilibrium level. Possibly predators such as birds have adapted to the new food source and are controlling sawfly.

Willow harvest and planting numbers in the previous table reflect the resurgence in planting of this very useful tree, traditionally used in watercourses and wet areas. Some of the newly established nurseries have opted for a proportion in willow stools.

Exotic forestry trends

In 2007, exotic forest planting for the whole of New Zealand was around 37,100 hectares, comprising 2,400 hectares of new planting and 34,700 hectares of restocking previously harvested areas. However, approximately 47,500 hectares of land harvested of forest remained unplanted, still awaiting restocking on 1st April 2008.

In the year ending April 1st, 2007, an estimated 1,284ha had been clear-felled, 1,259ha restocked and there were 416ha of newly planted forest. For the year ending April 1st 2008, 2,136ha were clear-felled, 1,240ha restocked and there were 218ha of new planting[4].

The average new planting rate for New Zealand as a whole over the last thirty years was 37,500 hectares per year. A planting boom between 1992 and 1998 saw an incredible 69,000ha of new forest per year planted (on average). But between April 1st 2007 and April 1st 2008, only around 1,000ha of new forests had been planted, the lowest level recorded since 1945.

In Gisborne District, at April 1st, 2007, exotic forests comprised 153,764 hectares of Pinus radiata, 2,444ha of Douglas fir, 133ha of cypress species, 1,133 ha other softwoods, 198 ha eucalypts, 690 ha other hardwoods .

Massive wood increases forecast

Forecasts prepared by MAF indicate that the available volume of radiata pine from the East Coast forests will steadily increase from 1.1 million cubic metres in 2007 to around 2.0 million cubic metres per year in 2013, and potentially to around 3.4 million cubic metres per year beyond 2020.

It is believed most of the increase in wood availability from 2013 on will come from the region's small-scale forest growers who established forests during the 1990s. However, decisions on when forests will be harvested depend on future market conditions, which cannot be predicted.

Consent activity

The rate of exotic forestry harvesting increased almost four-fold between 2007 and 2008. This in part reflects the age structure of some East Coast forests, with harvest-age trees coming on-stream, coupled with an improvement in prices for timber leading to a re-commencement of harvesting in areas where it had been put on hold. Forestry activity was reflected in roading/ tracking activity, which doubled in the reporting period.

Scrub clearing and track formation in the farming sector was, unsurprisingly, low across the board, a reflection of reduced farm incomes over this very dry two-year period, whereas earthworks increased almost sixteen-fold, reflecting an upsurge in digging dams.

Shingle extraction

Gisborne District Council, roading contractors and the major forestry companies hold shingle extraction consents.

Because many of the district's rivers have aggrading beds, extraction of shingle is sustainable. Consent holders must provide monthly returns to Council detailing shingle volumes extracted. This data, coupled with cross-sections of riverbeds, will enable a better understanding of patterns of aggradation and riverbed change over time.

Harvesting of indigenous timber decreased by two thirds from 2007 to 2008.

Category	Activity	Area/length/volume	
		2007	2008
Exotic forestry	Scrub clearing	0 ha	0 ha
	Harvesting	947.5 ha	3,647 ha
	Roads/tracks*	29.8 km	126.4 km
	Number new landings	66	331
Indigenous forestry	Merchantable timber	913m3	370m3
Quarrying	Vegetation removal	0.5 ha	1.6 ha
	New road formation	0	0.25 km
	Volume removed	5,000m3	92,000m3
Residential/	Roads/tracks*	3.8 km	0.85 km
housing	Earthworks	4,890m3	1,512m3
	Vegetation removal	0	0.05 ha
Farming	Scrub clearing	73.2 ha	21.1 ha
	Roads/tracks*	17 km	13.7km km
	Earthworks	740m3	11,400m3
Council/	Roads/tracks*	20.7 km	2.1 km
public works	Earthworks	9,760m3	103,500m3
Total	**Vegetation removal**	**1,021 ha**	**3,700 ha**
Total	**Roads/ tracks ***	**56 km**	**131 km**
Total	**Earthworks**	**20,390m^3**	**208,412m^3**

* Includes both new roads and tracks and upgrades of existing roads/tracks

River	m^3 Shingle extracted 2007
Waiapu	21,298
Awatere	8,359
Waipaoa	8,539
Maraehara	40
Pauariki	500
Mata	15,800
Makarika	4,040
Mangatu	0
Waikohu	0
Hikuwai	424
Taurangakautuku	14,154
Mangaoporo	2,100
Aorangiwai	413
Mangaraukokore	868
Wharekahika	1,030
Waitahaia	11,600
Karakatuwhero	7,000
Total	**96,165**

4. These estimates are based on survey data collected from forest owners in A National Exotic Forest Description, 2007 and 2008, MAF.

Above: Completely dry dams became a common sight during the summer of 07-08.

Farming in Gisborne District

By June 2007, Gisborne District had received just over one third of average annual rainfall for the year, and some areas had experienced 10 months of continually dry conditions. May ended with a monthly total of just 6.8mm recorded at Gisborne; the lowest May rainfall in 52 years. It was unseasonably warm, with an average temperature of 21°C compared with the long-term mean maximum of 17.1°C.

Agriculture Minister Jim Anderton described the drought as the worst to hit the East Coast - from East Cape through to Hawke's Bay for 125 years.

2008 was another tough year, with dry conditions persisting throughout much of the district and farmers facing increasing costs of inputs, fuel and services while experiencing falling prices for exports due to the beginning of the economic downturn.

Many farms reported that prices obtained for wool did not even cover the costs of shearing in 2008.

New Zealand	Gisborne District
Sheep numbers fell to 34.1 million, a fall of 11%, back to the level recorded in 1950	Sheep numbers fell by 145,000 (8%)
Dairy cattle numbers increased to a record 5.6 million, up 6%	Dairy cattle numbers in Gisborne District doubled from 8 to 16 thousand
Beef cattle numbers fell by 6% to 4.1 million	Beef cattle numbers remained steady
Deer numbers fell 14% from 1.4 to 1.2 million	Deer numbers fell by 4 thousand (15 %)

2008 compared with 2007

The combined effects of drought and land use change led to an incredible 4.3 million decline in sheep numbers across New Zealand as a whole in 2007/08; meanwhile dairy cattle numbers increased to a record 5.6 million for New Zealand (up 6%).

Dairy farming in Gisborne District

Dairy farming is not a major land use in Gisborne District. During this reporting period there were only three diary farms operating within the district, with plans for another two. The large upsurge in dairy cow numbers recorded in agriculture census and surveys actually reflects the increase in numbers of dry cows being grazed here.

	Total beef cattle	Ewes/hoggets put to ram	Total sheep	Dairy cattle*	Total Deer
1990	324,000	1,595,000	2,284,000	5,400	17,000
1994	351,000	n/a	2,089,000	6,000	n/a
2002	310,000	1,097,040	1,679,400	13,000	26,000
2003	350,000	1,333,000	1,870,000	7,000	..s
2004	342,000	1,345,000	1,848,000	..s	38,000
2005	301,000	1,275,000	1,717,000	..s	30,000
2007	287,000	n/a	1,825,000	8,000	27,000
2008	287,000	1,198,000	1,680,000	16,000	23,000

* There were only three dairy farms on the Poverty Bay Flats, as at 2006, therefore dairy cattle figures mainly represent dry cows grazed in Gisborne District. ..s suppressed n/a not available.

Source of data: Statistics New Zealand Agricultural Surveys, 2003, 2004, 2005, 2006, 2008; Agriculture Census 2002, 2007.

Gisborne District livestock numbers