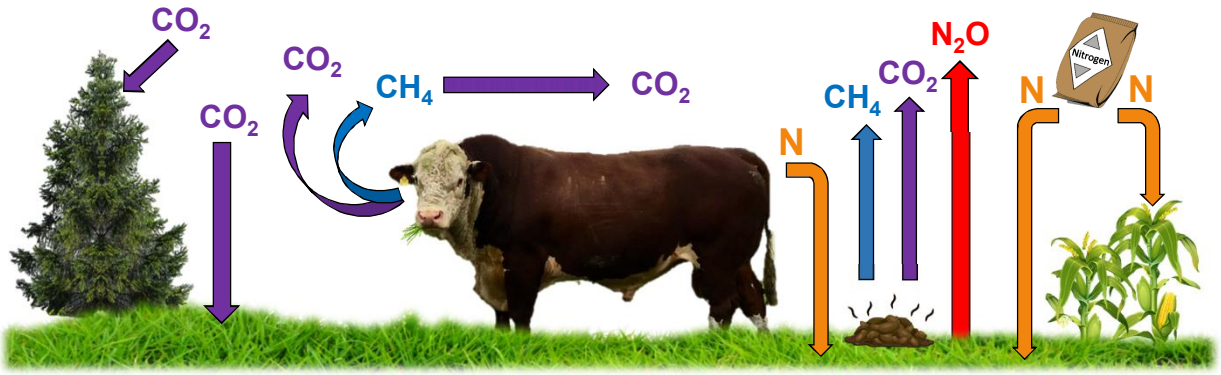
Farms, Trees and Carbon Workshop

beef+lamb new zealand | BY FARMERS. FOR FARMERS

Agriculture and climate change

NEW ZEALAND AGRICULTURAL GREENHOUSE GAS Research Centre

- Livestock are neither a direct source nor a store of CO_2
- Livestock <u>are</u> a source of methane (CH_4), which eventually decays back into CO_2
- Livestock <u>are</u> a source of nitrous oxide (N_2O), permanent loss of N



What can farmers do?

Keep getting the most out of your farm

Use resources more efficiently to increase outputs:

Improve stock genetics

Improve animal health

Improve pasture quality + feed utilisation

Get Farm level report on your farm emissions

Lower stocking rates

GROW TREES
income,
Incr. biodiversity,
shade & shelter,
reduce sediment,
store carbon
farm emission offset

ETS - Compliments good land use decisions

Right species… Right place

Pole plantings

Riparian/stock exclusion

Plantation Forestry

Indigenous/retired

Baseline date - Kyoto

31 December 1989

Was 'forest land' at 31 Dec 1989

and predominantly EXOTIC in 2008

can apply for 'Offset' to new location

"Pre-1990"

1 January 1990

Became 'forest land' from 1 Jan 1990

or change of land use / not forest land for longer than 4 years

"Post-1989"

Pre-1990 Deforestation

2 hectares or more deforested (change of land use)
by the same entity,
within legal boundary,
within 5 year compliance periods. (eg: 2013 – 2017)

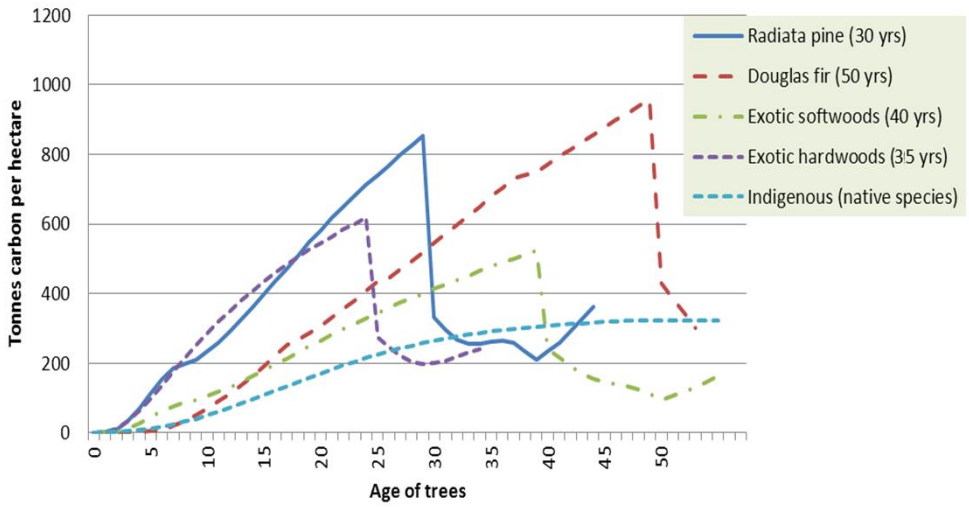
Obligation =
surrender of units equivalent to carbon released

Penalty if not notified in time =
up to $30 to MPI and $30 to EPA per unit

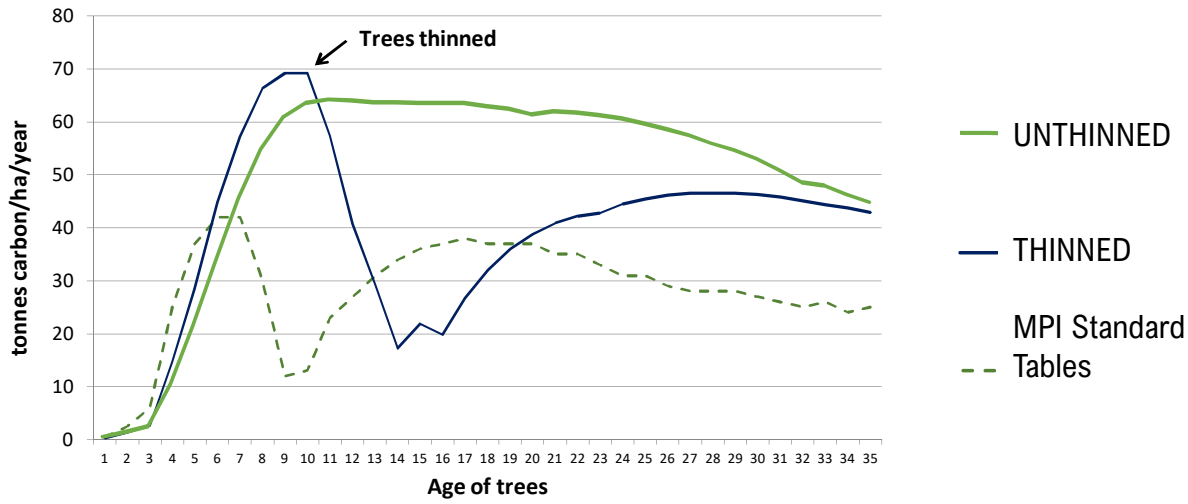
NZ Emissions Trading Scheme

- NZ's Domestic carbon market designed to reduce total carbon emissions
- Voluntary participation (Post-1989 land)
- 5 year compliance periods i.e. **2008 – 2012… 2013 – 2017… 2018 – 2022**
- Gain carbon units based on increase of carbon in a calendar year
- Pinus radiata *(regional),* Hardwood, Softwood, Indigenous, Douglas Fir
- Over 100 hectares registered (FMA) must measure actual carbon present

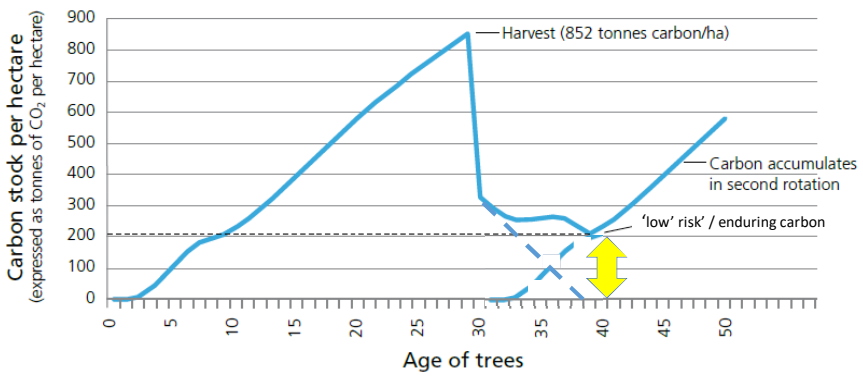
Carbon - Species Comparison



Carbon – Exotic Regimes



Enduring Carbon Opportunity - Current



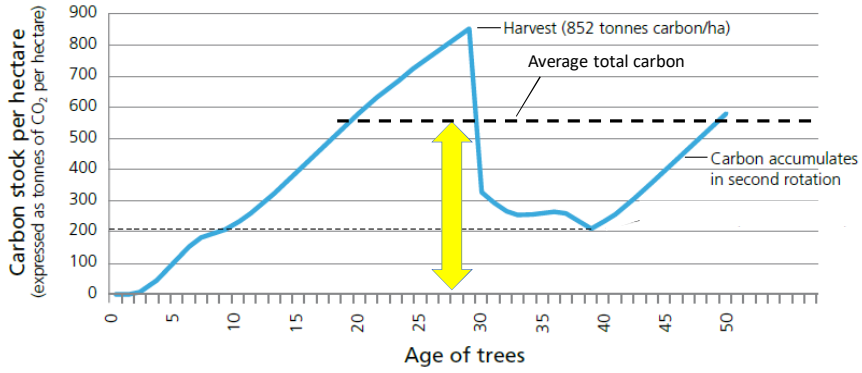
Enduring 'low risk' carbon

The lowest point of total carbon when replanted – multiple rotations

Depends on age felled and year replanted

Must have claimed years 1-10 of the 1st crop

ETS Review / Consultation



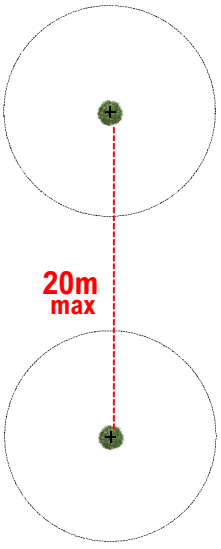
Averaging
Accounting approach = the average total carbon across rotations

Harvested Wood Products (HWP)
- Add increase to carbon tables or
- Create an "industry good" fund to develop longer lived HWP

Permanent Post-1989
- Like a Permanent Forest Sink (50yrs)
- Not capped at average

Spaced plantings - ETS eligibility tips

- Narrow varieties = Less canopy
- New poles - Max 4m buffer but 20m on perimeter poles
- Younger poles need higher stems per hectare (SPH)
- Mature trees eligible based on drip line (max 15m to edge)



Spaced/Riparian plantings - tips

- Survival …. Location and spacing crucial (monitor & replant)
- Assess >30% canopy cover potential well met
- Irregular shapes…. Link / increase existing poles
- Use to buffer narrow / riparian areas
- Determine age - Establishment records (evidence)
- Over 100 ha (FMA) measure actual carbon present (less)

Potential carbon

- Peak growth per hectare in years 6 - 10
- Annual growth plateaus around years 20 - 25 onwards

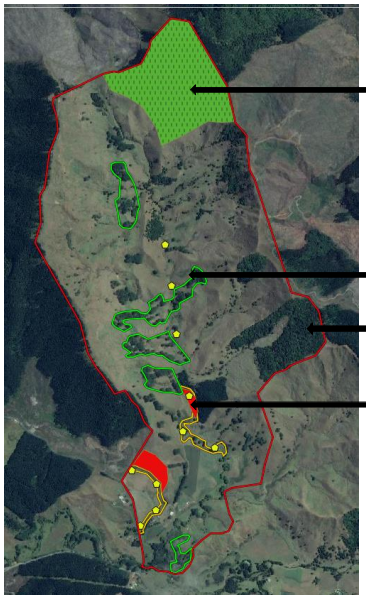
Other exotic Hardwoods

YEARs	1 - 5	6 – 10	11 -15	16 - 20	21 - 25	26 - 30
NZU for 5 year period	63	188	158	117	92	67
NZU TOTAL accrued	63	251	409	526	618	685

Source: MPI standard Look-up tables

Farm Example

483 ha Northland



Radiata
Solution …Right species right place:
- Plant 45 Ha pine

Pole plantings
Solution: Link existing pole plantings to create 26 ETS eligible Ha

Mature Indigenous Forest

Riparian and stock exclusion areas
Solution - plant:
- Poles outside fenced area to create 30m avg
- Pollen producing trees
- Hives and carbon opportunities

Farm Emission Profile Example

	Emissions
2018	3,460 (3,444 SU = 1.005 CO_2e per SU)
1990	Running similar numbers
Target 11% below 1990	Target is 3,114 CO_2e
	Reduction required of 346 units

Plant 45 Ha Pine	Average of 812 NZU/year
Plant 26 Ha Poplar	Average of 594 NZU/year
Stream plantings	Average of 80 NZU/year
Total NZU opportunity	**1,486 NZU/year (+180..from SU reduction)**

1,666 reduction achieved – 346 reduction required

Balance	**1,320 NZU x $25/NZU = $33,000/annum (48% reduction)**

Farm Net Benefit (30 years)

48% Emission reduction below 1990 levels

- Reduced sediment run off
- Increased pollination services from year round hive placement
- Increased bird life/other biodiversity

- At a loss of 180 SU
  - $253,800 revenue

30 Year Revenue	
Hive rental	$150,000
39,600 NZU (@ $25/NZU)	$999,000
Tree harvest revenues	$1,175,895
Sub-total	$2,324,895
Less stock unit revenue	$253,800
Total	**$2,071,095**

How is this useful?

- Farm story and web site
- 'Land environmental plan'(LEP) species placement selection
- Carbon profile…past present and future
- Funding applications
- ETS applications
- Succession planning /exit strategy