

Chemical Use PF Olsen Group Scheme FSC SW-FM/COC-000190

During 2004/05, PF Olsen Limited developed a monitoring system that captures active ingredient by area for the chemicals used within the managed estate.

Since then, PF Olsen have fine-tuned the monitoring system to deal with the complexities of different chemical concentrations of similar chemical products to get an accurate active ingredient used by affected area. The records system also enables separation of data for FSC and non-FSC forests.

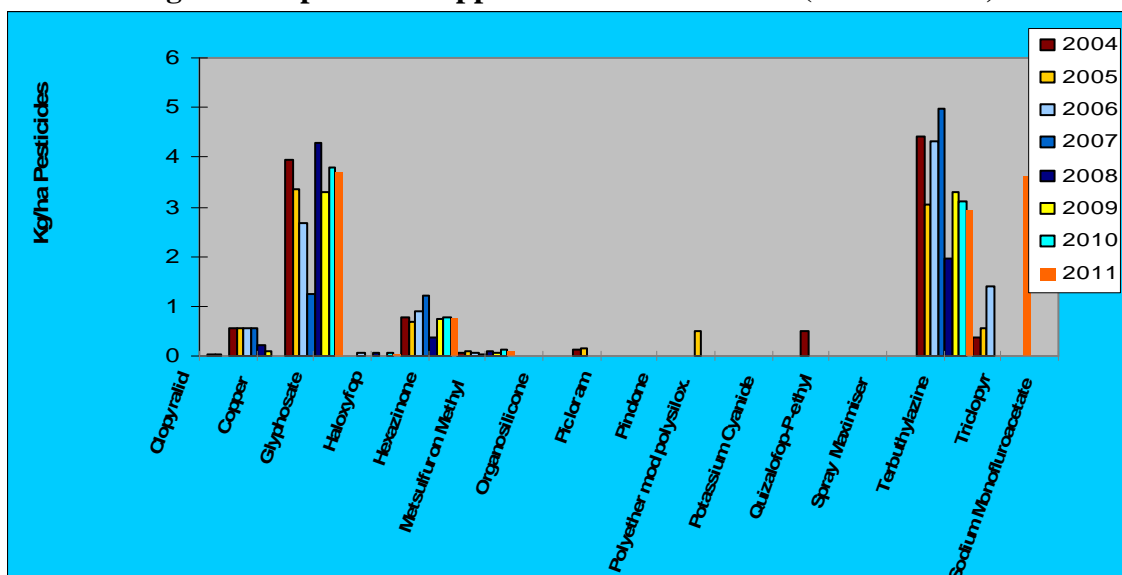
In 2004/05 the information collected represented only part of the estate and less than a full year. In 2005/06, the data covered total herbicide usage, and saw the introduction of fertilisers. The 2006/07 year completes the process with the addition of vertebrate pesticides used in the control of animal pests such as possums and wallabies.

The comparable areas treated in all forests (both FSC certificates and non-FSC forests) over the five years (in hectares) are:

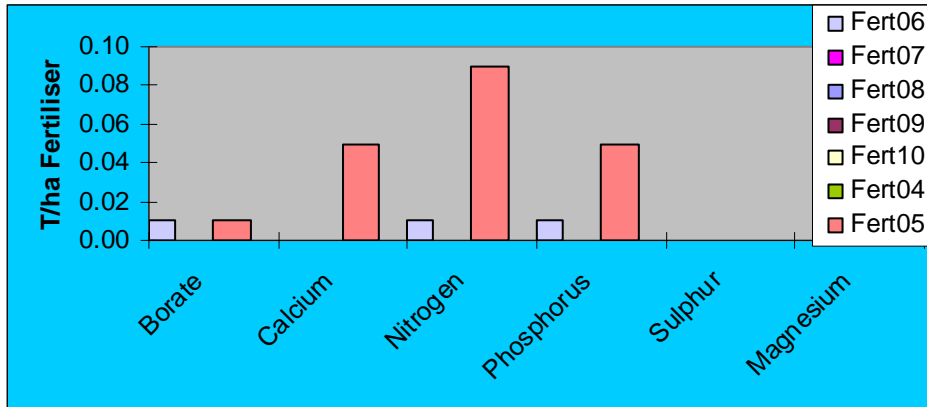
Total Area Treated	Herbicide	Fungicide	Fertiliser	Pesticide	Total
2004/05	6,267				6,267
2005/06	7,686	6,302	513		14,501
2006/07	21,511	5,283	211	1,563	28,568
2007/08	6,823	7,773	437	919	15,952
2008/09	6,823	7,773	437	2,947	17,980
2009/10	10,704	6751.5	290	4161.2	21,907
2010/11	9,937	2,977	2,936	919	16,770

Results of active ingredient usage by treated area over the measurement periods where comparisons are possible between chemicals are as follows:

Kg/hectare pesticides applied to FSC GS forests (Y.E. 30 June)



Tonnes/hectare fertiliser applied to FSC GS forests (Y.E. 30 June)



The tabular breakdown of the chemical usage over the year ending June 2010 is set out below. This includes not only the total quantities of active ingredient used but also the averaged application rate per hectare.

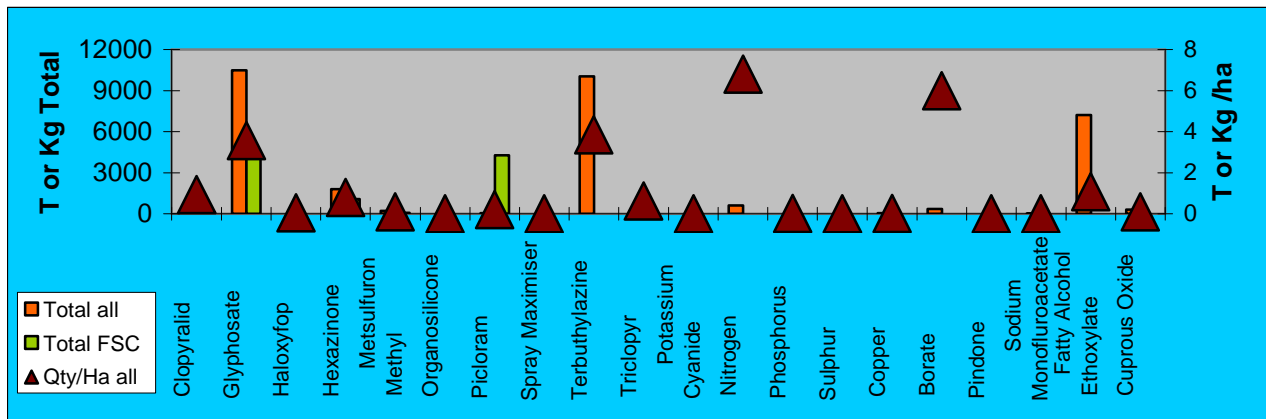
**Active ingredient applied to all forests (both FSC certificates and non-FSC),
1st July 10 - 30th June 2011**

From	1 July 2010 to		30 June 2011	
Active Ingredient	Total all	Unit Of Me	Area Ha	Qty/Ha all
Clopyralid	317.91	Kg	949.9	0.33
Glyphosate	8498.93	Kg	2473.8	3.44
Haloxypop	28.94	Kg	337.8	0.09
Hexazinone	1035.64	Kg	1209.5	0.86
Metsulfuron Methyl	388.92	Kg	1491.6	0.26
Organosilicone	2.26	Kg	3400.9	0
Picloram	21.88	Kg	231.4	0.09
Spray Maximiser	0.16	Kg	977.5	0
Terbutylazine	8650.74	Kg	3011.7	2.87
Triclopyr	83.97	Kg	231.5	0.36
Potassium Cyanide	0.21	Kg	646	0
Nitrogen	264.95	T	1708.9	0.16
Phosphorus	129.23	T	764.3	0.17
Sulphur	3.02	T	63.7	0.05
Calcium	0.88	T	273.2	0
Copper	146.5	Kg	138.3	1.06
Borate	0.39	T	125.8	0
Pindone	0.13	Kg	0	0
Sodium Monofluoroacet	22.72	T	273.2	0.08
Cuprous Oxide	249.46	Kg	2839.1	0.09
Fatty Alcohol Ethoxylat	6079.8	Ltr	2977.4	2.04

**Active ingredient applied to FSC GS forests,
1st July 10 - 30th June 2011**

From	1 July 2010	to	30 June 2011	
Active Ing	Total FSC		Area (Ha)	Qty/Ha
Glyphosate	4223.39	Kg	1137.6	3.71
Haloxypop	0.42	Kg	20.7	0.02
Hexazinone	351.66	Kg	463.7	0.76
Metsulfuron	46.07	Kg	457.6	0.1
Organosilic	0.75	Kg	1137.7	0
Spray Max	0.01	Kg	140.9	0
Terbuthylaz	1777.85	Kg	608.7	2.92
Triclopyr	0.36	Kg	0.1	3.6
Pindone	0.05	Kg	0	0

Total and FSC active ingredient usage – units/hectare treated Y.E June 2010



Note : Herbicide, fungicide and vertebrate pesticide use is denoted in kg/ha while fertiliser is denoted in tonnes/ha

Derogated Chemicals

Derogations applications for the continued use of hexazinone and terbuthylazine have been submitted. The original derogations expired early 2010, and continued use of the derogated chemicals is permitted until a new ruling is received from FSC.

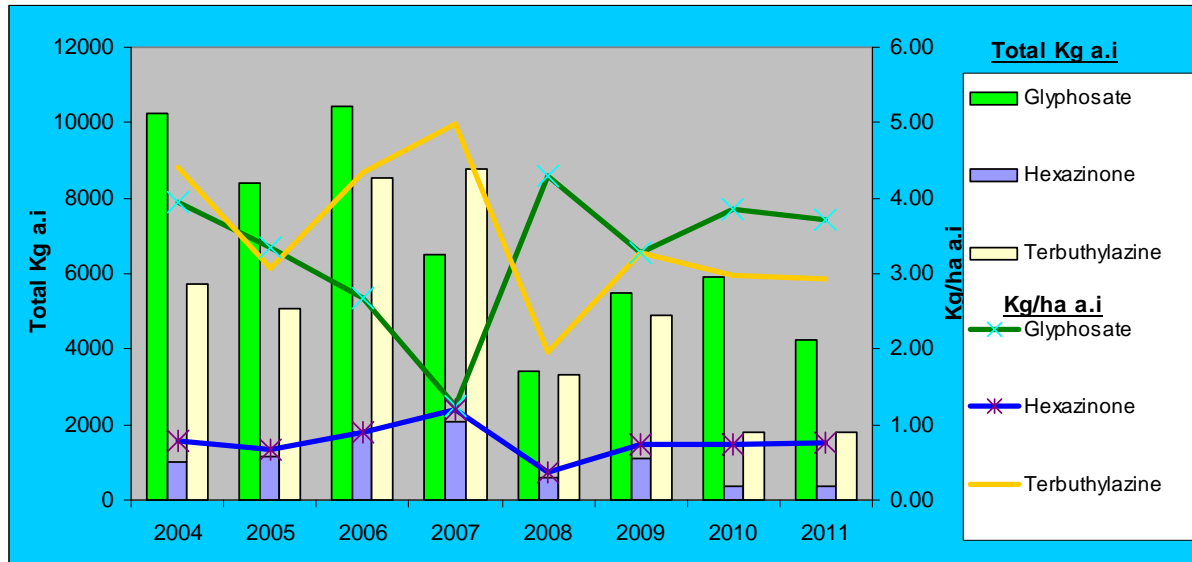
Time series tracking is enabling a watch to be kept on progress with the use of various chemicals used in forest management. As illustrated below, before 2009 there was a progressive decrease in both total quantity and the rate of hexazinone and terbuthylazine applied, and an increase in the use of glyphosate as a substitute.

In 2009 there was a spike in both quantity and rate. This was due to the increase in area to be planted in 2010, as pre-planting spraying for the areas occurred in 2009. The finalising of the Emissions Trading Scheme legislation by the government has led to the increase in planting, and areas that should have been planted last year have been left to this year. As well as resulting in a larger area to plant in 2010, the weeds on these held-over sites are more advanced, therefore requiring stronger chemical mixes. The rate and quantity applied in 2010

was similar to 2009, although there has been a slight substitution of glyphosate for terbuthylazine.

Through 2011, there has been a continued substitution of Terbuthylazine by Glyphosate and Metsulfuron (not shown) resulting in a downward trend in Terbuthylazine usage. Hexazinone usage trends remain flat, principally because of the nature of sites in which it is used.

Derogated chemical rates and quantities used- FSC GS forests only. Y.E June 2011



Derogations for the pesticides 1080 and Sodium Cyanide lapsed over the year and neither of those compounds were used. The need for them will be reviewed.

Research into Alternatives

PF Olsen Ltd continues to provide financial support to industry cooperative research programmes aiming to advance vegetation weed management efficacy and reduced chemical reliance including biological control. All been involved in developing a significant multifaceted strategy for long-term research into chemical use reduction and minimisation.

Key foci of this work are:

- Chemical safety characteristics
- Alternative FSC compliant formulations and treatment
- ‘Best Practice’ tools

At this stage a number of alternative FSC compliant active ingredients have been tested against the main forest establishment weeds resulting in a shortlist of alternatives with potential for further investigation. Limited field trials have begun with these chemicals with and without combinations of oversowing. A much wider environmental gradient and range of site conditions will require testing before any operational prescriptions can be determined. The group unsuccessfully sought assistance from the Governments Sustainable Farming Fund but will try again in the 2011 – 12 year.

Biological Control

PF Olsen is reviewing its biological control strategy to see if appropriate use of available agents is being made.

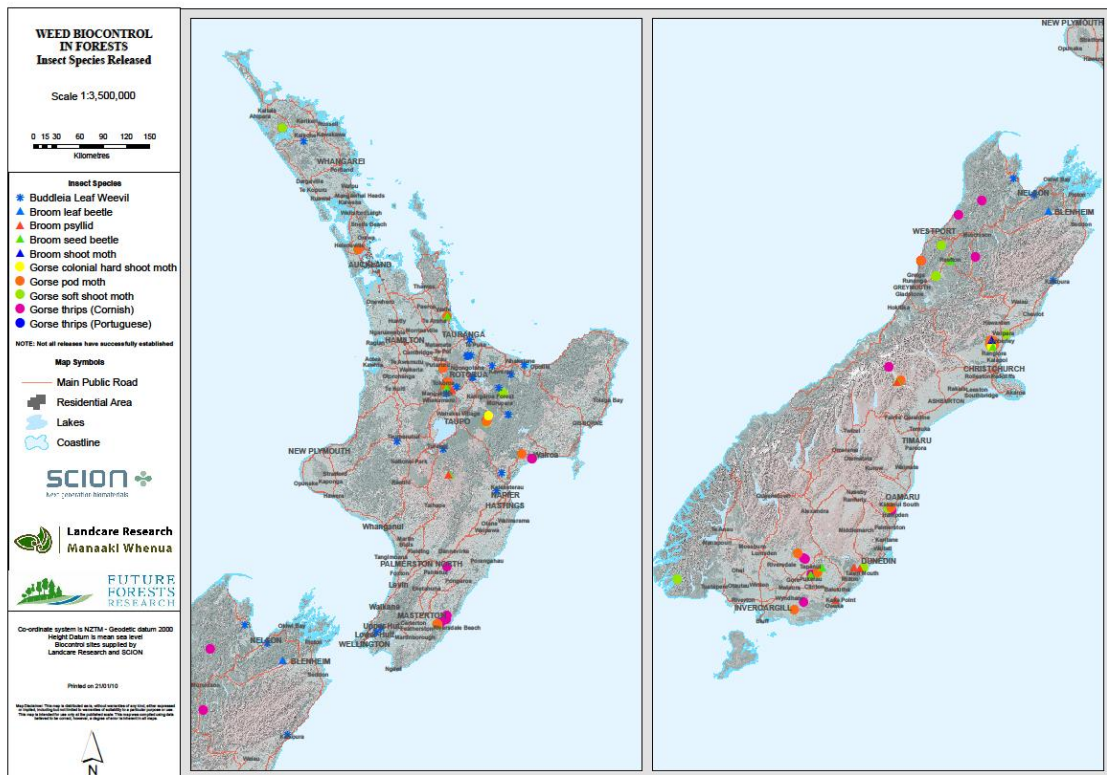
One agent *Cleopus japonicus*, a recently released biocontrol for *Buddleia* appears to be spreading rapidly and having a significant impact upon that difficult weed.

In conjunction with the industry cooperative efforts and Future Forests Research Ltd, a successful Sustainable Farming bid to investigate potential agents for the biological control of Pampas has commenced with Landcare Research Ltd being the research leader.



Cleopus japonicus larvae on Buddleia

Biocontrol release sites for Broom, Gorse, Old Man's Beard and Buddleia



Chemical Use PF Olsen West Coast Forests FSC SGS-FM/COC-000763

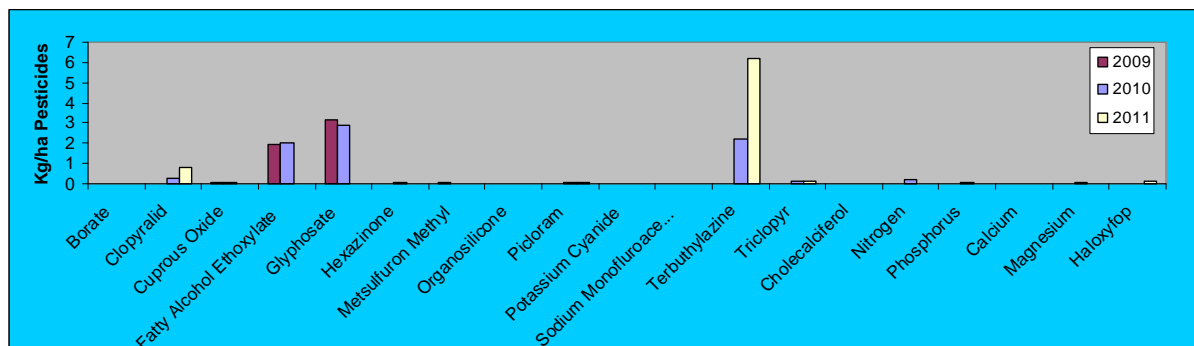
The forests of the West Coast commenced under PF Olsen Ltd management in January 2009 but for administrative convenience remained under their own FSC certificate.

In prior years chemical use records for these forests were maintained on the basis of formulation rather than active ingredient (a.i) as maintained under PF Olsen Ltd's systems. Because a.i content varies widely between formulations, tracking by a.i is preferred, however the work involved in back calculating the historic records is significant.

On this basis it is intended that records from the 1st of January 2009 will be stored and reported on the basis of a.i.

Over time the new data will provide an accurate picture. A record of chemical use over the last 12 months is shown below and the developing usage pattern graphed below. Time series graphing of active ingredient quantity and rate can begin to be compiled, although it will be several years before trends can be drawn from the data.

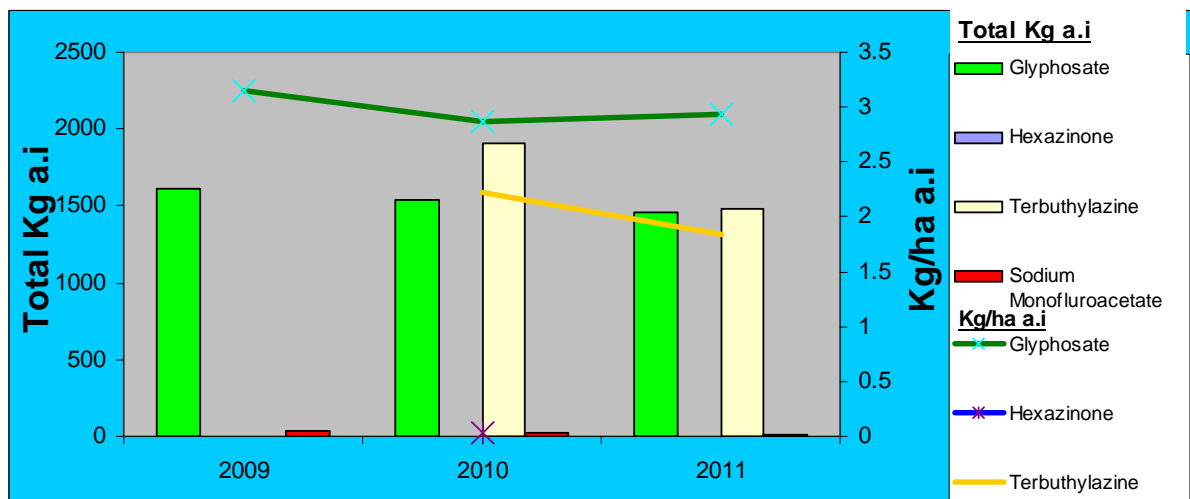
From	1 July 2010	to	30 June 2011	
Active Ingredient	Qty Total	Unit Of Measure	Area	Qty/Ha
Clopyralid	252.87	Kg	898.9	0.28
Glyphosate	1455.3	Kg	496	2.93
Haloxypop	1.8	Kg	16.1	0.11
Metsulfuron Methyl	17.05	Kg	496	0.03
Organosilicone	0.51	Kg	1446.3	0.00
Picloram	6.15	Kg	126.3	0.05
Terbutylazine	1482	Kg	806.7	1.84
Triclopyr	18.45	Kg	126.3	0.15
Potassium Cyanide	0.21	Kg	646	0.00
Nitrogen	190.79	T	1039.3	0.18
Phosphorus	67.44	T	686.7	0.10
Calcium	0.84	T	263.7	0.00
Borate	0.38	T	124.2	0.00
Magnesium	21.83	T	263.7	0.08
Sodium Monofluoroacetate	8.09	Kg	2780	0.0029
Cuprous Oxide	248.84	Kg	2831.1	0.09
Fatty Alcohol Ethoxylate	5575.8	Ltr	2831.1	1.97



Derogated Chemicals

Derogations for the continued use of the herbicides Terbuthalazine and Hexazinone and the vertebrate pesticides Sodium Monofluoroacetate (1080) and Sodium Cyanide are current and in force. In the 2011 year only Terbuthalazine was used for weed control and 1080 for possum by the Animal Health Board as part of wider pest and Bovine TB operations.

Derogated chemical rates and quantities used PF Olsen West Coast forests, SGS-FM/COC-000763.



NB: 2009 data = 1 Jan-30 June 2009 (6 months), 2010 = 1 July-30 June 2010 (12 months)

Research

As a forest estate under PF Olsen Ltd management, the West Coast forests are effective members and pro-rata financial contributors of the same research and strategic initiatives being undertaken as part of the PF Olsen Group Scheme in order to find ways to lessen the use of chemicals under FSC derogation.