Tasmania
DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT

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DEPARTMENT *of*
INFRASTRUCTURE,
ENERGY *and* RESOURCES

REVIEW OF THE SCAMMELL REPORT

Aerial Spraying in the George River Catchment

August 2004

Contents

Executive Summary

The Scammell report is an unscientific report that provides no evidence of a link between aerial spraying of chemicals in the George River catchment and either oyster deaths in Georges Bay or Devil Facial Tumours. Furthermore, the report provides no evidence of contamination of water supplies and no evidence to support its alarmist calls for a ban on aerial spraying either in the catchment, or more generally.

The scientific literature provides good evidence that Pacific oysters are not particularly sensitive to the chemical alpha-cypermethrin and that despite assertions in the Scammell report, this chemical could be quite readily detected in water if it were present at sufficient concentration to cause large-scale oyster mortalities.

The results of a ten-year monitoring program associated with alpha-cypermethrin use in Tasmanian forestry plantations and lack of observation of massive fish kills concurrent to oyster mortality events in Georges Bay provides significant evidence against the alpha-cypermethrin hypothesis.

Studies of the health of the George River and its tributaries over the past ten years found the river system to be in good health, with no evidence the macroinvertebrate community is under significant environmental stress.

Aerial spraying is strictly regulated in Tasmania and a helicopter crash in the Pyengana area during forestry spraying operations is unrelated to oyster mortalities in Georges Bay.

Considerable public information is available on forest plantation activity in Tasmania. There is no requirement for Commonwealth, State or local governments to gazette plantations. Landowners can apply to have their land declared a private timber reserve, which results in gazettal.

There has been no dramatic increase in the number of gazettals in the Break O'Day local government area in the past two years and there is no basis for the claim that there is a correlation between gazettals, plantation area and chemical usage, as assumed in the Scammell report.

Part 1 Review by Department of Primary Industries, Water and Environment

1.1 Oyster Mortalities in Georges Bay

The Scammell report[1] suggests that aerial application of the chemical alpha-cypermethrin in forestry plantations in the George River catchment is primarily responsible for large-scale oyster mortalities in Georges Bay. However, no evidence is provided that either the oysters or the water in which they were growing was contaminated.

Cypermethrin is a synthetic pyrethroid that is a mixture of eight isomers. Alpha-cypermethrin is a mixture of two of these isomers and is responsible for more than 90% of the insecticidal activity of cypermethrin. The International Programme on Chemical Safety report[2] for alpha-cypermethrin concludes that the toxicological information for cypermethrin can be used to evaluate the effects of alpha-cypermethrin, where certain studies for alpha-cypermethrin are lacking.

The Scammell report suggests that alpha-cypermethrin may be lethal to oysters at concentrations below that which can be measured. However, the scientific literature shows this quite clearly to be incorrect.

Dr Scammell's suggestion ignores the fact that oysters are relatively insensitive to cypermethrin. Hill[3] reported that studies with Pacific oysters (*Crassostrea gigas*) showed cypermethrin to exhibit only moderate to low toxicity, with a 48-hr LC_{50} of greater than 5000 µg/L. The report also refers to work by Tagatz and Ivey[4] who report a 48-hr LC_{50} of greater than 2300 µg/L for Pacific oyster larvae exposed to cypermethrin in salt water.

Laboratories can readily detect alpha-cypermethrin in water at a level of 0.1 µg/L. If the chemical were present in water at a sufficient concentration to kill oysters, it could quite readily be detected in water samples.

Molluscs generally, are much more tolerant of alpha-cypermethrin than many other aquatic species. Garforth[5] studied the effects of the chemical on a range of aquatic invertebrates placed in outdoor ponds. The three families of molluscs tested were all unaffected after 7 days following application of an alpha-cypermethrin spray onto the water surface at a rate equivalent to 100 g/ha; a rate some four times higher than the maximum rate applied to eucalypt plantations.

Fish, on the other hand are generally much more sensitive to the effects of alpha-cypermethrin than molluscs and in particular, oysters. Hill[3] summarised the results of various studies demonstrating 96-hr LC_{50} concentrations in the range of 0.4 – 3.2 µg/L for a number of fish species.

The Scammell report suggests that because alpha-cypermethrin is lipid-soluble it may have floated on the water surface to affect organisms in the inter-tidal zone of

Georges Bay. However, alpha-cypermethrin sprayed onto a water surface does not remain associated with the surface layer for an extended period. Degradation in the environment and binding to soils, sediments and other particulates results in a fairly rapid loss of the chemical from the water column. Pearson[6], for example, found that following application of a spray mix of cypermethrin to the surface of a freshwater pond, only 5% of the applied substance remained in the surface film after one day, while 19% was found in the sub-surface water.

If the George River and Georges Bay were contaminated by spray drift or run-off from areas treated with alpha-cypermethrin, there would be significant risk of exposure to organisms, including fish in the sub-surface water. Yet, despite their greater sensitivity to alpha-cypermethrin, anecdotal reports from investigating Departmental officers suggest that only small numbers of dead fish were found in the bay, concurrent to the most recent oyster mortality event. If alpha-cypermethrin were present at a concentration lethal to oysters, very large numbers of dead fish would be expected to be found in both the river and the bay.

To have any effect downstream, there would need to be some movement of chemical away from the area in which it was sprayed and into waterways. However, a number of studies have demonstrated that alpha-cypermethrin binds strongly to soils and other surfaces and is not very mobile in the environment. In a summary of the research conducted on the metabolism and environmental degradation of the pyrethroids, Leahy[7], concluded that the pyrethroids are virtually immobile in soil and are highly unlikely to move from soil into any other parts of the general environment.

Water sampling programs by Forestry Tasmania support this conclusion. Elliot and Hodgson[8] report that of 128 water samples collected in association with spraying of alpha-cypermethrin in forestry operations between 1993 and 2003, none were found to contain alpha-cypermethrin. Some of these samples were field blanks and pre-spraying samples, in accordance with Forestry Tasmania sampling protocols. However, the majority were post-spraying samples taken downstream following spraying operations.

Calculation of the amount of alpha-cypermethrin required to produce a toxic effect in oysters in Georges Bay is instructive. Based on an LC_{50} of 2300 µg/L for oyster larvae and an estimated flow into Georges Bay of 675 cumecs on 29th and 30th January 2004 (Percival and Ellard[9]), at least 5.6 tonnes of active cypermethrin per hour, or 134 tonnes per day, would need to find its way into the river and the bay in order to reach levels lethal to 50% of the oyster larvae. Significantly more would be required to kill mature oysters, for which the LC_{50} is greater than 5000 µg/L.

An audit of chemical use in forestry operations in the George River catchment during the year 2003/04 found that a total of 29 kg of alpha-cypermethrin had been used. It is clearly not possible that many tonnes of alpha-cypermethrin entered Georges Bay to cause significant oyster mortality.

1.2 Helicopter Crash

On 15 December, 2003, a helicopter operating for the company Tasmanian Helicopters crashed while spraying a *Eucalyptus nitens* plantation in the Pyengana area, with the insecticide Astound Duo (active constituent, alpha-cypermethrin).

Trees in the plantation in which the spraying occurred were estimated to be about 6m tall, with some ground cover and a significant infestation of blackberry. The soil at the site was a dark brown to black clay loam and the distance from the crash site to the South George River was estimated to be about 250 metres downhill. The land was contour-ploughed, with a mound width of a metre or so.

At full capacity, the helicopter could carry 400 litres of spray mix, containing 1 kg of the active ingredient, alpha-cypermethrin. At the time of the crash, the helicopter was estimated to have about 60 litres of spray mix remaining on board. Reports from people attending the crash site suggest that about 20 litres of the spray mix spilled onto the ground.

The Spray Information & Referral Unit of the Department of Primary Industries, Water and Environment collected three soil samples from the crash site on 5 April 2004. One sample was taken from the depression in the ground where the helicopter had come to rest. A second sample was taken about 9 metres away from that spot. That point was chosen because there was a natural decline along a contour, from the first site to a low point where liquid could possibly pool. A third sample was taken about 2 metres directly downhill from the first site. A water sample was collected from the South George River at what is known as the Intake Bridge. All samples were tested for alpha-cypermethrin.

Tests on soil samples taken from the crash site showed a concentration of alpha-cypermethrin of 218 mg/kg at the immediate crash site. At the other sampling points 2 metres and 9 metres from the impact site, the alpha-cypermethrin concentration in the soil was found to be 1.0 mg/kg and 0.2 mg/kg respectively. There was a rapid decline in cypermethrin levels over a short distance from the site locus. No chemical residues were detected in the water sample from the river.

Other chemicals were identified in the analysis of soil from the crash site; namely simazine, atrazine, terbacil and a trace of chlorothalonil. These chemicals showed a distribution similar to the cypermethrin found in the immediate environment of the crash site. That is, their concentration declined rapidly over a distance of 9 metres from the immediate site of impact.

The crash investigation revealed approximately 20 litres of spray mix had spilled to the ground, well away from any watercourses. The spray mix comprised 0.25% alpha-cypermethrin, equating to about 50 grams of active chemical. It does not represent a significant chemical spill and could in no way be associated with oyster mortalities in Georges Bay. Alpha-cypermethrin is rapidly and strongly adsorbed to soil particulates and is essentially immobile in the soil, as found in many studies and summarised by Leahy[7].

1.3 Chemicals Used in Forestry Operations in the George River Catchment

The Scammell report makes a number of incorrect claims with respect to the nature and extent of chemical usage in forestry operations in the Georges Bay catchment and in Tasmania generally.

Many of the chemicals identified in the report are neither used, nor registered to be used in forestry plantations in Tasmania. None of the chemicals chlorothalonil, carbaryl, maldison or dimethoate are registered for use in forestry in Tasmania. While chlorpyrifos is registered for use, it has not been used by the forestry industry in Tasmania for many years. However, the report identifies each of these chemicals and assigns some risk of tumour development to at least two of them, to aid in demonstrating a possible link to Tasmanian Devil facial tumours.

Dr Scammell suggests that the results of the analysis on soil taken from the helicopter crash site provides evidence of the mixing of a cocktail of pesticides used in Tasmanian forestry operations. However, this is clearly not the case.

The most likely explanation for the low levels of other chemicals found at the crash site is carryover of a small amount of residual spray mix left in the helicopter tank from previous spraying operations. There is also a remote possibility that low levels of these chemicals remain associated with the soil from the time the plantation was established, or from prior land uses. However, the period of time that has elapsed since these earlier activities and the half-lives of the chemicals in soil under aerobic conditions, would seem to mitigate against this explanation. The fact that the levels of herbicides in the soil at the crash site were found to reduce significantly with distance from the immediate crash site is further evidence against this theory.

The fungicide chlorothalonil was one of the chemicals found to be associated with the soil at the immediate crash site. It was detected at a level of 1.25 mg/kg. This chemical has never been registered or used by forestry in Tasmania. Its presence, albeit at very low levels, is difficult to explain, other than as a residual in the helicopter tank from previous agricultural work, or inadvertent contamination of the soil sample.

Other chemicals detected in the soil at the crash site were the herbicides atrazine, simazine and terbacil. It is unlikely they would be deliberately mixed with an insecticide and applied to a growing plantation, as to do so would kill or severely injure the eucalypts in the plantation.

The Percival report[9] on oyster health in Georges Bay recommended further investigation to establish which chemicals are used in the George River catchment, their chemical characteristics and their pattern of use.

The Spray Information & Referral Unit has conducted an audit of chemicals used in forestry operations in the George River catchment during the year 2003/04. Results of the audit are provided in Table 1.

Table 1 Pesticides Used in Forestry Operations in George River Catchment 2003/04

Chemical	Type of Chemical	Total Quantity of Active Constituent Used
alpha-cypermethrin	insecticide	29 kg
glyphosate	herbicide	70.4 kg
sulfometuron-methyl	herbicide	2.7 kg
terbacil	herbicide	42.2 kg

1.4 Devil Facial Tumours

The Diagnostic Services Branch of DPIWE is investigating the Devil Facial Tumour disease affecting Tasmania Devils. A structured approach for this work is required to first define the tumour type and confirm that the cancer in devils throughout the State is of the same type. From this information a direction will be set to identify possible trigger factors and/or contributory agents. It is in this context that possible carcinogens will be investigated.

All possible avenues of investigation have been put on the table and the research team is concentrating on research that can quickly yield information that can be used by the population management group in order to protect the devils.

1.5 Regulation of Aerial Spraying and the Use of Agricultural Chemicals in Tasmania

The Scammell report claims that aerial spraying is unregulated in Tasmania and is not policed. It also claims that the recommendations of the 1990 Senate Select Committee on Agricultural and Veterinary Chemicals in respect of aerial spraying have not been implemented. Each of these claims is unsubstantiated and incorrect.

The aerial spraying industry in Tasmania is highly regulated and there have been a number of very significant changes to the regulatory regime for agricultural and veterinary chemicals in Tasmania and Australia generally since the 1990 Senate Select Committee report.

The National Registration Scheme for Agricultural and Veterinary Chemicals was established and the Commonwealth *Agricultural and Veterinary Chemicals Code Act 1994* was enacted to provide the regulatory framework for the national assessment, registration and review of agricultural and veterinary chemicals. This replaced the system of individual State registrations that existed at the time of the Senate Select Committee report, with a collaborative national scheme. It ensures consistency in the chemical registration process and provides a significant pool of professional expertise to assess and review new and existing chemicals.

Locally, the *Agricultural and Veterinary Chemicals (Control of Use) Act 1995* was enacted in Tasmania to impose controls in relation to the handling of agricultural and veterinary chemical products and to impose controls on agricultural spraying.

A number of key provisions in the Act apply in respect of aerial spraying. Chemical products must be registered or permitted by the Australian Pesticides and Veterinary Medicines Authority before they can be used and they can only be used in accordance with label directions, on crops or in situations identified on the label, or permit. Pilots must hold a Pilot (Chemical Rating) Licence and any business that provides an aerial spraying service must hold an Agricultural Aircraft Operator Licence.

To qualify for a licence, pilots must hold a Commercial Pilots Licence with an Agricultural Pilot Rating and a flight radio-telephone operator licence issued by the Civil Aviation Authority of Australia. They must also hold an Aerial Agricultural Association of Australia Operation Spray Safe Certificate of Approval or an equivalent qualification, which includes training in application technology, droplet production and capture, aircraft configuration, aircraft operations, application techniques, pesticides, chemical safety, waste disposal and legislation. Agricultural aircraft operators must hold an approved policy of indemnity insurance.

In respect of damage by spray drift, the Act makes it an offence to adversely affect any person, plants, stock, agricultural produce, water bodies, groundwater or soil, on premises outside the intended site of application. Orders under the Act prohibit the spraying by air of any product that is classified as a schedule 7 poison in the Standard for the Uniform Scheduling of Drugs and Poisons; being the more hazardous and generally more toxic chemicals. The chemical 2,4-D may not be sprayed between spring and autumn without a permit issued by the Registrar of Chemical Products, specific to the property on which it is sprayed.

The Code of Practice for Aerial Spraying sets out responsibilities for land managers and pilots. It has had legal effect since 1996, when it was adopted through a Ministerial Order made under the Act. Maximum penalties of $22,800 for individuals and $45,600 for corporations apply in respect of offences committed against the Ministerial Order. The Code of Practice prohibits aerial spraying within 100 metres of the boundary of any area not zoned for agriculture or forestry, within 100 metres of dwellings and occupied buildings and within 1 km of schools during school hours. It also prohibits the discharge of an agricultural chemical product over waterways and bodies of water. The code requires notification of nearby neighbours and the keeping of records.

The Spray Information & Referral Unit was established in 1991. It is a part of the Chemical Management Branch in the Department of Primary Industries, Water and Environment. The Unit provides information for farmers, foresters and the public on matters relating to pesticides and agricultural spraying. Officers in the Unit investigate complaints and incidents associated with agricultural spraying and pesticides generally, to ensure compliance with the Act and Codes of Practice and to promote adoption of best chemical management practices.

1.6 Monitoring of Pesticides and River Health

A number of groups and organisations undertake monitoring of pesticides in water in Tasmania. Each of the water authorities, for instance, monitors the quality of the bulk water they provide to the major towns and cities. However, the sampling frequency and suite of pesticides they monitor is different for each Authority.

Forestry Tasmania and the major private forestry companies undertake monitoring in association with many of their spraying operations. This is not a legislative requirement, but forms part of their quality assurance programs. Elliot and Hodgson[8] report that 4396 water samples were collected and analysed during the period 1993 to 2003 in conjunction with pesticide applications by Forestry Tasmania.

The Spray Information & Referral Unit of the Department of Primary Industries, Water and Environment often conducts monitoring as part of its investigation of complaints and incidents referred to it.

While significant monitoring is undertaken, there is little coordination between the various groups and no common reporting formats or protocols. There would seem to be considerable scope to better coordinate the disparate pesticide monitoring programs and to provide for more transparent public reporting of monitoring results.

The Water Assessment Branch of the Department of Primary Industries, Water and Environment has an ongoing River Health program that includes sampling of several sites within the George River catchment. These include the George River at Pyengana, North George River at Tasman Highway, South George River at St Columba Falls, Groom River at Anchor Road, Powers Rivulet at Terryvale Road and Ransom River at Murdochs Road. A number of variables are monitored including temperature, conductivity, turbidity, dissolved oxygen, pH and macroinvertebrate diversity and density.

The results of sampling at these sites over the period of Spring 1994 to Autumn 2004 is provided in Appendix 1.

The river health at all sites in the catchment was good to excellent on all occasions, except one. The impaired rating in Spring 2003 occurred in an edgewater habitat of the Ransom River. This habitat was subsequently found to be unimpaired when it was sampled again in Autumn 2004. The mainstream George River was found to be in good condition both before and after the oyster mortality event in the 2004.

All sites showed good numbers of macroinvertebrates with the riffle habitat containing an average of 23 taxa per site. The edgewater habitats were slightly less diverse with an average of 18.2 taxa per site. The fauna is typical of Tasmanian rivers, with many families of stoneflies, mayflies and caddisflies (which are regarded as sensitive to disturbance) present in significant numbers.

The results clearly indicate that the aquatic macroinvertebrate community composition at the family level downstream of plantations in the George River catchment is equivalent to reference. In other words, all of the families of macroinvertebrates that would be predicted to be present are currently found there.

This is strong evidence that the aquatic macroinvertebrate community in the catchment is not under significant environmental stress.

A number of sites around Tasmania were monitored for pesticides, as part of the River Health program in the mid-1990's. A summary of the results of this monitoring program is provided in Table 2.

Table 2 Summary of Pesticide Monitoring Results from the River Health Program

Spring 1994	*121 sites sampled*	*Pesticides detected at 8 sites*	
Hellyer River at Guilford Link Rd.		Simazine	0.06 µg/L
Cattley Creek at Blackmarsh Rd.		Atrazine	0.1 µg/L
Little Henty River d/s Zeehan		Hexazinone	0.2 µg/L
Lisle Creek off Nook Rd.		Hexazinone	0.2 µg/L
Rubicon River at Smith and Others Rd.		Atrazine	0.7 µg/L
Great Forester River at Tasman Highway		Simazine	0.2 µg/L
South George River at St Columba Falls		Simazine	0.2 µg/L
Great Forester River at Prosperity Rd.		Simazine	1.0 µg/L
Spring 1995	*73 sites sampled*	*Pesticides detected at 2 sites*	
Great Forester catchment		Simazine	0.5 µg/L
Great Forester catchment		Simazine	0.4 µg/L
Autumn 1996	*74 sites sampled*	*No pesticides detected*	

The Australian Drinking Water Guidelines[10] set a guideline value of 0.5 µg/L and a health guideline value of 20 µg/L for the triazine herbicides atrazine and simazine and a guideline value of 2 µg/L and a health guideline value of 300 µg/L for hexazinone. Of the 268 samples collected in the River Health program, the guideline value was marginally exceeded on two occasions. None of the samples contained pesticides at levels approaching the health guideline value, which is set at about 10% of the Acceptable Daily Intake for a 70 kg adult consuming 2 litres of water per day.

Simazine was found in one sample from the South George River at St Columba Falls in the Spring of 1994 at a level of 0.2 µg/L. The river at the time was found to be in good condition (A band) for the riffle habitat and in excellent condition (X band) for the edgewater habitat. This is consistent with the findings of Davies et al[11], who suggested that contamination with atrazine (another triazine herbicide) at concentrations between 1-20 µg/L for several weeks, does not cause major changes in the aquatic fauna.

1.7 Recommendations

There are significant advantages from coordinating the conduct and reporting of various pesticide monitoring programs undertaken in Tasmania. The Agricultural, Silvicultural and Veterinary Chemicals Council should consider how these programs might be coordinated to ensure a frequency and quality of monitoring that ensures any risks to water quality from chemical spraying in agriculture and forestry are appropriately identified, assessed and controlled.

An audit of chemicals used in forestry operations in the George River catchment has been completed. A similar audit of chemicals used in agriculture in the catchment should be undertaken, as recommended by the Percival report.

1.8 Glossary of Terms

LC_{50} The amount of a substance that, when exposed to over a specified period of time, is expected to cause death in 50% of a defined animal population.

µg 10^{-6} grams.

cumecs Cubic metres per second.

1.9 References

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Appendix 1 River Health Monitoring Data, George River Catchment 1994 - 2004

Name	Season	Easting	Northing	Riffle O/E	Band	Edgewater O/E	Band	Temp (°C)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved O2 (mg/L)	pH
George River at Pyengana	Autumn 1997	584900	5428900	1.03	A	1.04	A	11.2	74.1	5.86		7.29
George River at Pyengana	Spring 1997	584900	5428900	1.22	X	1.13	A	10.5	65.3	2.52		6.35
George River at Pyengana	Spring 2003	584900	5428900	0.87	A	1.02	A	10.9	62.9	4.43		6.47
George River at Pyengana	Autumn 2004	584900	5428900	1.08	A	1.23	X	14.3	71.4	2.17	9.38	7.75
North George River at Tasman H'way	Spring 1994	579500	5431500	1.03	A	0.97	A	8.8	60.3	2.57	11.3	5.9
North George River at Tasman H'way	Autumn 1995	579500	5431500	1.09	A	1.23	X	11.2	67	0.87	10.4	5.9
North George River at Tasman H'way	Spring 1995	579500	5431500	0.98	A	0.86	A	10.2	54.2	2.3	10.9	5.3
North George River at Tasman H'way	Autumn 1996	579500	5431500	1.18	X	1.1	A	10.5	56	1.95	11.1	5.9
North George River at Tasman H'way	Autumn 1997	589300	5429400	0.92	A	1.38	X	11.5	75	4.63		7.24
North George River at Tasman H'way	Spring 1997	589300	5429400	0.97	A	0.96	A	9.1	69.6	3.13		6.41
South George River at St Columba Falls	Spring 1994	580000	5427500	0.91	A	1.19	X	7.3	59	2.04	11.7	5.9
South George River at St Columba Falls	Autumn 1995	580000	5427500	1.09	A	0.99	A	10.1	66	1.26	10.2	6.2
South George River at St Columba Falls	Spring 1995	580000	5427500	1.09	A	0.93	A	9	51.6	2.25	11.2	5.3
South George River at St Columba Falls	Autumn 1996	580000	5427500	1.16	X	1.15	A	8.5	56	1.5	11.8	5.9
Groom River at Anchor Rd	Autumn 1998	584800	5434800	1.19	X	1.15	A	9.2	52	1.75	11.2	4.44
Groom River at Anchor Rd	Spring 1998	584800	5434800	1.09	A	0.86	A	9.8	48	1.05	11.1	6.28
Powers Rivulet at Terryvale Rd	Autumn 1998	590900	5426400	1.21	X	1.16	A	7.7	97.2	1.23	11	5.48
Powers Rivulet at Terryvale Rd	Spring 1998	590900	5426400	1.22	X	0.86	A	11.1	83.8	34.5	8.7	6.42
Ransom River at Murdochs Rd	Autumn 1998	587300	5434800	1.12	A	1.15	A	9.6	50.7	0.98	10.5	4.82
Ransom River at Murdochs Rd	Spring 1998	587300	5434800	1.14	A	0.97	A	10.8	48	1.48	11.1	6.7
Ransom River at Murdochs Rd	Autumn 1999	587300	5434800	1.13	A	0.98	A	7.8	48.3	0.92	10.3	7.35
Ransom River at Murdochs Rd	Spring 1999	587300	5434800	0.91	A	1.22	X	12.1	46	2.38	9.9	6.1
Ransom River at Murdochs Rd	Autumn 2000	587300	5434800	1.12	A	1.03	A	9.6	52.6	0.76	11.2	6.95
Ransom River at Murdochs Rd	Spring 2000	587300	5434800	1.16	X	0.97	A	8.3	52	0.9	8.1	3.96
Ransom River at Murdochs Rd	Autumn 2001	587300	5434800	1.21	X	1.14	A	9.6	0	1.94	10.7	6.89
Ransom River at Murdochs Rd	Spring 2001	587300	5434800	1.22	X	0.97	A	10.8	10.7	1.59	10.8	7.21
Ransom River at Murdochs Rd	Autumn 2002	587300	5434800	1.18	X	0.91	A	12	54.8	1.53	10.8	5.99
Ransom River at Murdochs Rd	Spring 2002	587300	5434800	1.29	X	0.86	A	8.4	47.2	1.33	11.51	6.21
Ransom River at Murdochs Rd	Spring 2003	587300	5434800	1.07	A	0.64	B	9.5		0.7		6.67
Ransom River at Murdochs Rd	Autumn 2004	587300	5434800	1	A	1.04	A	11.8	56.6	0.61	9.39	8.08

Part 2 Review by Department of Infrastructure, Energy and Resources

2.1 Overview of Plantation Forestry in the George River Catchment

The Georges Bay catchment covers an area of approximately 61,700 hectares. Forest plantations in the catchment total 2,678 hectares, representing 4.34% of the catchment.

Forestry Tasmania manages 376 hectares of plantation forests in the catchment and the remaining plantations are managed by industrial forestry timber companies and other companies and individuals.

There are 20 hectares of private pine plantation and 2282 hectares of private hardwood plantations, the majority of which are less than 10 years old.

2.2 Examination of Claims in the Scammell Report

The Scammell report included a number of claims and comments on the 'Private Forests'. The following is an examination of those claims.

2.2.1 Availability of Information

Claim
'Plantations have gained increased support as an alternative to other forestry practices. However, as is the case with Tasmanian forestry in general, specific information on the growth of plantations was not readily available.'

Comment
There are number of publicly available reports which provide details on the growth of plantation activity in Tasmania.

The Department of Agriculture, Fisheries and Forestry, through the National Plantation Inventory produce an annual report on the area of plantation by type and tenure for Australia by State. These reports are freely available on the web or directly from the Bureau of Rural Resources.

The State government, with the assistance of Private Forests Tasmanian and Forestry Tasmania, annually produce a map of the forest cover in Tasmanian. This map includes areas planted to plantations. This map is freely available through a government site "The List".

In the report 'Sustainability Indicators for Tasmanian Forests 1996-2001 prepared by the Tasmanian and Commonwealth Governments for the 2002 review of the Tasmanian Regional Forest Agreement' Table 2.1.c.1 details area of Tasmanian plantations in five-year age classes.

2.2.2 Gazettal by Local Councils

Claim
"Private plantations are required to be gazetted by local council."

Comment
There is no requirement by the Commonwealth, State or Local Government to 'gazette' plantations. The author of the report falsely assumed that all private plantations had to be 'gazetted' in some manner.

A landowner can apply to have forest and/or private plantations declared as a private timber reserve. Not all landowners apply to have their plantations declared as a private timber reserve. There is no compulsion to have plantation declared as a private timber reserve. Only as a private timber reserve is the land gazetted.

2.2.3 Number of Private Timber Reserves in Break O'Day LGA

Claim
"A correlation can be seen between the increase in number of Private Forests and problems experienced by marine life." Graph 3.

Comment 1
It is unclear what the report has defined as "Private Forests". This term is generally used to describe native forests and plantation on freehold, owned by individuals, businesses, farmers and companies.

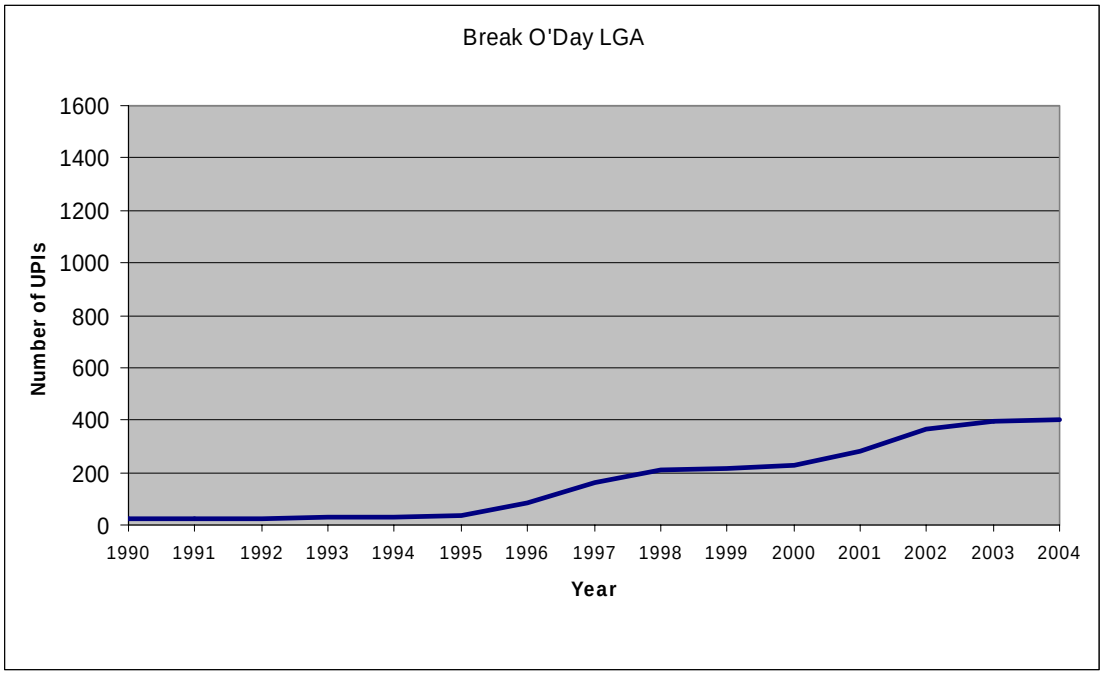
Comment 2
The author(s) appears to have graphed the number of UPIs of gazetted private timber reserves by year. UPIs (unique parcel identifiers) are used to identify parcels of land by UPI number on the 1:25,000 Tasmap series. UPIs are closely correlated with land title. The actual area of land identified by a UPI or land title varies considerably. There is no correlation between a UPI and the area it covers. That is, if number of UPIs 'gazetted" doubles then it is false to assume that the area would also double.

Comment 3
It has proven impossible to duplicate Graph 3 on page 9 of the Scammell Report using the same data that Scammell appears to have used. Scammell does not clearly reference the source of the data for Graph 3.

Chart 1 below, plots the number of UPIs gazetted by year for Break O'Day LGA. Chart 1 uses the same X and Y scale as used in Graph 3 in the Scammell Report (page 9).

Note that the total number of UPIs in Chart 1 just exceeds 400 whereas the report claims 1500 plus UPIs have been gazetted.

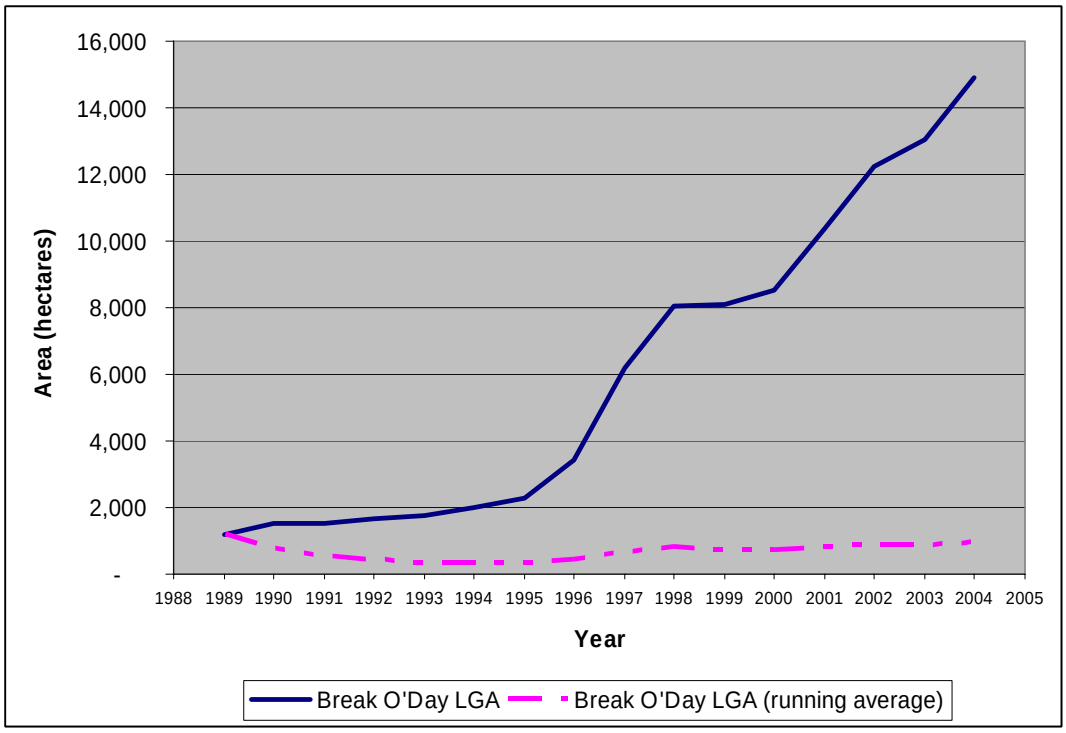
Chart 1. UPIs gazetted as private timber reserves by year for Break O'Day LGA



charted against year of gazettal.

The actual area gazetted as private timber reserve in the Break O'Day LGA by year is detailed in Chart 2.

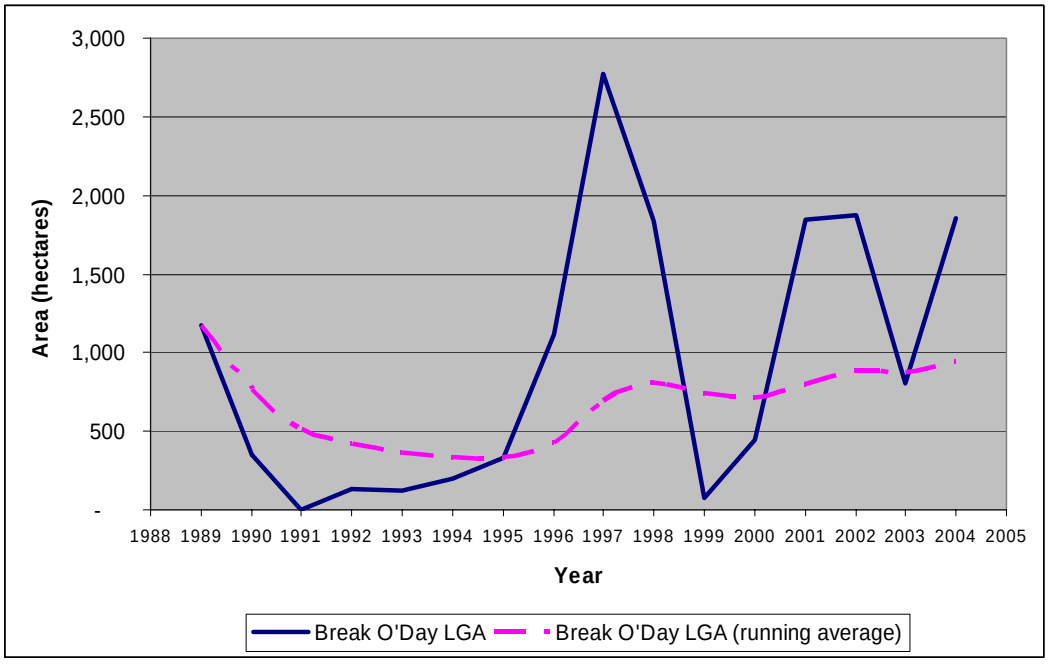
Chart 2 Total area gazetted as private timber reserve by year for Break O'Day LGA



Source: Private Forests Tasmania (2004)

A review of the annual gazettal of areas as private timber reserves is more useful. See Chart 3.

Chart 3 Annual area gazetted as private timber reserve by year for Break O'Day LGA



Source: Private Forests Tasmania (2004)

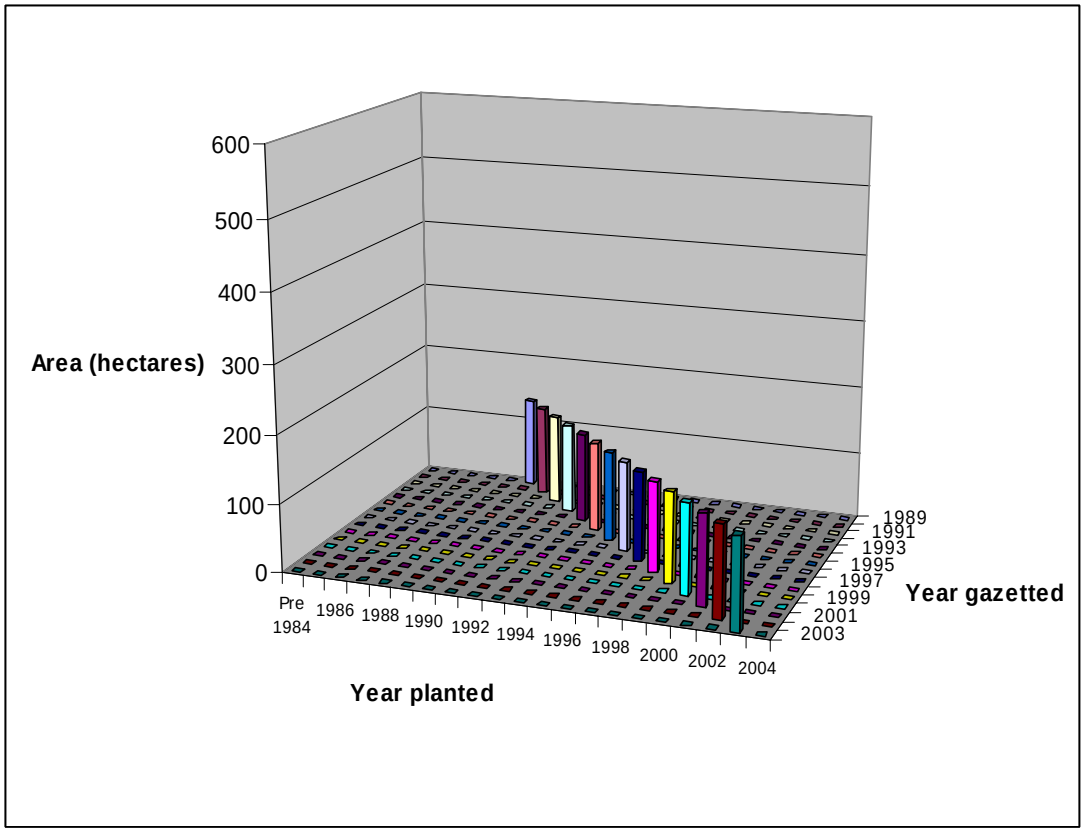
There is no clear pattern or trend in the area declared.

It must be noted that the area gazetted as private timber reserve may or may not contain areas planted to plantation.

In the case of George's Bay catchment there are 4,527 hectares declared as private timber reserves. Of the 4,527 hectares of private timber reserves 2,078 hectares are plantations. In total there are 2,302 hectares of private plantation in the catchment. There are 223 hectares of plantation in the George's Bay catchment, which is plantation and not declared as private timber reserve.

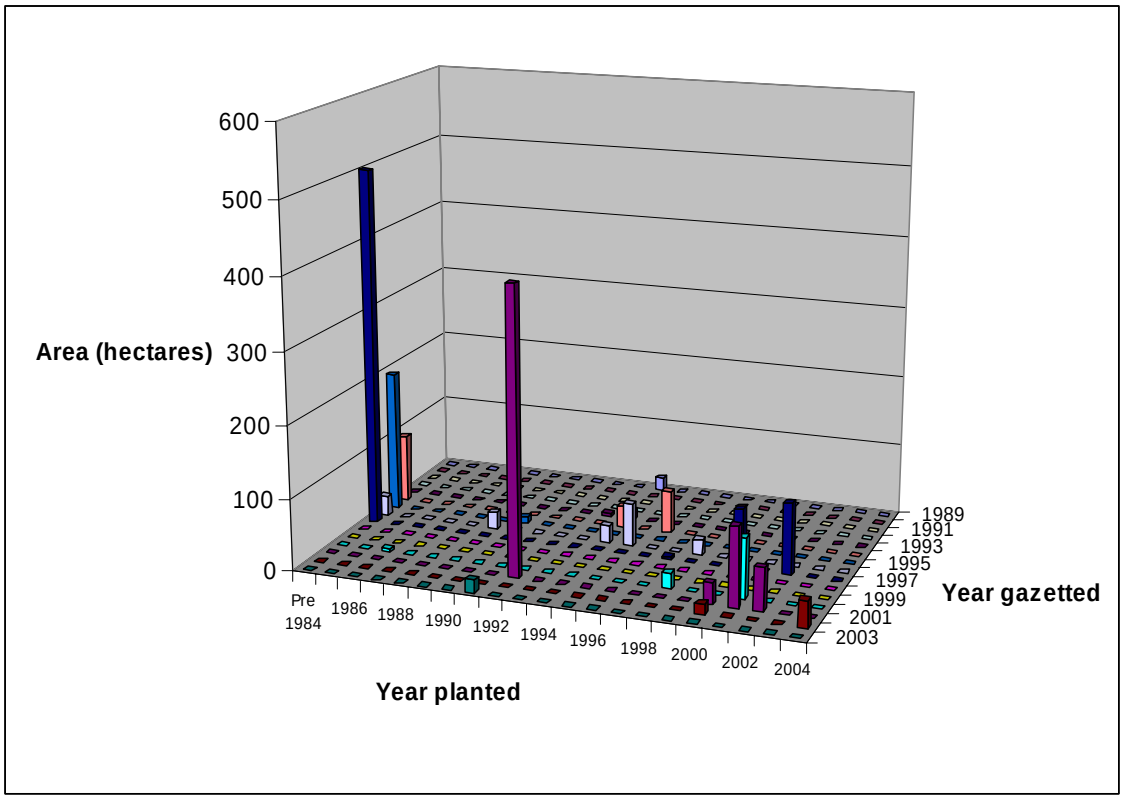
The Scammell report seeks to establish a correlation between the plantation area, chemical usage and area 'gazetted". This implies there is a positive relationship between the year of planting and the year of gazettal. Such a correlation could be graphically presented. See Chart 4.

Chart 4 Relationship assumed by Scammell between year of planting and year of gazettal



The actual relation between year of planting and year of gazettal is more complex. See Chart 5.

Chart 5 Actual relationship between year of planting and year of gazettal



Source: Private Forests Tasmania (2004)

2.2.4 Number of Plantations in Other Areas

Claim

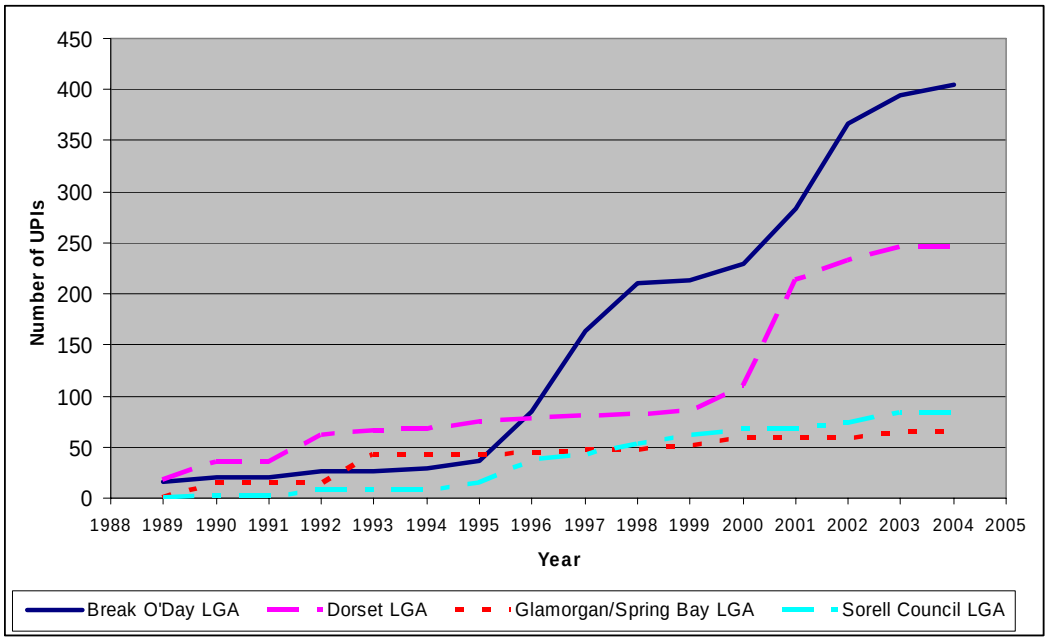
'If a growth in the number of plantations correlates with oyster issues in the Break O'Day area then the same correlation should occur in other areas. Similarly areas that have not had rapid changes in this agricultural practice should be similarly free of recent oyster mortality."

Comment

See comment above over the confusion over UPIs and area declared as private timber reserve and plantation area.

Chart 6 graphs UPI gazetted as private timber reserve by year for Break O'Day, Dorset, Glamorgan/Spring Bay and Sorell LGA. In this case the very general trend in an increase in UPIs 'gazetted' for Break O'Day and Dorset is apparent, but UPIs are not a reliable measure of the area involved or the presence of plantation.

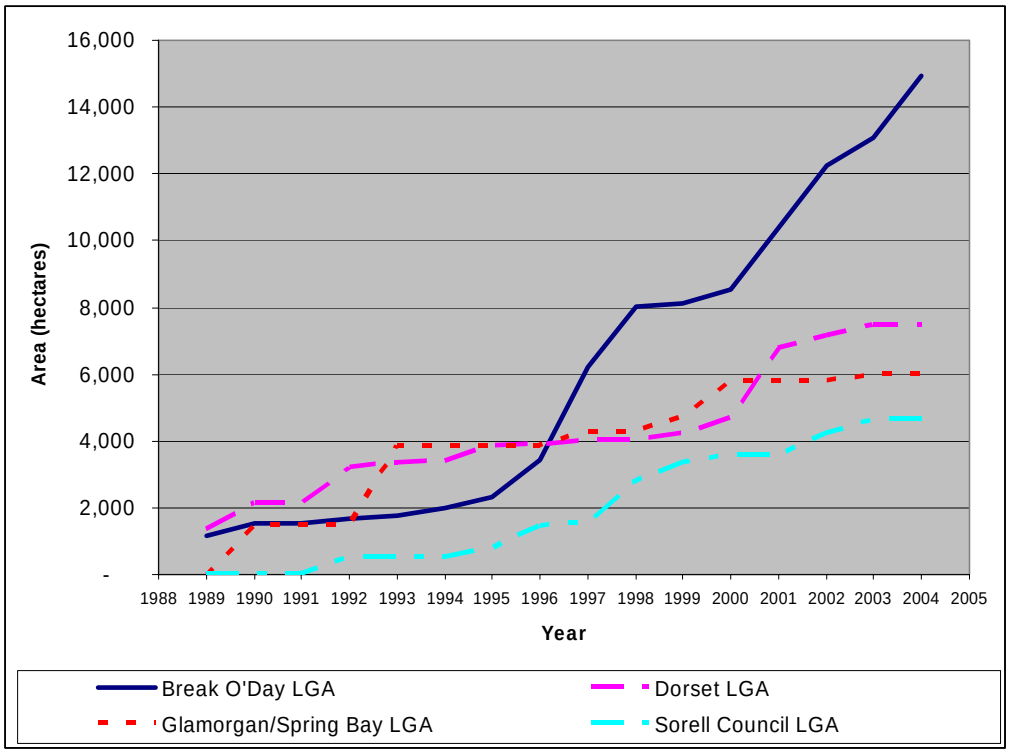
Chart 6 Number of UPIs gazetted by year for Break O'Day, Dorset, Glamorgan/Spring Bay and Sorell LGA



Source: Private Forests Tasmania (2004)

A more accurate picture of the growth in the area declared as private timber reserve is possible if actual area declared as private timber reserve is charted by year (Chart 7).

Chart 7 Total area gazetted as private timber reserve by year for Break O'Day Dorset, Glamorgan/Spring Bay and Sorell LGA



Source: Private Forests Tasmania (2004)

There has been a growth in the area declared as private timber reserve in the Break O'Day LGA, but as discussed above there is no correlation between the area declared as a private timber reserve and the area of plantation, nor between the gazettal of a private timber reserve and the year of planting.