

**Review of the implementation and effectiveness of
the 2011 season's trial of the forest industry and
Parks & Wildlife Service (PWS) Coordinated Smoke
Management Strategy (CSMS).**

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Review of the implementation and effectiveness of the 2011 season's trial of the forest industry and Parks & Wildlife Service (PWS) Coordinated Smoke Management Strategy (CSMS).

Terms of Reference:

The Consultant will address the following terms of reference and produce a report for the Chief Forest Practices Officer by 30th October 2011.

1. Consult with the relevant representatives of the forest industry, the Environment Protection Authority (EPA) and PWS to gather information on:
 - a. The proportion of forest industry and PWS burning between March 2011 and June 2011 which complied with the CSMS 2011 with regard to:
 - (i) Fuel Index (FI) calculation.
 - (ii) Daily prescribed limits of FI relative to the total bid units.
 - b. The consistency and reliability of the independent interpretation of daily F160 forecasts.
 - c. The consistency and reliability of the use of the CSMS by practitioners.
 - d. The effect of the implementation of the CSMS (which includes any significant non-compliance) on air quality which may be determinable from the available air quality monitoring data.
 - e. The relative effect of non-CSMS burns on smoke levels. Note that details of non – CSMS burning are largely dependent on information which may be provided by the Tasmania Fire Service. It may not be possible to quantify the effects of this burning unless it occurred at specific locations, in isolation from any CSMS burning and was detected by monitoring equipment.
 - f. The cost to the forest industry of implementing the CSMS in 2011.
 - g. The number and distribution of complaints about smoke relative to findings on forestry burning activity and on air quality data, as required in (a) and (c) above. – Note that the EPA needs to provide full details of complainants, subject to the provisions of the last paragraph, if this TOR is to be addressed adequately.
 - h. The management of complaints with regard to their processing and resolution.
2. Provide a report on findings and make recommendations on:
 - a. Options for improving the effectiveness of the CSMS including its administrative process and technical inputs.
 - b. Other relevant constraints or issues that may need to be addressed such as the regulation of smoke from sources other than the forest industry.

Executive Summary

This review covers the period from 7/03/2011 to 31/05/2011 when the planned burning by the forest industry and the Parks and Wildlife Service (PWS) was done. Two hundred and sixty five (265) planned burns were carried out on 32,153 hectares. This was 87 burns less than for the 2010 period and double the area. About 80% of the area burnt was for fuel reduction in very light fuels, most of which was done by the PWS. This was twice the area of fuel reduction burning done in 2010.

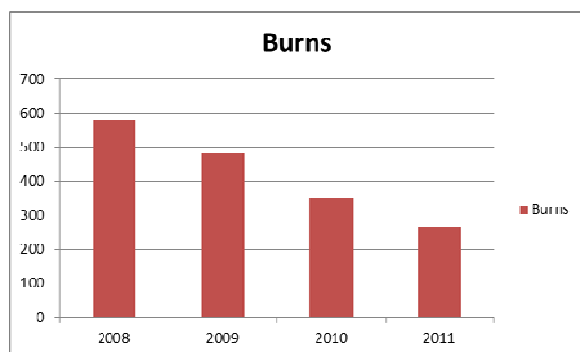


Figure 1: Number of burns by years

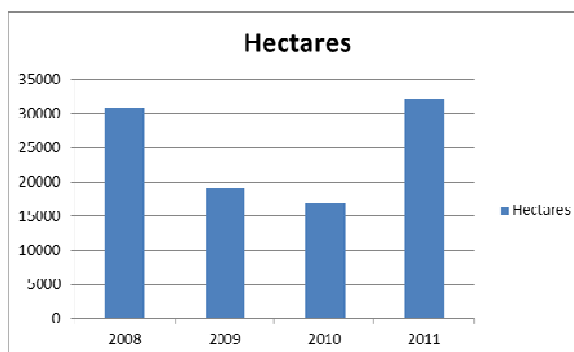


Figure 2: Area burnt by years

The total Fuel Index (FI) reported for the area burnt was 294,900 which was slightly more (5%) than the previous season's FI and indicative of the lower weight value of the majority of the fuels burnt.

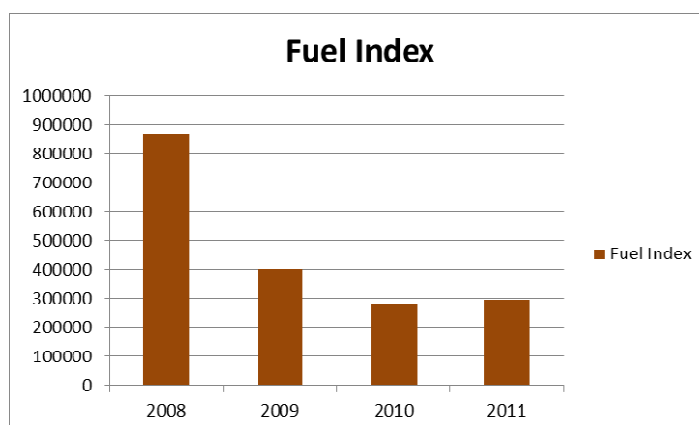


Figure 3: Total Fuel Index of burnt area by years

The CSMS users lodged 224 bids for FI allocations. There was 98% compliance with the allocated FIs which was slightly less than the previous season (98.5%). Of the 5 FI exceedences recorded only 1 was above 1000 which was the same as 2010.

Air quality monitoring occurred throughout the burning period at twenty four stations covering the main regional areas of the State. This was an increase from the nineteen stations which operated in 2010.

For the 2011 burning season one recording of PM_{2.5} above the reporting level of 25 µg per m³ has been attributed to CSMS burning and a second is likely to have been caused by CSMS burning. There were no recorded levels of PM₁₀ above the national standard of 50 µg per m³ which can be attributed CSMS burning. This was a significant improvement from 2010 and

reflects both the reduced amount of heavy fuel burning and better smoke management by the CSMS users. Eight “No Burning Days” were identified.

There were increases in recorded costs and loss of burning opportunities reported by three CSMS users but these were not significant factors in the overall implementation of the CSMS in 2011.

Forty seven (47) relevant complaints were recorded by the EPA compared with 82 in 2010. The overall incidence of complaint relative to the burnt FI reduced from 29 per 100,000 in 2010 to 19 for 2011. This was largely due to a reduction in heavy fuel burning, less burning in the most populated airsheds and in particular, a significant improvement in the complaint incidence in the Huon Valley airshed.

Inputs to the CSMS in 2011 were reliable with consistent Bureau of Meteorology (BoM) F160 forecast interpretations and efficient technical service being provided by the FPA’s CSMS coordinator and website manager.

A wet autumn resulted in less heavy fuel burns. Of the 25,000 hectares of fuel reduction burning about 70% was done in the unallocated airshed area in the southwest of the State and the sparsely populated airsheds of West Coast and South Arthur. The CSMS underpinned a daily routine of accountability, reinforcing the requirement for the users to apply the predictive tools which are now available to assist in the management of smoke.

Summary of Recommendations:

TOR 1 b: The consistency and reliability of the independent interpretation of the daily F160 forecasts:

Recommendation 1: The FPA should discuss the potential for automating the input of the F160 data to the CSMS model with the BoM before the next burning season.

TOR 2 a: Options for improving the effectiveness of the CSMS including its administrative process and technical inputs.

Recommendation 2: Where it can be reasonably determined that smoke from one day’s burning is likely to persist in an airshed or an adjacent airshed the following day or days, the CSMS user must bid for sufficient units in the relevant airshed(s) to allow for that smoke.

Recommendation 3: The dissemination of CSMS updates should be managed through a general notice prominently displayed on the website at the beginning of each burning season.

TOR 1 a: The proportion of forest industry and PWS burning between 7/03/2011 and 31/05/2011 which complied with the CSMS 2011 with regard to:

(i) Fuel Index (FI) calculation

The correct classification of the fuel type is important in the calculation of the FI. If fuels are under-valued then the FI will indicate a lower than actual value for the fuels being burnt. Only three fuel classes are identified which makes it easier for burning practitioners to subjectively determine the appropriate class.

Between 7/03/2011 and 31/05/2011 32,153 hectares were burnt being comprised of 25,066 ha of very light fuel (78%), 4,339 ha of light fuel (13.5%) and 2,748 ha of heavy fuel (8.5%). The fuel classifications reported by the users were consistent with the vegetation types in their areas of operation and no field checks were done. The greatest area treated was classed as very light fuel and the majority of this burning was done by the PWS for fuel reduction.

(ii) Daily prescribed limits of Fuel Indices relative to completed Fuel Indices reported by the CSMS users

From 7/03/2011 to 31/05/2010, 9 CSMS participants bid for 243,428 FI units in the 11 regulated airsheds (which excludes the unallocated airshed area in south west of the State) over 55 burning days. The allocated FIs were exceeded on 5 days. The exceedences on 4 of the five days were by less than 1000 units and on one day by more than 1000 units. The sum of the exceedences represented 2.4% of the total FI for the regulated airsheds. Details of the 2011 exceedences are shown in Table 1:

Date	Airshed	Completed FI	Allocated FI	Exceedence FI
07/04/2011	Tooms	3250	2500	750
19/05/2011	Goulds	780*	0	780
20/05/2011	Goulds	3655*	0	3655
20/05/2011	Brushy	360	0	360
20/05/2011	Surrey	255*	0	255

Table 1: Details of exceedences of allocated Fuel Indices in 2011

Note that the burning marked * was undertaken in consultation with senior management, having regard for local conditions and in line with the procedure set out for special circumstances in the CSMS Implementation Plan 2009, Appendix 3.

(iii) “No Burning Days” (NBD)

The CSMS Implementation Plan for 2011 provided for NBD to be prescriptively self-determined by the users. In the annual survey for this review the users were asked to report on their implementation of NBD.

Forestry Tasmania’s Executive declared 6 NBD state wide although limited dispensation was given to two districts on two of these days. The PWS reported 2 NBD and Norske Skog reported 6 NBD.

	Mur	Mers	Bass	Dwnt	Huon	PWS	FEA	Gunns	Norske
29/3/2011	√	√	√	√	√	√			√
5/04/2011	√	√	√	√	√				√
6/04/2011		√	√	√	√				√
7/04/2011	√	√		√	√				√
8/04/2011									√
15/04/2011	√	√	√	√	√	√			
17/04/2011	√	√	√	√	√				
21/04/2011									√

Table 2: Implementation of “No Burning Days” in 2011 by CSMS users

TOR 1 b: The consistency and reliability of the independent interpretation of the daily F160 forecasts

From 1/03/2011 to 31/05/2011, 1012 early morning interpretations of the Bureau of Meteorology’s F160 forecast were made by the FPA’s CSMS coordinator. The inputs of the predicted daily Ventilation Index and the Inversion Height for each of the 11 regulated airsheds are a key to the determination of the daily maximum FI for each airshed.

As noted in the 2009 Review: “The F160 (forecast) is derived from two balloon flights each 24 hours. The earliest forecast is posted on the BoM website at about 4:00 pm the preceding day and the updated forecast is posted at about 4:00 am on the same day. There can sometimes be a significant difference in the VI between these two forecasts.”

As the forecasts are not tagged with their time of origin it can only be assumed that the one being interpreted at about 0800 is the latest update. This issue was discussed with Dr Wain in 2009 but the forecasts are yet to be identified with a date and time of origin. The CSMS coordinator reported that on at least one occasion, the F160 was updated between 0800 and 0900.

For auditing purposes a 5% sample of F160 files was compared with the CSMS coordinator’s interpretation and only one case of a difference in inversion height was noted. As this is a subjective interpretation, it is reasonable to conclude that the F160 interpretations for 2011 were consistently done with a high degree of accuracy. An altitude axis in metres on the charts is a welcome addition and should have reduced the potential for human error in the interpretation of the predicted inversion height.

If the CSMS is to continue beyond 2011, the automation of the F160 input to the model should be a priority for discussion between the FPA and the BoM.

Recommendation: The FPA should discuss the potential for automating the input of the F160 data to the CSMS model with the BoM before the next burning season.

TOR 1 c: The consistency and reliability of the use of the CSMS by practitioners**(i) Recording of completed burning FIs**

An important part of the CSMS is the daily log of completed burning activity. To check the level of compliance with this requirement the users were asked to provide an independent list of all their completed burning for the period from 1/03/2010 to 31/05/2010. This was used to check the completed daily burning FI entries to the FPA database.

To determine a level of compliance, daily entries below 100 FI were excluded. Differences of 20% or more between the end of season daily summaries and what was entered into the CSMS database were considered 'significant'.

There was a slight improvement in the accuracy of daily reporting to the CSMS database with significant differences reducing to 14.5% of entries. The PWS was the most improved organisation with its differences falling from 19% in 2010 to 0. Mersey cut its rate from 53% last year to 25% in 2011.

Two of the 22 differences resulted in an exceedence of the CSMS allocation for the day, also Shown in Table 1 in section 1a (ii) above. Eight of the differences were as a result of actual burning being less than that reported to the CSMS database.

CSMS User	Entries*	*Differences	% 2010	% 2011
FT Derwent	24	1	0	4
FT Huon	3	0	0	0
FT Mersey	16	4	53	25
FT Bass	29	7	27	24
FT Murchison	13	3	6	23
Gunns	14	3	12	21
FEA	6	0	0	0
PWS Fire	35	0	19	0
Norske Skog	11	4	22	36
Totals	151	22	15	14.5

Table 3: Differences between CSMS database and users burning records
(* excludes entries < 100 FI and <20% variation)

Details of reporting differences are shown in the tables below:

Date	User	Airshed	Bid	Reported	Actual*	Allocated
14/03/2011	Derwent	Repulse	1840	1840	2480	5672

Table 4: Reporting differences in completed FI: Derwent

Date	User	Airshed	Bid	Reported	Actual*	Allocated
20/04/2011	Mersey	Miena	100	100	320	17500
28/04/2011	Mersey	Brushy	1000	530	835	12500
28/04/2011	Mersey	Miena	1000	530	825	1515
28/04/2011	Mersey	Surrey	2500	1330	840	7500

Table 5: Reporting differences in completed: FI Mersey

Date	User	Airshed	Bid	Reported	Actual*	Allocated
18/03/2011	Bass	Diddleum	645	645	280	12500
28/03/2011	Bass	Diddleum	300	195	440	2500
5/04/2011	Bass	Goulds	4325	3020	2320	11951
18/04/2011	Bass	Goulds	600	1545	825	2500
28/04/2011	Bass	Diddleum	2850	2850	4120	12500
28/04/2011	Bass	Goulds	3080	3080	5080	12500
19/05/2011	Bass	Diddleum	750	750	1230	2500

Table 6: Reporting differences in completed FI: Bass

Date	User	Airshed	Bid	Reported	Actual*	Allocated
12/03/2011	Murchison	Arthur	4480	3000	436	12809
6/04/2011	Murchison	Arthur	6000	2320	1800	17500
17/04/2011	Murchison	Arthur	8000	1240	1920	2299

Table 7: Reporting differences in completed FI: Murchison

Date	User	Airshed	Bid	Reported	Actual*	Allocated
19/03/2011	Gunns	Surrey	1000	1000	1480	20000
28/04/2011	Gunns	Miena	650	650	1140	985
20/05/2011	Gunns	Brushy	375	0	360	0

Table 8: Reporting differences in completed FI: Gunns

Date	User	Airshed	Bid	Reported	Actual*	Allocated
12/03/2011	Norske	Repulse	4860	1050	465	12534
19/04/2011	Norske	Repulse	3150	375	480	17500
28/04/2011	Norske	Repulse	1200	325	1620	7500
28/04/2011	Norske	Huon	1200	1000	0	12500

Table 9: Reporting differences in completed FI: Norske

*Actual FI derived from end of season reports. Note: two differences (shaded) exceeded the user's allocation.

(ii) The consistency and reliability of daily smoke dispersion forecast interpretation by the CSMS users

The 2010 review recommended the use of the surface wind forecast model, where appropriate, as an alternative to the smoke dispersion model. The large amount of low intensity burning in 2011 caused this method to be used for about 40% of the "favourability" assessments. The users of this method were PWS, Bass, Mersey and Derwent. It was noted that Derwent also used the surface wind model for some high intensity burning.

A 30% sample of the archived smoke dispersion models was checked for the days and the locations when the smoke model was used in preference to the surface wind forecast. The models were compared with the users' interpretations. There has been another significant improvement in the interpretation of the smoke models with the agreed interpretation percentage rising from 88% in 2010 to 95% in 2011. Differences where a 'favourable' interpretation was substituted for an 'unfavourable' model reduced from 9% in 2010 to 5% in 2011.

TOR 1 d: The effect of the implementation of the CSMS (which includes any significant non-compliance) on air quality which maybe determinable from the available air quality monitoring data.

In 2010 nineteen stations were monitoring air quality. By the end of the burning season in 2011, 24 stations were operating across the State.

The air quality standard is defined as a 24 hour average PM10 of 50 µg per m³ and above and the reporting standard as a 24 hour average PM2.5 of 25 µg per m³ and above. Of these, the PM2.5 is considered to be the better indicator of smoke. It should be noted however that the only official current standard is the National Environment Protection Measure (NEPM) which only refers to the 24 hour average PM10. For the purpose of this review recorded values above either the national standard for air quality (PM10) or the reporting standard for air quality (PM2.5) are referred to as an “exceedence”.

For the 2011 burning season one exceedence of PM2.5 at the Emu River site on 6/04/2011 has been attributed to CSMS burning:

On the 4/04/2011, 4 separate areas with a combined size of 128 hectares and a FI of 5120 were burnt in the Surrey Hills airshed. The FI was well within the allocated limit of 10000 units but conditions for dispersal were correctly interpreted by the Murchison District as unfavourable.

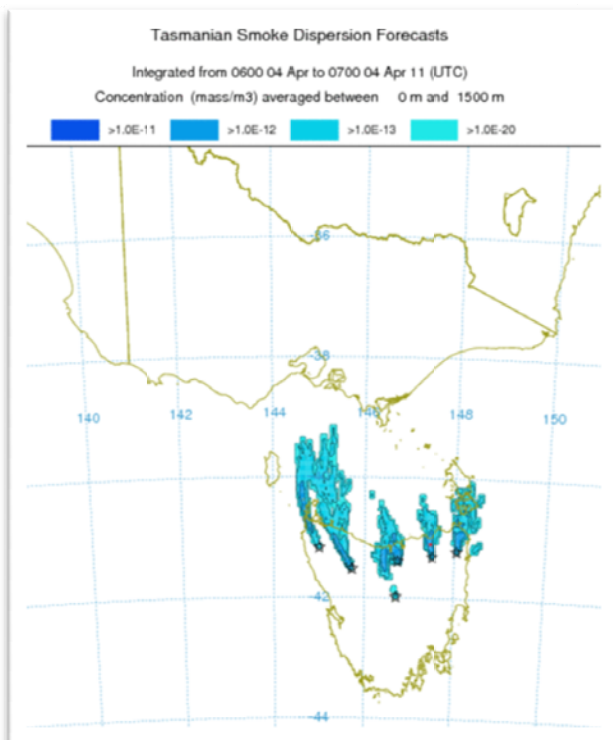


Figure 4: Smoke dispersion model showing Surrey Hills between 1600 and 1700 hours on 4/04/2011

Elevated levels of PM2.5 and PM10 were recorded at Emu River on the 5/04/2011, peaking on the 6/04/2011 at 36 µg per m³ for PM2.5 and 47 µg per m³ for PM10, returning to normal levels the following day with a strong NW airflow.

This smoke event has been attributed to a 40 hectare heavy fuel burn at the Kara Mine conducted by the Murchison District on 4/04/2011. One explanation is that the smoke plume initially travelled north into Bass Strait and then returned to the coast under the influence of a sea breeze. It is also possible that stoking of the unburnt fuel on the 5/04/2011 caused a second smoke plume which reached the coast. A satellite image supplied by the EPA tends to support this proposition:

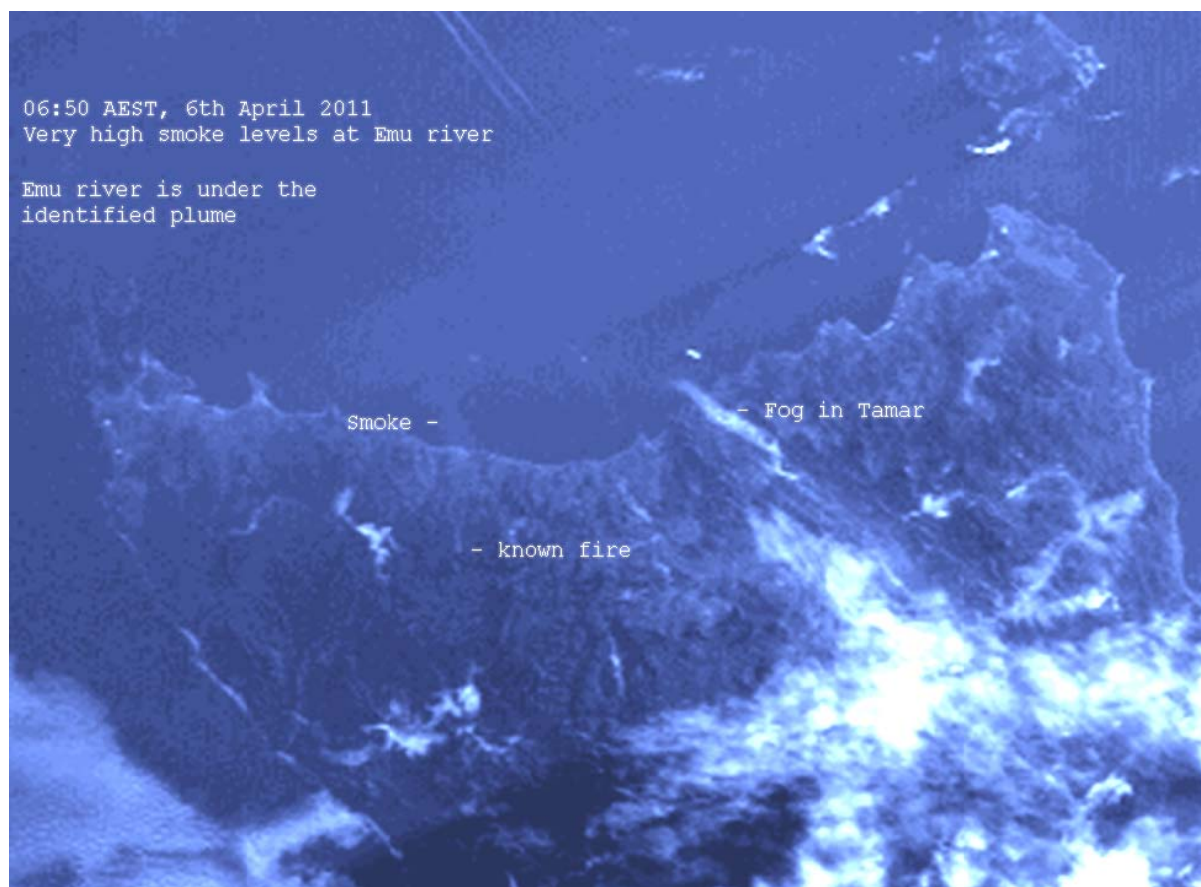


Figure 5: Satellite image showing smoke plume from Kara Mine burn on 6/04/2011 (Image supplied by EPA)

The EPA is currently reviewing all the data related to this smoke event and a comprehensive report is in preparation (*John Innis pers com*).

A PM_{2.5} of 29 at Geeveston on 30/04/2011 may have been caused by CSMS burning. The Derwent District burnt 29 hectares of heavy fuel with an index of 1160 in the Plenty Valley, west of Huonville on 29/04/2011 noting that: "Smoke drifted across Huonville, Gordon and Bruny Island before heading out to sea." On 29/04/2011 the PM_{2.5} was 22 at Geeveston, 13 at Huonville and 10 at Judbury. On the 30/04/2011 the PM_{2.5} was 29 at Geeveston, 12 at Huonville and 6 at Judbury and on 1/05/2011 the PM_{2.5} was 24 at Geeveston, 15 at Huonville and 5 at Judbury. Smoke from the Plenty Valley may have passed to the west of Huonville and Judbury on the 29/04/2011 and drained into the valleys around Geeveston either late in the day or overnight which would account for the lack of complaints. However, the volume of smoke from the Plenty was relatively low and it seems unlikely that this alone would have caused such a prolonged exposure to high levels of particulates in Geeveston which is about 40 kilometres from the presumed source. It is possible that the exceedence at Geeveston was unrelated to the burning in the Plenty Valley.

A PM₁₀ exceedence of 60 µg per m³ at Wynyard on 9/04/2011 does not appear to be associated with smoke as the corresponding PM_{2.5} was 8 µg per m³. The most likely cause was salt from sea spray

The EPA has investigated other smoke events from CSMS burning and produced three detailed reports so far. One was in the Diddleum airshed on 28/04/2011 and two in Huon airshed on the 7&15/03/2011 respectively. In each case the particulate levels recorded at the

relevant monitoring stations were well within the daily average limits. Table 10 is a summary of exceedences and high levels (20 µg per m³ and above) of PM2.5.

Date	Monitoring site	PM2.5	PM10	Airshed	Presumed Cause
7/03	Ti Tree Bend	20.95		Brushy	Unknown
29/03	Sth. Launceston	16	53	Brushy	Unknown
5/04	Emu River	23	30	Surrey	CSMS burn Kara Mine
6/04	Emu River	36	47	Surrey	CSMS burn Kara Mine
9/04	Wynyard	8	60	Surrey	Salt from sea spray
25/04	Geeveston	20	27	Huon	Unknown
29/04	Geeveston	22	34	Huon	CSMS Burn
30/04	Geeveston	29	41	Huon	CSMS Burn
1/05	Geeveston	24	34	Huon	CSMS Burn
7/05	Geeveston	26	34	Huon	Unknown
10/05	Geeveston	37	42	Huon	Unknown
14/05	Ti Tree Bend	20.37	26.31	Brushy	Unknown
18/05	Huonville	22	33	Huon	CSMS Burn
20/05	Wynyard	20	39	Surrey	CSMS burn
212/05	Wynyard	20	37	Surrey	CSMS burn
21/05	Geeveston	21	33	Huon	Unknown
25/05	Ti Tee Bend	20.73	27.78	Brushy	Wood heating
27/05	Sth. Launceston	22	30	Brushy	Wood heating
28/05	Ti Tree Bend	21.52	27.45	Brushy	Wood heating
29/05	Ti Tree Bend	24.8	29.06	Brushy	Wood heating
29/05	Sth. Launceston	32	35	Brushy	Wood heating
30/05	Ti Tree Bend	20.96	29.28	Brushy	Wood heating
30/05	Sth. Launceston	22	26	Brushy	Wood heating
30/05	Geeveston	32	40	Huon	Wood heating
31/05	Geeveston	39	46	Huon	Wood heating
31/05	Ti Tee Bend	24.38	33.16	Brushy	Wood heating
31/05	Sth. Launceston	27	34	Brushy	Wood heating
31/05	Sheffield	24	26	Surrey	Unknown

Table 10: Summary of exceedences (shaded) and levels of PM2.5 20 µg per m³ and above

The following summaries show the seasonal burning activity in each airshed with the results from the relevant monitoring stations. The summaries have been compressed to a day before and a day after each burning event.

Arthur	Completed		Allocated	Wynyard		Smithton		Complaints
	Area (ha)	FI		FI	PM 2.5	PM 10	PM 2.5	
11/03/2011	229	2162	13227					
12/03/2011	409	5861	20000					
13/03/2011	103	515	20000					
14/03/2011								
19/03/2011								
20/03/2011	1	5	10000					
21/03/2011								
27/03/2011				3	19	2	10	
28/03/2011	127	5080	7500	3	16	6	14	
29/03/2011				6	22	5	18	
5/04/2011				4	16	5	15	
6/04/2011	45	1800	17500	6	19	4	10	
7/04/2011	2000	10000	10000	3	16	2	9	
8/04/2011	2000	10000	20000	4	43	4	20	
9/04/2011				8	60	11	31	
14/04/2011				4	17	3	12	
15/04/2011	40	200	17500	3	21	4	14	
16/04/2011	120	600	7500	4	25	4	15	
17/04/2011	108	2220	2500	6	22	8	17	
18/04/2011	160	6400	7500	6	25	6	22	
19/04/2011				4	25	5	19	
26/04/2011				6	22	4	12	
27/04/2011	66	2640	7500	8	24	4	12	
28/04/2011	158	5520	10000	4	18	3	13	
29/04/2011				3	28	2	18	
Totals	5566	53003						

Table 11: Airshed Summary for South Arthur

RAC (6) 09/011

Surrey Hills	Totals		Allocated FI	Wynyard		Emu River		Sheffield		Ulverstone		Complaint
	(ha)	FI		PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	
17/03/2011						1	6	1	7	1	6	
18/03/2011	85	3400	17500			1	6	2	9	1	8	
19/03/2011	37	1480	20000			2	10	3	11	2	13	
20/03/2011						2	12	2	10	2	17	
21/03/2011	3	120	20000			3	14	8	21	3	26	
22/03/2011						2	10	5	17	3	21	
27/03/2011				3	19	2	10	2	8	2	16	
28/03/2011	4	160	2500	3	16	2	7	3	10	4	18	
29/03/2011				6	22	7	16	11	20	6	18	
30/03/2011				5	26	5	13	4	11	3	15	
31/03/2011	9	320	17500	3	27	2	12	2	11	3	15	
1/04/2011				4	28	2	9	1	7	1	11	
3/04/2011				3	21	2	11	1	8	1	11	
4/04/2011	128	5120	10000	4	18	3	10	1	4	1	7	
5/04/2011				4	16	23	30	3	8	4	11	6
6/04/2011				6	19	36	47	4	8	3	11	2
7/04/2011	30	1200	7500	3	16	2	7	3	6	4	12	
8/04/2011				4	43	3	14	2	14	9	34	
13/04/2011				2	10	1	7	2	9	2	13	
14/04/2011	2	80	17500	4	17	2	10	3	8	3	18	
15/04/2011				3	21	1	9	1	8	2	16	
16/04/2011				4	25	2	13	4	12	6	23	1
17/04/2011	60	300	2500	6	22	4	13	7	14	4	21	
18/04/2011	13	520	2500	6	25	4	13	6	15	4	17	
19/04/2011				4	25	2	12	5	13	3	18	
26/04/2011				6	22	2	9	9	14	3	12	
27/04/2011	57	2280	2500	8	24	2	9	12	22	4	13	
28/04/2011	56	840	7500	4	18	2	8	5	10	4	16	1
29/04/2011				3	28	2	13	2	11	4	20	
9/05/2011				9	16	2	5	6	10	2	7	
10/05/2011	7	105	12500	6	13	5	10	12	16	4	9	
11/05/2011				6	12	1	4	4	6	2	6	
18/05/2011				18	36	4	11	10	16	8	16	
19/05/2011	7	105	12500	15	35	9	21	15	25	9	22	
20/05/2011	17	255	0	20	39	15	26	12	21	14	28	
21/05/2011				20	37	14	25	17	24	13	25	2
Totals	393	11405										12

Table 12: Airshed Summary for Surrey Hills

RAC (6) 09/011

Brushy	Totals		Allocated FI	Carrick		Exeter		Sheffield		Ulverstone		Rowella		Ti Tree Bend		George Town		Sth L'ton		Complaint
	(Ha)	FI		PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	
28/03/2011				2	11			3	10	4	18	2.44	11.08	3.46	8.26	3.65	8.09	2	25	
29/03/2011	35	525	12500	15	25			11	20	6	18	14.99	24.09	16.93	21.8	13.85	18.14	16	53	1
30/03/2011				4	11			4	11	3	15	0.92		2.37	10.22	0	11.55	3	32	
31/03/2011	77	1155	not set	3	12	2	14	2	11	3	15	3.64	18.16	1.97	11.17	4.22	12.5	3	18	
1/04/2011				1	8	1	12	1	7	1	11	0.8	10.57	3.07	7.24	3.98	10.24	2	17	
6/04/2011				4	9	3	12	4	8	3	11	2.51	11.49	6.88	12.3	9.36	14.97	5	17	
7/04/2011	12	480	2500	2	6	3	11	3	6	4	12	2.49	13.48	5.62	9.07	5.81	19.11	4	20	
8/04/2011				3	11	4	18	2	14	9	34	2.19	11.48	3.94	10.11	16.1	30.58	3	20	
17/04/2011				5	12	4	18	7	14	4	21	4.37	14.22	6.93	12.74	7.95	16.84	6	14	
18/04/2011	52	780	7500	4	13	4	18	6	15	4	17	4.76	15.4	5.78	11.42	7.42	13.38	4	13	
19/04/2011	67	1005	17500	3	12	4	18	5	13	3	18	5.55	18.24	6.11	12.41	7.63	16.2	4	15	
20/04/2011	16	240	20000	1	10	2	16	1	9	1	13	0.44	8.3	3.15	8.1	3.9	9.09	2	11	
21/04/2011				2	8	2	14	2	9	1	11	1.63	12.46	4.87	9.88	3.81	10.6	4	12	
27/04/2011				6	12	5	17	12	22	4	13	4.29	11.57	10.73	15.57	0	14.24	12	19	
28/04/2011	56	835	12500	7	13	5	17	5	10	4	16	2.9	11.3	16.52	22.74	0	11.95	11	19	1
29/04/2011				4	13	6	22	2	11	4	20	1.39	9.59	16.07	23.69	0	11.42	10	21	
3/05/2011				4	9	4	19	6	10	4	16	1.08	7.05	0	14.13	0	9.2	11	18	
4/05/2011	76	1140	20000	2	5	3	10	1	6	3	11			6.82	10.62	0		7	11	
5/05/2011				4	9	2	11	5	11	1	7	2.15	13.88	13.33	18.97	6.86	18.5	13	19	
8/05/2011				4	8	4	11	3	5	1	4	2.65	13.14	13.2	17.58	5.62	18.17	16	20	
9/05/2011	21	840	12500	3	8	1	6	6	10	2	7	1.86	12.07	6.33	12.9	5.4		3	8	
10/05/2011				6	9	4	9	12	16	4	9	3.18	18.81	7.23	10.69	6.03	13.55	7	11	
17/05/2011				2	8	3	12	4	9	4	11	3.69	14.52	10.57	17.11	10.52	22.52	6	15	
18/05/2011	61	915	12500	4	11	5	18	10	16	8	16	4.21	16.48	5.96	10.93	0		7	17	
19/05/2011				8	20	10	30	15	25	9	22	8.81		11.43	19.04	18.17	30.48	12	26	2
20/05/2011	24	360	0	11	22	12	31	12	21	14	28	12.01		16.68	23.56	16.83	25.14	16	31	1

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21/05/2011				11	19	11	22	17	24	13	25	11		13.15	17.68	13.6	19.53	12	19	1
26/05/2011				6	8	6	12	8	10	2	6	6.47		19.67	26.93	11.58	22.49	17	23	
27/05/2011	175	1125	12500	4	8	5	13	4	9	1	8	4.18		27	35.94	4.52	9.89	22	30	
28/05/2011	50	250	12500	15	20	7	13	7	10	6	11			21.52	27.45	8.4	14.81	19	23	
29/05/2011				10	11	8	12	6	8	7	10			24.8	29.06	10.13	14.42	32	35	
30/05/2011	50	250	7500	7	8	10	14	14	16	5	9			20.96	29.28	10.25	20.91	22	26	
31/05/2011				9	11	9	13	24	26	4	9			24.38	33.16	12.21	31.16	27	34	
Totals	772	9900																		6

Table 13: Airshed Summary for Brushy Lagoon

RAC (6) 09/011

Diddleum	Totals		Allocated FI	Lilydale		Scottsdale		Rowella		Ti Tree Bend		Sth Lton		George Town		Complaint
	(Ha)	FI		PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	
18/03/2011	7	280	12500	2	9	1	8	3.08	11.79	3.96	11.15	2	18	0	19.61	
19/03/2011				4	10	3	8	3.52	10.45	4.98	9.74	4	13	0	15.04	
27/03/2011				4	15	3	13	3.25	12.16	4.24	9.13	2	13	4.75	12.85	
28/03/2011	88	440	2500	7	17	1	9	2.44	11.08	3.46	8.26	2	25	3.65	8.09	
29/03/2011				5	13	5	11	14.99	24.09	16.93	21.8	16	53	13.85	18.14	
30/03/2011				4	11	2	8	0.92		2.37	10.22	3	32	0	11.55	
31/03/2011	76	1248	20000	3	12	1	9	3.64	18.16	1.97	11.17	3	18	4.22	12.5	1
1/04/2011				3	11	1	7	0.8	10.57	3.07	7.24	2	17	3.98	10.24	
3/04/2011				4	12	1	6	2.98	12.3	3.39	6.68	2	11	3.48	9.01	
4/04/2011	62	930	20000	2	9	1	6	3.38	12.37	4.55	8.85	2	19	3.57	11.29	
5/04/2011	60	900	12500	5	12	1	6	4.47	14.26	4.72	10.37	3	31	6	20.76	
6/04/2011				4	11	1	7	2.51	11.49	6.88	12.3	5	17	9.36	14.97	
7/04/2011	8	145	2500	4	11	1	6	2.49	13.48	5.62	9.07	4	20	5.81	19.11	
8/04/2011				3	11	1	8	2.19	11.48	3.94	10.11	3	20	16.1	30.58	
9/04/2011				9	20	10	21	7.99	20.91	9.19	17.39	7	21	10.87	21.45	1
10/04/2011				1	7	1	5	0.39	8.76	2.17	4.72	1	7	2.4	6.23	
27/04/2011				8	17	1	8	4.29	11.57	10.73	15.57	12	19	0	14.24	
28/04/2011	103	4120	12500	4	11	3	25	2.9	11.3	16.52	22.74	11	19	0	11.95	1
29/04/2011				3	13	2	9	1.39	9.59	16.07	23.69	10	21	0	11.42	1
30/04/2011				9	19	3	9	5.63	17.64	11.72	20.63	10	18	0	16.87	
1/05/2011				10	20	2	8	4.52	11.63	14.47	20.04	12	17	0	11.98	
2/05/2011				6	12	1	8	2.52	9.91	9.37	12.79	8	15	0	11.36	
3/05/2011				9	17	1	6	1.08	7.05	0	14.13	11	18	0	9.2	
4/05/2011	219	3285	20000	6	12	0	4			6.82	10.62	7	11	0		1
5/05/2011	212	3150	12500	9	15	0	4	2.15	13.88	13.33	18.97	13	19	6.86	18.5	

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6/05/2011				14	20	2	5	5.99	19.68	16.8	23.06	16	22	8.61	20.15	
9/05/2011				1	4	0	3	1.86	12.07	6.33	12.9	3	8	5.4		
10/05/2011	11	165	12500	5	15	1	2	3.18	18.81	7.23	10.69	7	11	6.03	13.55	
11/05/2011				1	4	0	2	0.18		8.07	9.59	6	9	5.3	9.02	
16/05/2011				5	10	0	4	1.68	9.68	2.68	5.19	3	7	3.95	10.61	
17/05/2011	100	1500	12500	8	15	3	10	3.69	14.52	10.57	17.11	6	15	10.52	22.52	
18/05/2011				9	16	3	9	4.21	16.48	5.96	10.93	7	17	0		
19/05/2011	82	1230	2500	14	27	8	17	8.81		11.43	19.04	12	26	18.17	30.48	
20/05/2011				17	29	10	21	12.01		16.68	23.56	16	31	16.83	25.14	
Totals	1021	17393														5

Table 14: Airshed Summary for Diddleum

Huon	Totals		Allocated	Geeveston		Huonville		Judbury		New Town		Complaint
	(Ha)	FI		FI	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	
7/03/2011				9	25	5	26	3	27	9.22	17.94	4
8/03/2011				9	24	8	26	5	22	14.26	22.4	
10/03/2011				1	6	1	8	1	9	2.03	4.95	
11/03/2011	20	100	12500	3	14	2	17	2	14	3.56	8.93	
12/03/2011				3	15	2	12	2	12	3.79	7.7	
14/03/2011				3	17	3	30	2	22	6.44	17.42	
15/03/2011	161	6440	20000	9	22	8	29	4	18	9.87	19.05	1
16/03/2011				3	11	4	17	1	12	3.89	9.08	
18/03/2011				5	11	2	9	1	7	2.43	5.75	
19/03/2011	266	10640	17500	3	10	3	12	2	10	2.51	7.03	1
20/03/2011	271	10840	20000	5	13	5	15	2	11	3.37	7.89	1
21/03/2011	156	6215	17500	6	19	8	30	6	25	6.53	16.18	2
22/03/2011				4	20	5	36	3	23	7.38	20.25	
27/03/2011				3	7	5	18	1	13	2.75	5.86	
28/03/2011	46	1840	2500	2	6	6	21	3	14	5.81	11.77	
29/03/2011	340	1700	20000	8	19	11	29	6	20	11.21	17.77	
30/03/2011				4	10			2	12	3.83	9.06	
7/04/2011				6	16	4	11	3	19	6.29	12.34	
8/04/2011	16	250	20000	8	19	6	12	5	14	5.8	15.74	
9/04/2011	38	595	17500	10	21	6	12	6	16	7.97	16.11	
10/04/2011				5	15	2	8	1	12	3.82	6.79	
16/04/2011				11	17	8	16	2	13	10.12	18.78	
17/04/2011	670	3350	2500	10	19	8	17	5	21	12.04	17.51	
28/04/2011				17	27	9	15	3	12	11.54	17.9	
29/04/2011	29	1160	not set	22	34	13	19	10	20	8.67	14.87	
30/04/2011				29	41	12	20	6	18	14.26	21.02	
16/05/2011				4	8	1	3	0	4	1.88	4.73	
17/05/2011	20	300	7500	17	27	9	17	2	15	12.18	27.23	
18/05/2011	15	225	7500	19	27	22	33	4	18	13.95	23.54	
19/05/2011				15	26	13	23	4	18	7.02	12.68	
Totals	2048	43655										9

Table 15: Airshed Summary for Huon Valley

Goulds	Totals		Allocated FI	Derby		Fingal		St Helens		Complaint
	(Ha)	FI		PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	
14/03/2011				3	25	2	14	2	13	
15/03/2011	400	2000	20000	5	28	2	20	4	17	
16/03/2011	1400	7000	12500	8	23	2	15	3	14	
17/03/2011				9	17	2	17	6	13	
18/03/2011	78	3120	17500	2	9	1	7	1	8	
19/03/2011				2	9	1	5	1	7	
5/04/2011	58	2320	12500	3	16	2	13	1	7	
6/04/2011	11	55	2500	5	17	2	13	2	9	
7/04/2011				3	11	2	12	2	6	
8/04/2011	34	510	10000	4	17	1	12	1	10	
9/04/2011				10	21	5	14	9	17	
17/04/2011				4	17	2	9	2	11	
18/04/2011	55	825	2500	5	18	2	11	4	11	
19/04/2011	157	1600	12500	4	25	2	10	5	12	
20/04/2011	275	4125	20000	2	16	4	12	3	8	
21/04/2011	150	2250	17500	4	10	2	8	1	6	
22/04/2011				2	17	1	7	1	8	
27/04/2011				4	22	2	8	2	9	
28/04/2011	127	5080	12500	8	26	1	6	1	9	
29/04/2011				6	27	5	15	2	10	
6/05/2011	67	1005	12500	8	12	5	8	1	6	
7/05/2011				10	16	2	7	1	5	
8/05/2011				5	10	1	6	1	6	
9/05/2011	100	2425	20000	7	11	0	5	1	6	
10/05/2011	102	1530	12500	5	10	1	4	2	5	
11/05/2011	70	1050	17500	5	8	0	4	1	4	
12/05/2011				8	12	2	6	4	7	
17/05/2011				5	14	2	13	3	13	
18/05/2011	16	240	2500	8	19	3	8	4	8	
19/05/2011	52	780	0	19	32	5	13	6	13	
20/05/2011	517	3655	0	12	32	7	17	6	17	
21/05/2011				13	24	8	17	8	16	
22/05/2011				16	27	4	12	5	14	
24/05/2011				4	13	0	5	1	5	
25/05/2011	78	1170	7500	5	11	2	6	1	6	
26/05/2011				11	14	4	6	2	6	
30/05/2011				8	12	3	6	1	4	
31/05/2011	134	2010	7500	11	13	4	5	1	3	
Totals	3881	42750								

Table 16: Airshed Summary for Goulds Country

Repulse	Totals		Allocated FI	Gretna		Bryn Estyn		New Town		Complaint
	(Ha)	FI		PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	
10/03/2011				1	4	1	6	2.03	4.95	
11/03/2011	105	1575	12500	2	5	2	7	3.56	8.93	
12/03/2011	89	1335	20000	2	6	2	7	3.79	7.7	
13/03/2011	21	840	20000	3	9	4	10	5.67	10.97	
14/03/2011	62	2480	12500	2	11	2	19	6.44	17.42	
15/03/2011	16	640		3	11	3	15	9.87	19.05	
16/03/2011	44	1760	20000	2	6	1	10	3.89	9.08	
17/03/2011				1	4	0	4	2.45	5.33	
18/03/2011	18	720	12500	3	5	0	4	2.43	5.75	
19/03/2011				3	8	2	9	2.51	7.03	
20/03/2011				2	6	2	8	3.37	7.89	
21/03/2011	77	1155	12500	3	9	3	18	6.53	16.18	
22/03/2011				2	11	3	19	7.38	20.25	
26/03/2011				1	5	1	7	3.73	7.19	
27/03/2011	34	510	7500	1	3	1	5	2.75	5.86	
28/03/2011	97	1455	10000	2	4	3	8	5.81	11.77	2
29/03/2011				4	7	13	19	11.21	17.77	6
5/04/2011				1	4	3	9	3.72	9.34	
6/04/2011	4	20	17250	3	8	3	11	5.77	11.29	
7/04/2011				5	9	6	15	6.29	12.34	
8/04/2011	23	642	20000	4	8	6	12	5.8	15.74	
9/04/2011				6	11	8	13	7.97	16.11	
15/04/2011				4	11	5	17	7.01	15.33	
16/04/2011	180	900	2500	5	12	3	11	10.12	18.78	
17/04/2011	100	1500	17500	7	12	7	14	12.04	17.51	1
18/04/2011	73	1100	17500	8	13	5	10	6.98	13.27	
19/04/2011	32	480	17500	3	9	2	10	3.66	11.36	
20/04/2011				4	10	3	11	3.56	8.76	
27/04/2011				5	10	8	14	12.24	28.46	
28/04/2011	108	1620	7500	6	10	12	17	11.54	17.9	
29/04/2011				5	8	6	10	8.67	14.87	
16/05/2011				1	3	0	3	1.88	4.73	
17/05/2011	20	300	7500	2	6	2	7	12.18	27.23	
18/05/2011						5	12	13.95	23.54	
19/05/2011				5	11	5	14	7.02	12.68	
20/05/2011	37	555	7500	5	14	6	16	14.07	26.83	
21/05/2011				6	12	8	13	9.73	16.89	
Totals	1140	19587								9

Table 17: Airshed Summary for Repulse

Miena	Totals		Allocated FI	Gretna		Carrick		Exeter		Sheffield		Rowella		Ti Tree Bend		George Town		Complaint
	(Ha)	FI		PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	PM 2.5	PM 10	
6/04/2011				3	8	4	9	3	12	4	8	2.51	11.49	6.88	12.3	9.36	14.97	
7/04/2011	70	2800	12500	5	9	2	6	3	11	3	6	2.49	13.48	5.62	9.07	5.81	19.11	
8/04/2011	60	1550	17500	4	8	3	11	4	18	2	14	2.19	11.48	3.94	10.11	16.1	30.58	
9/04/2011				6	11	6	19	8	28	5	18	7.99	20.91	9.19	17.39	10.87	21.45	
19/04/2011				3	9	3	12	4	18	5	13	5.55	18.24	6.11	12.41	7.63	16.2	
20/04/2011	8	320	17500	4	10	1	10	2	16	1	9	0.44	8.3	3.15	8.1	3.9	9.09	
21/04/2011				1	4	2	8	2	14	2	9	1.63	12.46	4.87	9.88	3.81	10.6	
26/04/2011				6	12	4	9	4	20	9	14	2.68	12.7	9.67	15.8	0	16.97	
27/04/2011	100	1500	12500	5	10	6	12	5	17	12	22	4.29	11.57	10.73	15.57	0	14.24	
28/04/2011	131	1965	2500	6	10	7	13	5	17	5	10	2.9	11.3	16.52	22.74	0	11.95	
29/04/2011				5	8	4	13	6	22	2	11	1.39	9.59	16.07	23.69	0	11.42	
9/05/2011				3	7	3	8	1	6	6	10	1.86	12.07	6.33	12.9	5.4		
10/05/2011	138	2070	17500	7	9	6	9	4	9	12	16	3.18	18.81	7.23	10.69	6.03	13.55	
11/05/2011				3	6	2	5	1	5	4	6	0.18		8.07	9.59	5.3	9.02	
17/05/2011				2	6	2	8	3	12	4	9	3.69	14.52	10.57	17.11	10.52	22.52	
18/05/2011	52	780	7500			4	11	5	18	10	16	4.21	16.48	5.96	10.93	0		
19/05/2011				5	11	8	20	10	30	15	25	8.81		11.43	19.04	18.17	30.48	
Totals	559	10985																

Table 18: Airshed Summary for Miena

RAC (6) 09/011

Tooms	(Ha)	FI	Allocated	PM 2.5	PM 10	Complaint	Wielangta	Totals		Allocated	Complaint
								(Ha)	FI	FI	
6/03/2011				1	8						
7/03/2011	30	150	12500	3	17		7/03/2011	182	930	2500	
8/03/2011	30	150	12500	4	15		8/03/2011				
9/03/2011				6	14		27/03/2011				
14/03/2011				2	13		28/03/2011	228	1140	12500	
15/03/2011	400	2000	20000	4	17		29/03/2011				
16/03/2011				3	14		7/04/2011				
28/03/2011				2	10		8/04/2011	45	1305	7500	1
29/03/2011	60	300	20000	5	12		18/04/2011				
30/03/2011	140	700	20000	3	8		19/04/2011	15	225	12500	
31/03/2011				2	9		20/04/2011				
3/04/2011				1	4		Totals	470	3600		1
4/04/2011	200	1000	20000	1	8						
5/04/2011	200	1000	17500	1	7						
6/04/2011				2	9						
7/04/2011	650	3250	2500	2	6	4					
8/04/2011	60	300	7500	1	10	1					
9/04/2011				9	17						
Totals	1770	8850				5					

Table 19: Airshed Summary for Wielangta

Unallocated airshed	Totals		Allocated FI
	(Ha)	FI	
6/04/2011	3757	18785	
7/04/2011	467	2335	
17/04/2011	5234	26170	
27/04/2011	615	4225	
Totals	10073	51515	

Table 20: Airshed Summary Mount Tooms

Table 21: Airshed Summary for Unallocated airshed

West Coast	Totals		Allocated FI	Smithton		Complaint
	(Ha)	FI		PM 2.5	PM 10	
7/03/2011	50	250	7500			
8/03/2011						
17/03/2011						
18/03/2011	180	900	17500			
19/03/2011	300	1500	12500			
20/03/2011						
5/04/2011				5	15	
6/04/2011	30	150	12500	4	10	
7/04/2011				2	9	
8/04/2011	3600	18000	20000	4	20	
9/04/2011				11	31	
14/04/2011				3	12	
15/04/2011	100	500	12500	4	14	
16/04/2011	200	1000	2500	4	15	
17/04/2011				8	17	
Totals	4460	22300				

Table 22: Airshed Summary for West Coast

TOR 1 e: The relative effect of non-CSMS burns on smoke levels

Information which is currently collected by the Tasmania Fire Service during the Fire Permit Period (FPP) and voluntarily provided by some burners outside the FPP lacks specific details about the fire size and the fuel type, although locations are given as a six figure grid reference. In 2011 the FPP ended on the 4/03/2011. CSMS burning did not commence until the 7/03/2011 hence the whole program was outside the FPP.

From the end of the FPP until the 31/05/2011 there were 1348 private burning registrations averaging 15 per day. The range of daily private burning registrations was 1 to 62 with the maximum registrations occurring on the first day after the end of the FPP.

The available data is insufficient to be able to comment on the contribution of private burning to air quality as the relevant fuel index cannot be calculated and unlike the CSMS there is no feedback to quantify the amount of burning completed. Under the current FPP system all private property burning may not have been registered for the period of the review.

TOR 1 f: The cost to the forest industry and PWS of implementing the CSMS in 2011

Three CSMS users reported costs for implementing the CSMS in 2011, five reported no additional costs and one did not comment.

For comparative analysis, CSMS users' costs were spread over the total hectares of their completed programs to give a \$ per hectare figure. The costs included labour, aircraft, machinery and overheads. The costs of implementing the CSMS were reported by three CSMS users as: \$2.50, \$2.85 and \$0.43 respectively per ha of completed burning. This is higher than the range experienced in 2010.

One CSMS user reported on areas not burnt due to implementing the CSMS. The report was treated in the same way as costs for comparison. Burning opportunities were missed at the rate of 1.03 hectares per hectare of completed burning which was a much higher rate than anything previously reported. The reporter noted that some opportunities were missed as a consequence of management decisions about smoke issues rather than limits imposed by the CSMS model.

One company did not provide any data but estimated that the CSMS had cost it an additional \$40,000 in maintaining contract crews for longer than might have been the case had there been no strategy in place.

Over three seasons the direct cost of implementing the CSMS due to cancelled burns and the reorganisation of schedules has been relatively minor within the broader context of silvicultural burning costs. The loss of burning opportunity has generally been insignificant apart from a single case. The higher costs in 2011 are a likely consequence of the reduced area of silvicultural burning which was achieved by the forest industry group, largely because of wet weather.

TOR 1 g: The number and distribution of complaints about smoke relative to findings on CSMS burning activity and on air quality data

The complaints database for 2011 supplied by the EPA was the source of information. The EPA recorded 60 complaints. Thirteen of these were unrelated to the CSMS as there was no burning done in the relevant airsheds for significant periods before the date of the complaint.

Nine (9) complaints, including one from a resident in the Huon Valley, related to a single smoke event in the Derwent Valley (Repulse airshed 28- 29/03/2011). Eight (8) complaints related to one smoke event in the Burnie / Penguin area (Surrey Hills airshed 5-6/04/2011) and fuel reduction burning by the PWS caused a combined total of 10 complaints from residents in the Wielangta, Mt. Tooms and Huon Valley airsheds.

Complaints	SA	SH	BL	Mn	Dm	Gc	Wt	Rp	Hu	MT	WC	Total
No. in 2011	0	12	6	0	5	0	1	9	9	5	0	47
CI 2011	0	105.2	60.6	0	29.2	0	28	46	20.6	56.8	0	19.3
No. in 2010	1	7	2	0	6	2	0	0	64	0		82
CI 2010	1.7	24.3	20.9	0	31.8	10.3	0	0	99.4	0		29.3
No. in 2009	0	7		3	15	2	1	11	17	0		56
CI 2009	0	14.8		3.5	34.8	7.1	6.3	16.4	34.2	0		14
No. in 2008	0	2		0	38		4	13	24	0		81
CI 2008	0	2.8		0	11		5.6	6.7	54.4	0		9.4

Table 23: Complaints and complaint incidence (CI) per airshed 2008 to 2011. (CI is a comparative measure of complaints per 100,000 FI)

The number of relevant complaints reduced from 82 in 2010 to 47 in 2011 and the CI also reduced meaning that there were fewer complaints relative to the amount of burning done. The mix of fuel types burnt changed significantly in 2011 with heavy fuels making up less than 10% of the total area burnt. The forest industry group burnt about 30% of the total area with the PWS accounting for the balance, all of which was in very light fuel. About 70% of the PWS burning was done in remote areas and the less populous airsheds of West Coast and South Arthur.

A significant improvement from 2010 occurred in the Huon airshed where about the same area of heavy fuel burnt then was also burnt in 2011. Four of the 9 complaints for the Huon airshed originated from a PWS fuel reduction burn in the Wielangta airshed. It was also noted that in 2011, FT's Huon District was more conservative in its interpretation of the smoke dispersion models and all burning days were classed as 'unfavourable'.

While the total number of complaints was low the CI increased substantially in the airsheds which had particular smoke events such Surrey Hills and Repulse.

Most complaints referred to the physical effects of smoke and only 10% were concerned with the visual effects.

TOR 1 h: The management of complaints with regard to their processing and resolution

The recording and management of smoke complaints was coordinated through the EPA. The database supplied to the reviewer was well organised and concise but with sufficient information available for the analysis in this report.

The EPA reviewed several smoke events with some comprehensive reports completed and others in preparation.

An implementation procedure agreed to at the pre-season meeting of the Smoke Management Working Group was:

“Users will supply a 13 figure grid reference and Fuel Index for all completed burns to close out a day and be given access to new bidding. The CSMS web site will provide a new screen to accommodate this requirement. The information will be used by the EPA to manage the complaints process.”

This was not fully implemented because the implementation plan was not disseminated to all of the users before the start of burning (*D. Livingston pers com*).

Recommendation: See TOR 2a

TOR 2 a: Options for improving the effectiveness of the CSMS including its administrative process and technical inputs

A PWS initiative of bidding for continuing burns or smoke which has not cleared is a practical way of ensuring at a field level that an airshed does not become overloaded with smoke from a previous day or days by being increased with new bids which don't account for existing conditions.

Recommendation: Where it can be reasonably determined that smoke from one day's burning is likely to persist in an airshed or an adjacent airshed the following day or days, the CSMS user must bid for sufficient units in the relevant airshed(s) to allow for that smoke.

There have been occasions prior to 2011 when changes to the operation of the CSMS have not been passed on to relevant operational personnel in time for their implementation. The latest example has been described in relation to the implementation plan for 2011 affecting the management of complaints (TOR 1 h).

Recommendation: The dissemination of approved CSMS updates should be managed through a general notice prominently displayed on separate page on the website at the beginning of the season.

TOR 2b: Other relevant constraints or issues

The lack of relevant data about non CSMS burning continues to impede the development of a comprehensive strategy which addresses all sources of smoke. The establishment of the air monitoring network is assisting in identifying the source of particular smoke events but only after they occur. The potential for a consequential response from the EPA may provide burners outside the CSMS with the incentive to modify their future burning practices.

Changes to the forest industry have already resulted in less planned burning of heavy fuels in high intensity fires and this trend is likely to continue. The substitution in area of low intensity burning for fuel reduction and ecological management may bring a new set of problems which the CSMS in its present form may not be able to manage. With fewer users the coordinating function may also become less relevant.

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Glossary of Acronyms

BoM – Bureau of Meteorology

CI – Complaint Incidence expressed as number of complaints per 100,000 FI

CSMS – Coordinated Smoke Management Strategy

EPA – Environment Protection Authority

F160 – Bureau of Meteorology atmospheric stability forecast

FEA – Forest Enterprises Australia

FI – Fuel Index

FPA - Forest Practices Authority

FPP – Fire Permit Period

FT – Forestry Tasmania

NBD – No Burning Day

PWS – Parks and Wildlife Service

TFS – Tasmania Fire Service

TOR – Terms of Reference

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