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Reference: Forest Management Plan 2004-2013 Mid-term Audit of Performance

Please find attached our submission on the Forest Management Plan 2004-2013 Mid-term Audit of Performance Report 24 December 2008.

Yours sincerely,

Convenor
25 June 2009

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Forest Management Plan 2004-2013 Mid-Term Audit of Performance 2009

Submission from Denmark Environment Centre to the Environmental Protection Authority

For further discussion or questions regarding this submission please contact Alex Syme alex.syme@westnet.com.au

INTRODUCTION

This response focuses on climate changes that have occurred over the last 30 to 40 years in south west Western Australia. We have concerns that major changes in annual rainfall volumes and rainfall distribution throughout the year have not been factored into past and current management. In the current FMP and in the previous two FMPs, annual rainfall identified as isohyets determines the location of the High, Intermediate and Low Rainfall Zones. Management prescriptions for extraction rates, logging, regeneration and application of fire are all guided by Rainfall Zone. For example, see Silviculture Specifications 1989, 1991, 1995, 2004; SFM Interim Guideline No. 1. 2007; SFM Interim Guideline No. 2. 2007; Eastern Jarrah Area Indicative Harvest Plan 2008 – 2010; SFM Soil & Water Guideline, Draft 2008.

Our mapping, developed for this submission, demonstrates that the High Rainfall Zone has all but disappeared, the Intermediate Rainfall Zone has been reduced by half and the rest has shifted into the Low Rainfall Zone whilst the Low Rainfall Zone has moved west and south by significant amounts. See Maps 1 – 5.

In its overview of implementation the Commission states (p.6) ***The Conservation Commission has recognised the importance of a precautionary response to climate change to ensure that the health, diversity and productivity of the environment for future generations are maintained, together with the conservation of biological diversity and ecological integrity***.

The Commission's position is strongly supported. However, the precaution must be based on accurate and up to date data.

This response suggests that base data regarding annual rainfall which guides the FMP management and extraction is at least 30 years old and probably over 40 years old. Further, major changes in rainfall seasonal distribution have not been considered or acknowledged by the Department or the FPC.

The recommendations of this submission are on pages 6. and 14.

BACKGROUND

Effects of declining rainfall in the south west have become more apparent in recent years. Many south west town water supplies have been restricted, often for the first time. Who would have thought that drinking water would have to be carted from Denmark to Walpole for that towns consumption, or that water would have to be carted from Albany and Mount Barker to supply Denmark and that Denmark consumers would be subject to Stage 5. water restrictions, the highest restriction levels applied in Western Australia (Government Gazette 28 December 2007).

These water shortages are the result of a progressive decline of water levels in catchments throughout the forested regions of the southwest. The decline in water tables and catchment runoff in the Perth water supply dams is well documented (see App. 2.)

In order to investigate the rainfall decline, the Denmark Environment Centre purchased climate data from the National Climate Centre, Bureau of Meteorology, Melbourne (BOM). This data has been used to show the major changes that have occurred since the mid 1970s in the three forest regions. In the process of this research, it has been discovered that the base line rainfall data used to inform the current FMP 2004-2013 uses climate data collected by the BOM only up to 1961, some 48 years ago.

This submission will address two areas associated with climate change impacting the south west forest estate 1. Declining Annual Rainfall. 2. Changing Seasonal Distribution of Rainfall.

PART 1. DECLINING ANNUAL RAINFALL

History Of The Base Line Rainfall Data Informing the FMP 2004-2013

In July 2002, the Draft 10 year FMP was released with submissions to be made by 15th October 2002. During the submission period, the then Department of Conservation and Land Management (CALM) published a map to inform submitters. This map is titled 'Rainfall Isohyets And Occurrence Of Karri And Jarrah Or Wandoo Mix', dated 11th September 2002. Its Data Directory states the date of the data is 1994. This is the data that informs the current FMP 2004-2013. Further, this data underpins current silviculture guidelines and sustainable forest management guidelines.
The rainfall isohyets displayed on this map have been digitised into GIS computer software by the Denmark Environment Centre. This has enabled the comparison of the FMP data with actual data purchased from the BOM for the 31 year period 1977 to 2007.

We have investigated the age of the CALM 1994 rainfall data. The date '1994' appears to refer only to when the data was entered into the Department's current database. Or, the Data Directory is only referring to the "Occurrence Of Karri And Jarrah Or Wandoo Mix" which leaves the rainfall isohyet data unreferenced. It does not mean the data was based on rainfall recordings up to 1994. In fact, we have established that the rainfall isohyets displayed and used to inform the 1987 FMPs are exactly the same as those published by CALM in 2002 to inform the 2004-2014 FMP. The 1987 FMPs rainfall isohyet maps are referenced to 'Bureau of Meteorology (1965) *Climate Survey, Region 16 – South West Western Australia*' which provides data based on records up 1961 (Table 1. p.8-10).

In coming to these conclusions, the following publications (in publication date order) have been reviewed in order to track the source of rainfall data used to inform the current FMP.

A - Publications with the EXACT same isohyet data as the 2002 CALM map.

- **1978**. Annual Rainfall Characteristics Of The Warren, Donnelly And Shannon River Basins, Loh & King, Water Resources Section, Planning, Design & Investigation Branch. Public Works Department, Water Resources Technical Report No. 78, May 1978 – Figure 2. **REFERENCES: Bureau of Meteorology 1965; 1977.**
- **1986**. Agricultural Land Release Proposals – Shire Of Manjimup, EPA Bulletin No. 269, December 1986 – Appendix A. Figure 1. **UNREFERENCED**
- **1987**. Draft Management Plans. Southern Forest Region; Central Forest Region; Northern Forest Region. CALM April 1987 – Map 2. **REFERENCE: Bureau of Meteorology (1965) Climate Survey, Region 16 – South West Western Australia.**
- **1987**. WACAP TOWARDS 2005. Environmental Review and Management Programme, Draft Environmental Impact Statement. Dames & Moore, April 1987 – Figure 12 **UNREFERENCED**
- **1987**. Stream and Groundwater Response to Logging and Subsequent Regeneration in the Southern Forest of Western Australia. Technical Report No.16. CALM April 1987 – Figure 2. **REFERENCE: Loh and King 1978**.
- **1987**. Regional Management Plans 1987-1997. Southern Forest Region; Central Forest Region; Northern Forest Region. CALM December 1987 – Map 3. **REFERENCE: Bureau of Meteorology (1965) Climate Survey, Region 16 – South West Western Australia.**

- **1988**. Landscope Magazine, April 1988, Restoring Nature's Balance, Shea & Bartle – Page 11. Map. **UNREFERENCED**
- **1991**. Proceedings of a Seminar: A Review of Road, River and Stream Zones In South West Forests, Lands and Forest Commission 9 July 1991. Paper titled 'Hydrological Values' by Alan Walker – Figure 2. **REFERENCE: Loh and King 1978**.
- **1993**. Proposal for the Export of Eucalypt Globulus Paper Pulp Woodchips Through The Port of Bunbury, Consultative Environmental Review. Bunnings Forest Products Pty Ltd, February 1993 – Figure 1. **REFERENCE: CALM Landscope Magazine Autumn 1988**
- **1997**. Forest Management Plan 1994-2003. Progress and Compliance Report. December 1997 - Map 1.; Map 2. **UNREFERENCED**
- **2001**. URS (2001) Assessment *of the Scientific, Economic and Community Values and the Impacts of Logging on Salinity in Areas Subject to a Moratorium on Logging.* Unpublished report to the Conservation Commission of Western Australia. 2001 – Figure 7.2. **REFERENCE: CALM**
- **2005**. Salinity and Land Use Impacts, Department of Environment, SLUI 38, 2005 - Figure 4.5. **UNREFERENCED**

B - Indicative corroborating publications with isohyet data that appears the same as the 2002 CALM map but that cannot be determined due to display quality &/or scale

- **1967**. Controlled Burning In The Forests Of Western Australia, Forests Department, 1967. A paper prepared for the Ninth Commonwealth Forestry Conference 1968 – MAP. **UNREFERENCED**
- **1971**. A Study of Scrub Fuels In The Jarrah Forest Of Western Australia, Forests Department, Bulletin No. 80 1971 – Figure 1. **UNREFERENCED**
- **1974**. The Influence Of Land Use On Stream Salinity In The Manjimup Area, Western Australia, Department of Agriculture Western Australia, Technical Bulletin No. 27, December 1974 – Map 2. **UNREFERENCED**
- **1975**. Site Vegetation Mapping in the Northern Jarrah Forest (Darling Range). 1. Definition of Site-Vegetation Types, Forests Department, Bulletin No. 86 1975 – Figure 3. – **REFERENCE: Bureau of Meteorology (1965) Climate Survey, Region 16 – South West Western Australia.**
- **1975**. Jarrah Dieback – Soil Temperature and Moisture Regimes of some Southern Forest Types, Forests Department, Bulletin No. 88 1975 – Figure 1. **UNREFERENCED**
- **1979**. Clearing and Stream Salinity in the South West of Western Australia, Public Works Department Western Australia, Document No. MDS 1/79, July 1979 – Figure 3. **UNREFERENCED**
- **1983**. Salt Storage in the Bauxite Laterite Region of the Darling Range, Western Australia, Alcoa Australia Limited, Environmental Research Paper No. 16. April 1983 – Figure 1. **UNREFERENCED**
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- **1987**. A State Conservation Strategy For Western Australia, Bulletin 270, Department of Conservation and Environment, January 1987. Figure 1. **UNREFERENCED**
- **1990**. Discussion Paper No. 1. South West Region of Western Australia. Select Committee Into Land Conservation, Legislative Assembly Western Australia, June 1990 – Figure 13. **REFERENCE: K. Tinley, 1986.**
- **1991**. Relationships of Groundwater Levels and Soil Salt Storages to the Geomorphology of the Intermediate Rainfall Zone of the Northern Jarrah Forest Western Australia, Alcoa Australia Limited, Environmental Research Paper No. 24. October 1991 – Figure 1. **UNREFERENCED**
- **1992**. Research into Reforestation Techniques for Saline Groundwater Control. Report No. WS 97, Water Authority of WA, June 1992. Figure 1. **UNREFERENCED**
- **1992**. The State Of The Rivers Of The South West, Western Australian Water Resources Council, June 1992. Figure 1. **UNREFERENCED**

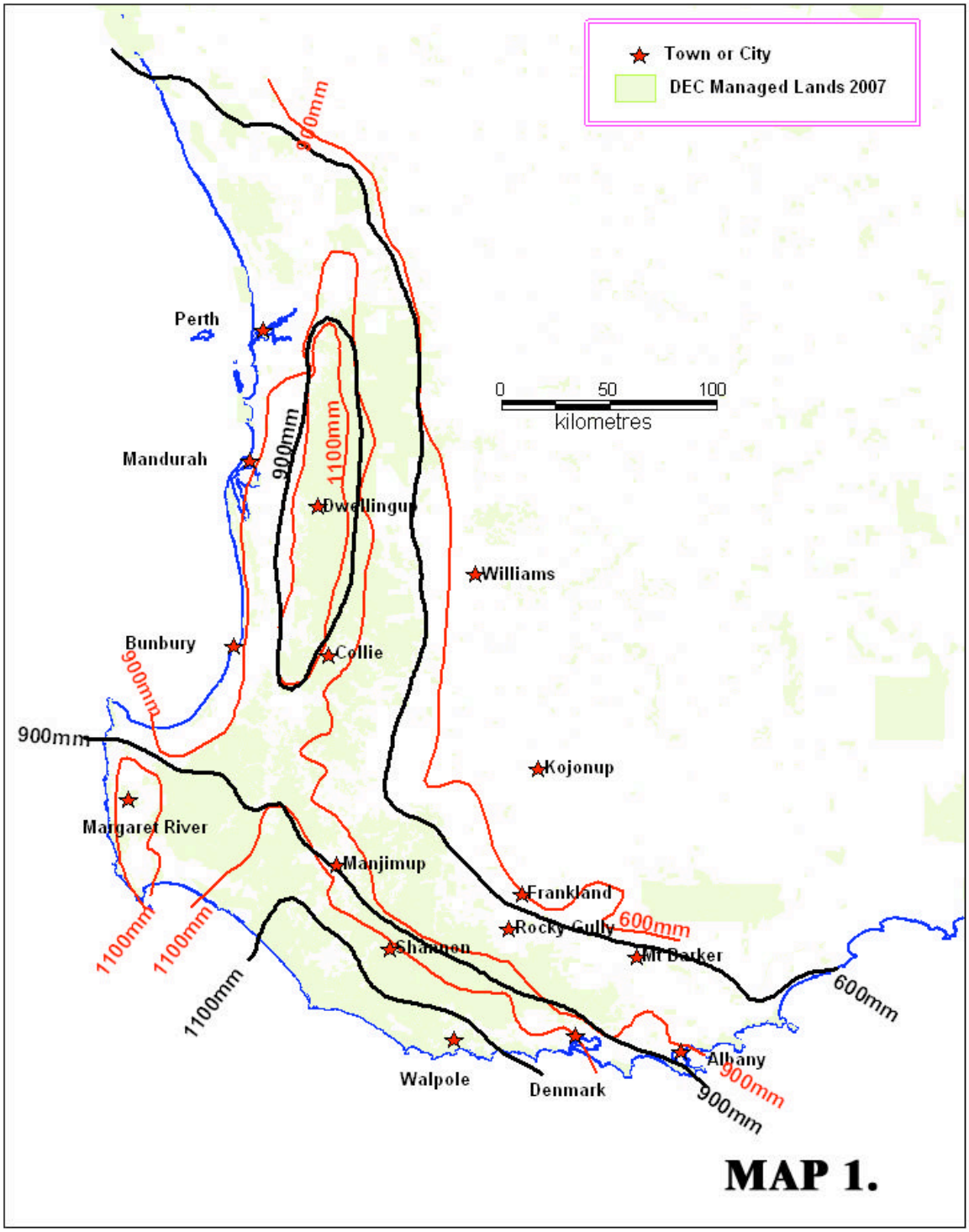
C - Example of a current publication with isohyet data that substantially match the BOM data obtained by the Denmark Environment Centre

- 2009 GM Canola Trial Sites, DAFWA, April 2009 – Map released by Minister for Agriculture and Food 15 April 2009. (Attachment 1.)

Comparison FMP Rainfall Zones with actual of past 30 years

Rainfall Isohyets - CALM 1994 printed 11 September 2002

Rainfall Isohyets - BOM 1977 to 2007



MAP 1.

PART 1.

CONCLUSIONS

It is possible that the base line rainfall data adopted for the 2004-2013 FMP is based on rainfall data up until only 1961. However, Loh & King (1978) produced a rainfall isohyet map for the Southern Forest Region that has the exact same isohyet locations as the current FMP. Again, their work is referenced to 'Bureau of Meteorology (1965) Climate Survey, Region 16 – South West Western Australia' (1961 data) plus 'Bureau of Meteorology, May 1977, Rainfall Statistics Australia, Metric Edition' (provides statistics to 1974). At best, if the same references as Loh & King (1978) have been used, then the current Plan is based on rainfall data for the Southern Forest Region up until only 1974, and for the Central and Northern Forest Regions on data up until only 1961.

OBSERVATIONS

This submission does not speculate as to why for over two decades the climatic data for forest management plans have not been updated. However, we submit that the Conservation Commission, the Environmental Protection Authority, the WA community and Governments, both State and Federal, have been and continue to be mislead because climatic information was not kept up to date.

It is notable that the Department of Environment and Conservation and the Forest Products Commission in their responses in the Audit report generally infer that the impacts of Climate Change are something for future consideration and NOT of immediate concern. For example, in their Audit response to Objective 23. Enhanced greenhouse effect they state '*Potential impacts of the projected changes to climate on Western Australia's forest ecosystems will be investigated...'*. This begs the question, have these agencies mislead themselves?

Fundamental management prescriptions applied under the current FMP are derived from and guided by whether the management area occurs within any of the three rainfall zones of High (HRZ = > 1100mm annual rainfall), Intermediate (IRZ = 900mm – 1100mm annual rainfall), and Low (LRZ = 600mm - 900mm annual rainfall).

All guided by these Rainfall Zones are extraction rates, logging prescriptions, regeneration precriptions and the application of fire. For example, see Silviculture Specifications for both jarrah and karri 1989, 1991, 1995, 2004; SFM Interim Guideline No. 1. 2007; SFM Interim Guideline No. 2. 2007; Eastern Jarrah Area Indicative Harvest Plan 2008 – 2010; SFM Soil & Water Guideline, Draft 2008.

FINDINGS

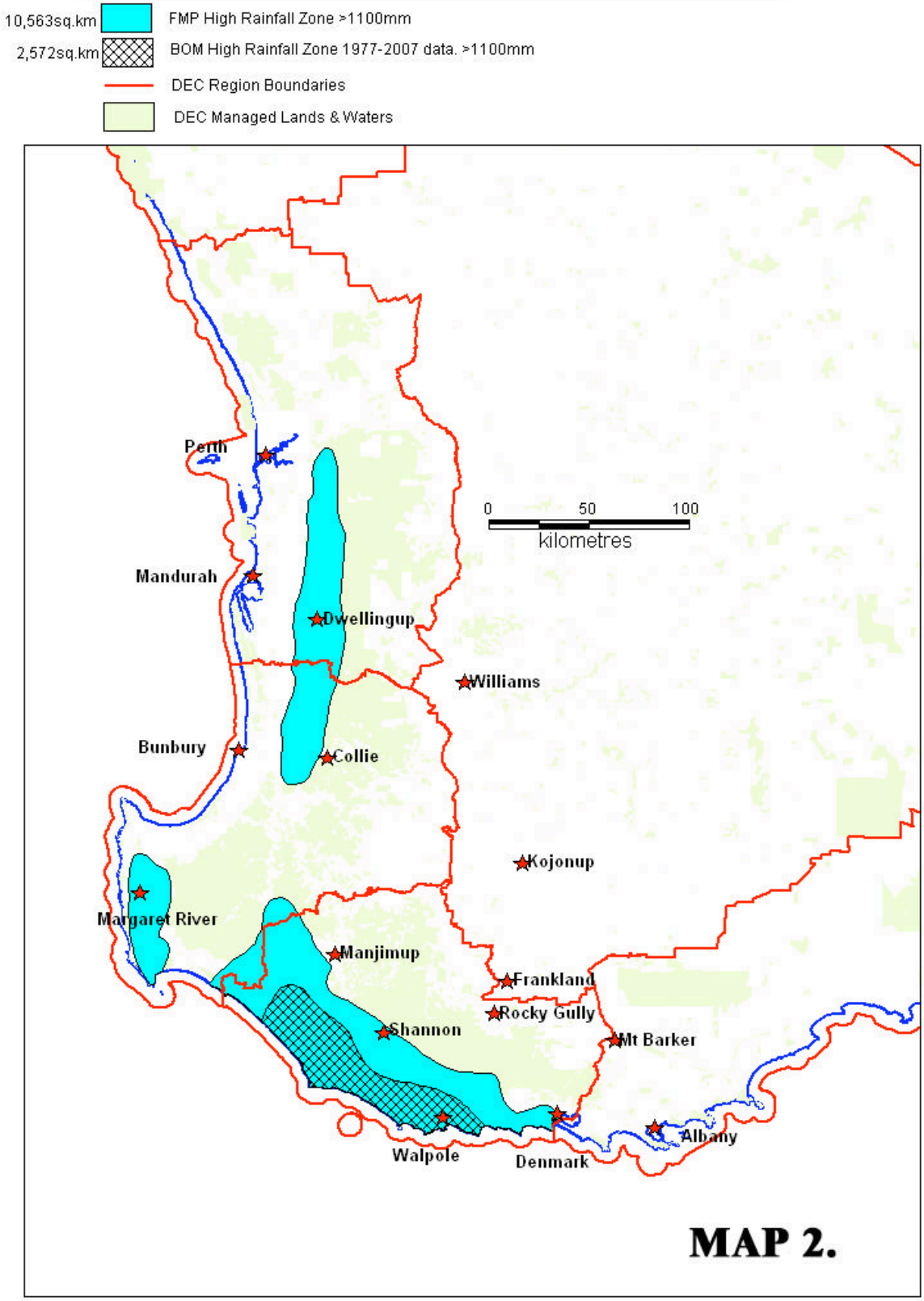
- Our calulations show the current FMP High Rainfall Zone to cover an area of 10,563km^2. Using the BOM data for annual rainfall 1977-2007 we map this area as now covering only 2,572km^2, a 75% reduction (Map 2.)
- Our calulations show the current FMP Intermediate Rainfall Zone to cover an area of 14,300km^2. Using the BOM data for annual rainfall 1977-2007 we map this area as now covering 13,780km^2, a similar area in size but now occupying some 8,000km^2 of former HRZ (Map 3.).
- Our calulations show the current FMP Low Rainfall Zone to cover an area of 26,140km^2. Using the BOM data for annual rainfall 1977-2007 we map this area as now covering 29,080km^2, a similar area in size but now occupying a substantial portion of former IRZ (Map 4.).
- Our mapping shows that most of the Jarrah Forest Estate now falls within a Low Rainfall Zone (Map 4. Map 5.).
- The BOM data for annual rainfall 1977-2007 shows that all Jarrah Forest mapped as Eastern Jarrah Forest (SFM Guideline No. 1. 2004), is now located within 750mm or less rainfall occurrence.

- Our mapping and Department of Food and Agriculture mapping shows that almost the entire area of Karri Forest within the FMP State Forest category is now located within the Intermediate Rainfall Zone and, critically, with some located within the Low Rainfall Zone (Map 2. Map 3. Map 5. Appendix 1.).
- The BOM data for annual rainfall 1977-2007 and Department of Food and Agriculture mapping shows that most of the Karri Forest within the FMP State Forest category is now located within an annual rainfall occurrence of less than 1,000mm (Map 1. ; Appendix 1.).
- The Conservation Commission, the WA Environmental Protection Authority, the WA community and Governments, both State and Federal, have been and continue to be mislead because climatic information was and is not kept up to date.

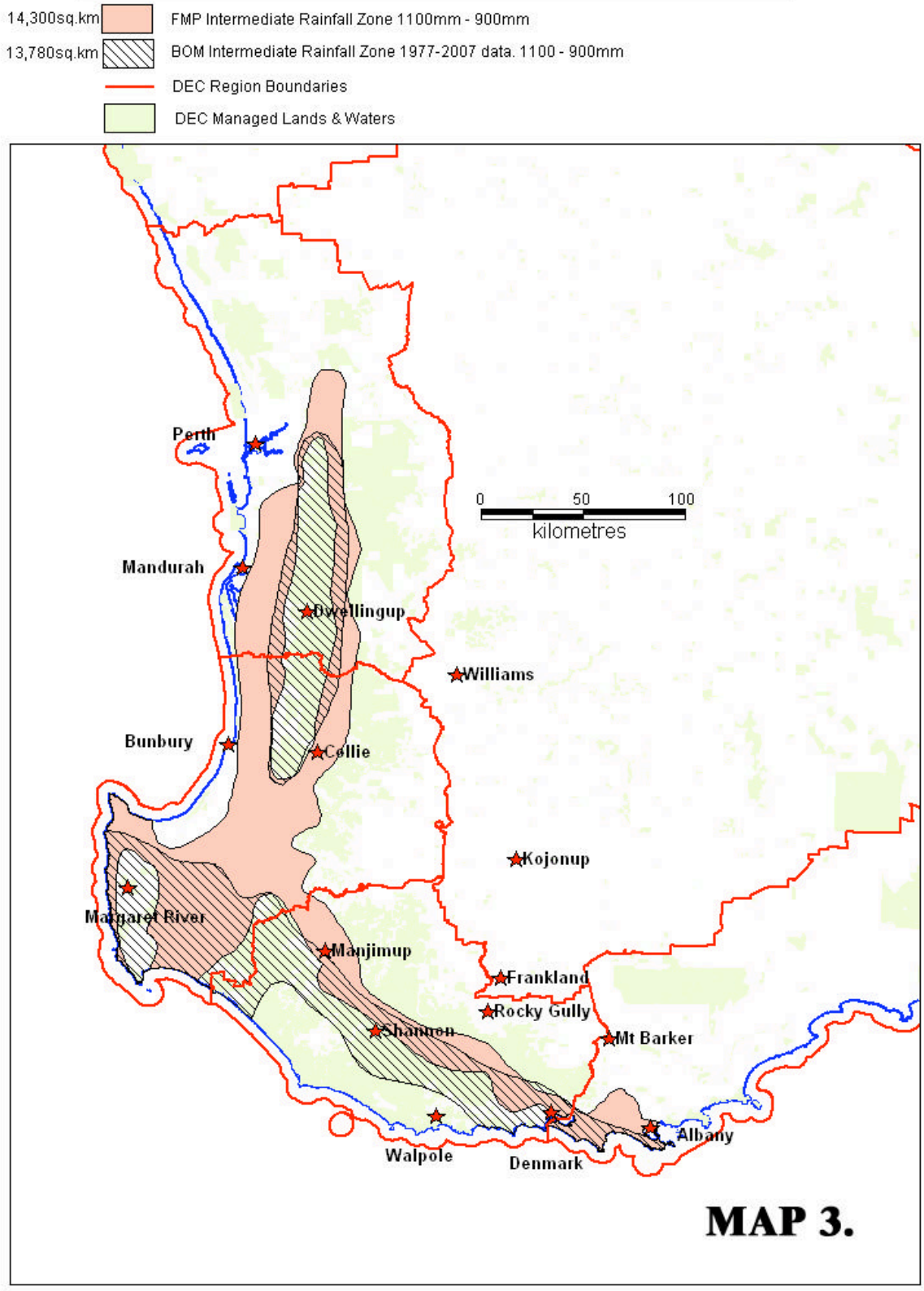
RECOMMENDATIONS

- The Conservation Commission require the Department of Environment and Conservation and the Forest Products Commission to as a matter of urgency immediately develop new silviculture specifications and sustainable forest management guidelines that reflect the actual location of Rainfall Zones identified by the mapping in this submission (Maps 1. – 5.).
- The Conservation Commission instruct the Department of Environment and Conservation and the Forest Products Commission to phase out by 2013 all industrial scale logging in Jarrah Forest within the Low Rainfall Zone as identified by the mapping in this submission (Maps 1. – 5.).
- The Conservation Commission instruct the Department of Environment and Conservation and the Forest Products Commission to immediately cease logging within all Jarrah Forest mapped as Eastern Jarrah Forest by Sustainable Forest Management Guideline No. 1. 2004 (Department of Environment and Conservation, 2004. Silvicultural Practice in the Jarrah Forest, SFM Guideline No. 1. 2004.)
- The Conservation Commission instruct the Department of Environment and Conservation and the Forest Products Commission to immediately cease logging within all Karri Forest within the Low Rainfall Zone as identified by the mapping in this submission (Map 4. Map 5.).
- The Conservation Commission instruct the Department of Environment and Conservation and the Forest Products Commission to phase out by 2013 all industrial scale logging in Karri Forest within areas receiving 1,000mm or less annual rainfall as identified by data for annual rainfall 1977-2007 and Department of Food and Agriculture mapping (BOM; Appendix 1. of this submission).

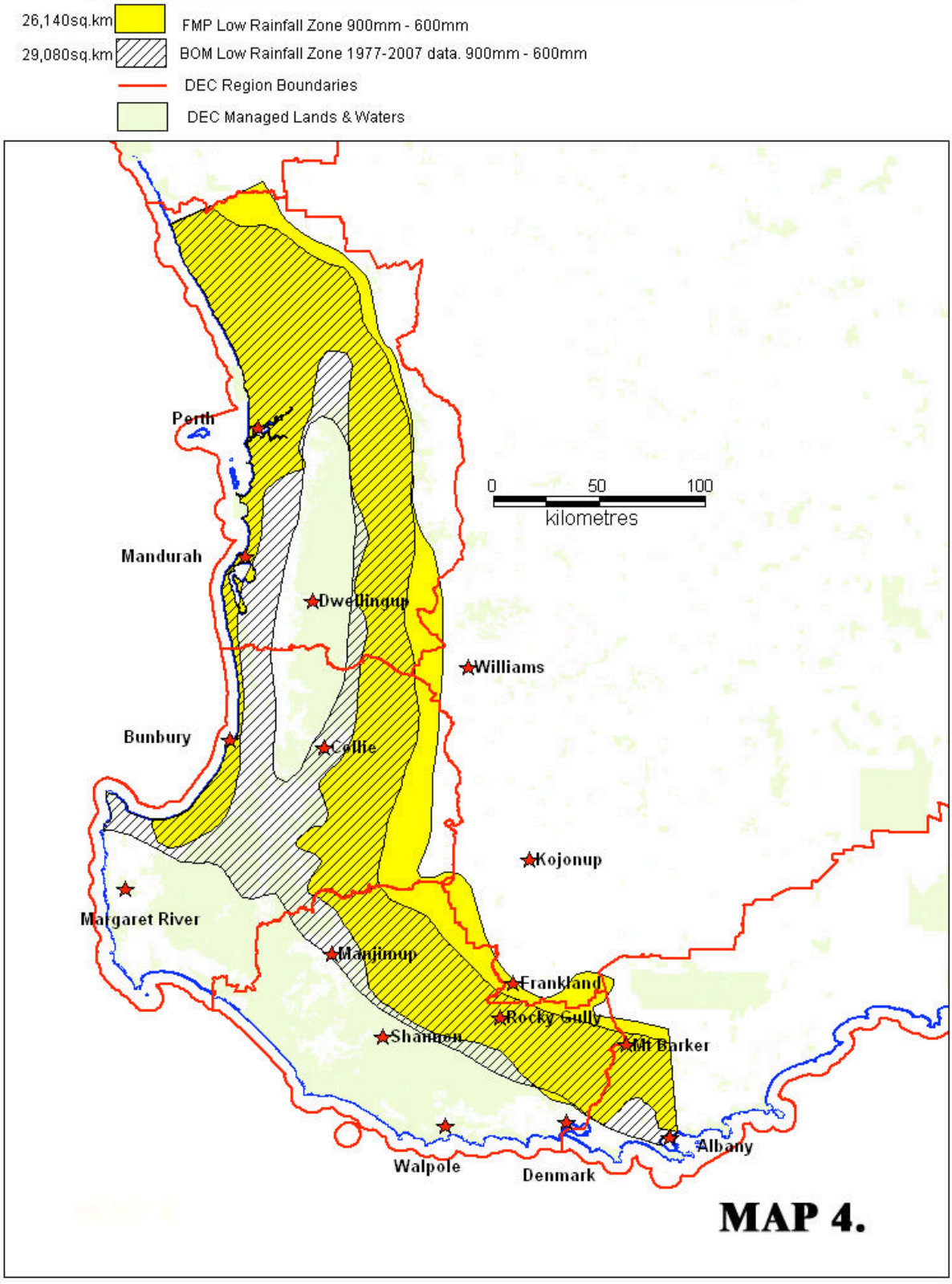
Comparison FMP Rainfall Zones with actual of past 30 years



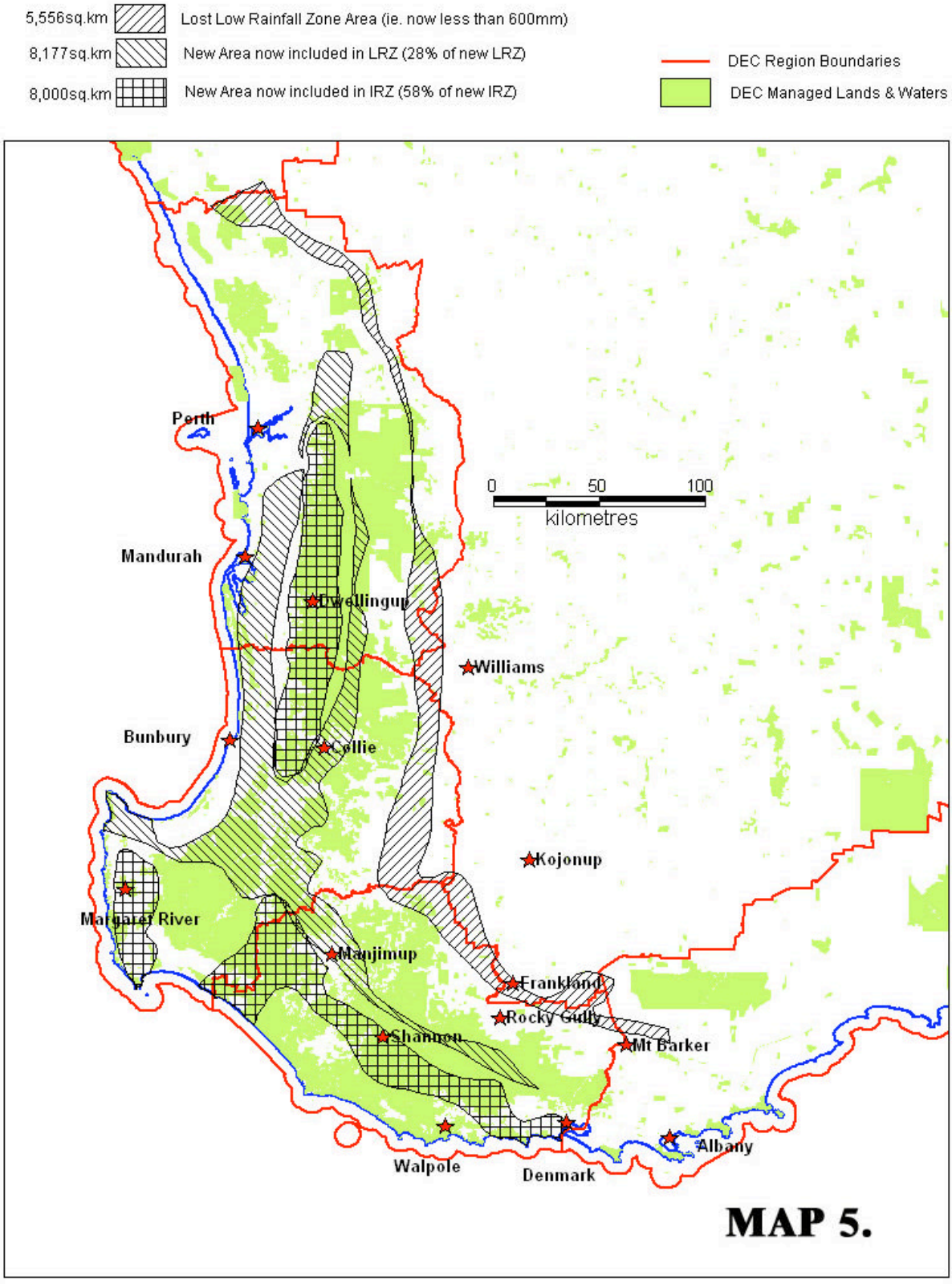
Comparison FMP Rainfall Zones with actual of past 30 years



Comparison FMP Rainfall Zones with actual of past 30 years



Changed Locations of Rainfall Zones Based On BOM data 1977-2007



PART 2. RAINFALL SEASONAL DISTRIBUTION

In their Audit response to 'Objective 23. Enhanced greenhouse effect', the Department and FPC make the following statements regarding Action 23.1:

One of the key initiatives that the Forest Products Commission and the Department are involved in at the national level include the National Climate Change Action Plan for Forestry which is being developed under the National Climate Change Adaptation Framework endorsed by the Council of Australian Governments.

and

The Forest Products Commission chairs the Forests and Climate Change Committee which is progressing the Action Plan.

and

The Department is a full member of the Indian Ocean Climate Initiative (IOCI) and a member of the IOCI Panel Executive. As a member of the IOCI Panel, the Department is working to generate better climate change information and scenarios for forest and other ecosystems, and land management planning.

and

Potential impacts of the projected changes to climate on Western Australia's forest ecosystems will be investigated as part of the Department of Environment and Conservation – South African National Biodiversity Institute collaborative bioclimatic research project.

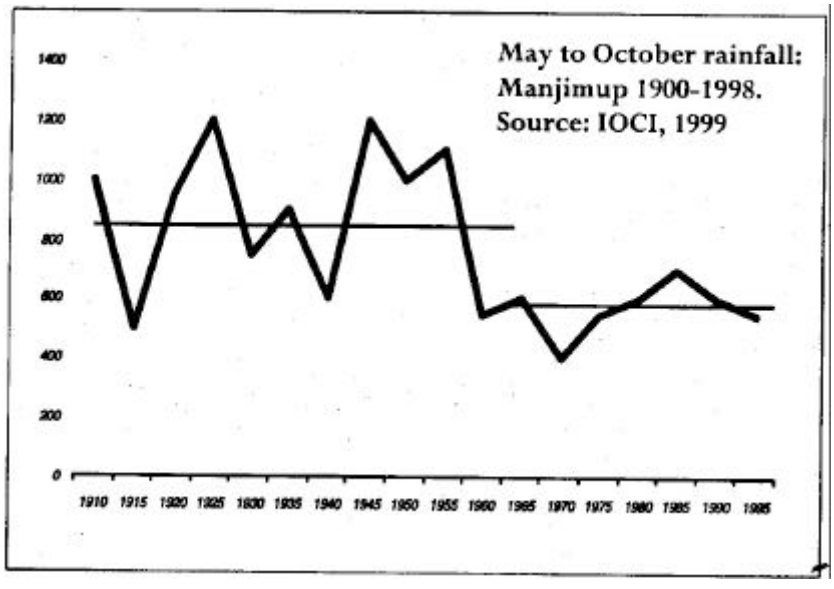
and

Re-measurement of forest inventory plots is continuing to monitor the change in timber volume and the growth of trees. Initial analysis of the data collected to date, although based on a limited number of plots, has not detected any short-term anomalies in growth rates. This work is ongoing.

All the above has the smell of 'Fiddling while Rome Burns'.

Loh & King 1978 (p. 22) concluded "*the annual rainfall is dominated by reliable winter rainfall between May and October.*" A reasonable conclusion at the time, but is this now out of date information still informing current forest management? It would appear that it is. More than adequate evidence has been available for many years that major changes are occurring and have occurred over the last 30 to 40 years.

The Western Australian Government established the Indian Ocean Climate Initiative (IOCI) in 1998 because of the then known changes in climate in the south west. In 1999 the IOCI published various reports and even then the sharply declining winter rainfall in the south west was clear.



Further, in June 2004 the IOCI published the following extracted from its 'Notes on changed climate in Western Australia – number 2'. This shows that the 500mm winter rainfall isohyet of south west WA, which was centred on the south west tall forests, has moved west by >100km and virtually disappeared.

• Notes on Changed Climate in Western Australia- *Number 2* **Indian Ocean Climate Initiative** June 21, 2004

Changes Across the Region

The total rainfall for May – July is shown by isohyets (lines of equal rainfall amount) in Figure 3. The south west coast receives the largest amount of rainfall, while it is drier inland and to the north. The westward shift in the isohyets in the later period is striking.

Figure 4 shows the percentage change in May - July rainfall from the earlier to later periods across the region. Areas in red indicate a decline in rainfall since 1975, while areas in blue indicate an increase in rainfall. The percentage change is less meaningful in regions where the total rainfall is low.

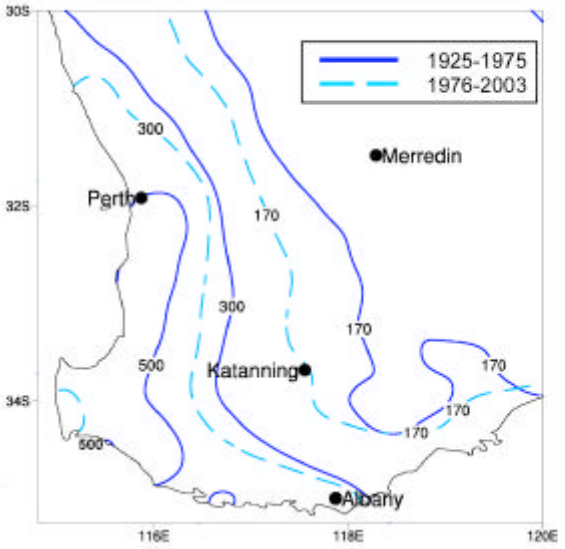
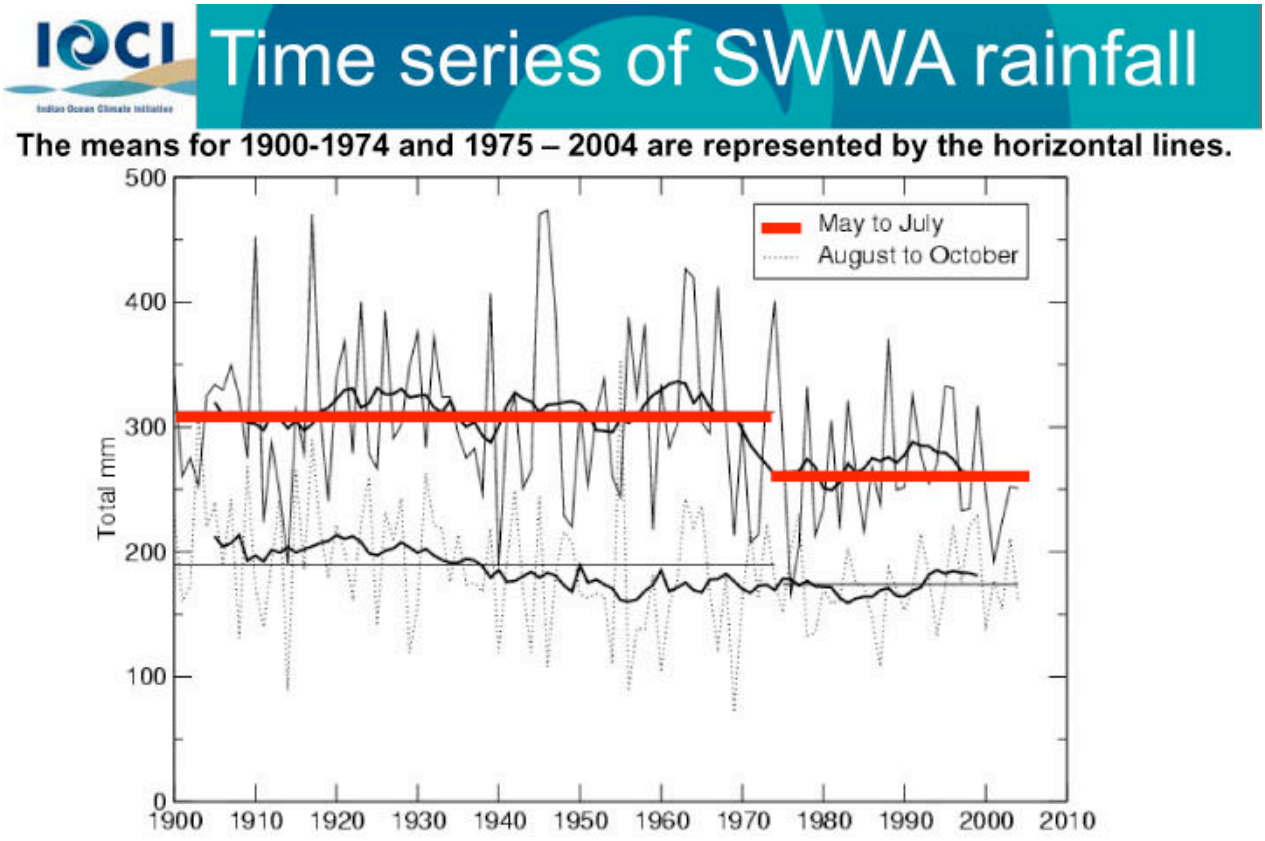


Figure 3 Isohyets of May-July rainfall totals in mm

Isohyets are lines of equal rainfall amount

More recently, these dramatic changes have further been documented by presentations at the Greenhouse 2009 Conference, Perth March 2009.



The solid trace represents early winter (May to July) totals, while the dotted trace represents August to October totals.

ABOVE FROM. *Seasonal and Decadal shifts in weather systems affecting WA*, Jorgen Frederiksen, Carsten Frederiksen, Stacey Osbrough. CSIRO Marine and Atmospheric Research and Bureau of Meteorology, Greenhouse 2009, 25 March 2009

	1969-1999	2000-2007
Far south-west Wilgarrup (Manjimup)	-25%	-44%
Wheat belt Nyerilup (Mt Madden, Doongin Peak)	-14%	-35%
South coast Peppermint Grove	+7%	-15%
Inland Bulong (near Kalgoorlie)	+22%	-42%

ABOVE FROM. Pandora Hope. IOCI, *Historical, Recent and Projected Rainfall Trends in Western Australia*, Greenhouse 2009, 25 March 2009

PART 2.

CONCLUSIONS and OBSERVATIONS

On page 93 of the Audit Report it is stated *The Department is a full member of the Indian Ocean Climate Initiative (IOCI) and a member of the IOCI Panel Executive. As a member of the IOCI Panel, the Department is working to generate better climate change information and scenarios for forest and other ecosystems, and land management planning.*

- Surely, with the Department a full member of the Indian Ocean Climate Initiative (IOCI) and a member of the IOCI Panel Executive, acknowledgement and on ground actions would have been canvassed by the Department in its Audit response.
- Further, the Department and the Forest Products Commission fail to canvass the impacts of severely reduced winter rainfall and increased summer rainfall events, all documented by the IOCI (examples shown above), on changes required for regeneration methods, logging prescriptions, application of fire and hygiene to prevent further spread of Phytophthora Dieback

In their Audit response the Department states

Re-measurement of forest inventory plots is continuing to monitor the change in timber volume and the growth of trees. Initial analysis of the data collected to date, although based on a limited number of plots, has not detected any short-term anomalies in growth rates. This work is ongoing

The Commission states (page 9 Audit Report) "*The Conservation Commission remains concerned with performance in the areas of regeneration, regrowth and thinning schedules and advises that it will consider undertaking future specific performance assessments during the remainder of the plan's duration.*" and

"*The Conservation Commission acknowledges that the current FMP has already incorporated climate change ..... the Department's calculation of sustained yield for the present plan took climate change into account by assuming no further growth on standing crop trees, and by incorporating the effects of declining rainfall up to the then present time when determining future growth*".

We question the veracity of the Department's reassurances given:

- The limited number of plots measured;
- The need to blindly accept or trust the sustained yield modelling process;
- The old out date databases used in the modelling process;
- The belief that predictions based on past observations are now valid into the future;
- The continuing assumption that *sustained yield for the present plan took climate change into account by assuming no further growth on standing crop trees* was based on data with integrity;
- The assumption that regeneration is/has been timely and successful;
- The apparent failure to make allowance for major changes in climate over the last >30 years.
- The assumption that regeneration has been and continues to be successful in for example the eastern areas of the jarrah forest or the north eastern areas of the karri forest.
- Further, the Department states on page 19. in the recently released 'Supplemental advice to the Conservation Commission concerning the causes for the higher levels of karri other bole volume production during 2004-2007'.

"First thinning operations in regrowth jarrah were nominally scheduled to commence in 2006 in stands in the Warren Region that had been regenerated between 1974 and 1984. A program of approximately 450 hectares per annum was provisionally scheduled, based on broad site quality and stand age strata. To October 2008, thinning in these stands has not commenced. Preliminary field inspection of some of the scheduled stands has indicated that refinement of the site stratification will be necessary to reschedule many areas, as they are not yet ready for thinning due to variable stocking and slower growth rates."

- This is a clear 'tip of the iceberg' indication of unsuccessful regeneration and below forecast growth rates all of which are embedded in the sustainable yield modelling and calculations.
- Despite widespread documentation, no mention or acknowledgement of the impacts of declining water tables in the south west forests is made in the Audit report.

RECOMMENDATIONS:

- In light of climate changes impact on Rainfall Seasonal Distribution the Conservation Commission require the Department of Environment and Conservation and the Forest Products Commission to as a matter of urgency immediately develop new silviculture specifications and sustainable forest management guidelines that reflect changes required for:
    1. Regeneration methods;
    2. Logging prescriptions;
    3. Application of fire, and;
    4. Hygiene to prevent further spread of Phytophthora Dieback
- In light of climate changes impacts on Rainfall Seasonal Distribution the Conservation Commission immediately initiate specific performance assessments of regeneration and regrowth and thinning schedules.
- In light of climate changes impact on Rainfall Seasonal Distribution and Annual Rainfall the Conservation Commission immediately initiate an assessment of forest inventory plots in relation to their location and suitability given the significant changes that have occurred.
- The Conservation Commission require the Department of Environment and Conservation to provide and publish a comprehensive report on the forest inventory plots detailing data recorded since their establishment and including mapping showing their location.
- The Conservation Commission require the Department of Environment and Conservation to provide a review of the impacts of declining water tables within the forest estate in relation to:
    1. Regeneration of logged areas;
    2. Impact of regenerating forest on water tables within all adjoining unlogged forest whether within State Forest category or conservation estate category.

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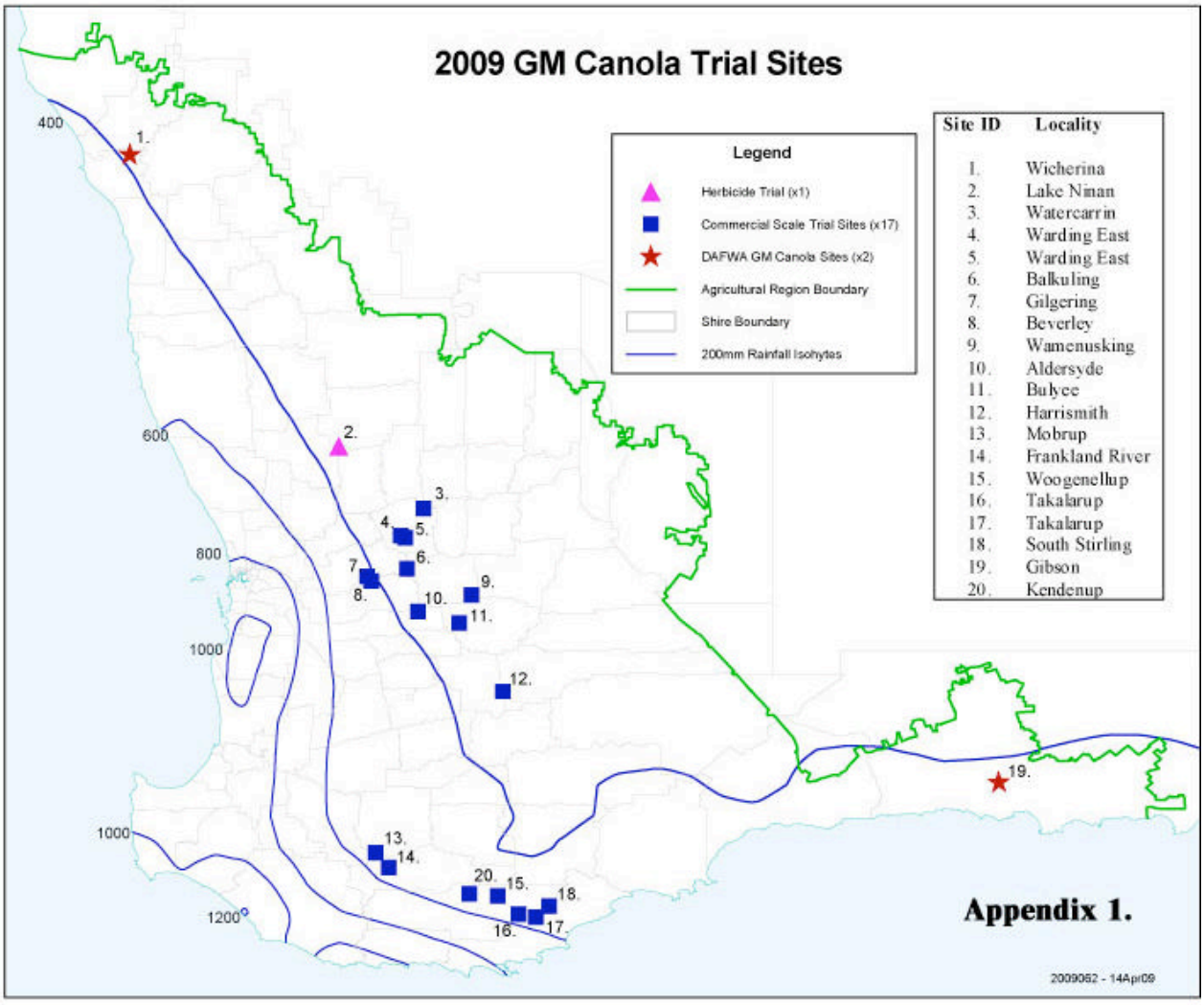
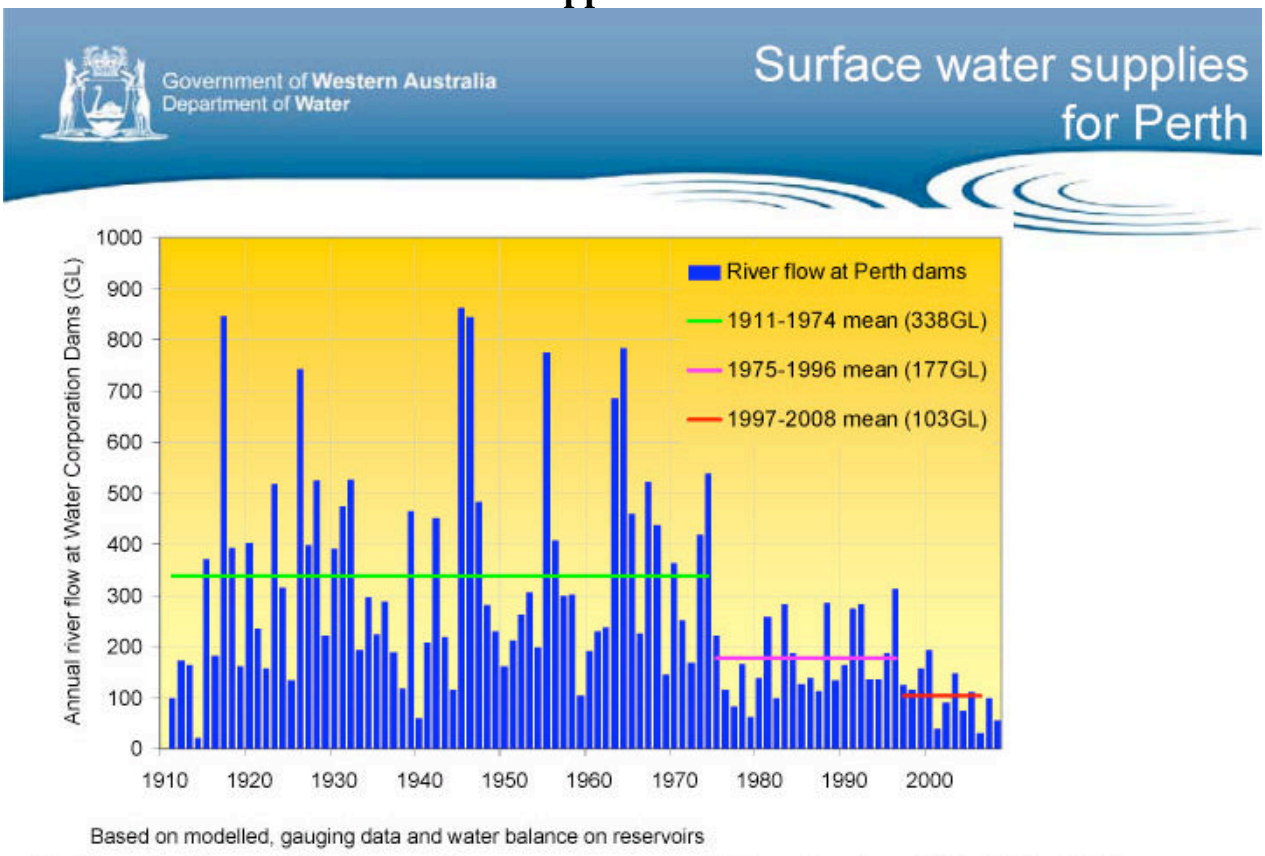
Appendix 1.


2009 GM Canola Trial Sites
Legend
Herbicide Trial (x1)
Commercial Scale Trial Sites (x17)
DAFWA GM Canola Sites (x2)
Agricultural Region Boundary
Shire Boundary
200mm Rainfall Isohytes
Site ID Locality
1. Wicherina
2. Lake Ninan
3. Watercarrin
4. Warding East
5. Warding East
6. Balkuling
7. Gilgering
8. Beverley
9. Wamenusking
10. Aldersyde
11. Bulyee
12. Harrismith
13. Mobrup
14. Frankland River
15. Woogenellup
16. Takalarup
17. Takalarup
18. South Stirling
19. Gibson
20. Kendenup
400
600
800
1000
1000
1200
Appendix 1.
2009062 - 14Apr09

Appendix 2.



Appendix 2.