Outcomes of the 1993 Fire Weather Conference

Reporting notes taken by Rick McRae.

The conference was held at the Craigieburn Conference Centre in Bowral from May 2 to May 7, 1993. It was attended by roughly 35 meteorologists and 10 fire agencies representatives. The five-day agenda covered a range of issues relevant to fire weather.

Highlights of the agenda are discussed below, followed a review of significant outcomes.

Highlights

Conference opening

Cold front reconnaissance report

The programme flying a specially outfitted aircraft into cold fronts as they approach the SE of Australia over the Bight has been running for some time now. Much useful experimental data were obtained. Its operational effectiveness was discussed. Two views were held: (1) Maintain the program on a limited, more cost-effective basis for the really "blow-up" days; (2) Scrap the program altogether. The latter appears most likely, pending review of operating costs.

As a result of the program, much more is now known about the behaviour of maritime cold-fronts, including the role of meso-scale lows that develop in unexpected places.

Communications in the computer age.

It became apparent that the Mets have only just begun to learn effective communications with their clients. The best example was the style of fire weather forecasting in Victoria, which went from highly technical in style in '91 to an almost colloquial style today. Neither are appropriate, and the Met needs to follow the learning curve a little longer before a good product emerges.

The ADMIN system available from AEMI was discussed and seen as useful.

It is relevant that the BoM has not been involved in the AEMI workshop "information management in disaster response"

Smoke dispersion in WA.

A case study of extreme air pollution over Perth caused by the interaction of burn-off smoke and weather patterns was reviewed.

It was agreed that smoke management would be a key area of Bureau client interaction.

Aerosonde.

The aerosonde project was described - a lightweight pilotless aircraft (3m wingspan, 12 kg fuelled weight, 45,000 foot ceiling, 10,000 km 5 days endurance) using GPS for navigation and satellite communications. A number of further years of research and development are needed. The benefits from improved forecasting worldwide from this project are enormous.

Ageostrophic flow around cold fronts.

It was made entirely clear that the mathematics of modelling winds that do not follow pressure gradients are extremely complicated. Hidden amongst the mathematics were some important lessons about what occurs around the 3-dimensional structure of a cold-front. The less commonly understood winds (from the fire perspective) are the ones that may cause the most unexpectedly severe fire behaviour.

Meso-scale modelling.

Recent advances in the software used to model weather systems on a ten-kilometer grid have allowed detailed local-area modelling. This will be available across the Bureau, and will allow improved understanding of various local phenomena.

The Haines Index.

The US National Weather Service claims value from an index that combines ground to middle level stability and dewpoint depression. The index allows the distinction to be made between wind-driven fires and convection-driven fires. High values of this index, the Haines index or the Lower Atmosphere Stability Index - LASI, can explain why some fires grow larger than others, all other factors being equal. It was agrees that the Index be made available to fire managers over the next two years for evaluation purposes.

Outposting.

The outposting service developed in Victoria has now shown its value and is to be considered by other Regions of the Bureau.

Update of the Grassland FDI models.

A review of progress on developing new grassland fire danger models was presented by Phil Cheney. Key points discussed were:

- The Bureau says that the fire agencies could give better advice on curing levels.
- The new models don't work well for non-uniform curing - as this leads to non-uniform fire spread. At 100% curing this problem disappears.
- There is a need to separate out modelling for fire spread from fire danger.
- There is a general consensus on using the McArthur Mark 4 Grassland Fire Danger Meter for FDI work.

Forecasting for fuel reduction burning.

Rick Sneeuwjagt from CALM WA gave a talk on their needs for forecasting for fuel reduction burning purposes and how they have opted to use the services of Oceanroutes on a contract basis for this. Details of the contractual performance agreements and verification procedures were presented.

Fuel assessment using remote sensing.

A climatology of severe weather events in SW WA.

Personal notes taken by Rick McRae

SOAPBOX

⊛ Demarcation lines -
between fire authorities at state borders
between Met Regions / HQ sections.

Case Study (1)

⊛ Natural phenomena don't recognise such borders.
eg Extreme grass fuel loads throughout
SE Australia — "a slow disaster"
large fires and/or plagues.

Case study (2)

⊛ Some [redacted] large infrastructure items [redacted] are too expensive / complex for one agency to [redacted] run.
eg lightning detection???

⊛ Implication is that, on a multi-agency, multi-jurisdictional basis, we must learn to share resources to a higher degree than at present. Models:
(i) Informal cross-regional liaison
(ii) Pooled resources --- involved agencies
(iii) Formal cooperation AAFFA / BoM.
(iv) Informal interagency working groups/conference

Case Study (3)

⊛ Satellite image map consortium in SE NSW Region
* pooled - digital data
- satellite image purchasing
- tourist map production
- budget management income/expenditure

NSW Shires / NSW DBFS / ACT RFS / AUSLIG (federal)

Severe Met Matters

ACTION

* Check if ACTES is developing action statements to go on Severe Weather/Storm Warnings

NSW { Short-term goal: STS Warning for Sydney area.
      Long " " " : Routine forecasts for whole state + SES message.

Recent BoM workshops & public + AEMI workshop soon on action statements/sociological statements.

National Natural Hazards GIS
- BoM, Aust Geol Survey Org, NRIC
- Federal project.
- pilot – earthquakes, cyclones.

Increasing profile – joint efforts BoM, agencies. ACTION

[Cheney] bub agreement in general, to standardize on Mk4 G

Check & Geoff re ADMIN – ARNET – McIDAS link!
? Get dial up access.

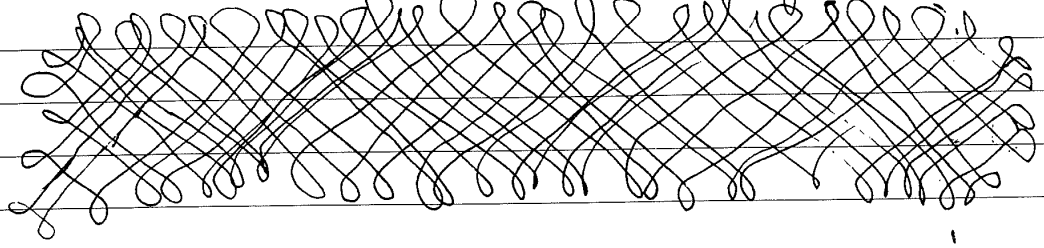
AVHRR

* ch 3-4 adjust by 0.25 pixels } sensor misalignment.
  ch 3-5 adjust by 0.15 pixels } East-west
* McIDAS area 5991
* Able to detect on-going fires by locating extremes on Channel 3... or rather of [3-4]
* CSIRO Tas has an AVHRR archive.

NDVI on Met Computer (McIDAS).

Bureau wants to buy lightning detection system, capital cost shared with users on a consortium basis.

Haines Index to be made available for evaluation.



INFO SHARING

→ Distribution of NSW Fire Weather Course Note

TION → Any comments welcome.

Next Conference

1) Outcomes from '93
2) Review in 1 yr.
3) Wish list to Region a few months before '95 conference.
4) Less Met Technical waffle

} measuring performance allows credibility

Interaction between weather and bushfires (Packham)

conservation of momentum
moisture
heat
mass

Training of Fire Weather Mets.
* Key specialists / Practitioners / Basic level
* Each level different training
  training - Fire Auth courses?
  - ICS
  - visit fire ground!

ACTION

Circulate examples of Fire Weather products ACTION

Phil Cheney:

Seperate FDI equations (eg Mk4 & 5) (uncoTOBANS).
from ROS equations (eg new NBRU model).

NBRU doesn't cover effects of curing less than 100%
because heterogeneous curing ⇒ hetero spread
& thus can't derive a meaningful estimate.

Discussion on how to give regional curing estimates
Met says fireies don't give good advice.

Sneewgagb.

CALM met contract with Oceanrooks re weather for ~~AREA~~ Verification parameters defined. If predictions within limits a certain percent of days - base payment
better than bonus
poorer than penalty
eg 3 test stations, $4K/per month ~~per station~~,
penalty = $1000, bonus ? $1200, percent hits target c. 75-80%

Prescriptions: (25 0000 ha/annum) ... fairly standard but need 80% coverage, and need stable air (even an inversion) to proceed.

Fire Met Training
(Casinader)

Needs for fire weather forecaster
* Commitment to user down core
* Good comms ability
* Know fire weather for region
* " meso-scale fire weather processes
* " tech systems

Qs
- Who should do the training?
- Should mets be trained on fire behaviour?
- Prior experience before training?
- Assessible / accreditable?
- Case studies for training?

Future of FDIs. (Packham)

* Who are clients? (eg Ambulance go to higher standby!)
* FRBs
* Public warnings (- too much reliance on actual FDI)
* What does Met warn for?
* "AIs" - lots of meso-scale models
  - various fire models
  - new models - new Rothermel Haines
  - activity level models

* yet another Index (Don Latham)

⊗ Aerosonde

- funding base of Tropical cyclone work.

WISH LIST:

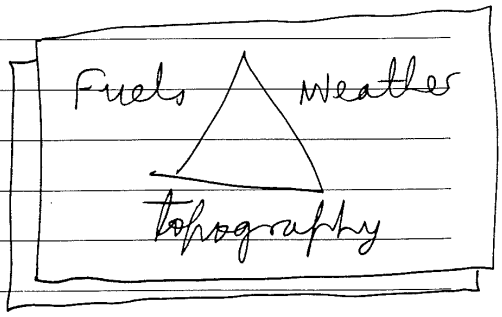
- 3 m wingspan; (1kg fuel) 1kg; 10 000 km 3-5 days
- GPS Nav, Satellite comms, 45 000' ceiling
- Autonomous ops.

lots of engine R&D needed years, more

Rick Ochoa

Haines Index
(Lower Atmosphere Stability Index - LASI)
Stability & dryness.

Get copies of papers!



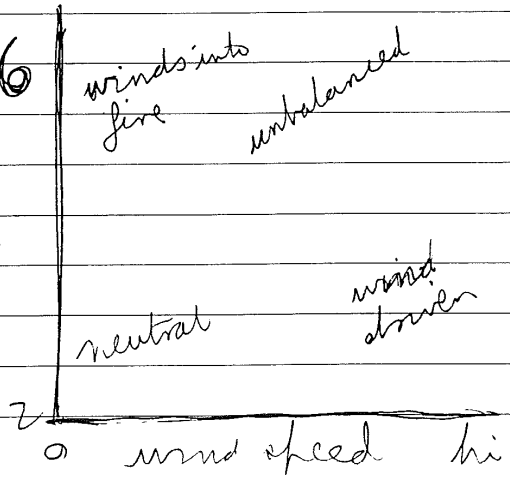
HI	% days	% Area burnt	area burnt
6	5%	45	
5	22	44	exponential
4	28	5	increase.
2,3	45	6	

Use Water Vapour Imagery to backup radiosonde data to map HI.

HI can be as a good index of dry lightning cool moist upper air, hot dry lower air gives dry based storms.

High HI ⇒ more spotting, larger convection.

Useful in distribution between wind & convection driven fires



9.00

(Andrew Watson) SA

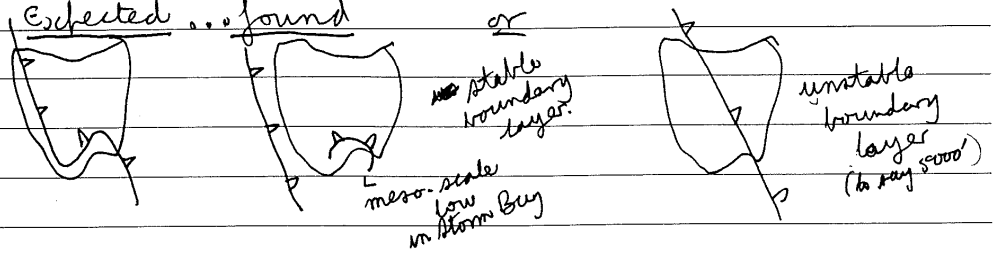
⊛ Cold Front Recon (John Bally) TAS

- used to use RAAF - only under dire circumstances
- needed a standby call beforehand.
- little ops benefits — lots of research benefits
- best for "west coast" fires - little lead time.

10.00

11.00

Expected ... found or



12.00

⊛ Comms & clients in computer age John Main (MO)

INFO MODEL

- ADMIN (AEMI)

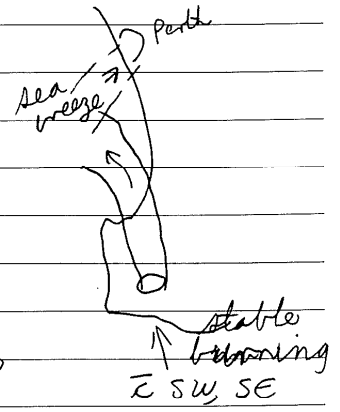
ADMIN → Mgmnt & Training
Mitigation
Disaster
Response
Recovery

- Enhanced forecast data presentation in Vic (flow on from '91)
BUT gone too far from coding to almost colloquial briefings - just as ambiguous!
Pro forma for requesting Aprob forecasts.

Smoke Dispersion

Rick Snigtrach.

- In WA: rule of thumb
  "Max burn area = distance from Perth × 20!"
  [≡ Burn diameter ∝ (distance)$^{\frac{1}{2}}$]



- BofM developing meso-scale particle drift model, on 10km grid, tying in sea-breezes.

- 22-3 Oct, '92 ... worst air pollution for Perth, from burn-offs.