

# Bushfire Ignition in Victoria

An adventure in wrangling spatial data

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## The Inspiration



# The Fire Danger Rating System

The McArthur Forest Fire Danger Index:

$$F = 2.0 \exp(-0.450 + 0.987 \ln(D) - 0.0345H + 0.0338T + 0.1)$$

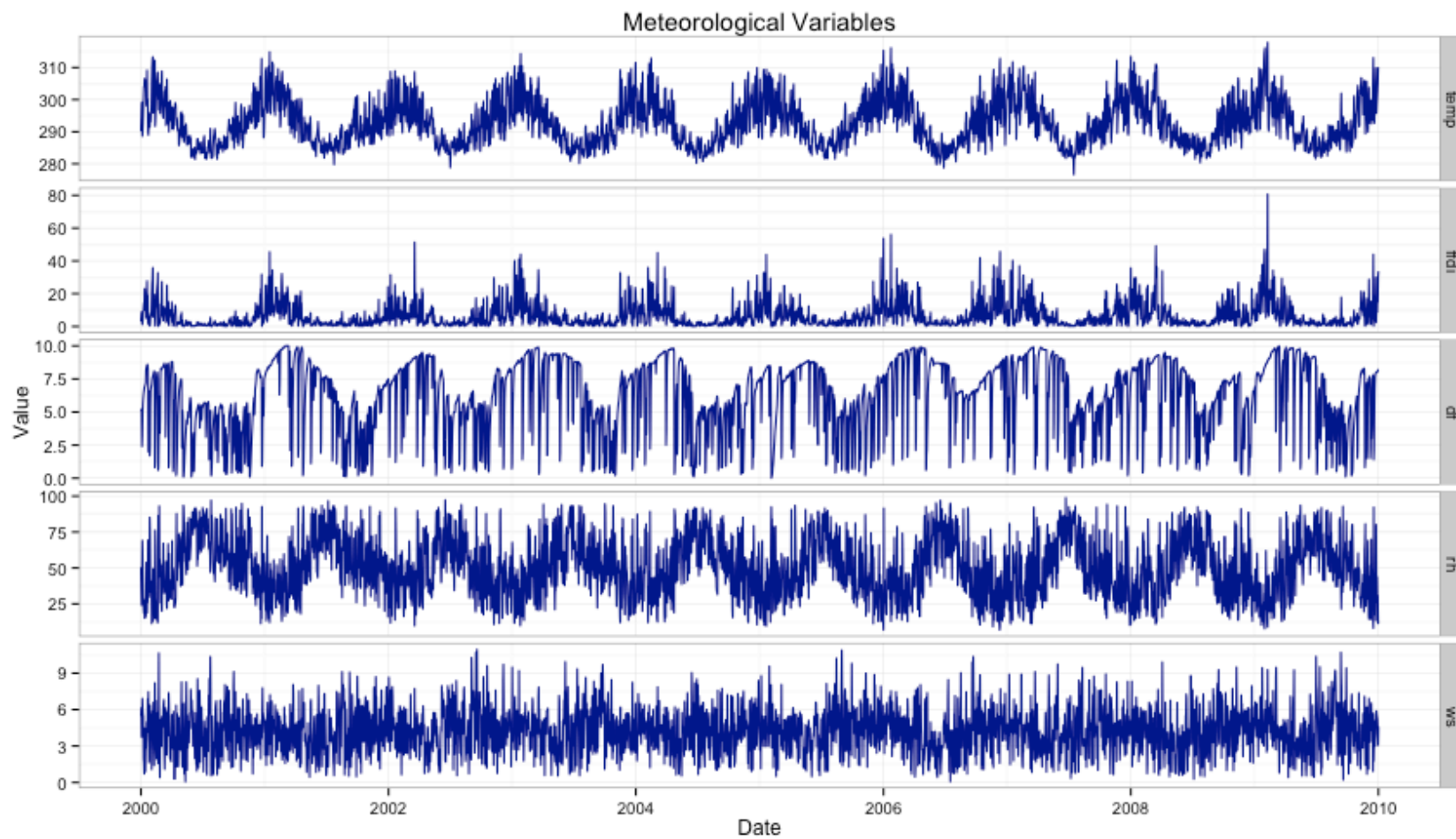


## WRF Model Data in NetCDF Format

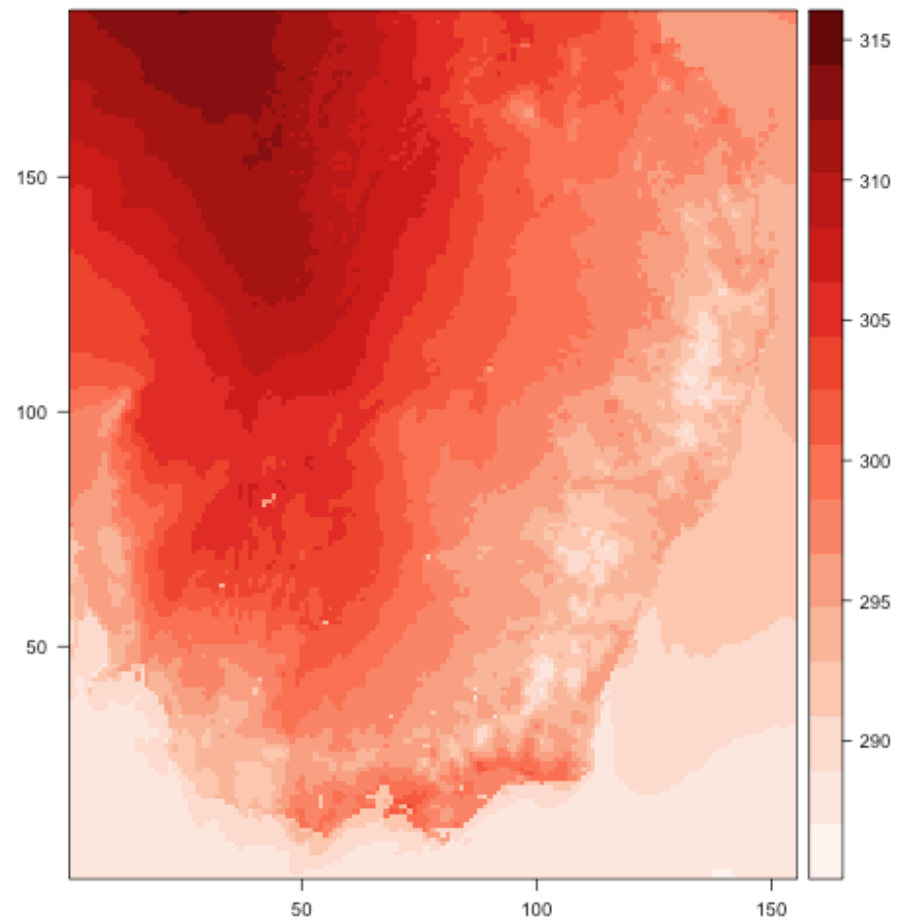
```
library(ncdf)
temp.nc <- open.ncdf("./tmax_subset.nc")
temp.nc
```

```
## [1] "file ./tmax_subset.nc has 3 dimensions:"
## [1] "time      Size: 11"
## [1] "south_north  Size: 185"
## [1] "west_east    Size: 155"
## [1] "-----"
## [1] "file ./tmax_subset.nc has 3 variables:"
## [1] "float TMAX[west_east,south_north,time]  Longname:TMAX Missval:-999"
## [1] "float XLAT[west_east,south_north]  Longname:XLAT Missval:1e+30"
## [1] "float XLONG[west_east,south_north]  Longname:XLONG Missval:1e+30"
```

## WRF Data Time Series - Silvan



## WRF Model Temperature



## Shapefiles

```
## OGR data source with driver: ESRI Shapefile
## Source: "/Users/ellesaber/bushfire/data_raw/shps", layer: "STE11aAust"
## with 9 features
## It has 2 fields
```

## ABS Statistical Divisions

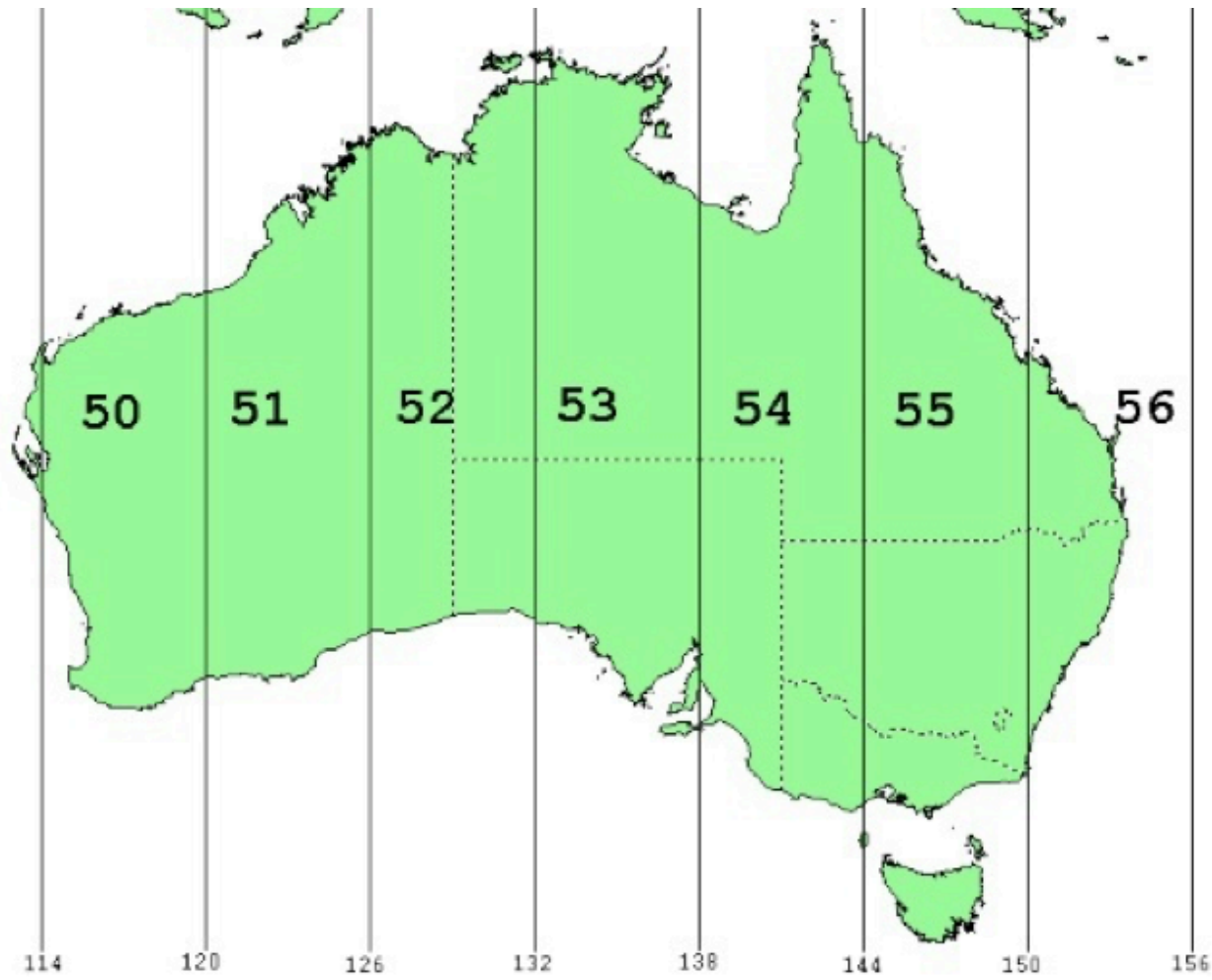
```
## OGR data source with driver: ESRI Shapefile  
## Source: "/Users/ellesaber/bushfire/data_raw/shps", layer: "SD11aAust"  
## with 61 features  
## It has 3 fields
```



## Fire & Incident Reporting Service

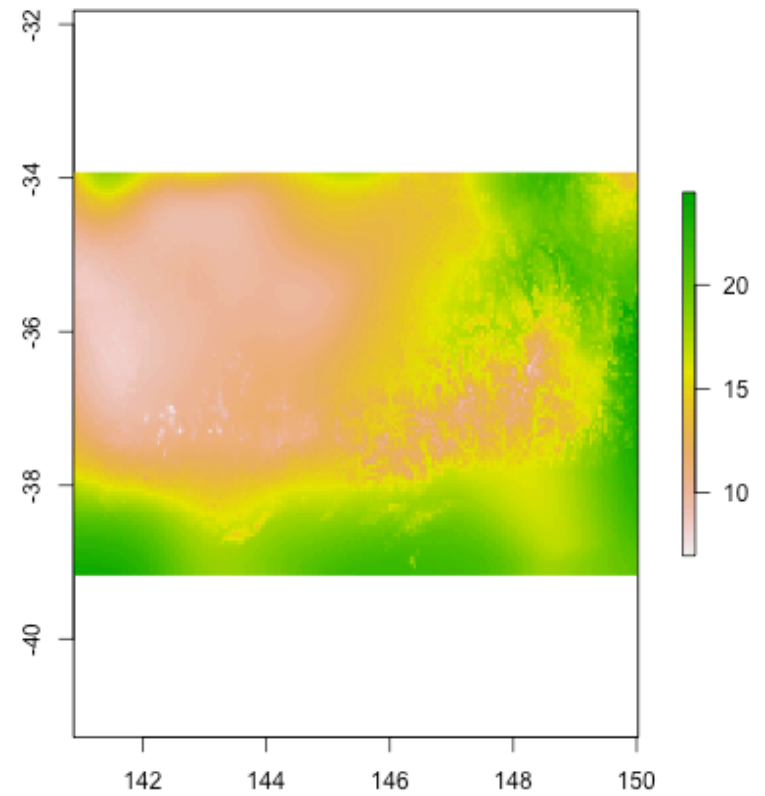
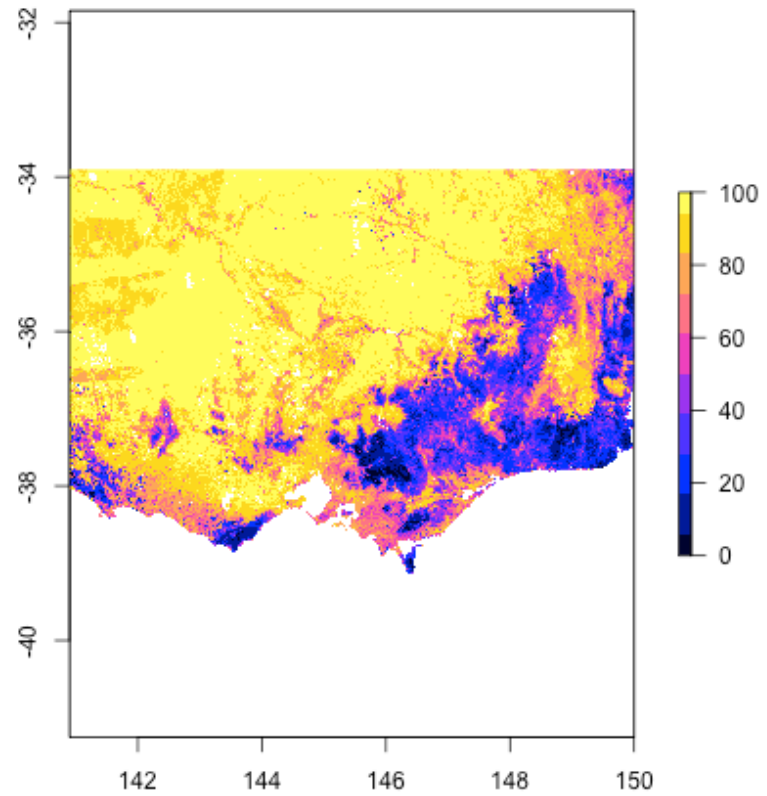
02/04/05 23:11:40	MELTON	182,474	MELTON SOUTH	Grass fire (more than one hectare)	55	286,745	5,825,070
02/04/05 22:15:51	TERANG	8,306,292	TERANG	Scrub or bush and grass mixture fire (more than o	54	666,657	5,765,670
02/04/05 20:09:00	CORIO	182,460	BELL PARK	Grass fire (more than one hectare)	55	267,181	5,780,087
02/04/05 18:48:41	CRANBOURNE	182,450	CRANBOURNE	Grass fire (more than one hectare)	55	348,117	5,783,408
02/04/05 13:29:31	ROWVILLE	182,421	LYSTERFIELD	Grass fire (more than one hectare)	55	351,621	5,799,809
02/04/05 13:27:00	SEBASTOPOL	5,608,928	SEBASTOPOL	Grass fire (more than one hectare)	54	750,421	5,833,977
02/04/05 12:57:42	LESLIE MANOR	8,306,248	LESLIE MANOR	Scrub or bush and grass mixture fire (more than o	54	704,255	5,782,355
02/04/05 09:09:22	FRANKSTON	182,396	FRANKSTON NORTH	Grass fire (more than one hectare)	55	337,848	5,778,794
01/04/05 19:44:17	DANDENONG	182,365	DANDENONG SOUTH	Grass fire (more than one hectare)	55	344,547	5,791,726
01/04/05 19:15:35	DANDENONG	182,359	DANDENONG SOUTH	Grass fire (more than one hectare)	55	344,545	5,790,898
01/04/05 15:19:49	FRANKSTON	182,336	FRANKSTON NORTH	Grass fire (more than one hectare)	55	337,614	5,778,831
01/04/05 14:39:20	CLONBINANE	8,306,196	BROADFORD	Scrub or bush and grass mixture fire (more than o	55	334,273	5,875,965
01/04/05 13:23:56	DUNOLLY	8,306,183	DUNOLLY	Grass fire (more than one hectare)	54	743,620	5,917,277
31/03/05 22:09:11	KINGLAKE DISTRICT /DEI	182,289	KINGLAKE	Scrub or bush and grass mixture fire (more than o	55	354,919	5,846,322
31/03/05 19:38:00	MILDURA	6,502,469	MILDURA	Grass fire (more than one hectare)	54	605,800	6,216,800

## Australian Map Grid Zones

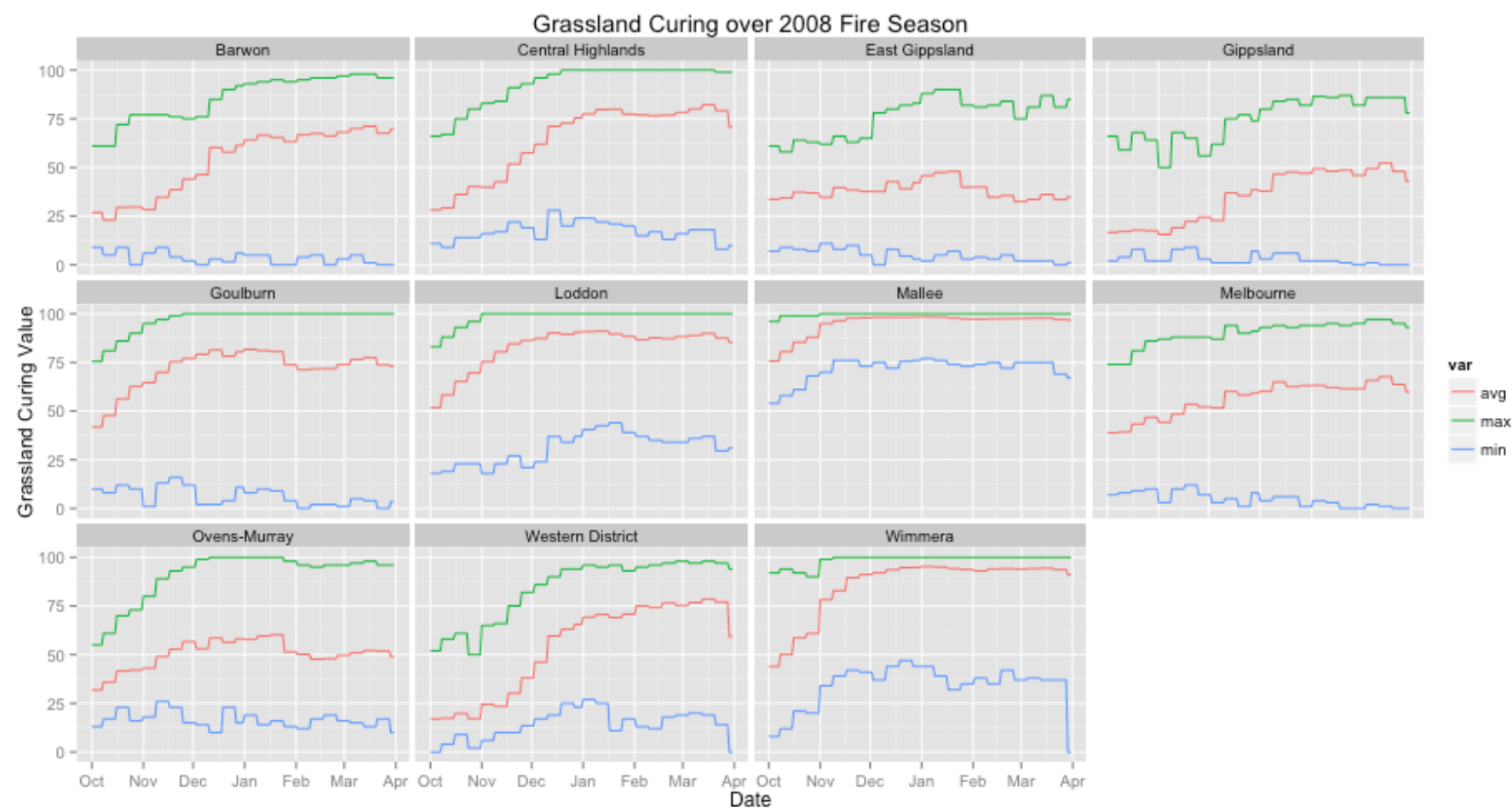


## Fire Map

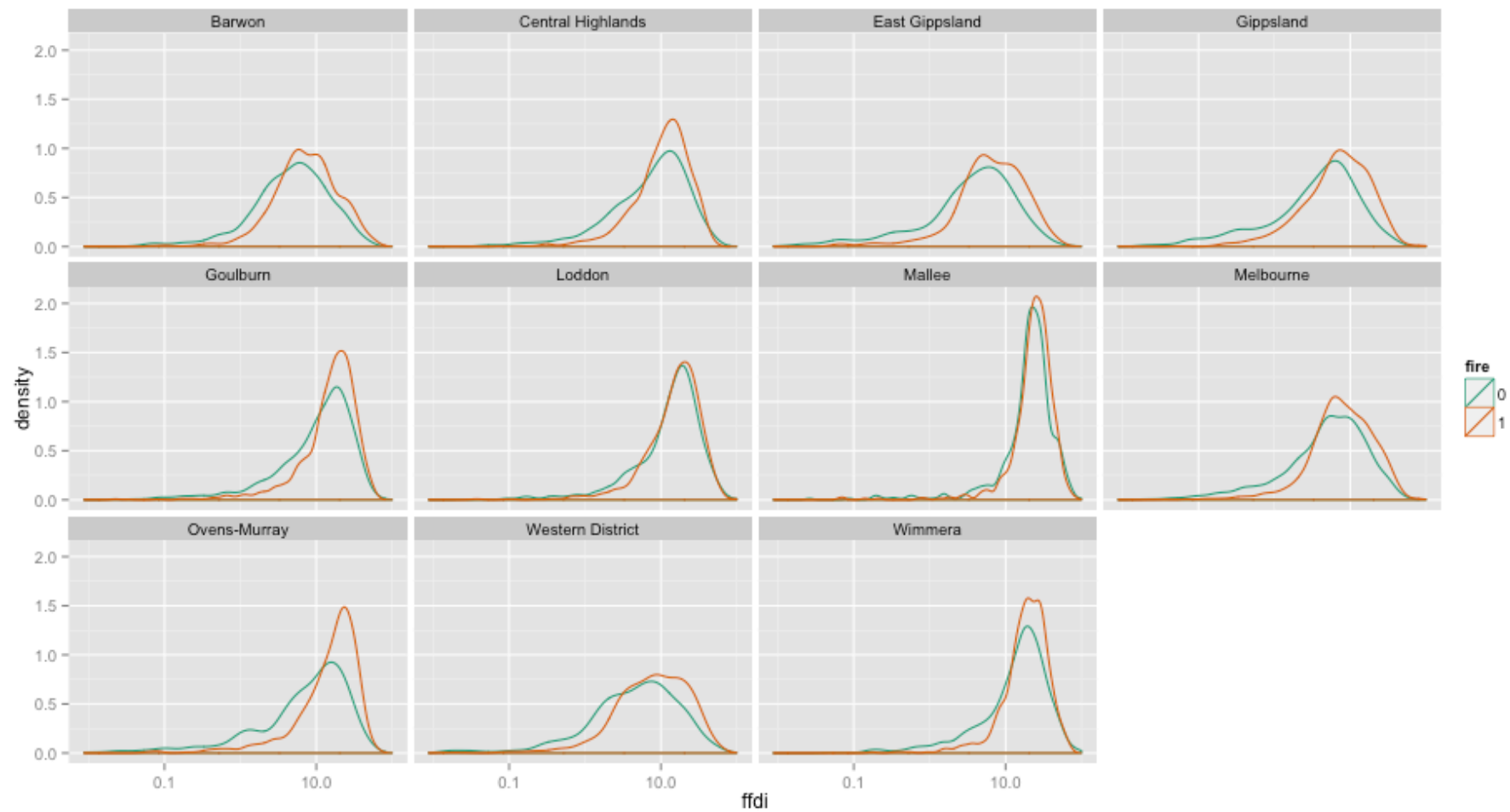
## Grassland Curing & Vapour Pressure



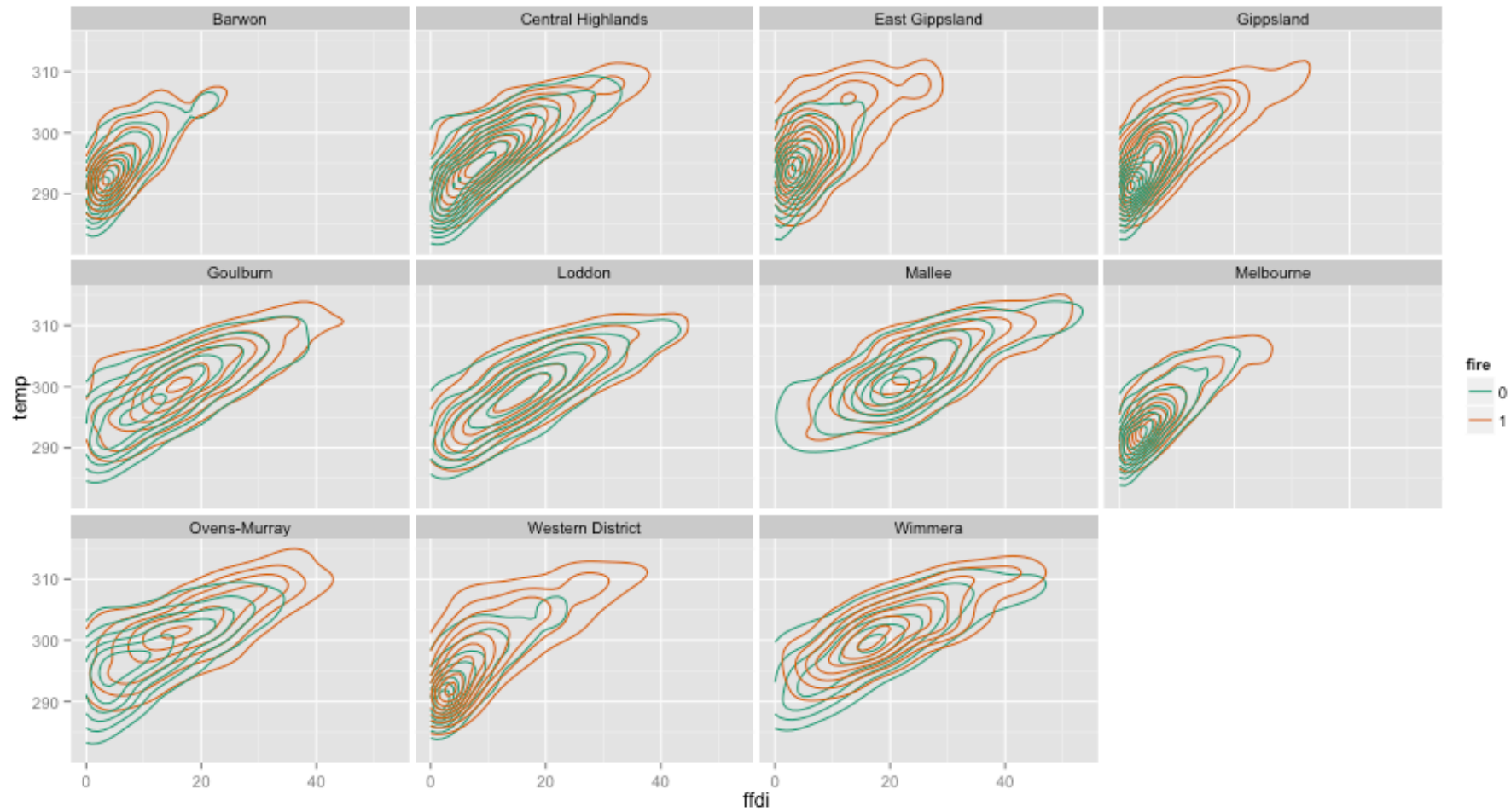
# Grassland Curing Evolution



## The Fire Danger Index and Fire Occurrence



# The Fire Danger Index and Temperature



# The Fire Danger Index and Grassland Curing

