bushfire&natural HAZARDSCRC

FROM HECTARES TO TAILOR-MADE SOLUTIONS FOR RISK MITIGATION

Systems to deliver effective prescribed burning across Australian ecosystems

Ross Bradstock, Hamish Clarke, Owen Price: Centre for Environmental Risk Management of Bushfires, University of Wollongong, NSW

Matthias Boer: Hawkesbury Institute, Western Sydney University

Trent Penman, Brett Cirulis: School of Ecosystem & Forest Science, University of Melbourne

Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Programme

University of Wollongong

THE UNIVERSITY OF MELBOURNE

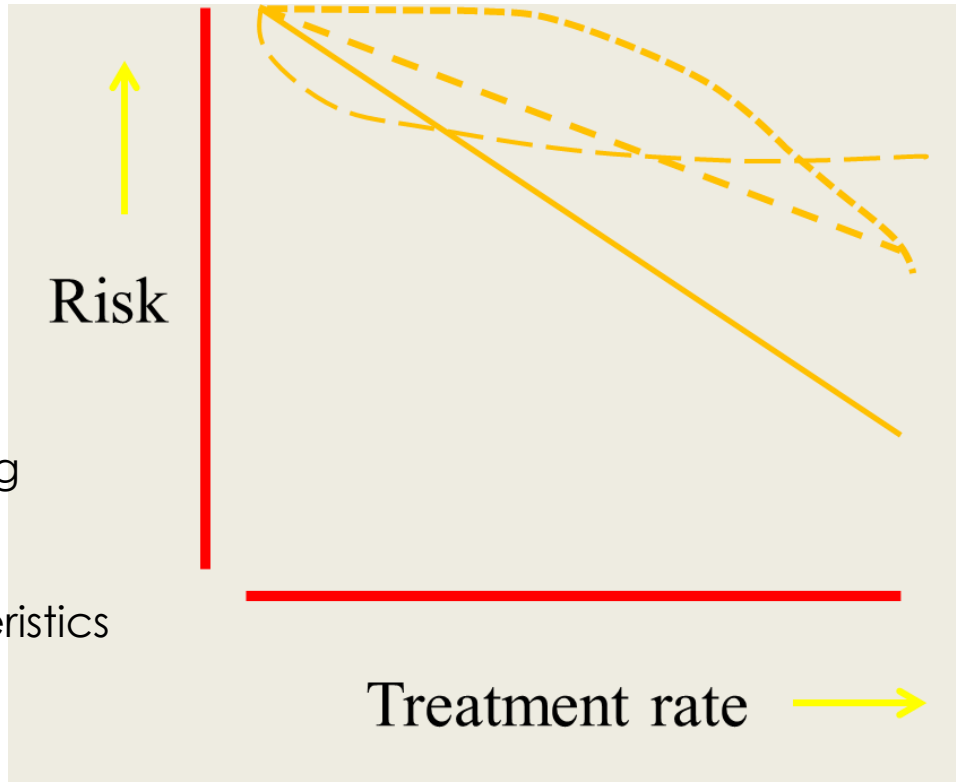
Problem Summary

- There is 'no one size fits all solution' because PB effectiveness is related to biophysical underpinnings and human context
- The role for PB in risk mitigation is poorly quantified
- Underpinnings and context are changing

The Solution

- The solution is a set of solutions that explicitly account for the range of biophysical influences and human context found in southern Australian Bioregions

THE PRESCRIBED BURNING ATLAS



Comparative performance of differing prescribed burning strategies in reducing risk to multiple values

Capacity to derive fire regime characteristics & risk solutions for individual Bioregions

Present and future projections

Accessible interface

Amenable to updates via functional architecture that accounts for biophysical and human attributes of individual Bioregions

PROJECT STREAMS

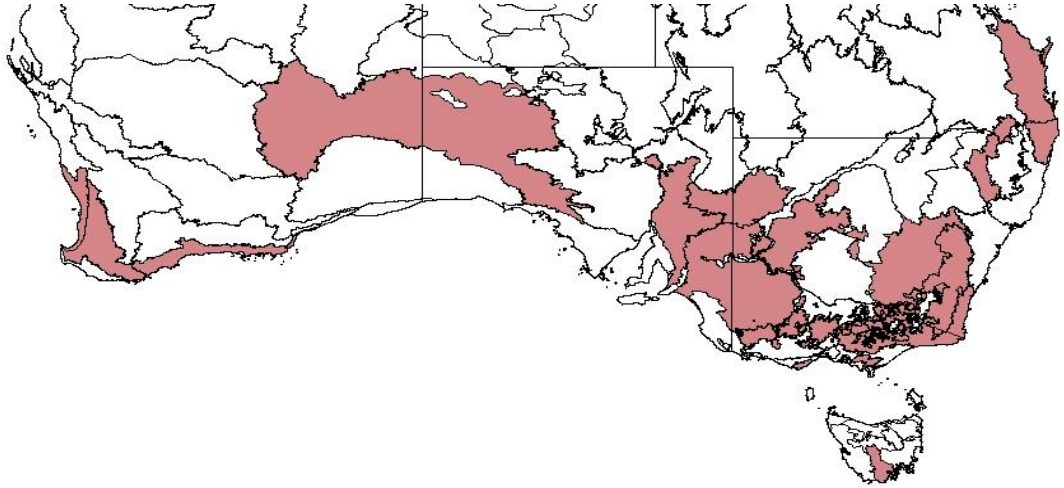
1) Fire spread simulations in case study landscapes (yrs 1-2)
2) Empirical analyses of prescribed burning effects on area burned, severity etc. (yrs 1-2)
3) Risk estimation for case study landscapes (yrs 2-3)
4) Multi-criteria decision analysis to investigate trade-offs between key values and cost-benefit (yrs 2-3)
5) Modelling of climate change effects on ignitions, fuels, fire regimes and risk (yrs 2-4)
6) Data, models, software, testing and launch of the "Prescribed Fire Atlas"(yrs 3-5)

Commenced	Progressed	Substantially Advanced

Today's presentation

SIMULATION CASE STUDY REGIONS – 3 TIERS

Tier	Ecoregion	States
1 Peri-urban	Temperate & Broadleaf Forests	SE QLD, NSW, TAS, VIC
2 Mixed agricultural inland	Mediterranean Forests, Woodlands & Scrub Temperate Grasslands, Savannas & Shrublands	NSW, SA, SW WA NSW, VIC
3 Dry interior rangelands & conservation estate	Deserts & Xeric Shrublands	NSW, SA, WA



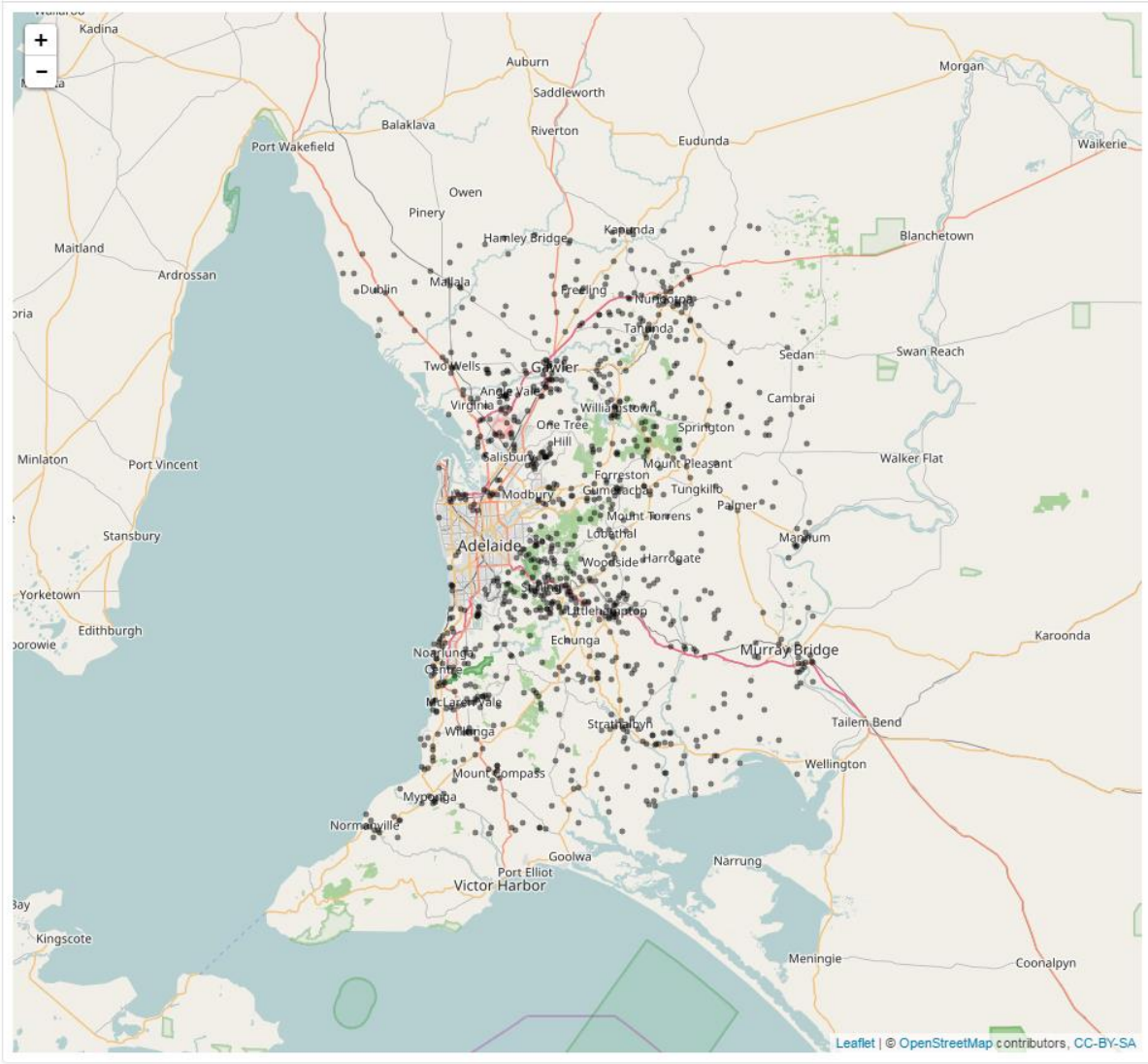
SIMULATION SETUP

- Phoenix Rapidfire version 4.0.0.7
- 7 treatment levels (0,1,2,3,5,10,15 % PB)
- 6 FFDI categories (L-M,H,VH,S,E,C)
- 3 FFDI drivers (temp, wind, wind Δ)
- 1000 replicates (200 ignitions x 5 wf histories)
- Variables assessed:
  - Area Burnt
  - Life Loss (Harris Method)
  - Life Value Cost
  - Economic Cost
  - Powerlines
  - House Loss
  - Life Loss (Ratio Method)
  - Environmental Cost
  - Roads

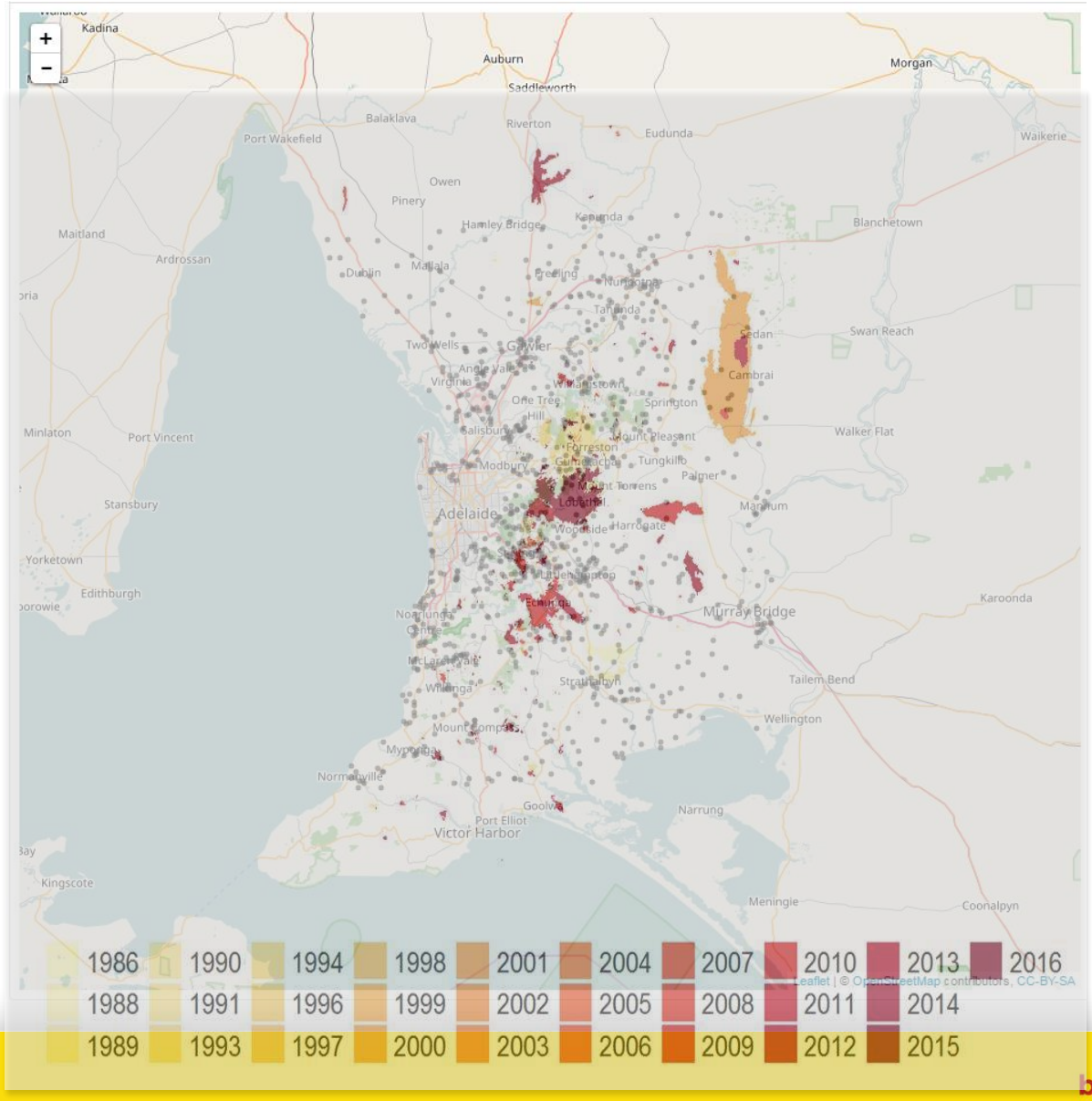
Comprehensive exploration of effects of variation in fire weather and ignition patterns
Output = raw material for risk estimation
Spatial patterns of PB to come

SIMULATION AREAS: TIER 1 PERI-URBAN

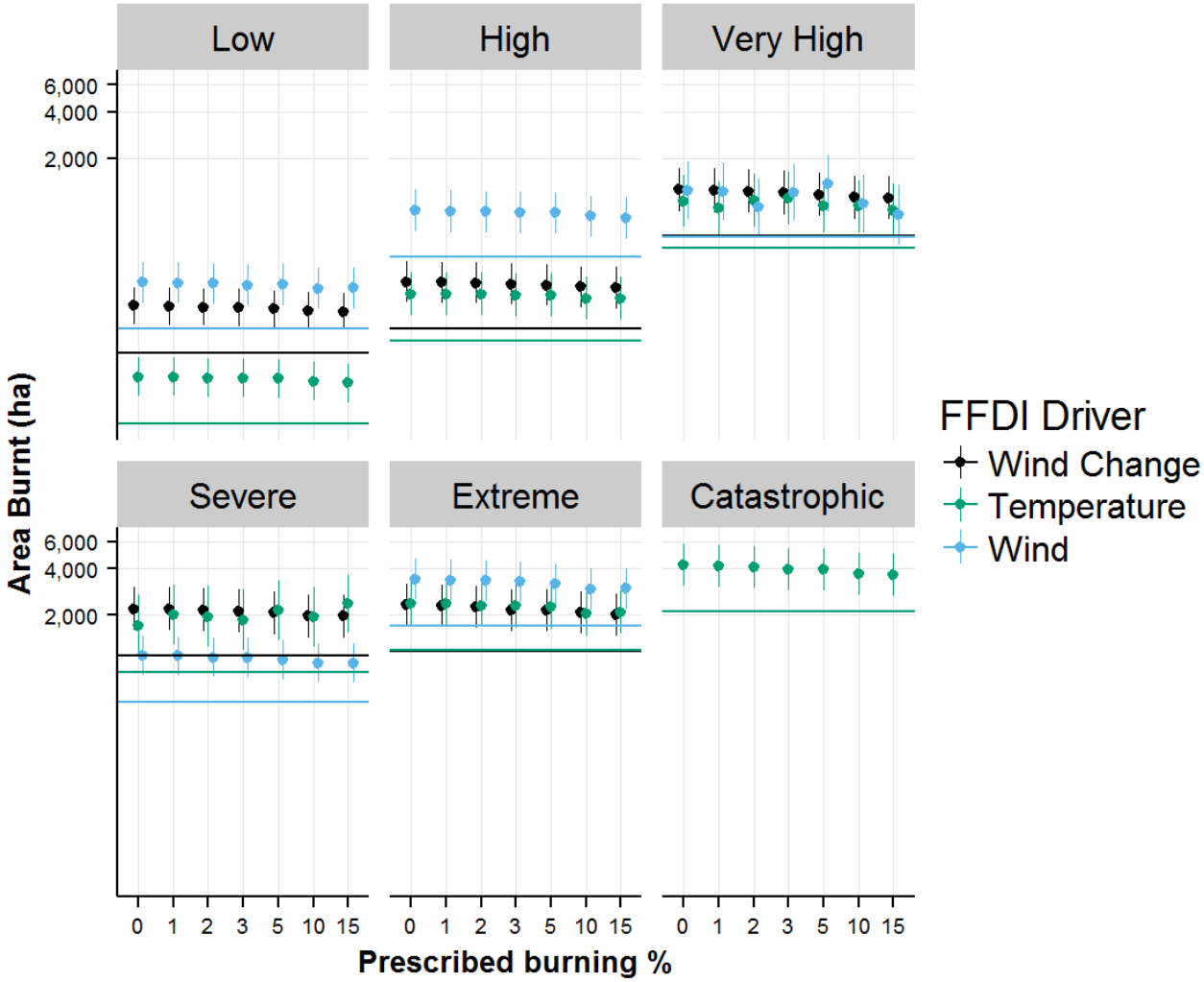
SA IGNITION POINTS



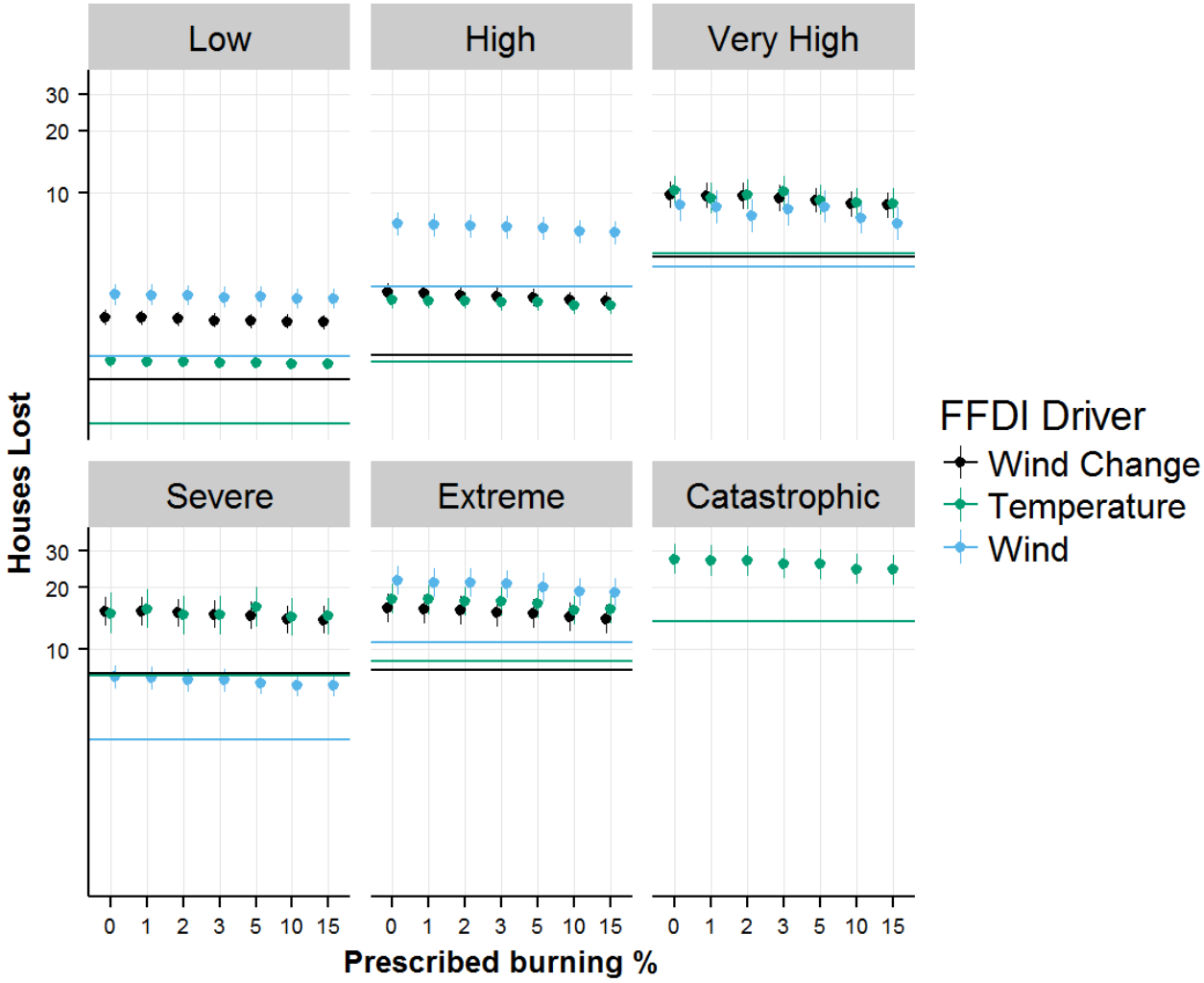
SA FUEL TREATMENT 1%



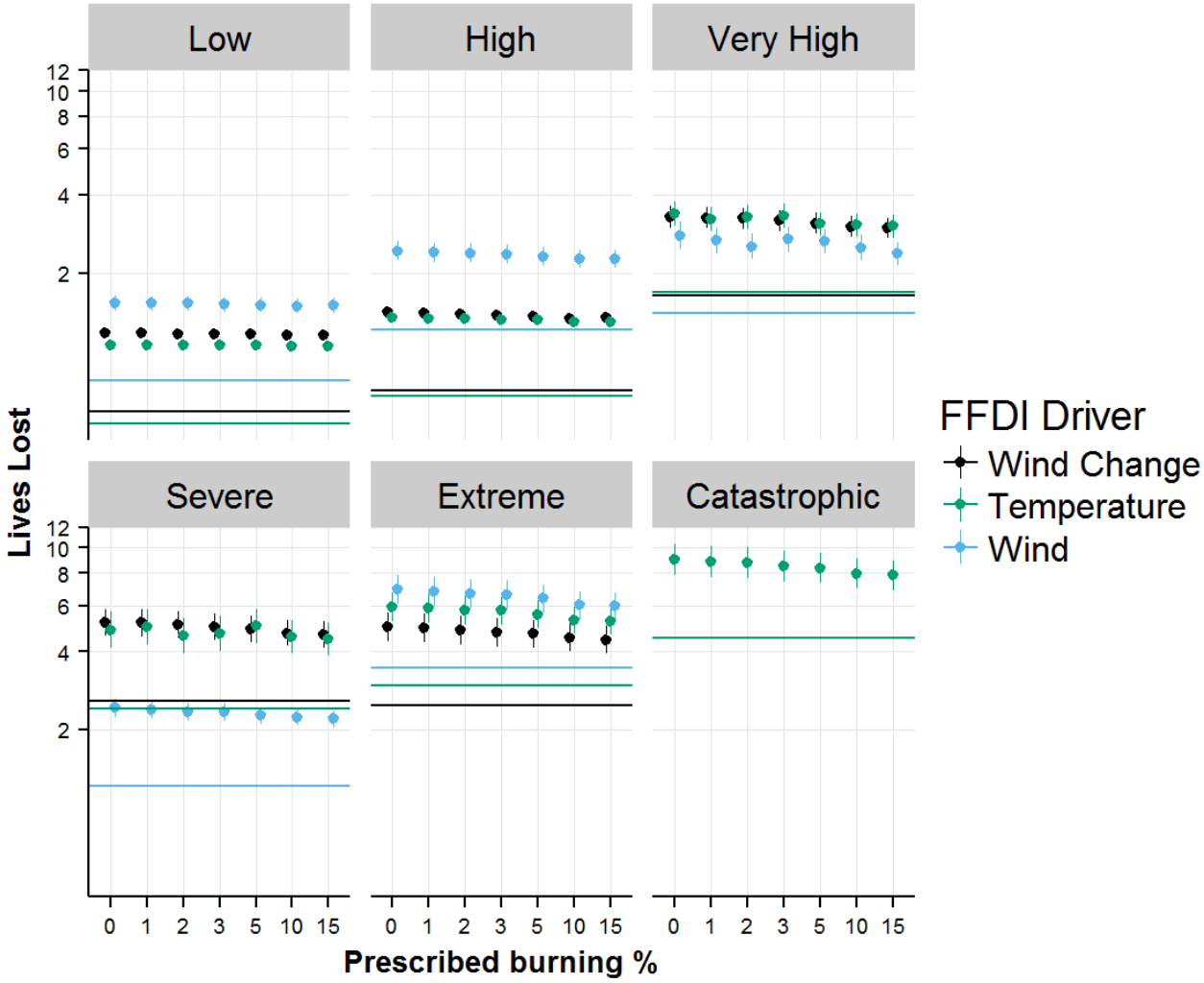
SA AREA BURNT MEAN



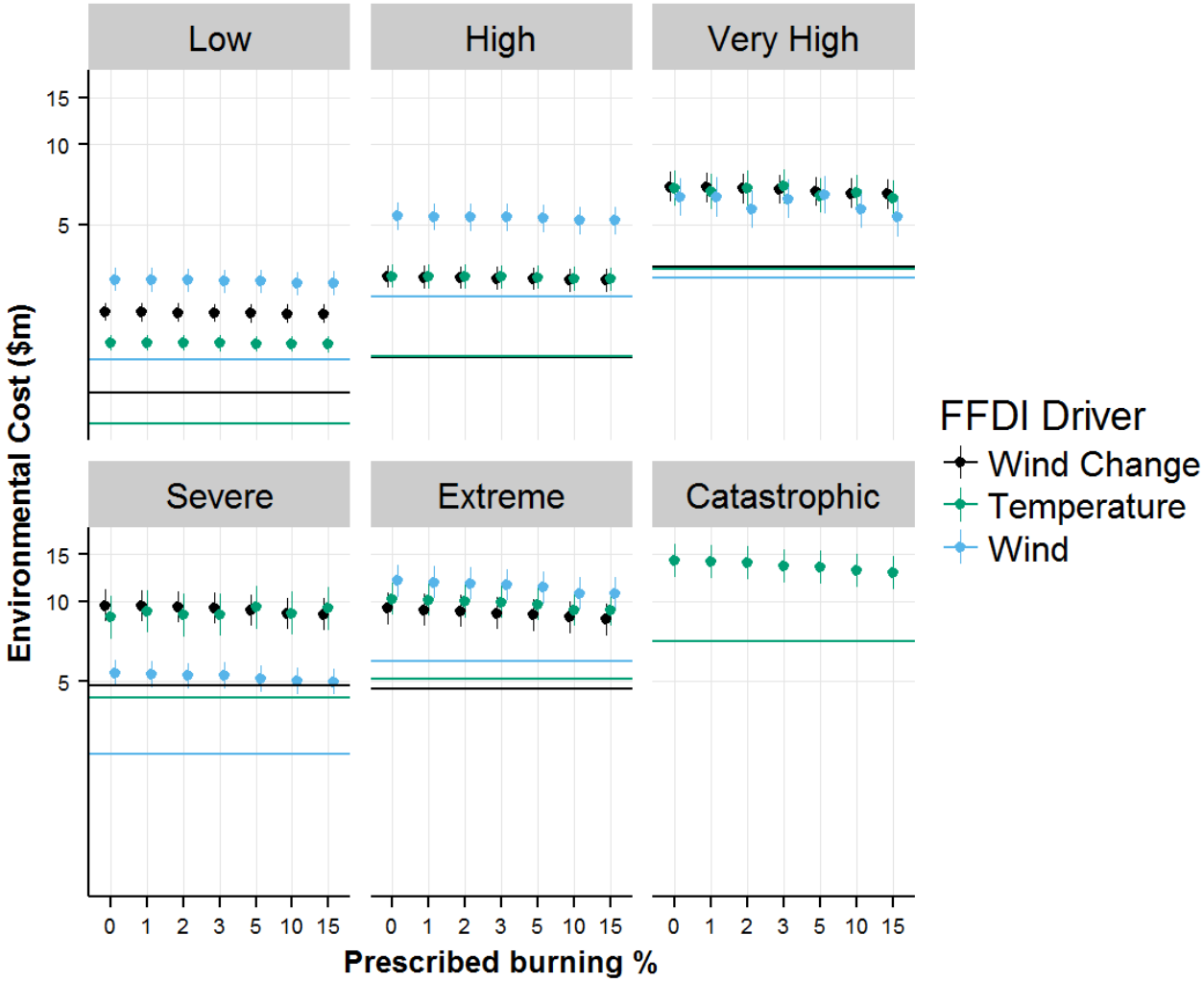
SA HOUSE LOSS MEAN



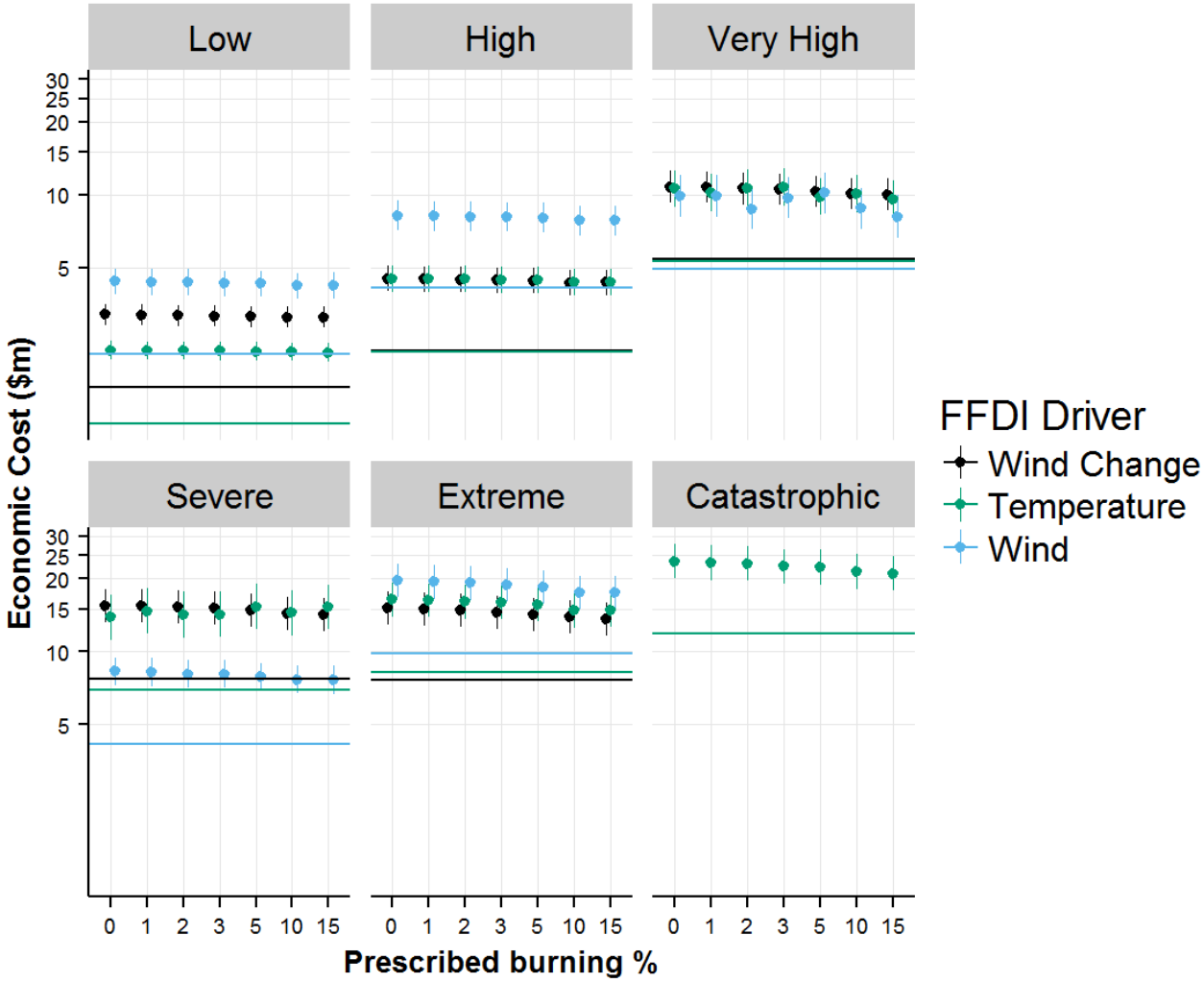
SA LIVES LOST: HARRIS METHOD MEAN



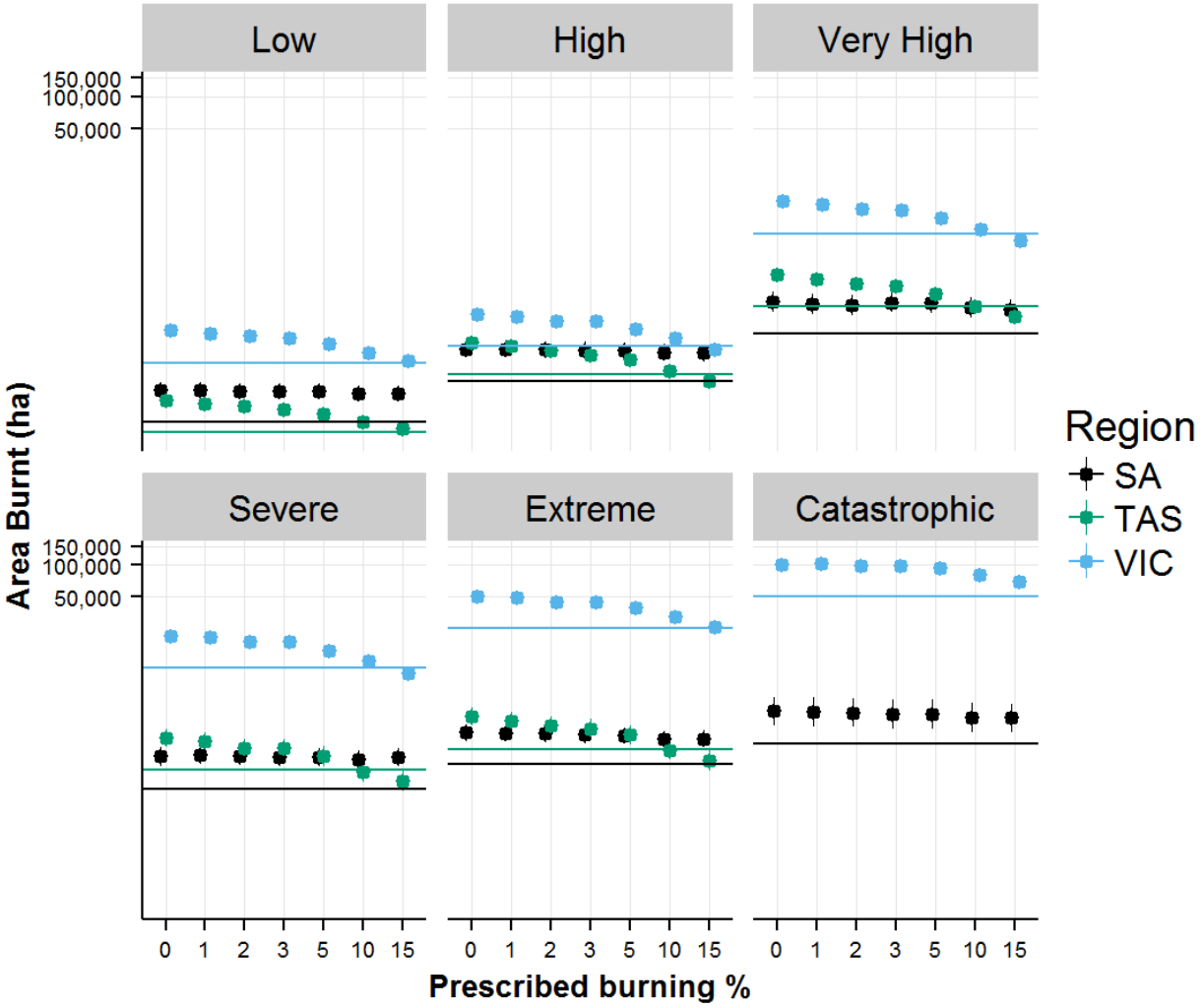
SA ENVIRONMENTAL COST MEAN



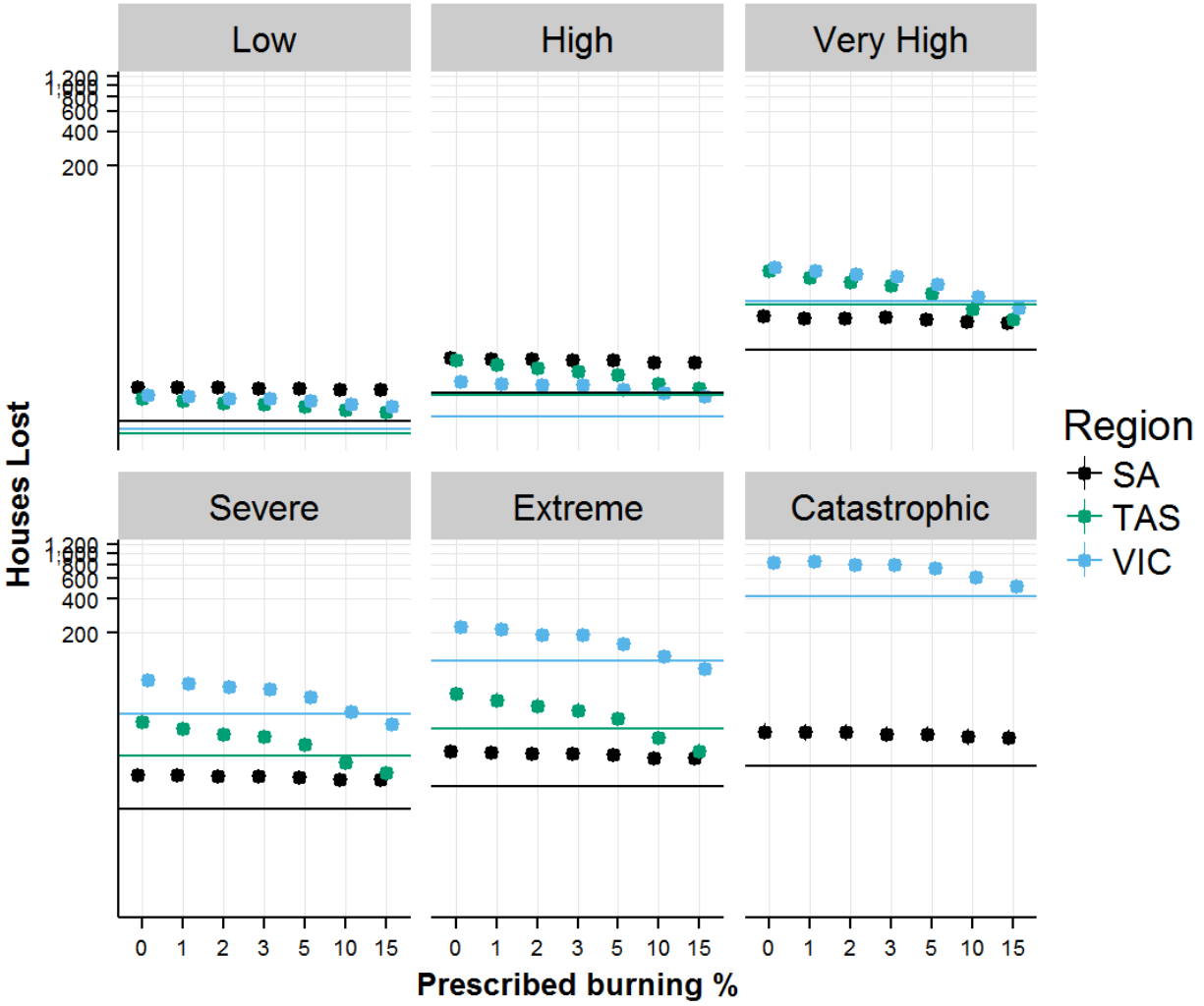
SA ECONOMIC COST MEAN



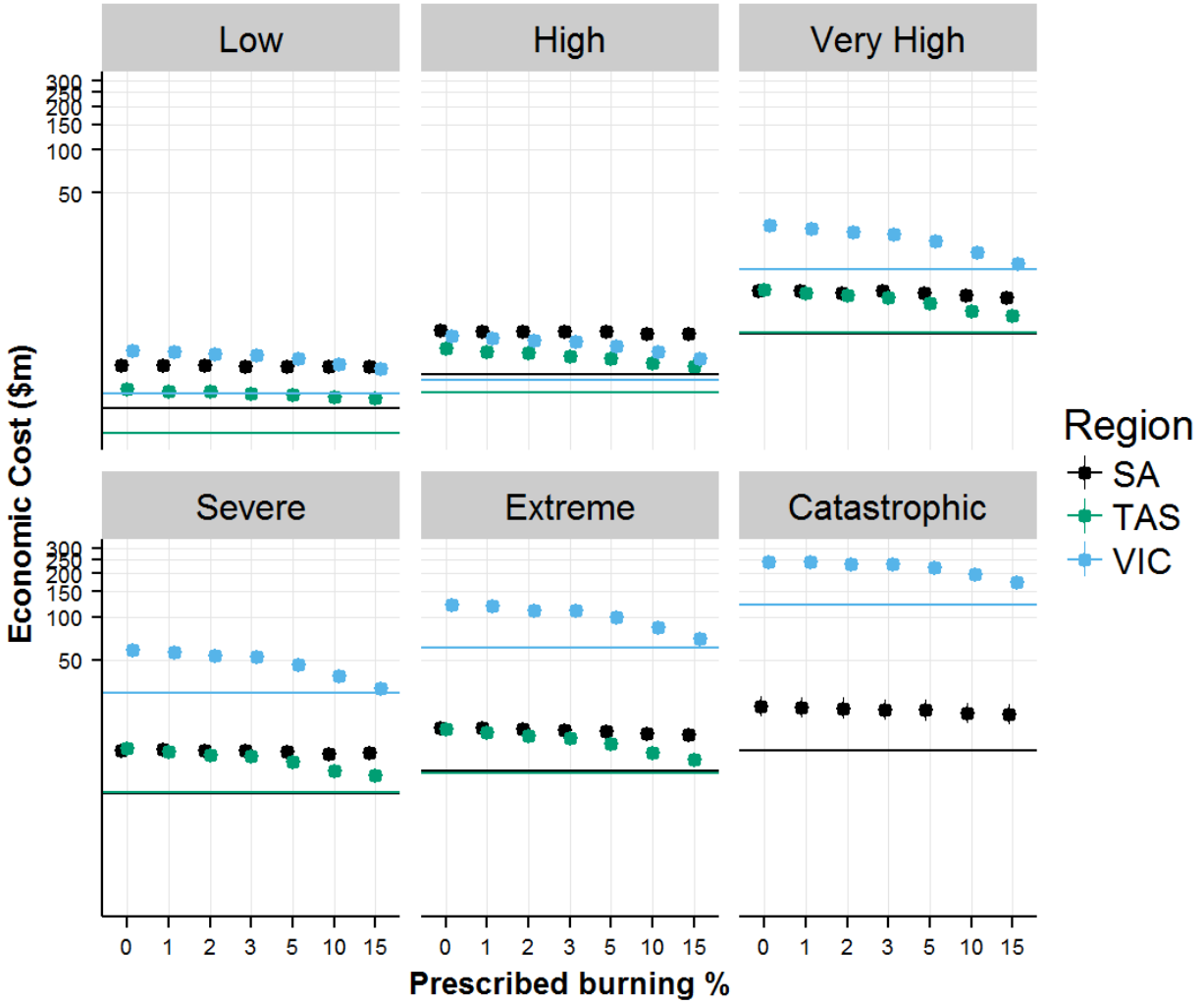
ALL REGIONS AREA BURNT MEAN



ALL REGIONS HOUSE LOSS MEAN



ALL REGIONS ECONOMIC COST MEAN



SUMMARY

‘Tier one’ peri-urban simulations partially completed

Marked differences in sensitivity to treatment rate between case studies (biophysical and human effects)

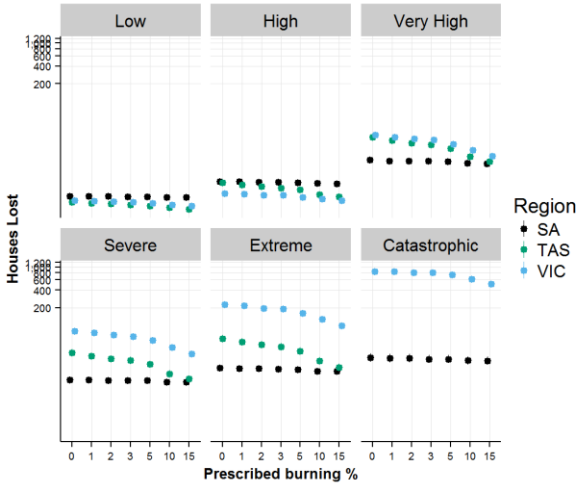
Lower sensitivity of differing ‘values’ to treatment rate and fire weather variation within case studies

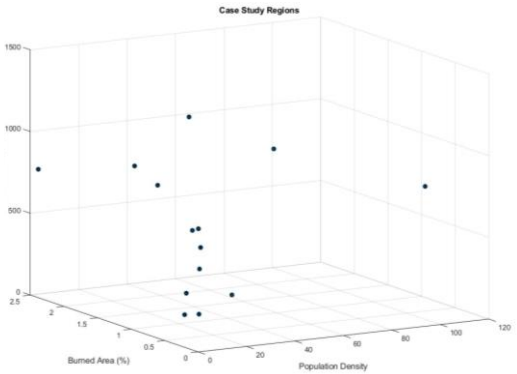
Effects of variations in spatial patterns to be explored soon

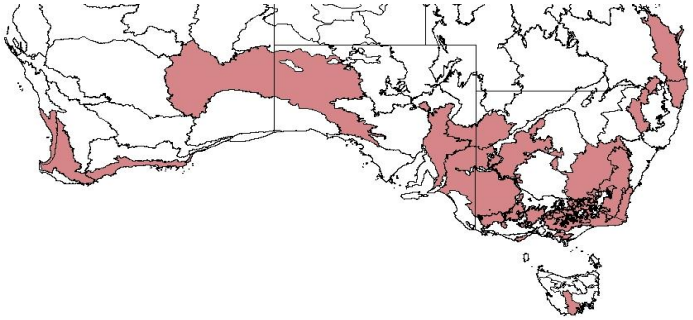
These raw data will be converted into risk estimates for each ‘value’

Validation of outputs in 2017 (e.g. area burned, fire severity)

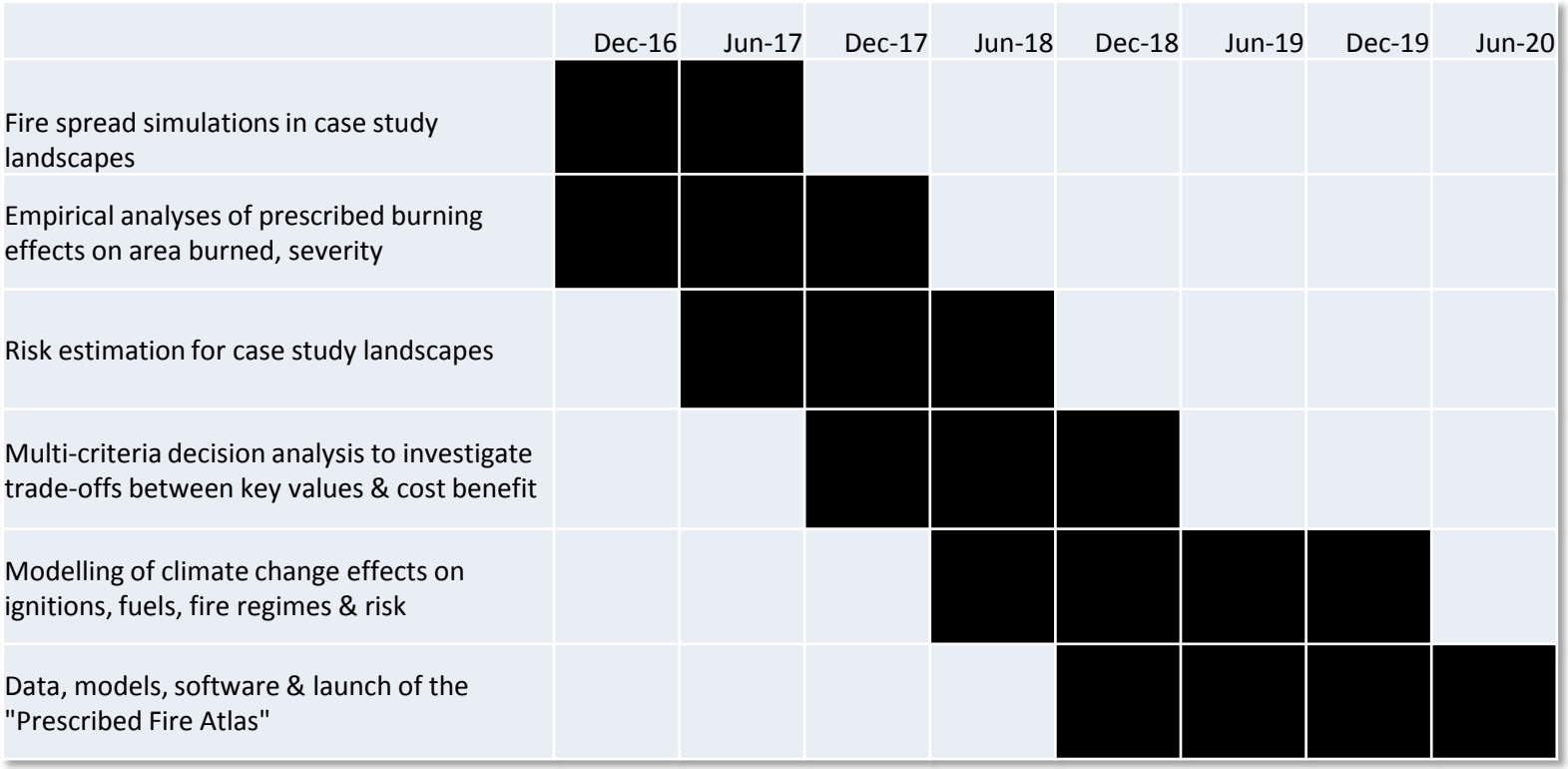
NEXT STEPS: RISK ESTIMATION, BIOPHYSICAL MODELLING







NEXT STEPS


Dec-16
Jun-17
Dec-17
Jun-18
Dec-18
Jun-19
Dec-19
Jun-20
Fire spread simulations in case study landscapes
Empirical analyses of prescribed burning effects on area burned, severity
Risk estimation for case study landscapes
Multi-criteria decision analysis to investigate trade-offs between key values & cost benefit
Modelling of climate change effects on ignitions, fuels, fire regimes & risk
Data, models, software & launch of the "Prescribed Fire Atlas"