

# Predicting woody fuel consumption; can existing models be accurately applied to Australian eucalypt forest fires?

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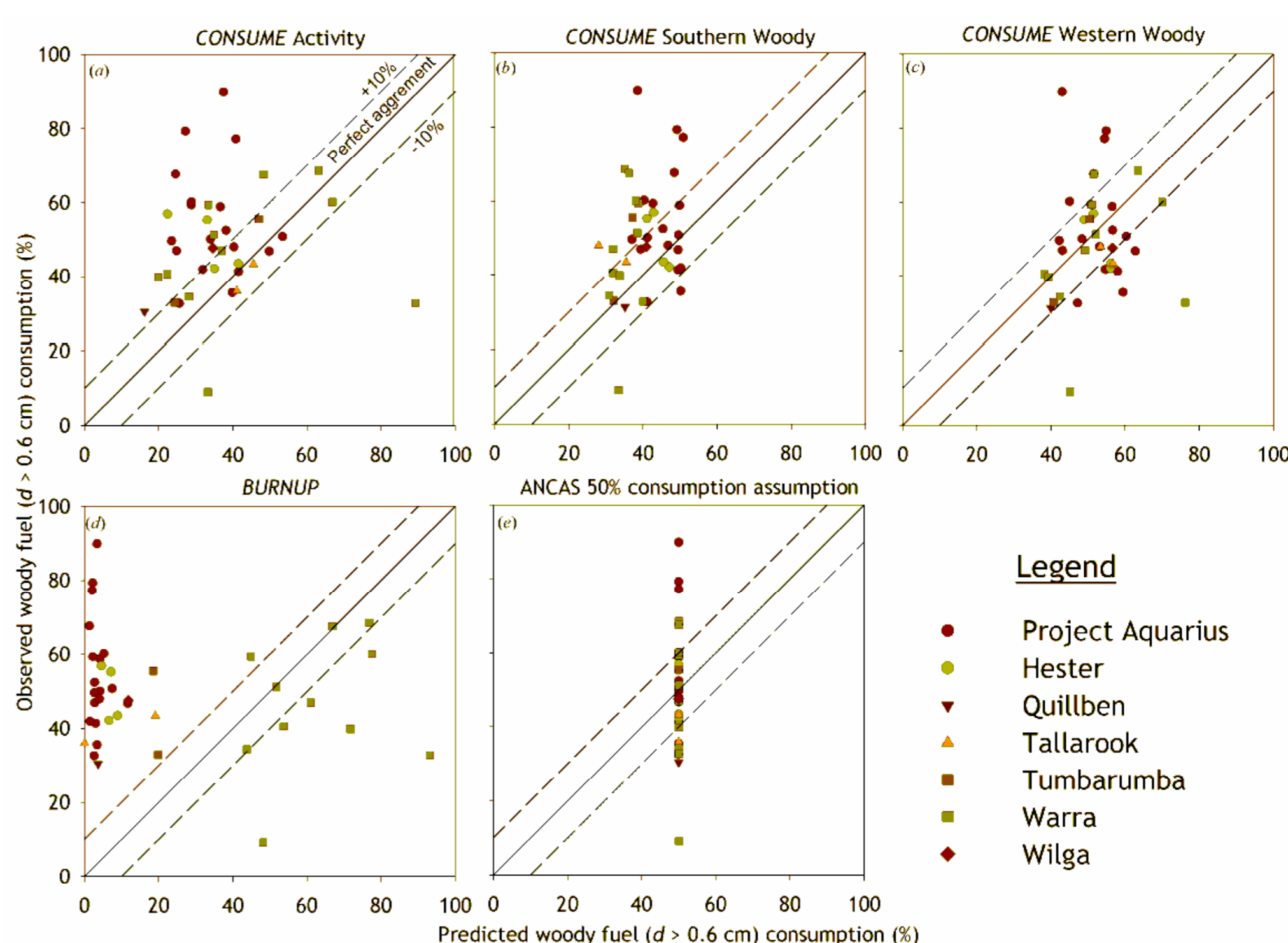
## Background & research objectives

The ability to accurately predict woody fuel (*diameter* > 0.6 cm) consumption is important for both forest and fire management. Information on woody fuel consumption in Australian southern eucalypt forest fires is scant and the predictive capacity of existent models unknown. In this poster, the predictive capacity of the following five models is evaluated using woody fuel consumption data collected throughout southern Australian eucalypt forests:

- (a) CONSUME Activity
- (b) CONSUME Western Woody
- (c) CONSUME Southern Woody
- (d) BURNUP and
- (e) Australian National Carbon Accounting System (ANCAS) recommended 50%.



## Results



	MAE	MBE	RMSE	MAPE
CONSUME Activity	18.2	13.1	23.4	40.4
CONSUME Southern Woody	13.6	9.3	17.2	30.1
CONSUME Western Woody	12.1	-1.9	16.1	33.2
BURNUP (All data except Warra)	45.2	45.2	48.0	87.0
BURNUP (Warra Data)	19.0	-16.3	25.6	77.5
ANCAS (Consumption is 50% of fuel load)	11.2	0.1	14.9	31.9

MAE: mean absolute error; MBE: means bias error; RMSE: root mean square error; MAPE: mean absolute percentage error.

## Conclusions

- Model evaluation statistics indicate that the minimum level of error can be achieved by applying a simple model which assumes 50% of the woody fuel load at a site is likely to be consumed under the majority of fuel and fire scenarios.
- The CONSUME Activity and Southern Woody models underpredicted observations while the CONSUME Western Woody model had very little bias and a good proportion of predictions (59%) within  $\pm 10\%$  of the observed woody fuel consumption.
- The BURNUP model showed the greatest level of error when used with natural fuels. However its performance improved when applied to heavy modified fuel loads resulting from clearcut operations.
- Many variables affect woody fuel consumption. Results showed there was little correlation between woody fuel consumption and with any of the primary variables driving CONSUME and BURNUP models.

## Field data collection & sources



Field data was collected at Wilga, Hester and Quillben blocks in south-west Western Australia and at Tallarook in northern-central Victoria. To increase variability within the dataset analysed, data was also sourced from McCorkhill block (WA, Project Aquarius), Tumberumba (NSW) and the Warra LTER site (TAS).

## Further information

- Hollis, J.J., Matthews, S., Ottmar, R.D., Prichard, S.J., Slijepcevic, A., Burrows, N.D., Ward, B., Tolhurst, K.G., Anderson, W.R., Gould, J.S. (In Press) Testing woody fuel consumption models for application in Australian southern eucalypt forest fires. Forest Ecology and Management.
- Tolhurst, K.G., Anderson, W.R., Gould, J. (2006) Woody fuel consumption experiments in an undisturbed forest. In: Viegas, D.X. (Ed.), Conference Proceedings of the V International Conference on Forest Fire Research. Coimbra, Portugal.

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