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A multi-species synthesis of physiological mechanisms in drought-induced tree mortality

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1 **Supplementary Methods**

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3 **PLC estimation from indirect measures.** Plant xylem water potential was used to estimate
4 PLC in four cases from studies 4, 12, 13, and 17 using hydraulic vulnerability curve (HVC) data
5 from recent studies (see Supplementary Table 1 for specific studies). For these four cases, all
6 HVCs were generated with the air injection method by the same researcher (PJ Hudson), from
7 branches cut underwater and rehydrated for 24 hours under refrigeration (Wheeler et al. 2013),
8 and data were fit with a Weibull curve. Data used to estimate PLC in *Eucalyptus globulus*
9 branches were from 1-year old seedlings grown in 30 L pots in a glasshouse, sourced from an
10 Australian nursery (Zeppel et al. unpublished data), analogous to the *E. globulus* used in study 4
11 (Mitchell et al. 2013, 2014). For *Pinus edulis* PLC estimation, we used two HVCs from mature
12 trees of varying size growing in the field at two sites in New Mexico, USA, near Los Alamos
13 (Garcia-Forner et al. 2016a) and at the Sevilleta experiment (study 14; Hudson et al.,
14 unpublished data). The Los Alamos HVC was used to estimate PLC for the mature, field-grown,
15 *P. edulis* trees in study 17 because this curve was generated from trees located several miles
16 from the mortality study. A mean of PLC estimates from both HVCs was used for the
17 transplanted, small mature *P. edulis* from studies 12 and 13, which were sourced in New Mexico.
18 Hydraulic conductance was used to model PLC in *P. edulis* from study 14 following the method
19 of Sperry et al. (1998; Supplementary Table 1).

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21 **Additional wood density data sources.** Wood density data were obtained for *Eucalyptus*
22 *smithii* (Gardner 2001), *Juniperus osteosperma* (Chojnacky and Moisen 1993), *Nothofagus*