Vilà-Cabrera et al. – Supporting information

Appendix B. Full list of articles used for assessing empirical evidence addressing the different components of the theoretical framework.

- Alfaro-Sanchez R, Lopez-Serrano FR, Rubio E, *et al.* 2015. Response of biomass allocation patterns to thinning in Pinus halepensis differs under dry and semiarid Mediterranean climates. *Ann For Sci* **72**: 595–607.
- Alfaro-Sánchez R, Sánchez-Salguero R, las Heras J De, *et al.* 2015. Vegetation dynamics of managed Mediterranean forests 16 yr after large fires in southeastern Spain. *Appl Veg Sci* 18: 272–82.
- Azul AM, Mendes SM, Sousa JP, and Freitas H. 2011. Fungal fruitbodies and soil macrofauna as indicators of land use practices on soil biodiversity in Montado. *Agrofor Syst* **82**: 121–38.
- Bar Massada A, Carmel Y, Koniak G, and Noy-Meir I. 2009. The effects of disturbance based management on the dynamics of Mediterranean vegetation: A hierarchical and spatially explicit modeling approach. *Ecol Modell* **220**: 2525–35.
- Battipaglia G, Strumia S, Esposito A, *et al.* 2014. The effects of prescribed burning on Pinus halepensis Mill. as revealed by dendrochronological and isotopic analyses. *For Ecol Manage* **334**: 201–8.
- Benito-Garzón M and Fernández-Manjarrés JF. 2015. Testing scenarios for assisted migration of forest trees in Europe. *New For* **46**: 979–94.
- Blanco JA, Imbert JB, and Castillo FJ. 2006. Influence of site characteristics and thinning intensity on litterfall production in two Pinus sylvestris L. forests in the western Pyrenees. *For Ecol Manage* 237: 342–52.
- Blanco JA, Imbert JB, and Castillo FJ. 2008. Nutrient return via litterfall in two contrasting Pinus sylvestris forests in the Pyrenees under different thinning intensities. *For Ecol Manage* **256**: 1840–52.
- Campo AD del, Fernandes TJG, and Molina AJ. 2014. Hydrology-oriented (adaptive) silviculture in a semiarid pine plantation: How much can be modified the water cycle through forest management? *Eur J For Res* **133**: 879–94.
- Camprodon J and Brotons L. 2006. Effects of undergrowth clearing on the bird communities of the Northwestern Mediterranean Coppice Holm oak forests. *For Ecol Manage* **221**: 72–82.
- Cañellas I, Río M Del, Roig S, and Montero G. 2004. Growth response to thinning in Quercus pyrenaica Willd. coppice stands in Spanish central mountain. *Ann For Sci* **61**: 243–50.
- Cassagne N, Pimont F, Dupuy JL, *et al.* 2011. Using a fire propagation model to assess the efficiency of prescribed burning in reducing the fire hazard. *Ecol Modell* **222**: 1502–14.

Ciancio O, Corona P, Lamonaca A, et al. 2006. Conversion of clearcut beech coppices into

high forests with continuous cover: A case study in central Italy. *For Ecol Manage* **224**: 235–40.

- Corcuera L, Camarero JJ, Sisó S, and Gil-Pelegrín E. 2006. Radial-growth and woodanatomical changes in overaged Quercus pyrenaica coppice stands: Functional responses in a new Mediterranean landscape. *Trees - Struct Funct* **20**: 91–8.
- Cotillas M, Sabaté S, Gracia C, and Espelta JM. 2009. Growth response of mixed mediterranean oak coppices to rainfall reduction. Could selective thinning have any influence on it? *For Ecol Manage* **258**: 1677–83.
- Crecente-Campo F, Pommerening A, and Rodríguez-Soalleiro R. 2009. Impacts of thinning on structure, growth and risk of crown fire in a Pinus sylvestris L. plantation in northern Spain. *For Ecol Manage* **257**: 1945–54.
- Curt T and Delcros P. 2010. Managing road corridors to limit fire hazard. A simulation approach in southern France. *Ecol Eng* **36**: 457–65.
- Dreyfus P. 2012. Joint simulation of stand dynamics and landscape evolution using a treelevel model for mixed uneven-aged forests. *Ann For Sci* **69**: 283–303.
- Dufour-Dror JM. 2007. Influence of cattle grazing on the density of oak seedlings and saplings in a Tabor oak forest in Israel. *Acta Oecologica* **31**: 223–8.
- Duguy B, Alloza JA, Röder A, *et al.* 2007. Modelling the effects of landscape fuel treatments on fire growth and behaviour in a Mediterranean landscape (eastern Spain). *Int J Wildl Fire* **16**: 619–32.
- Espelta JM, Retana J, and Habrouk A. 2003. Resprouting patterns after fire and response to stool cleaning of two coexisting Mediterranean oaks with contrasting leaf habits on two different sites. *For Ecol Manage* **179**: 401–14.
- Fernandes PM. 2009. Examining fuel treatment longevity through experimental and simulated surface fire behaviour: a maritime pine case study. *Can J For Res* **39**: 2529–35.
- Fernandes PM, Fernandes MM, and Loureiro C. 2012. Survival to prescribed fire of plantation-grown Corsican black pine in northern Portugal. *Ann For Sci* **69**: 813–20.
- Fernandes PM, Loureiro C, and Botelho H. 2004. Fire behaviour and severity in a maritime pine stand under differing fuel conditions. *Ann For Sci* **61**: 537–44.
- Fernández-de-Uña L, Cañellas I, and Gea-Izquierdo G. 2015. Stand competition determines how different tree species will cope with a warming climate. *PLoS One* **10**: 1–18.
- Fernández C, Vega JA, Fonturbel T, *et al.* 2008. Immediate effects of prescribed burning, chopping and clearing on runoff, infiltration and erosion in a shurbland area in Galicia (NW Spain). *L Degrad Dev* 19: 242–56.
- Fernández C, Vega JA, and Fonturbel T. 2012. The effects of fuel reduction treatments on runoff, infiltration and erosion in two shrubland areas in the north of Spain. *J Environ Manage* **105**: 96–102.
- Fernández C, Vega JA, and Fonturbel T. 2013. Does fire severity influence shrub resprouting after spring prescribed burning? *Acta Oecologica* **48**: 30–6.
- Ganatsios HP, Tsioras PA, and Pavlidis T. 2010. Water yield changes as a result of

silvicultural treatments in an oak ecosystem. For Ecol Manage 260: 1367-74.

- Garcia-Prats A, Antonio DC, Tarc??sio FJG, and Antonio MJ. 2015. Development of a Keetch and Byram-Based drought index sensitive to forest management in Mediterranean conditions. *Agric For Meteorol* **205**: 40–50.
- García-Tejero S, Taboada Á, Tárrega R, and Salgado JM. 2013. Land use changes and ground dwelling beetle conservation in extensive grazing dehesa systems of north-west Spain. *Biol Conserv* 161: 58–66.
- Gilioli G, Bodini A, and Baumgärtner J. 2013. Metapopulation modelling and area-wide pest management strategies evaluation. An application to the Pine processionary moth. *Ecol Modell* **260**: 1–10.
- González-Ochoa A and Las Heras J De. 2002. Effects of post-fire silviculture practices on Pachyrhinus squamosus defoliation levels and growth of Pinus halepensis Mill. *For Ecol Manage* **167**: 185–94.
- González-Ochoa AI, López-Serrano FR, and Las Heras J De. 2004. Does post-fire forest management increase tree growth and cone production in Pinus halepensis? *For Ecol Manage* **188**: 235–47.
- González-Olabarria JR and Pukkala T. 2011. Integrating fire risk considerations in landscapelevel forest planning. *For Ecol Manage* **261**: 278–87.
- González-Sanchis M a., Campo AD Del, Molina AJ, and Fernandes T sio JG. 2015. Modeling adaptive forest management of a semi-arid Mediterranean Aleppo pine plantation. *Ecol Modell* **308**: 34–44.
- Guàrdia M, Fernàndez J, Elena G, and Fleck I. 2012. Stomatal patchiness in the Mediterranean holm oak (Quercus ilex L.) under water stress in the nursery and in the forest. *Tree Physiol* **32**: 829–38.
- Jiménez MN, Spotswood EN, Cañadas EM, and Navarro FB. 2015. Stand management to reduce fire risk promotes understorey plant diversity and biomass in a semi-arid Pinus halepensis plantation. *Appl Veg Sci* **18**: 467–80.
- La Montaña E De, Rey-Benayas JM, and Carrascal LM. 2006. Response of bird communities to silvicultural thinning of Mediterranean maquis. *J Appl Ecol* **43**: 651–9.
- las Heras J de, González-Ochoa A, López-Serrano F, and Simarro ME. 2004. Effects of silviculture treatments on vegetation after fire in Pinus halepensis Mill. woodlands (SE Spain). Ann For Sci 61: 661–7.
- Las Heras J De, Martínez-Sánchez JJ, González-Ochoa AI, *et al.* 2002. Establishment of Pinus halepensis Mill. saplings following fire: Effects of competition with shrub species. *Acta Oecologica* **23**: 91–7.
- las Heras J de, Moya D, L??pez-Serrano FR, and Rubio E. 2013. Carbon sequestration of naturally regenerated Aleppo pine stands in response to early thinning. *New For* 44: 457–70.
- Las Heras J De, Moya D, López-Serrano F, and Condés S. 2007. Reproduction of postfire Pinus halepensis Mill. stands six years after silvicultural treatments. *Ann For Sci* 64: 59– 66.

- Lavoir A V., Orme??o E, Pasqualini V, *et al.* 2013. Does Prescribed Burning Affect Leaf Secondary Metabolites in Pine Stands? *J Chem Ecol* **39**: 398–412.
- Linares JC, Camarero JJ, and Carreira JA. 2009. Plastic responses of Abies pinsapo xylogenesis to drought and competition. *Tree Physiol* **29**: 1525–36.
- Loepfe L, Martinez-Vilalta J, and Piñol J. 2012. Management alternatives to offset climate change effects on Mediterranean fire regimes in NE Spain. *Clim Change* **115**: 693–707.
- López-Serrano FR, Las Heras J De, González-Ochoa AI, and García-Morote FA. 2005. Effects of silvicultural treatments and seasonal patterns on foliar nutrients in young postfire Pinus halepensis forest stands. *For Ecol Manage* 210: 321–36.
- López BC, Gracia CA, Sabaté S, and Keenan T. 2009. Assessing the resilience of Mediterranean holm oaks to disturbances using selective thinning. *Acta Oecologica* 35: 849–54.
- Lopez B, Sabate S, and Gracia C. 1998. Fine roots dynamics in a Mediterranean forest: effects of drought and stem density. *Tree Physiol* **18**: 601–6.
- Mancilla-Leytón JM, Pino Mejías R, and Martín Vicente A. 2013. Do goats preserve the forest? Evaluating the effects of grazing goats on combustible Mediterranean scrub. *Appl Veg Sci* **16**: 63–73.
- Mangas JG and Rodríguez-Estival J. 2010. Logging and livestock influence the abundance of common mammal species in Mediterranean forested environments. *For Ecol Manage* **260**: 1274–81.
- Manso R, Pukkala T, Pardos M, *et al.* 2014. Modelling Pinus pinea forest management to attain natural regeneration under present and future climatic scenarios. *Can J For Res* **44**: 250–62.
- Martín-Benito D, Río M Del, Heinrich I, *et al.* 2010. Response of climate-growth relationships and water use efficiency to thinning in a Pinus nigra afforestation. *For Ecol Manage* **259**: 967–75.
- Matteo G Di, Angelis P De, Brugnoli E, *et al.* 2010. Tree-ring ∆ 13 C reveals the impact of past forest management on water-use e ffi ciency in a Mediterranean oak coppice in Tuscany (Italy). *Ann For Sci 67* 67: 1–8.
- Mazza G, Amorini E, Cutini A, and Manetti MC. 2011. The influence of thinning on rainfall interception by pinus pinea L. in mediterranean coastal stands (castel Fusano-Rome). *Ann For Sci* **68**: 1323–32.
- Molina AJ and Campo AD del. 2012. The effects of experimental thinning on throughfall and stemflow: A contribution towards hydrology-oriented silviculture in Aleppo pine plantations. *For Ecol Manage* **269**: 206–13.
- Monimeau L, Mouillot D, Fons R, *et al.* 2002. Impact of prescribed burning on the survival rates of the wood mouse (Apodemus sylvaticus). *Acta Oecologica* **23**: 51–8.
- Moreno-Gutiérrez C, Barberá GG, Nicolás E, *et al.* 2011. Leaf δ 180 of remaining trees is affected by thinning intensity in a semiarid pine forest. *Plant, Cell Environ* **34**: 1009–19.

Moya D, Las Heras J De, L??pez-Serrano FR, et al. 2009. Structural patterns and biodiversity

in burned and managed Aleppo pine stands. *Plant Ecol* 200: 217–28.

- Moya D, las Heras J De, López-Serrano FR, and Leone V. 2008. Optimal intensity and age of management in young Aleppo pine stands for post-fire resilience. *For Ecol Manage* **255**: 3270–80.
- Navarro FB, Jimenez MN, Cañadas EM, *et al.* 2010a. Effects of different intensities of overstory thinning on tree growth and understory plant-species productivity in a semi-arid Pinus halepensis Mill. afforestation. *For Syst* **19**: 410–7.
- Navarro FB, Jiménez MN, Gallego E, and Ripoll MA. 2010b. Short-term effects of overstory reduction and slash mulching on ground vegetation in a Mediterranean Aleppo pine woodland. *Eur J For Res* **129**: 689–96.
- Navarro FB, Romero-Freire A, Castillo T Del, *et al.* 2013. Effects of thinning on litterfall were found after years in a Pinus halepensis afforestation area at tree and stand levels. *For Ecol Manage* **289**: 354–62.
- Olivar J, Bogino S, Rathgeber C, *et al.* 2014. Thinning has a positive effect on growth dynamics and growth-climate relationships in Aleppo pine (*Pinus halepensis*) trees of different crown classes. *Ann For Sci* **71**: 395–404.
- Osem Y, Yavlovich H, Zecharia N, *et al.* 2013. Fire-free natural regeneration in water limited Pinus halepensis forests: A silvicultural approach. *Eur J For Res* **132**: 679–90.
- Pérez-Ramos IM, Zavala MA, Marañón T, *et al.* 2008. Dynamics of understorey herbaceous plant diversity following shrub clearing of cork oak forests: A five-year study. *For Ecol Manage* 255: 3242–53.
- Pimont F, Dupuy JL, Linn RR, and Dupont S. 2011. Impacts of tree canopy structure on wind flows and fire propagation simulated with FIRETEC. *Ann For Sci* **68**: 523–30.
- Piñol J, Beven K, and Viegas DX. 2005. Modelling the effect of fire-exclusion and prescribed fire on wildfire size in Mediterranean ecosystems. *Ecol Modell* **183**: 397–409.
- Quevedo L, Arnan X, Boet O, and Rodrigo A. 2014. Post-fire selective thinning of Arbutus unedo L. coppices keeps animal diversity unchanged: The case of ants. *Ann For Sci* **71**: 897–905.
- Quevedo L, Arnan X, and Rodrigo A. 2013. Selective thinning of Arbutus unedo coppices following fire: Effects on growth at the individual and plot level. *For Ecol Manage* **292**: 56–63.
- Quevedo L, Arnan X, and Rodrigo A. 2015. Post-fire forestry management improves fruit weight and seed set in forest coppices dominated by Arbutus unedo L. *For Ecol Manage* **345**: 65–72.
- Regos A, Aquilué N, Retana J, *et al.* 2014. Using unplanned fires to help suppressing future large fires in mediterranean forests. *PLoS One* **9**: 1–10.
- Ricouart F, Cereghino R, Gers C, *et al.* 2013. Influence of fire prevention management strategies on the diversity of butterfly fauna in the eastern Pyrenees. *J Insect Conserv* **17**: 95–111.
- Rodríguez-Calcerrada J, Pérez-Ramos IM, Ourcival JM, *et al.* 2011. Is selective thinning an adequate practice for adapting Quercus ilex coppices to climate change? *Ann For Sci* 68:

575-85.

- Rodríguez y Silva F and Molina-Martínez JR. 2012. Modeling Mediterranean forest fuels by integrating field data and mapping tools. *Eur J For Res* **131**: 571–82.
- Roig S, Río M Del, Cañellas I, and Montero G. 2005. Litter fall in Mediterranean Pinus pinaster Ait. stands under different thinning regimes. *For Ecol Manage* **206**: 179–90.
- Ruano I, Rodríguez-García E, and Bravo F. 2013. Effects of pre-commercial thinning on growth and reproduction in post-fire regeneration of Pinus halepensis Mill. *Ann For Sci* 70: 357–66.
- Ruiz-Mirazo J and Gonzalez-Rebollar JL. 2013. Growth and structure of a young Aleppo pine planted forest after thinning for diversification and wildfire prevention. *For Syst* **22**: 47–57.
- Ruiz-Mirazo J and Robles AB. 2012. Impact of targeted sheep grazing on herbage and holm oak saplings in a silvopastoral wildfire prevention system in south-eastern Spain. *Agrofor Syst* **86**: 477–91.
- Ruiz-Peinado R, Bravo-Oviedo A, López-Senespleda E, *et al.* 2013. Do thinnings influence biomass and soil carbon stocks in Mediterranean maritime pinewoods? *Eur J For Res* 132: 253–62.
- Ruiz-Peinado R, Bravo-Oviedo A, Montero G, and R??o M del. 2016. Carbon stocks in a Scots pine afforestation under different thinning intensities management. *Mitig Adapt Strateg Glob Chang* **21**: 1059–72.
- Sabaté S, Gracia CA, and Sánchez A. 2002. Likely effects of climate change on growth of Quercus ilex, Pinus halepensis, Pinus pinaster, Pinus sylvestris and Fagus sylvatica forests in the Mediterranean region. *For Ecol Manage* **162**: 23–37.
- Sánchez-Humanes B and Espelta JM. 2011. Increased drought reduces acorn production in Quercus ilex coppices: Thinning mitigates this effect but only in the short term. *Forestry* 84: 73–82.
- Schiller G, Unger ED, Moshe Y, *et al.* 2003. Estimating water use by sclerophyllous species under east Mediterranean climate II. The transpiration of Quercus calliprinos Webb. in response to silvicultural treatments. *For Ecol Manage* **179**: 483–95.
- Tárrega R, Calvo L, Taboada Á, *et al.* 2009. Abandonment and management in Spanish dehesa systems: Effects on soil features and plant species richness and composition. *For Ecol Manage* 257: 731–8.
- Valor T, González-Olabarria JR, and Piqué M. 2015. Assessing the impact of prescribed burning on the growth of European pines. *For Ecol Manage* **343**: 101–9.
- Vega JA, Fernández C, and Fonturbel T. 2005. Throughfall, runoff and soil erosion after prescribed burning in gorse shrubland in Galicia (NW Spain). *L Degrad Dev* **16**: 37–51.
- Verkaik I and Espelta JM. 2006. Post-fire regeneration thinning, cone production, serotiny and regeneration age in Pinus halepensis. *For Ecol Manage* **231**: 155–63.
- Wic Baena C, Andrés-Abellán M, Lucas-Borja ME, *et al.* 2013. Thinning and recovery effects on soil properties in two sites of a Mediterranean forest, in Cuenca Mountain (South-eastern of Spain). *For Ecol Manage* **308**: 223–30.

Zagas T, Raptis D, Zagas D, and Karamanolis D. 2013. Planning and assessing the effectiveness of traditional silvicultural treatments for mitigating wildfire hazard in pine woodlands of Greece. *Nat Hazards* **65**: 545–61.