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ABSTRACT SPECIFICATIONS

Title: Integrating rehabilitation, restoration and conservation for a sustainable jarrah forest future during climate disruption

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Abstract: The northern jarrah forest of Mediterranean-climate, south-western Australia is characterised by deeply weathered soil profiles and low fertility, reflecting long geological and climatic stasis. The associated biota displays linked interactions with the fire-environment, novel methods of nutrient acquisition, and primary forests of low productivity but high biomass. We outline historical management and contemporary climate change interactions in this forest, and provide an approach for potential resolution to a climate-change/exploitation dilemma. Since European settlement (1826), this forest has been structurally transformed by deforestation and resource extraction, including logging and mining. Rainfall has declined by 15-20% since 1970, with projections for further decline. A new hydrological regime foreshadows regolith drying, with a disrupted climate leading to a higher incidence of unplanned fire regimes of greater intensity. Substantial areas of bauxite are mined and rehabilitated while the forest dilemma intensifies. However, areas mined for bauxite may offer an opportunity to integrate state-of-the-science rehabilitation, focused on

the understorey, with restoration of the surrounds for a resilient future, despite inevitable change. This approach recognises loss of forest values through mining, but anticipates conservation of biodiversity and important elements of forest structure by minimising ecologically unacceptable disturbance to the surrounding forest, so benefiting a broad range of forest values. Thus novel and complex challenges due to interactions between exploitation and climate change require equally novel and complex solutions – increasingly required under transformative change.