High water use by tree plantations lends them strategic value in mitigating salinity and water-logging. However, expanding tree plantations in high-rainfall water supply catchments can reduce inflows to river systems, supporting downstream communities, agricultural industries and wetlands. A bio-economic model estimated the economic and streamflow impacts of establishing tree plantations upstream in the 2.8 million ha Macquarie valley of Australia’s Murray-Darling Basin. Water use by different land covers was quantified using Zhang curves. Direct costs of establishing plantations and opportunity costs of displaced land uses were expressed as dollars per GL of water yield reduction (a novel approach). The consequences of four tree product values and two policy settings were investigated. Without requirements to compensate downstream water users, $40/m^3$ tree products induced 94,000 ha of new plantation for net gains ($13M) in catchment economic surplus, but reduced environmental flows (-76 GL/yr). $70/m^3$ tree products induced 600,000 ha of new trees for net gain $405M in catchment economic surplus, but reduced environmental flows by 345 GL/yr. Economic gains upstream were accompanied by large economic and environmental losses downstream. With $70/m^3$ tree products, but requiring new tree plantations to purchase water entitlements equivalent to their annual transpiration, there was no net loss of environmental water, smaller areas of new trees (78,000 ha) and smaller gains in net economic surplus ($330M) shared up and downstream. Extending the water market upstream enables greater economic-efficiency, social-equity and environmental-sustainability; such that higher value forest products could redound to the benefit of all sectors in the catchment.