The use of streamside management zones (SMZs) as buffers to protect streams in the agricultural and forestry landscape is a priority internationally for investing in water quality protection. The use of SMZs is a prominent feature in many codes of forestry and agricultural practices. Local examples are commonly sought to guide code development, but the quantitative benefits of this practice are difficult to predict for a range of water quality parameters. It also has been generally unclear in Australia how codes of forest practice apply to situations where land managers want to use forest plantation trees in SMZs as buffers for both environmental and commercial benefits. We conducted research to quantify the effects on water quality of using best management practices (BMPs) in plantation SMZs on grazed farmland, and we developed knowledge that could influence policy and practice. We used a paired-catchment experiment for a study of the establishment phase, and a reach-scale study of the harvesting phase. Both studies were in headwater catchments in Tasmania. Positive effects of BMPs were measured during both phases on sediment, phosphate or bacteria in stream water. Cultivation in SMZs pre-planting for site preparation should be tailored for soil erodibility, but, if used carefully, SMZ plantations offer the potential for assisting in large-scale water quality improvement in agricultural landscapes, as well as providing several other benefit. To maximize the water quality benefit, this development needs to occur in conjunction with the identification and control of non-SMZ-plantation sources of potential contaminants on farms.