

Variable Retention Silviculture: A comparison between Tasmania, Australia and the Pacific Northwest

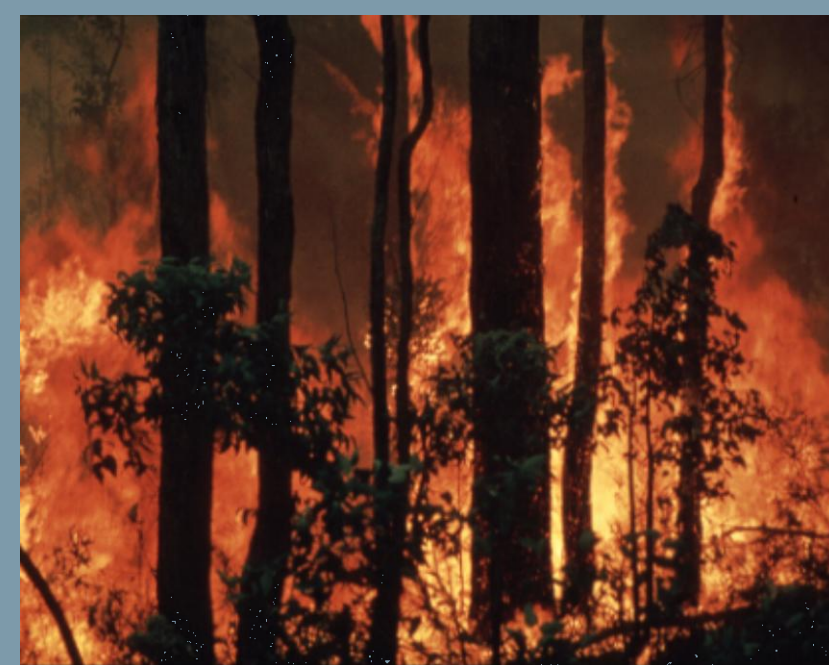
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Background

Variable retention (VR) was initially developed in the Pacific NorthWest of USA and Canada. It was developed as an alternative to clearcutting, that aims to retain structural elements at the time of harvesting, thereby allowing working forests to be managed for multiple (economic, social and ecological) objectives. Variable retention approaches are guided by natural disturbance (e.g. blowdown, wildfire). They aim to provide refuges for mature-forest species and structures that would suffer under repeated clearcutting rotations, and to accelerate recolonisation by late-successional species into the harvested areas. VR is now also being used in Tasmania, Australia and several other countries around the world.



Wildfire in Tasmanian eucalypt forest. Wildfires vary in intensity and severity, thus resulting in patchy landscapes with biological and structural legacies from the old forest (e.g. fireskips, snags, logs, scattered living trees).



Tasmanian variable retention (left) also maintains legacies within sites. Retention is 'anchored' on special habitats, e.g. small streams, areas with large old trees and snags. Clearcutting (right) is illustrated with a photoshopped version of the same site.

Types of variable retention

There are three common types of variable retention being practiced: aggregated retention, dispersed retention and mixed retention. Aggregated retention involves leaving intact clusters of both overstorey and understorey forest while the trees around them are harvested. Dispersed retention involves retaining scattered individual overstorey trees throughout a site. Mixed retention combines these two approaches at one site.

Both Tasmanian and PNW research studies indicate that aggregated retention has benefits for many biodiversity groups in the first decade following harvest, although some species are advantaged by dispersed trees. Mixed retention and aggregated retention are usually used in western USA and Canada, while only aggregated retention is used in Tasmania because of worker-safety.



Aggregated retention



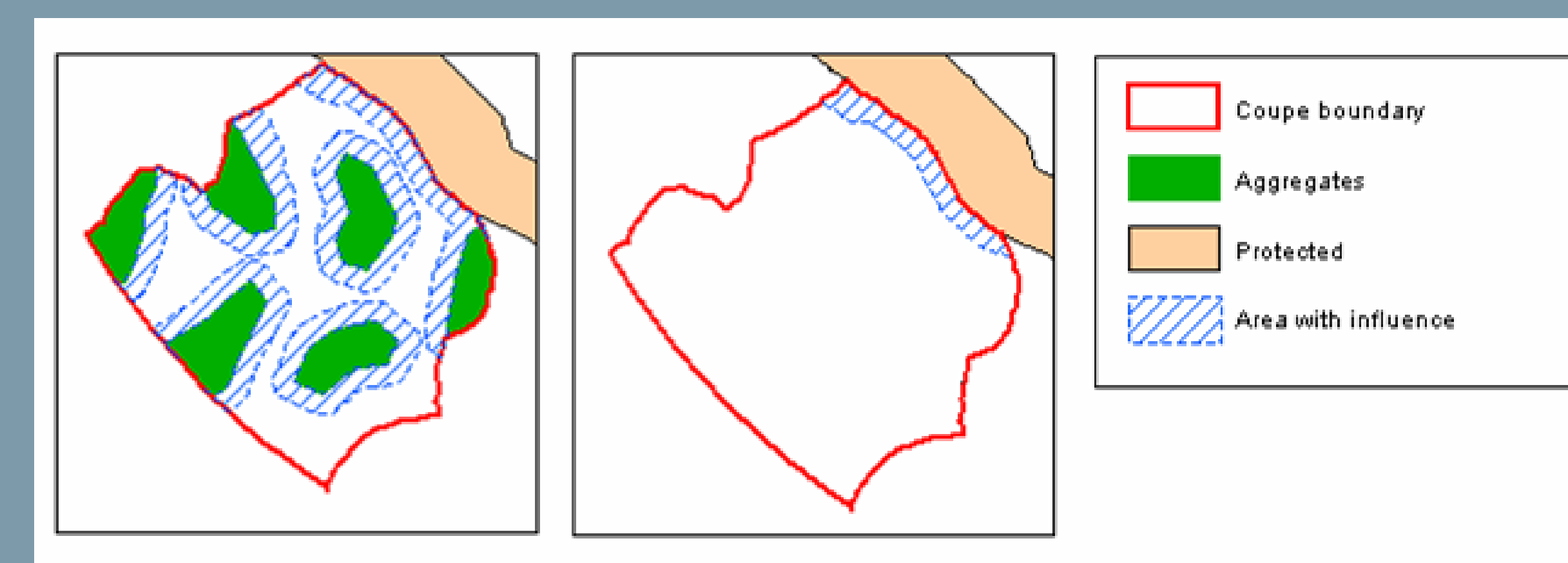
Dispersed retention



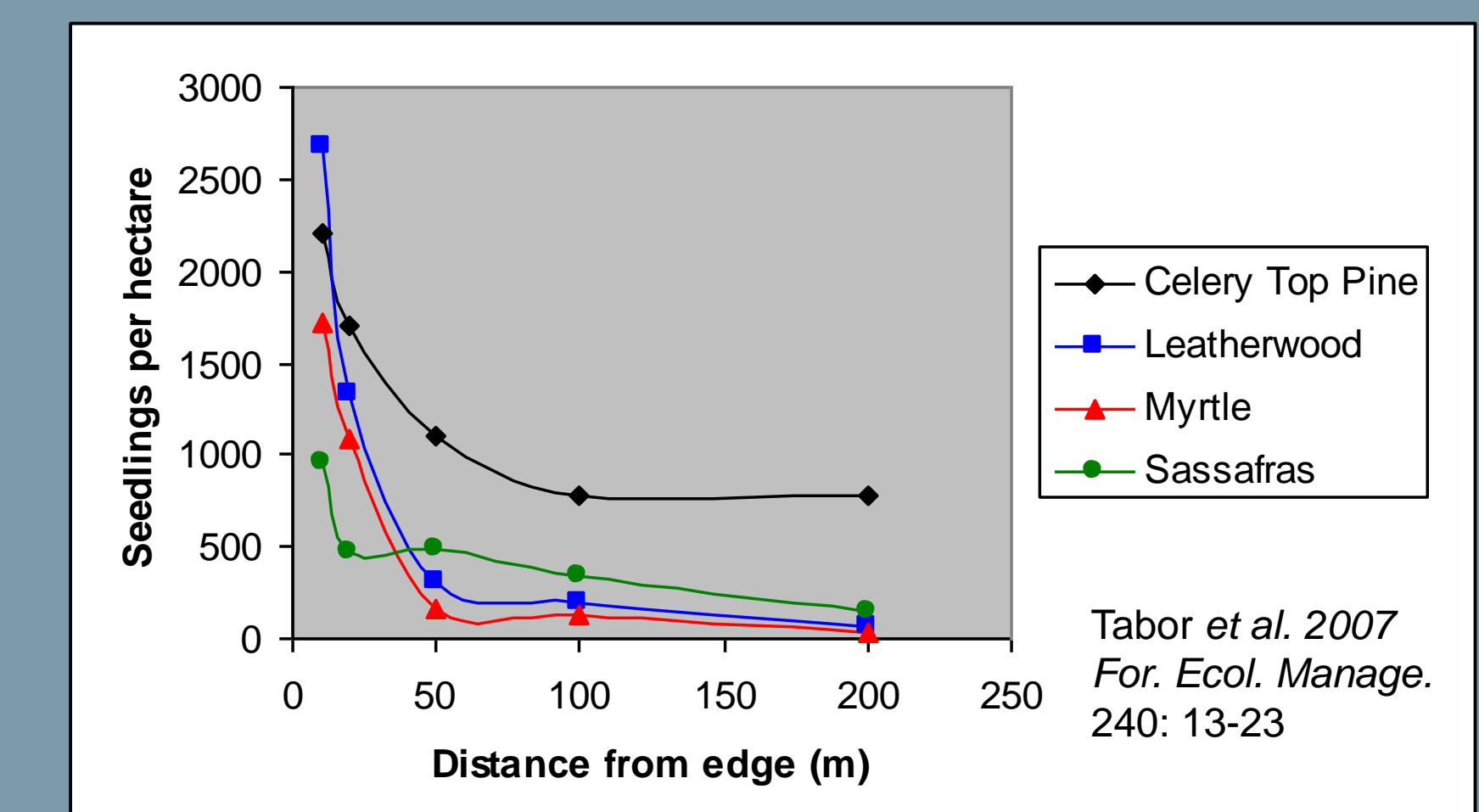
Mixed retention

Forest Influence

Variable retention is not only intended to *retain* species and structures within the harvested stands, but this retention is further expected to *influence* species composition in harvested areas. "Use of structural retention to sustain biological diversity assumes that refugia will provide the inocula for re-establishing species in the harvested area once the new forest stand and other suitable habitat conditions are re-established (Franklin *et al.*, 1997)". In some regions (e.g. Tasmania, Vancouver Island) forest influence rules distinguish variable retention from clearcutting. However this is not the case in western USA. For example the majority of the harvested area (Tasmania) or stand (Vancouver Is.) may be required to be within one co-dominant tree height of long-term retention. This is expected to facilitate recolonisation of harvested areas.



Forest influence (areas within 1-tree-height of long-term retention) is illustrated for a site with a permanently protected riparian buffer (top R.H.S.). By retaining 23% of the stand in aggregates, the VR site (left) has 51% forest influence compared to only 6% for the clearcut (right).



Tasmanian rainforest tree regeneration diminishes rapidly with increased distance into harvested areas away from unlogged mature forest edges.

Application of VR in western USA and Canada

VR is used by many organizations in western USA and Canada, including government and small and large private companies. Implementation varies widely. VR is used in several forest types, and in both oldgrowth and second growth forests. Organizations using VR feel that it finds a balance between the economic, social and ecological objectives of forest management.

Conclusions

Research and operational experience has shown variable retention to successfully maintain biodiversity from older forests at the stand-level. Future research will further refine management practices and lead to improved understanding of forest influence.

