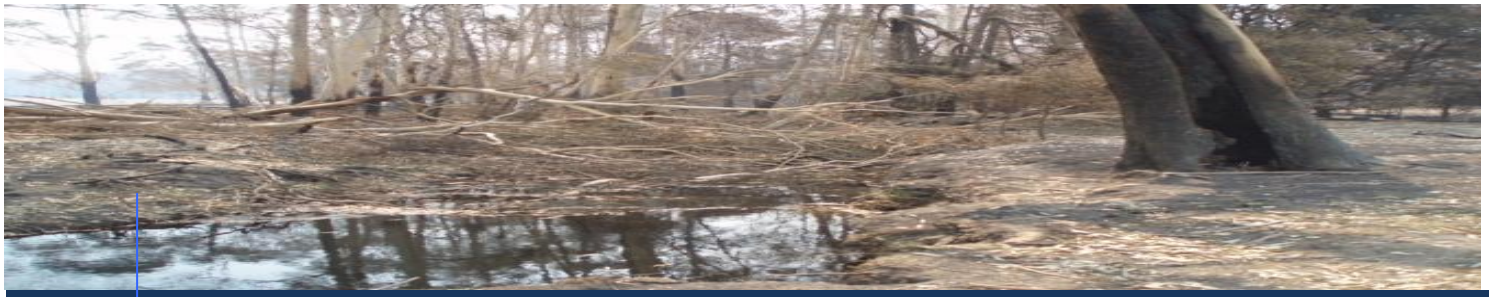


MANAGEMENT OF INSTREAM WOODY HABITAT AFTER FIRE

Goulburn Broken Catchment Management Authority Region[1]

This information sheet has been prepared to assist landholders in the fire affected areas of the Goulburn Broken Catchment Management Authority region with issues relating to waterways.

Management of Instream Timber following fire events

Wildfires can have huge impacts on streams both within and downstream from burnt areas. The major impact on aquatic life in streams is generally a result of around post-fire run-off, which can introduce large amounts of sediment and ash into waterways.

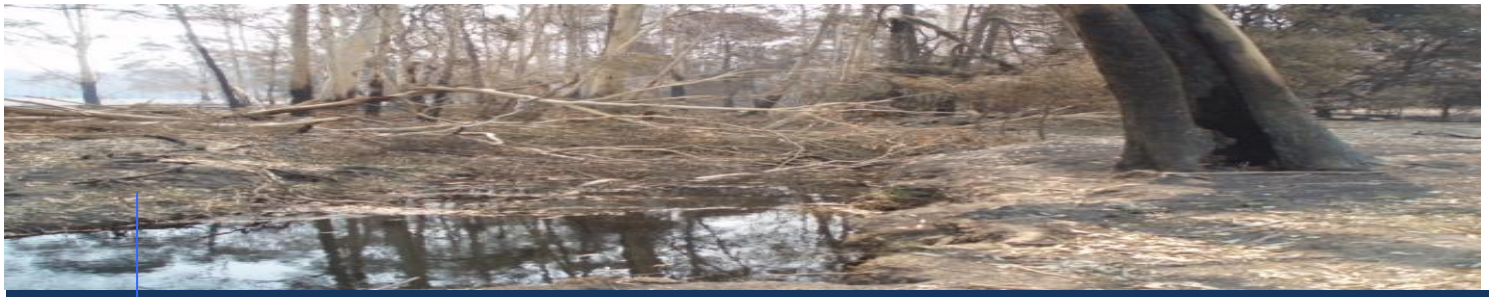
This run-off can kill aquatic organisms by reducing the amount of dissolved oxygen in the water, and also by clogging the gills with very fine sediment. In the longer term, aquatic biota can also be impacted by a loss of shading, reductions in food sources (i.e. macroinvertebrates) and changes in stream nutrient levels as leaf fall decomposes. Fires can also impact woody habitat within streams, firstly by burning some areas of existing woody habitat (thereby reducing the amount of wood in streams), and secondly by introducing large amounts of wood from burnt trees.

As fire is a natural process, in general these fallen trees are good for the stream, as they provide important habitat for fish species, algae and macroinvertebrates. In some cases, however, the numbers of fallen trees after a fire, or the position of the trees, can have detrimental impacts given current catchment uses. As such, the points below should be considered when undertaking works on waterways within (or downstream) from a fire impacted area:

- Remember that, in general, although it may look messy, having wood in a stream is good for stream health and it maintains a complexity of habitats (i.e. along with rocky/sandy substrates)
- Minimal removal is often the best result for river health. Timber in the stream is beneficial.

"Minimal removal is often the best result for river health. Timber in the stream is beneficial."

- Where large amounts of sediments have been washed into streams, woody habitat can also support the formation of scour pools, creating refuge habitat for native fishes in an otherwise blanketed environment with minimal habitat complexity



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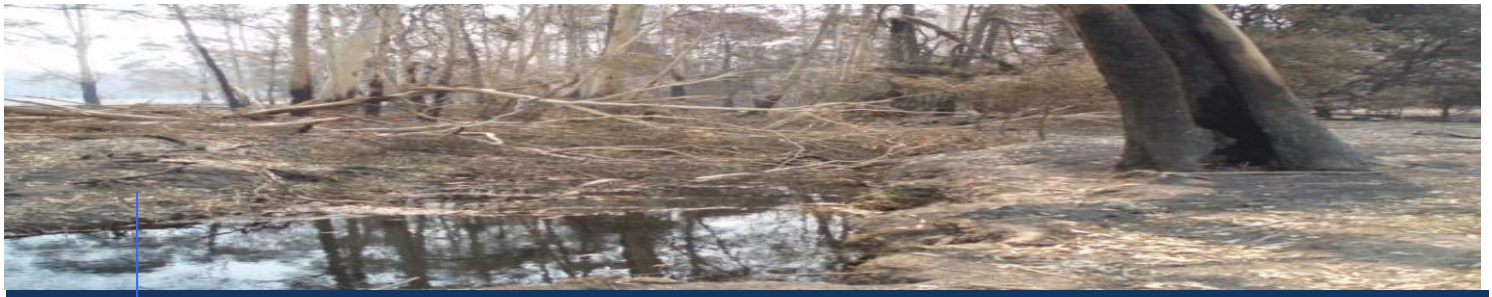
- Preliminary research has shown that on a small scale, introducing charcoal to water (which occurs through interaction with burnt bark on fallen trees) does not add large amounts of chemicals to the water. As with all wood introduced to a stream, some carbon is leached into the water column. In times of drought and low flow be aware that this may impact downstream areas in the form of algal blooms and low dissolved oxygen
- Where possible, salvage logging should be kept as far as possible away from streams, especially in areas which have been severely burnt, in areas where there is a high likelihood of erosion, or on steep slopes

- Areas where wood removal may be considered will generally focus on asset protection. For example, if it is clear that a fallen tree may cause erosion to a bridge or has the potential to cause a channel avulsion (realignment of the entire channel), then this tree may have to be re-aligned or removed. Similarly, if fallen burnt trees are likely to wash downstream and cause damage to bridges or fences, removal options may have to be considered
- Try to ensure that if wood does have to be removed, a high enough density is retained within the stream so that natural processes (small scale evulsions, scour pools, etc) can continue. Note that the densities retained will differ according to the size of the stream. In general, steep upland streams may require lower densities of woody habitat than deeper, slower flowing lowland streams.
- Also consider instream habitat downstream from the burnt area. It is likely that this zone will also receive high sediment inputs, which in deeper, slower flowing areas may settle into important habitat pools. Anything which can create turbulence (rocks, wood, pile fields, groynes) can be considered for use to ensure scour pools are maintained throughout a time when habitat diversity may become particularly low (due to smothering with silt)
- Avoid creating new roads in the burnt landscape – such areas are prone to erosion which can wash into waterways. Also, where new creek crossings have been built, ensure that there is enough water depth and habitat complexity at the crossing that fish can move within their stream (i.e. try not to cause barriers to fish movement).



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BURNT STREAM AREA CHECKLIST

Task	Done
Assets (roads, bridges, etc) identified	☑
Natural values (fish, habitat types) identified	☑
Assessment of woody debris load undertaken and recorded	☑
Erosive potential Identified	☑
Wood removed or realigned (if needed)	☑
Report submitted	☑

Woody Habitat

Structural Woody Habitat (SWH), or "Snags", are tree branches, large limbs or whole trees which fall into a creek or river or are reintroduced as part of a river health/waterway management initiative.

SWH provide a range of functions:

- can be an important to control of bank and bed erosion in active river channels;
- provide grade control
- cause an upstream pool to develop and provide a control
- amour and protect the bed against erosion and incision
- increase channel diversity; and
- enhance habitat and fishery values.

Use

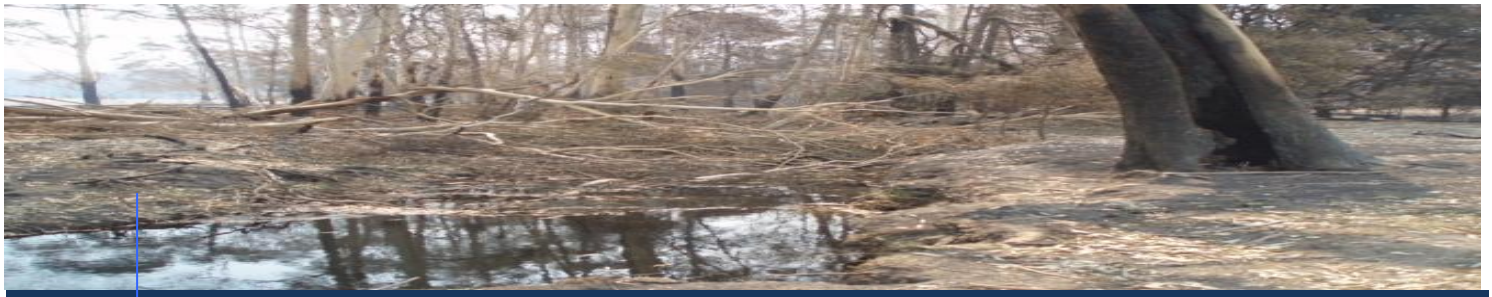
Snags are reintroduced to the stream to aid the functions listed above.

The Structural Woody Habitat when reintroduced into the stream is placed either exposed, submerged or semi-submerged along the stream at varying angles.

Suggested specifications for SWH instream habitat[1]

- use complex timber when possible ('root-balls' and timber with the highest branch counts).
- use recently fallen timber as it is heavier than old timber (reduces the likelihood of downstream movement)
- trunk circumference of the timber used for habitat should approximate 1 to 1.5m.
- some SWH may need to be 'pinned' or secured to the stream bed or bank to prevent movement
- timber should be grouped together during installation to provide the greatest habitat complexity.

[1] from Arthur Rylah Institute (ARI) - Proposed In-stream works program for Hollands Creek Demonstration Reach, 2009



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- preferable to have the largest timber on the bottom of the 'snag stack' with smaller timber laying over the top of the large snags.
- trunks of the 'root balls' should face down stream while the trunks with complex branches should face up-stream to simulate natural conditions.
- in-stream timber is preferably situated in the deep sections of the outer banks.

Above and right: Ash and debris in the upper Goulburn River catchment after the 2009 fires

FURTHER INFORMATION:

Department of Sustainability and Environment (DSE)
Further information can be obtained at local DSE offices, the DSE website **www.dse.vic.gov.au**

Goulburn Broken Catchment Management Authority (GB CMA)
The GB CMA will be undertaking rehabilitation works on waterways in fire affected areas. If you require assistance with a waterway issue or are interested in finding out more about other bushfire recovery works, contact the GB CMA on **(03) 58 201100, 57 360100** or **www.gbcma.vic.gov.au**

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