Fact sheet 15: Decision support systems

Decisions about how to best manage Victoria's forests are becoming more complex

Key points

- The health of Victoria's forests depends on a number of factors, including the climate, the history of bushfire, fire management, forestry practices, land zoning, recreation and tourism.
- Government policies, the law, and our social, cultural, environmental and economic values also shape the way we manage forests and conserve biodiversity.
- Many government agencies and businesses are responsible in some way for what happens in Victoria's forests; for example, ensuring that high-conservation forests are cared for, or a tourism business taking visitors into State forests and parks.
- With so many stakeholders, a wide range of factors to consider, and uncertainty about the effects of policy or activities, it can be difficult to make informed and accountable decisions about how to manage forests.

Making decisions about Victoria's forests

Forest management navigates the complexities of policy, law, and social, economic and environmental values. As with all decision making there is a degree of uncertainty, some of which can be resolved with more science, economic modelling or consultation with partners and stakeholders.

Making decisions about Victoria's forests is becoming more complex. This is partly because of increasing uncertainty about the environment in the future due to climate change. We also now consider values that have not been accounted for in the past. We need a decision support system that will help handle the complexity and uncertainty, while still maintaining the transparency needed for good governance.

A decision support system will help us answer a number of questions such as:

- How can we manage forest ecosystems so that we continue to receive the benefits of ecosystem services in spite of the risks of fire and climate change?
- How can we improve the interface between science and policy?
- How do we balance different objectives, values, and community expectations?
- How do we incorporate community values into decisions?

Building a decision support system

The objective of this project is to develop a model that will help land managers and communities to interactively explore potential changes to forest ecosystems, depending on a range of environmental factors, policies and interventions. These interventions may include planned burning as part of bushfire management, extracting forest products, managing pests and weeds, and maintaining and restoring habitat.

The decision support system will be designed to:

- give a consistent structure to the decision-making process
- allow the values of a broad range of stakeholders to be represented
- support collaborative planning and evaluation
- enable scenarios to be developed according to different management objectives or actions
- support multi-attribute analysis methods
- allow forecasting of biophysical, social and economic values over a range of timeframes in specific locations
- support communication to stakeholders about the acceptability of management options

Research project titles

A decision support system for forest management

Who is doing this work?

University of Melbourne

Department of Environment, Land, Water and Planning as part of the Integrated Forest Ecosystem Research Agreement

- help decision makers explore adaptive management options
- make it easy for diverse groups to use the system to explore outcomes depending on the scenario or priority given to forest values.

The ultimate goal is to develop a decision support system for the whole state; however, initial development and testing will be for the Central Highlands.

The project will have three stages

This project is in the early stages of development with parallel activities also happening to develop software, standardise metrics, and integrate new social and economic research.

1. A prototype

The research team will develop a prototype that can carry out cost-benefit analyses and risk assessment against a range of quantifiable values, for three higher-priority management practices: fire management, timber harvesting, and land-use change.

The table shows the range of values that will be modelled, with examples of the risk measures.

The prototype has been developed for the Central Highlands region. Scenarios – including climate change, harvesting and planned burning – will be used to test it. The prototype will have the capacity to examine the effects of environmental factors, policies and interventions at a landscape scale and at the scale of a forest stand. It will also be able to model the 'tactical' short term of 3 to 5 years, or the 'strategic' long term of 5 to 50 years.

The prototype will be used by trained department staff with outputs available for guided conversations and consultation with stakeholders and partners.

2. Refine and expand the model

The research team will increase the number of scenarios and landscapes that the model can support, and improve the usability of the interface. The team will also recommend ways to present risk assessment to communities and stakeholders.

3. Improve functionality

During this stage the team intends to improve functionality to allow real-time modelling, so, for example, questions can be tested and answered during community consultation.

Values	Example risk metrics
Natural (biodiversity)	Deviance from optimal growth stage distributions Changes in species habitat Tolerable fire intervals
Natural (carbon)	Percentage change relative to carbon carrying capacity
Natural (water)	Changes in water supply quantity Number of days water is undeliverable Likelihood of impact on physical infrastructure
Regional economy	Economic impact measured in monetary terms compared to baseline
Implementation cost	Economic cost How costs are borne by different groups
Human health (emphasis on life)	Loss of houses and lives
Infrastructure	Impacts on assets (lines, towers, electronic equipment)
Cultural history and heritage—Indigenous	Impacts on cultural sites
Cultural history and heritage—non-Indigenous	Impacts on community facilities Loss of houses
Experiential	Percentage of landscape blackened
Recreational setting	Impacts on facilities

Bridging a gap

The decision support system will not be ready to support the renewal of the regional forest agreements, but it will be instrumental in forest and fire management planning in the future.

For the purposes of modernising the regional forest agreements, researchers are developing a tool called the Integrated Forest and Fire Model (IFFM), which will capture the full suite of environmental, social and economic forest values.

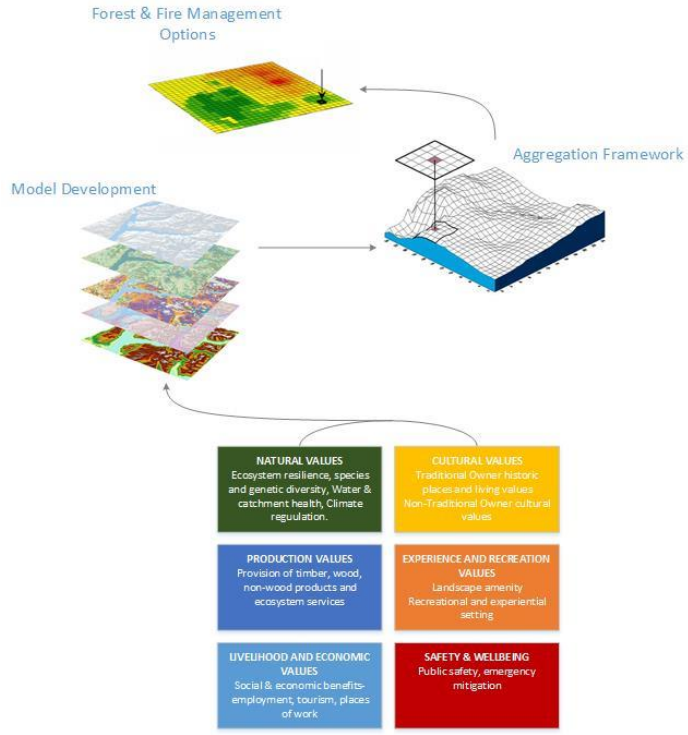
This model will support the visions for forest management, inform the development of regional forest agreements, and help practitioners to evaluate management strategies.

The model is based on a structured decision-making framework, which helps people deconstruct complex decisions, generate creative management options and make informed, defensible and transparent choices based on scientific evidence and values-based trade-offs.

With the Integrated Forest and Fire Model DELWP will be able to

- simulate potential management scenarios with explicit spatial and temporal detail that maximises the biodiversity values across Victoria's forests
- explore the consequences of these scenarios on the suite of forest values, objectives and measures
- analyse scenarios relevant to the scale of a forest value at local level to the whole state
- roll out outputs from the modelling platform to regions and integrate it with other land managers
- integrate the Integrated Forest and Fire Model IFFM with the decision support system in the future.

Work on the Integrated Forest and Fire Model will commence in early 2019 with a view to informing the negotiations for regional forest agreements from September 2019.



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This series of fact sheets

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