Context Document: USFS Timber Management ESCM

http://bit.ly/NI-ESCM

Ecosystem Service Conceptual Models (ESCMs) summarize the effects of an intervention on ecological and social systems. Each model links changes in biophysical systems caused by an intervention to measurable socioeconomic, human well-being, and ecological outcomes. This is a general ESCM that assumes the intervention is successful and includes all potentially significant outcomes for the intervention. For individual projects, not all outcomes will be relevant and will depend on location and environmental conditions.

The direction of an outcome (whether the intervention will have a positive or negative influence) often depends on the specific situation. There may be multiple links (arrows) leading into an outcome that have opposite effects. Thus, language like "increased" or "decreased" is not included in this model. These models are often used to consider management with or without an intervention or to compare different interventions.

This document provides information about the intervention—**Timber Management on U.S. Forest Service (USFS) Land**—and details about some of the relationships in the ESCM. It also includes a list of the references used to develop the ESCM and names of experts with whom we spoke to refine the model.

This ESCM was adapted from the Fire and Timber Management ESCM, which includes the interventions described below as well as additional interventions for fire management. The Predictive Model Library for the Fire Management and Timber Harvest ESCM includes summaries of quantitative models available to predict the relationships shown in the ESCM and short discussions of relationships for which predictive models are not currently available. These models could be linked together to develop a scenario modeling tool with ecosystem service outcomes.

USFS Timber Management Interventions

Two interventions are included in the ESCM:

- **Harvest** of timber for commercial sale refers to the removal of whole trees from a stand for the purpose of milling, and includes clear-cut, shelterwood-cut, and selective harvesting approaches.
- **Thinning** refers to the removal of a certain percentage of trees, particularly from a young stand (10–15 years), to improve stands' commercial value or to manage fuel loads. This includes both precommercial and commercial thinning.

External Factors

Many external environmental and social factors influence the type of intervention that can be done in a certain location and how successful the intervention is. Public opinion can influence the use of timber harvest (can be negative or positive depending on the community composition and interest groups). Harvest and thinning are often not possible on steep slopes due to limited access.

Model Notes and Clarifications

Landscape aesthetics: Landscape aesthetics are a difficult-to-measure quality that determine how aesthetically pleasing people find the landscape, and therefore how suitable they think it is for various recreational uses. Many characteristics of the landscape can influence aesthetics; a few major ones (canopy structure, plant species composition, tree size) are included in the model.

White nodes: White boxes represent system components that are only relevant in specific contexts. For example, pine straw biomass can be a commercially valuable product in certain types of pine forest; ticks and tickborne disease are particularly important in the northeastern U.S., and mushrooms are harvested recreationally and commercially in certain locations.

Carbon flux: The carbon flux node represents changes in carbon emissions or sequestration. This can occur through short-term events, such as carbon emissions from wildfires, or over a longer time period, like changes in carbon sequestration rates after a management action reduces the total number of trees in the forest or shifts tree species composition. Both types of changes are included in the ESCM, represented by the links leading to the carbon flux node.

Other relevant ESCMs: This ESCM represents management actions that are focused on timber harvest. If you are using the ESCM in a context where a significant fire event is likely to occur, especially in the timeframe you are considering for management, it may be helpful to look at the additional ESCM indicated in a green oval.

Experts Consulted

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Jimmy Kagan, Oregon State Institute for Natural Resources

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