

HARMENY MANAGEMENT PERSPECTIVES

Forest Asset Accounting: A Discussion Paper

Executive Summary

This HARMENY MANAGEMENT PERSPECTIVE introduces the notion of Forest Asset Accounting as a methodology that:

- Provides an integrated approach to dealing with trade-offs in resource utilization that balances biological, social and business concerns.
- Provides an accounting framework that increases the transparency of the basis for, and financial consequences of such trade-offs in resource utilization.
- Provides a basis for valuing forest assets in the short and long term.
- Provides a basis of measuring progress towards sustainable resource management goals

The economic objectives of forest asset management are as follows :

- To increase short-term cash flow.
- To increase long-term asset value.
- To reduce exposure to risk that long-term asset value will be jeopardized due to inadequate environmental management.

To achieve these economic objectives, forest asset management depends on a proper biological foundation which can be reduced to a single, but extremely meaningful item:

- To establish the inventory as the foundation for monitoring, management and reporting of forest assets.

The rest of this document develops the concepts needed to understand forest asset accounting, and illustrates its use through a case example based on coastal forestry in British Columbia.

In working through the example, it becomes clear that forest asset accounting relies first and foremost on an accurate picture of the forest land base today and tomorrow: the forest inventory. The forest inventory is the asset. Take it to the bank.

Forest Asset Accounting – Why Does Industry Need it?

The suitable allocation of forests to produce a wide variety of forest assets cannot be gauged without a common accounting system that is capable of valuing the trade-offs inherent in choosing one set of outcomes versus another. These trade-offs involve the meeting of social, economic and environmental objectives and they are often weighed within the concept sustainability.

The success of forest managers depends (or should depend) on their abilities to maintain or enhance forest assets through a process that involves assessing trade-offs inherent in choosing one allocation versus another to produce desired outcomes. Such trade-offs, however disagreeable they may be to some individuals in society, are an unavoidable fact of our individual existence and of our (need for) respect for (the needs of) others. We can try to ignore them (trade-offs), but they will not go away. We must choose, and we need a basis that makes the consequences of our choices clear to ourselves, and to the communities and stake-holders we are responsible to.

A system is needed:

- To account for trade-offs in alternative allocations of forested areas to the production of different forest assets.
- To monitor the efficiency and effectiveness with which desirable outcomes are produced.
- To identify the degree to which the value of forest assets are being maintained or enhanced.
- To identifying opportunities for increasing the total value of the sum of the assets.

In the rush to produce Criterion Indicators, the basic management problem of managing trade-offs using a common currency (language, accounting standard) has been sacrificed for the sake of producing a plethora of indicators (languages, accounting systems) that answer to individual concerns and suit individual preferences, but do not address the unavoidable fact – a fact that must be addressed if society is to get the most from their assets and if forest managers are to be empowered to succeed in producing the desired outcomes.

“ The most important and routine decisions affecting forest asset management are about which stands and which trees to cut, and which stands and which trees to leave behind.”

The Concept of Forest Asset Accounting

Forest Asset Management is a unified system of accounting for Social, Economic and Environmental assets. It helps communicate the values of forests to stakeholders and public interest groups, as well as to Executives and Directors. It helps Managers to identify opportunities for enhancing Forest Assets through innovative forest practices.

The foundation for this system of accounting is embodied in the following equation:

$$AV = CT_{PY} + CT_{FD} + CE_{FD} + CS_{FD} \qquad \text{Equation 1}$$

where,

AV = Total Asset Value

CT_{PY} = Net cash flow from liquidation of timber and expenditures in the previous year, including allowance for depletion.

CT_{FD} = Expected discounted net revenue - future liquidation of remaining timber.

CE_{FD} = Opportunity Cost of expected discounted net revenue from future liquidation of remaining timber, allocated for environmental protection.

CS_{FD} = Opportunity Cost of expected discounted revenue from future liquidation of timber, allocated for community well being.

This basic equation provides a foundation for Generally Accepted Accounting Principles (GAAP) as applied to the management of forest assets. It develops a common currency for describing forest assets. The environmental and social accounts identified above can be further subdivided into more specific uses such as "Maintenance of Biodiversity" or "Maintenance of Visual Quality" for specific landscapes.

Forest Asset Management

The accounting system is initialized relative to the last three terms and a long term forecast of expected revenues and opportunity costs given historical trends in social, economic and environmental factors. The opportunity costs involve reassigning the potential benefits that would be accrued through harvesting to the protection of social and environmental values. However, instead to displaying these as costs (negative numbers) they are indicated as benefits. Logically the values of social and environmental goods and services exceed the potential values from harvesting, otherwise harvesting would proceed unabated.

The system is implemented operationally in the course of preparing an annual statement that shows the change in forest asset value relative to the expected state as of the start of the previous year (excluding the term CT_{PY}). If, for example, a large amount of timber is liquidated in a poor market (relative to the expected long-term average established in the forecast) then the change in forest assets from the previous year will be negative (There is a decline in Forest Asset Value). Harvesting that involves a liquidation of social and environmental assets are indicated as such by assigning a reduction in the values assigned to those accounts. While there may be good reason for this activity (e.g. windthrow), such changes in asset value require explanations of the kind that would typically be found in the footnotes of a standard accounting Statement of Assets and Liabilities.

The challenge for forest managers is to ensure that environmental goods and services are indeed maintained or enhanced while providing for cash flow to maintain a profitable and competitive forest management operation. This provides a focus on the forest values that are actually being protected (as opposed to their attributes), for example the production of clean water throughout the year. The Forest Manager must constantly evaluate the forest attributes and management practices that are necessary to achieve that objective.

Opportunities for enhancing forest assets may be available to the Manager by effecting a transfer of assets from the Environmental account to the Economic Account while at the same time maintaining or enhancing Environmental goods and services (win-win). In economic terms there is a potential to expand the frontiers of production to the overall benefit of everyone. The challenge for the Forest Manager is to find those opportunities. The Forest Asset Management accounting system enables clear and consistent reporting when such opportunities are realized, by indicating a shift in assets from the Social and Environmental portions of the ledger to the Timber Harvesting / Forest Management side of the ledger. Along with this shift in assets, a footnote is provided as to why such a shift occurred.

Reducing the costs of management can also enhance Forest Assets provided that such reductions do not also reduce revenues.

Sustainability – Forest Asset Accounting’s Context

Sustainability involves maintaining or enhancing Environmental, Social and Economic goods and services such that future generations will be endowed with a range and extent of opportunities that are similar to our own. Environmental issues include the following:

- Protection of Biodiversity through Ecosystem Management (Based on the Philosophies of Natural Disturbances, Keystone Species, Integrated Pest Management) and / or Habitat Management (Based on the notions of Life forms, Guilds, Feature Species, Unique Habitats, etc.).
- Amelioration or prevention of Greenhouse effects and the effects of pollutants in general (e.g. Water Quality).
- Social issues revolve around the allocation of Property Rights, for the purposes of maintaining or enhancing:
 - Traditional uses.
 - Recreation and Aesthetic Values.
 - Employment.
 - Health.

Forest Asset Accounting is designed as means of weighing up the allocation of assets to each of the social, environmental and economic accounts. Forest assets should be maintained or enhanced and the balance of accounts amongst the various kinds of assets be managed to obtain sustainability. Actions causing a decline in environmental assets, either directly (logging an old growth reserve without providing a substitute) or indirectly (harvesting a Riparian area after extensive windthrow) are management’s failures to provide for sustainability. Actions ameliorating the impacts of these kinds of events or preventing them from occurring at minimum cost result in management that is increasingly consistent with the notion of sustainability. The Forest Asset Accounting System provides a consistent means for communicating on the degree to which success in managing for sustainability is being achieved and helps managers focus on where and when the degree of success can be improved through a change in forest practices.

Although not discussed herein, Forest Asset Accounting is modeled after the notion of accounting for Net National Welfare as substitute for Gross National Product. The latter fails to account for the liquidation of assets that were required to produce Economic benefits. In the case of a forest and within a narrow economic context, maximum (short-term) benefits are obtained by liquidating forest assets in the hopes of reinvesting the proceeds into higher-yielding investments. The difficulty with this proposition is that over the longer-term these “higher-yielding investments” may ultimately produce lower yields than would have been produced by managing forests more consistent with the notions of sustainability. This discussion is beyond the scope of this introduction to Forest Asset Accounting. Those interested in the concept of Net National Welfare accounting can refer to Goodstein (2002). Those interested in the rates of return in the short versus long-terms and their effects on the choice of suitable discount rates can refer to Ferguson (2001).

A Hypothetical Example From BC Coastal Operations

Table 1, on the next page, describes a hypothetical strategy for implementing forest asset management in a British Columbia Coastal Forestry Operation.

The major limitations to implementing this strategy are:

- The quality (fidelity) of the inventory and the ability to properly project stands and forests through time, with and without various kinds of treatments.
- The capacity and techniques used for updating and reporting on the current state of the inventory, including the ability to project the current state of the forest forward.
- The capacity to model future forest conditions as an ongoing activity central to forest asset management of the company.
- Information is the most limiting factor because forests can not be understood from first-hand experience alone; they are generally too big to be understood by any one person, even after a lifetime of experience, and information provides a kind of long term memory of what the forest was, how it functions, and therefore about what it is expected to become.

The inventory and its management is therefore a necessary step toward making long-term improvements in forest asset value. This investment is much the same as an investment in permanent access structures such as main roads, and should be accounted for in much the same way within the organization.

Table 1 lists a set of key objectives with respect to forest asset management, and key actions to realize those objectives. As such, in précis form, it provides the template for a forest asset management system and illustrates a view of forest assets that integrates the perspectives of the forest manager and forest economist, recognizing that both perspectives ultimately depend on the state of the forest inventory, and this is often the area where information is most lacking, and a gain in information can have the greatest long term impacts.

Table 1. A list of possible actions to enhance the Forest Asset Value of B.C. Coastal Forestry Operations.

Item	Objective	Action
1	Develop and implement procedures for forest asset management using existing information.	a) Finalize development of asset management procedures and integrate into annual accounting and reporting procedures.
2	To increase short-term cash flow.	<ul style="list-style-type: none"> a) Schedule harvests to protect growth potential. Liquidate slow growing stands first. b) Harvest only those stands that have a minimum marginal return (e.g. 10 \$/m3) to meet overhead and cost of capital requirements. c) Use 6 month to 1-year market forecasts for various log grades. d) Review road construction, maintenance and deactivation plans. e) Review flexibility to increase and decrease harvests in response to market demands. f) Review mix of long-term (Market security) and short-term (Maximizing revenues) sales agreements. g) Review ability to forecast log quality production / Adjust harvest schedules to meet different demands for products.
3	To increase long-term asset value.	<ul style="list-style-type: none"> a) Develop silviculture investment policy with minimum internal rates of return (2 to 3%) for assessing silviculture / habitat / environmental protection investments. b) Review current silviculture investment strategy and assumptions regarding increases in production in response to various kinds of treatments. c) Review long-term access management strategy, including road construction, upgrades, and the use of temporary roads. d) Review windthrow management strategy. e) Develop silviculture and harvesting regimen. f) Integrate these into a forecast of long-term cashflow using a spatially explicit planning model.

Table 1 (continued).

Item	Objective	Action
4	To reduce exposure to risk that long-term asset value will be jeopardized due to inadequate environmental management.	<ul style="list-style-type: none"> a) Develop capacity to incorporate modeling of large-scale ecosystem processes into forecasts of reasonably possible future forest conditions. This modeling is designed to assist in emulating natural disturbance patterns (esp.: watershed dynamics: snow-pack accumulation and retention, peak and minimum flows, siltation of streams, quantity and quality of fish habitat) and to reduce losses due to damaging agents such as windthrow. b) Review current riparian zone management restrictions to ensure sustainability of basic ecosystem processes – (1) Recruitment of large organic debris, (2) Disturbances to promote alder and cottonwood production as streamside vegetation, (3) Promotion of regeneration of conifers and of commercial thinning for achieving long-term stability in recruitment of large organic debris. c) Develop habitat system of management, identifying key life forms, indicator species and habitat use or requirements for purposes of designing post-harvest stand conditions. d) Review basis for establishing and maintaining FENS. e) Confirm strategies for operating in areas with unstable slopes.
5	To establish the inventory as the foundation for monitoring, management and reporting of forest assets.	<ul style="list-style-type: none"> a) Establish process for retaining plot level tree lists and producing stand and stock tables for each polygon in the inventory. b) Populate initial stand and stock tables for each polygon using a well designed sampling regime. c) Develop capacity to update inventory – growth and depletion – based on current inventory, stand and stock tables, and ultimately tree lists. d) Review all survey and assessment procedures – ensure that they are properly integrated into maintenance of the inventory. e) Calibrate system for localized growth projections and yield compilations.

Table 1 (continued).

Item	Objective	Action
6	To develop a short and long-term plan for meeting the above objectives.	<ul style="list-style-type: none">a) Start by designing forest asset management system using existing information.b) Complete review of objectives and potential action items described above with staff, particularly as they relate to issues that have not been identified.c) Identify priorities for next management plan.d) Identify priorities for short-term business management needs.e) Identify short-term priorities necessary to enable long-term developments to proceed.f) Develop budget and timelines for completing activities.

References

Ferguson, Niall. 2001. **The cash nexus. Money and power in the modern world. 1700 – 2000.** Basic Books, New York, NY, USA.

Goodstein, Eban S. 2002. **Economics and the environment. Third edition.** First published in 1960. John Wiley & Sons, Inc.



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