

# Harmeny's Management Perspective

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# Mission Statement

Harmeny Systems is a team devoted to forest stewardship through the improved design, development and delivery of management systems, integrating strategic planning, monitoring, analyses, implementation and forecasting of future outcomes.

## Who we are and How Harmeny came to be

Harmeny Systems Limited developed from a group of Foresters and Researchers working on a large monitoring and management programs for several companies in N. British Columbia in the mid 1990's. The work began in silviculture, based on the development of Integrated Pest Management, Planting Management, Silviculture Treatment (Response) Monitoring and Operational Planning. This work has been extended more recently into Inventory Management including Growth and Yield plot establishment, measurement and modeling, storing and retrieving Forest Cover and Vegetation Resource Inventory Data, etc. Ian Moss, and Mishtu Banerjee developed Harmeny Systems Ltd to further develop the software tools, analyses, and forest management ideas that originated out of this group.

## A Perspective On Forest Inventory, Monitoring and Management Systems

The development of an effective forest inventory monitoring and management system requires: (1) clear forest management objectives or statement of desired forest level outcomes, (2) a thorough assessment of data and information requirements necessary to meet those objectives, (3) a comprehensive, flexible and user friendly framework to manage the inventory. The focus of the program must be in maintaining an up-to-date account of the current state of the forest, and in enabling the development of rapid strategic forest and stand-level management responses to changing social, economic and environmental conditions. To achieve these ends it is worth describing a few key forest management paradigms.

# Forest Management Paradigms

## Sustainability

Sustainability requires that as much as possible, social, economic and environmental issues be resolved in favour of a win-win-win solution. Social issues are resolved by producing an equitable distribution of wealth emanating from the use or very existence of the forest. Economic issues are directed toward maximizing the total wealth produced from the forest, regardless of distribution. Environmental issues are addressed via the paradigms of ecosystem and habitat management described below. The management of these issues can be incorporated into an adaptive management framework that produces continuous improvement in our ability to achieve desired forest level outcomes, and in our actual achievement of the same.

## Ecosystem Management

Ecosystem Management is founded in natural disturbance philosophy with the objective of maintaining biodiversity. The philosophy states that each species is adapted to a range of conditions that have been historically produced, in particular by large scale natural disturbance agents such as fire, bark beetles and root rots. Furthermore, if one chooses to focus on creating favorable habitat conditions for a select few species (keystone, feature, indicator, threatened and endangered, and other kinds of species) then one can not help but contribute to the marginalizing other species. Accordingly, the best that we can do as forest managers is to maintain landscapes in a condition that is within the historical natural range of variation relative to certain structural features, often referred to in the context of seral stage distributions.

This notion has been criticized by some who point out that the natural range of variation may be extended by current broadscale environmental conditions (e.g. the prospect of global warming) that are changing the way in which natural processes interact with the landscape, and that these changes will occur no matter how hard we try to manage to meet with an historical range of conditions. Under these terms the former strategy is mal-adaptive; the very thing that we seek to protect may be destroyed because we focused on historical structural characteristics rather than how processes are likely to manifest changes through time. Ecosystem management is re-interpreted as being the act of accounting for how natural disturbance processes interact with landscape conditions, for the purpose of anticipating the occurrence of large scale (catastrophic) events, and for designing activities that could be used to ameliorate the potential impacts.

Reasonably possible future forest conditions are forecast with consideration for the details of how ecological processes function in different landscapes and how these result in different landscapes characteristics, rather than forecasting solely with reference to the activities of mankind. This enables a risk assessment of the potential for different kinds of outcomes, that in turn can be used to guide the development of silviculture, harvesting and forest protection strategies.

The concept of Integrated Pest Management is closely aligned with this view of Ecosystem Management insofar as it attempts to minimize the interventions required to meet the desired outcome – working with nature rather than against it.

## Habitat Management

Habitat Management is organized around the concepts of species guilds or life-forms. With reference to the latter, each lifeform has a common set of habitat requirements that are defined with reference to biogeoclimatic-ecosystematic characteristics. The maintenance of life-forms is dependent on maintaining those characteristics in appropriate proportions and juxtapositions within a landscape. Each life-form is represented by an indicator species that can be monitored as to its occurrence and abundance within a landscape; these statistics can be compared with the availability of habitat to determine whether or not there is a potential problem related to either the definition of habitat or the protection of a particular species. Habitat Management extends beyond this broad categorization of species to also deal with feature, threatened and endangered species.

The advantage of Habitat Management is that it provides a foundation for quantifying the occurrence of species and their habitats. Its weakness is in the very fact that it can not deal in detail with all of the species present within a landscape and it is this same point that leads to the practice of Ecosystem Management. The two systems are complimentary. The prudent manager will use both concepts as the rubric within which to forecast and describe reasonably possible future forest conditions and thus for developing appropriate forest management strategies directed toward maintaining biodiversity.

## Forest Asset Management

Forest Asset Management is based on the desire to conduct profitable forestry operations. The objective of managing forests to maximize short-term cashflows by choosing those stands and trees that are best harvested today and those that are best left behind to maintain or enhance the potential value of the forest asset. In the long term, the asset value of the forest estate is increased by: (1) having implemented sound environmental management practices (see above), (2) having produced a reputation for being socially responsible both as an employer and a

member of the broader community, (3) having reduced the annual cost of accessing the forest through sound access management, (4) having reduced the potential unit costs of accessing timber through sound silviculture and harvesting practices, (5) having increased the option value of the forest by maintaining a solid base of standing forest assets that can be utilized in poor as well as good market conditions, (6) having made use of monitoring and management information systems to substantiate these improvements, and to provide for a detailed accounting of the potential value of the standing forest assets for use by potential investors and owners, through a process of multiple accounts.

## Adaptive Management

Adaptive Management encompasses the process of learning how to do things more effectively and efficiently. Leading edge organizations are concerned about advancing their competitive position in the market place; to do this they need employees who have a clear management objectives, ready access to information that can help them determine how best to achieve those same objectives (see above) and whether or not they have been met, and employees who are motivated and empowered to achieve the desired outcomes through all reasonable means. This concept is self evident to those working in the forest industry but it is rarely implemented. Commonly, forest management objectives are too vague to act upon with any chance of success. As a result incentives to direct employees toward meeting those objectives are of little use. Monitoring and information management systems are directed toward meeting regulatory requirements without any strategic or tactical application.

The key to success is to acknowledge that while forests are complex, the objectives should be relatively simple, easy to understand, capable of being assessed as to whether or not they are being met, important enough to do something about them if they are not met, and of a sufficiently enduring quality that they are worthwhile pursuing in spite of the exigencies of the social, economic and environmental circumstances within which we operate. The above mentioned concepts are critical to the development of such objectives. A commitment to adaptive management then provides the context for building monitoring and management systems to ensure that progress is being made toward fulfillment of those objectives. These are the winning conditions necessary for achieving successful forest management.

# Building Information from Data, Obtaining Knowledge from Information

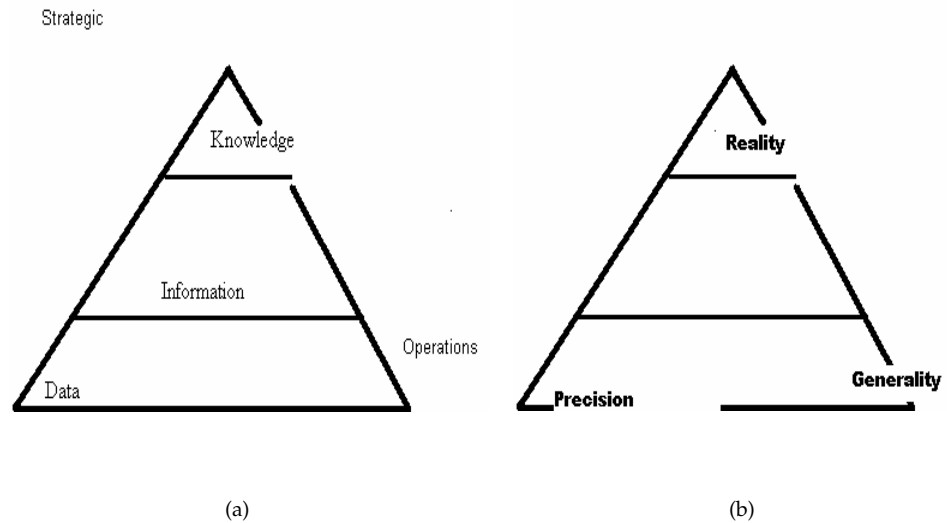


Figure 1. What is information? a) From data to knowledge. b) Trade-offs in the kinds of information that can be obtained.

Figure 1 provides two different perspectives on the question of what is information. We must answer this question to be effective in developing our information management system. Figure 1(a) describes information as a summary of sensory data; such information becomes knowledge when it can be put to use in decision making. There is much data that is never processed into information, and there is much information that has no application for developing responses to changes in the environment. The challenge for the manager is to filter the minimum amount of data that is necessary and sufficient for effective strategic and tactical decision making, and then to organize it so that it is delivered in support of timely decisions.

Figure 1(b) presents the idea that information about different kinds of events has three dimensions. A realistic description of an event requires that we sacrifice precision and generality for the sake of making extensive observations of what actually happened. Generalizations are acquired by sacrificing that which is unique for that which on average describes the similarities between a relatively large number of disparate events. Precision is obtained by isolating the influence of just a few factors at a time, all others factors being equal, on a relatively small number of events or by subdividing an ever larger number of events in an effort to isolate the factors that provide the best explanation for the differences between them. Researchers are often focused on obtaining a high degree of precision whereas Managers often seek to obtain a general set of guiding principles that can be applied to many circumstances,

sometimes at the cost of reality. The expense of obtaining a high degree of precision must be weighed against the potential benefits that will be accrued as a result.

For many managers economically efficient decisions can be made with a low level precision, particularly where the potential for benefits is large and/or the potential for regret is large if alternative decisions are made. In such cases a knowledge of probable outcomes made with higher degrees of precision will have no impact on the managers decision. A practical balance must be struck between that which is realistic, generalizable and precise in the course of developing the information management strategies and tactics.



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