# MF013 MANEJO FORESTAL II

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|---|---|---|
| **NIVEL** | **:** | **PREGRADO** |
| **CARRERA** | **:** | **INGENIERÍA FORESTAL** |
| **CARÁCTER** | **:** | **OBLIGATORIO** |
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| **PROFESOR RESPONSABLE** | **:** | **HORACIO BOWN** |
| **E-MAIL** | **:** | **hbown@uchile.cl** |
| **Fono** | **:** | **978 5872** |

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## Ecosystem Management

**The use of an ecological approach to resource management at the landscape level that blends social, physical, economic, and biological processes to ensure the sustainability of healthy ecosystems while providing desired values, goods, and services.**

Source: Society of American Foresters

| | Forest Management | Ecosystem Management |
|---|---|---|
| Objectives | Sustain flows of specific products | Maintain ecological and desired forest condition, within which the sustained yield of products to meet human needs are achieved |
| Strategy | Resembles agricultural model | Reflects patterns of natural disturbance |
| System character | Emphasizes production efficiency with environmental constraints | Retains complexity and processes |
| Unit of management | Stands and aggregation of stands within an ownership | Landscapes and aggregation of landscapes across ownerships |
| Rotation | Rotation determined by landowner objectives | Rotation reflecting natural disturbances |

**Source: Davis et al. (2001)**

# Key elements in Ecosystem Management

1. Adaptive management as a guiding principle

   - Managenment prescriptions are at best working hypothesis whose outcomes are uncertain
   - Call for permanent monitoring and revision of management decisions

Source: Davis et al. (2001)

# Key elements in Ecosystem Management

2. Simultaneously recognizing multiple spatial scales such as patches , stands and groups of stands within watersheds or forests

   - In the past, timber production was the primary focus. No connection for spatial scales, except to see if there was enough timber to sustain harvest at desired rates
   - Greater attention is being paid to higher levels e.g. watershed as compared to ownerships

**Source: Davis et al. (2001)**

# Key elements in Ecosystem Management

3. Considering actions in the light of the cumulative effects of actions by all owners over large planning areas

   - En Chile, por ejemplo, podría significar que el Servicio Forestal debiera considerar todas las acciones en una provincia y región, para retroalimentar sobre decisiones a propietarios individuales

Source: Davis et al. (2001)

# Key elements in Ecosystem Management

4. Quantifying and projecting all ecosystem services and not only timber
5. Recognizing the formative power of major disturbances such as fire and floods (wind also) to shape landscapes (forests are dynamic)
6. Recognizing spatial patterns and relationships among land forms and vegetation (e.g. relationships streams and stands)
7. Improving public understanding and participation through collaborative learning

Source: Davis et al. (2001)

# CONCEPTS AND CRITERIA FOR FOREST MANAGEMENT

**What values will be sustained?**

**How can we tell if our management plans will sustain them?**

# SUSTAINABILITY

- Broadly recognized of interdependent environmental, economic and social values
- It operates on several levels
- As a collective vision, sustainability means meeting the needs of current generations without compromising the ability of future generations to meet their needs
- As an approach to decision making, it calls for integrating the management of biological and ecological systems with their social and economic contexts, without compromising the functioning of the ecosystem
- As a measure of progress, sustainability has spawned a worldwide movement to develop a common set of criteria and indicators

# Process-based approach

- Ecosystem management should concentrate on conserving native biodiversity and ecosystem productivity
- We should aim to understand ecosystem patterns and processes, and then,
- Attempt to manage in harmony with nature even when it becomes financially difficult or inconvenient to do so

# Natural disturbance patterns and processes

- Manipulation of forest ecosystems should work within the limits established by natural disturbance patterns prior to extensive human alteration of the landscape
- Key assumption here is that native species evolve under these circumstances, and thus maintaining a full range of similar conditions under management offers the best assurance against losses of biodiversity

# Natural disturbance patterns and processes

- Disturbance: any relatively discrete event in time that disrupts ecosystem, community or population structure and changes resource availability or the physical environment
- Fire, wind, insect outbreaks, floods, avalanches, ice storms, landslides, and volcanic eruptions

# Natural disturbance patterns and processes

- To describe a specific disturbance regime, we must quantify at least three parameters:
- 1. Return Interval: 1/R = frequency
- 2. Severity: the intensity of disturbance
- 3. Spatial pattern: distribution of the disturbance at different spatial scales from within the stand to the landscape

# Natural disturbance patterns and processes

- A large number of disturbances could theoretically affect a stand or a forest
- A few types of disturbances dominate as the formative forces of a forest type
- Emulating disturbances as guiding principle of forest management is taking increasing importance

# Selecting silvicultural systems

- even-aged
- Uneven-aged
- These systems arise naturally from very different disturbance regimes
- Even-aged=most of the trees of an area are killed at the same time
- Uneven-aged= reflects more selective disturbance, that creates gaps from the killing of  a patch of trees or individual trees

# Selecting silvicultural systems

- Recently two developments have strengthen the ecological basis of these concepts:
- 1. New even-aged prescriptions variants where dead and live trees are left after harvest
- 2. The use of “cohorts” to describe silvicultural systems rather than age classes.
- Cohorts are populations of trees that originate after disturbance
- Even-aged= single cohort stands
- Uneven-aged= multiple cohort stands

# Selecting rotation age and age-class distribution

- From an ecological perspective, the age structure of the forest should reflect the structure that would occur under the dominance disturbance regime that operate in the area
- Under some conditions the age distribution will follow a negative exponential

# Selecting spatial patterns of harvest

- How size, shape and distribution of harvests compare with the spatial characteristics of natural disturbance
- Patch size, the amount of edge, and the continuity of the patches across the landscape can all affect the ability of the landscape to support different species
- This is specially relevant with single- and two-cohort stands

A clearcut in the Great Bear Rainforest