

Managing Forests More Sustainably

Three widely used approaches to managing forests are maximum sustainable yield, ecosystem-based management, and adaptive management.

The maximum sustainable yield (MSY) approach involves harvesting the maximum amount of trees without reducing future yields. Trees in a forest or plantation grow fastest at an intermediate age. Then they slow down and eventually reach a maximum size based on the carrying capacity of their environment, represented by an S-curve of population growth (see [Figure 5.16](#), right). The goal of maximum sustainable yield management is to harvest trees of an intermediate size at the midpoint of the growth curve between planting and the area's carrying capacity. This approach sounds good, but there are difficulties. Calculating the MSY is almost impossible because it is difficult to know an area's carrying capacity and the point at which the MSY has been reached. In addition, changes in environmental conditions over several decades of forest growth can change an area's carrying capacity.

The goal of *ecosystem-based management* is to harvest a renewable resource such as trees in ways that minimize the harmful impacts of harvesting on an ecosystem and the ecological services it provides. This can be a useful approach. However, it is often limited because of a lack of knowledge about how ecosystems in different areas work.

Adaptive management involves using available knowledge to harvest forests or other resources, evaluating the results, and modifying the approach or using a different approach as needed. This approach recognizes that there will be failures because of inadequate ecological knowledge and that we can learn from such failures.

[Figure 10.14](#) lists specific ways to grow and harvest trees more sustainably, regardless of what management approach is used (Concept 10.2 - We can sustain forests by emphasizing the economic value of their ecosystem services, halting government subsidies that hasten their destruction, protecting old-growth forests, harvesting trees no faster than they are replenished, and planting trees to reestablish forests.). One tool is the certification of sustainably grown timber and of sustainably produced forest products. This helps inform consumers about products made from sustainably grown wood. The nonprofit Forest Stewardship Council (FSC) oversees the certification of forestry operations that meet certain sustainable forest standards ([Science Focus 10.2](#)).

Figure 10.14

Ways to grow and harvest trees more sustainably (Concept 10.2 - We can sustain forests by emphasizing the economic value of their ecosystem services, halting government subsidies that hasten their destruction, protecting old-growth forests,

harvesting trees no faster than they are replenished, and planting trees to reestablish forests.). **Critical thinking:** Which three of these methods of more sustainable forestry do you think are the best methods? Why?

Solutions

More Sustainable Forestry

- Include ecosystem services of forests in estimates of their economic value
- Identify and protect highly diverse forest areas
- Stop logging in old-growth forests
- Stop clear-cutting on steep slopes
- Reduce road-building in forests and rely more on selective and strip cutting
- Leave most standing dead trees and larger fallen trees for wildlife habitat and nutrient cycling
- Put tree plantations only on deforested and degraded land
- Certify timber grown by sustainable methods

© Cengage Learning

© Cengage Learning

Science Focus 10.2

Certifying Sustainably Grown Timber and Products Such As the Paper Used in This Book

Collins Pine owns and manages a large area of productive timberland in the northeastern part of the U.S. state of California. Since 1940, the company has used selective cutting to help maintain the ecological and economic sustainability of its timberland.

Since 1993, Scientific Certification Systems (SCS) of Oakland, California, has evaluated the company's timber production. SCS is part of the nonprofit Forest Stewardship Council (FSC), which was formed to develop environmentally sound and sustainable practices for use in certifying timber and timber products.

Each year, SCS evaluates Collins Pine's landholdings. It has consistently found that their cutting of trees has not exceeded long-term forest regeneration; roads and harvesting systems have not caused unreasonable ecological damage; topsoil has not been damaged; and downed wood (boles) and standing dead trees (snags) are left to provide wildlife habitat. Year after year, SCS has found that the company is a good employer and a good steward of its land and water resources.

The FSC reported that, by 2013, it had certified about 6% of the world's forest area in 80 countries and about 7% of U.S. forests. The FSC also certifies 5,400 manufacturers and distributors of wood products. The paper used to make this textbook was produced with the use of sustainably grown timber, and contains recycled paper fibers (Figure 10.A).

Figure 10.A

This Forest Stewardship Council (FSC) symbol certifies that the paper used in this textbook was produced from environmentally responsible sources with the use of recycled fibers.



© Forest Stewardship Council

Critical Thinking

Should governments provide subsidies or tax breaks to encourage the use of sustainably grown timber and sustainably produced forest products? Explain.

Loggers could be encouraged or required to make greater use of more sustainable selective cutting (Figure 10.6a) and strip cutting (Figure 10.6c) to harvest trees instead of clear-cutting (Figure 10.6b). To reduce damage to neighboring trees when cutting and removing individual trees, loggers can first cut the canopy vines (lianas) that connect them.

Many economists urge governments to begin making a shift to more sustainable forest management. They recommend phasing out government subsidies and tax breaks that encourage forest degradation and deforestation and replacing them with forest-sustaining subsidies and tax breaks. This would likely lead to higher prices on unsustainably produced timber and wood products, in keeping with the full-cost pricing **principle of sustainability**. Costa Rica (Core Case Study) is taking the lead in using this approach. Governments can also encourage tree-planting programs to help restore degraded forests. **GREEN CAREER: Sustainable forestry**



Chapter 10: Sustaining Biodiversity: Saving Ecosystems and Ecosystem Services Managing Forests More Sustainably

Book Title: Living in the Environment

Printed By: Karin Gastreich (karin.gastreich@avila.edu)

© 2018 Cengage Learning, Cengage Learning

© 2019 Cengage Learning Inc. All rights reserved. No part of this work may be reproduced or used in any form or by any means - graphic, electronic, or mechanical, or in any other manner - without the written permission of the copyright holder.