Growth and production

Canada

Aspen as an energy source

Aspen, an abundant but little-used tree species in western Canada, has good potential as an alternative energy source. Studies to determine biomass production in aspen stands on different sites and the distribution by component (stem wood, bark, branches, etc.) provide background information to help plan viable harvesting operations.

Intensive harvesting for energy use would likely mean the removal of all the above-ground woody plant components. If done on a relatively short rotation to maximize production, it could lead to soil impoverishment by removing plant nutrients faster than they are replaced. This could significantly reduce forest producitivity in the future. In order to prevent this, it might be necessary to take precautions such as restricting harvesting to the winter season and using only stem wood and branches.

A 3-year study to determine the total amount of biomass and nutrients in different components of aspen stands in Alberta is currently under way. This information is a first step in determining the ecological consequences of harvesting aspen for energy. At a later date it will be necessary to study the rate at which soil nutrients become available for use by the trees.

IVOR EDWARDS

Biomass equations for prairie species

The first step in estimating forest stand biomass by component is the development of weight tables for different species in terms of easily measurable variables such as diameter at breast height (dbh) and total height. These relationships have now been developed for all major tree species of the prairie provinces.

Three different models using dbh and total height as predictor variables for estimating the ovendry biomass have shown good fit. For living tree above-ground biomass (without foliage), the R^2 values for the 10 tree species ranged from 0.96 to 0.99 for the best model. Using dbh alone, R^2 values also ranged from 0.96 to 0.99, although most species were near the lower end of this range.

Weight tables have been published based on the model

$$W = a_0 + a_1D + a_2H + a_3D^2H + a_4D^2 + a_5D^3$$

where W is the ovendry biomass weight, D is the diameter at breast height, and H is the total tree height. The model parameters a_0, a_2, a_2, a_3, a_4 and a_5 were estimated as regression coefficients from the data collected.

The biomass equations for each tree species describe the relationships of dbh and total height with the biomass of various components such as merchantable stem, nonmerchantable stem, stump, big branches, and small branches without foliage. These predicting equations are additive; so coefficients can be added to obtain equally valid equations for a combination of components such as total stem biomass and total branch and foliage biomass.

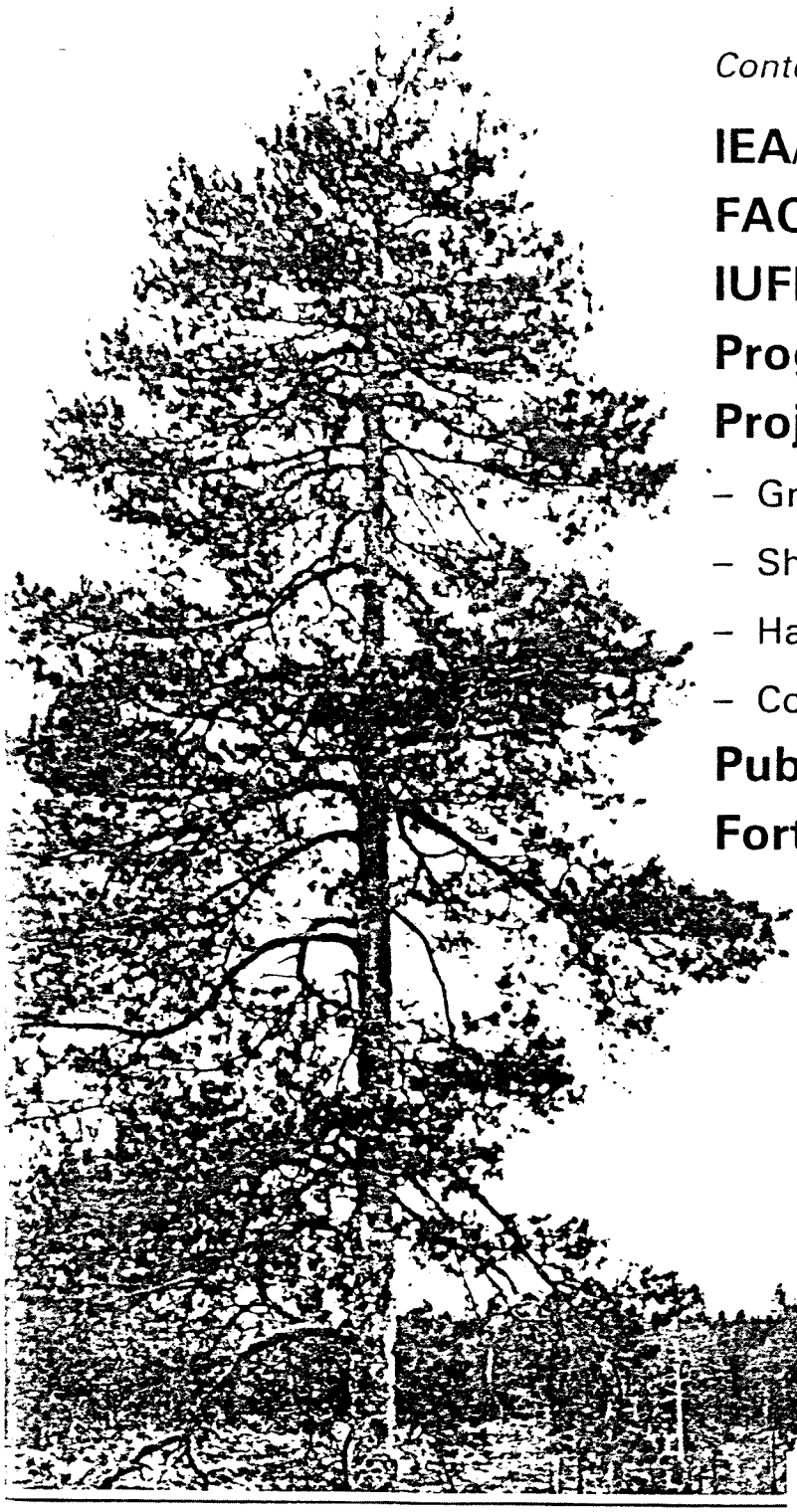
Because the nonmerchantable stem and the nonstem tree components form the bulk of residues left in the forest, weight tables estimating these components are necessary if these materials are to be used as an alternative energy source. Tables for the three prairie provinces and the NWT have been developed from the prediction equations established for each tree species.

TEJA SINGH

FOREST ENERGY NEWSLETTER

A SOURCE OF INFORMATION FOR R&D ORGANIZATIONS **No 2 1984**

Produced by the Forest Energy Secretariat, SLU, Garpenberg, Sweden



Contents

IEA/FE Activities 3
FAO Activities 5
IUFRO Activities 8
Programme Information 12
Project Information
- Growth & Production 13
- Short Rotation Forestry 14
- Harvesting, Processing & Transport 16
- Conversion 17

Publications 18
Forthcoming Meetings 19

This newsletter is supported by:
IEA Forestry Energy Agreement
IUFRO
FAO Cooperative Network on Rural Energ.