COFORD
NATIONAL COUNCIL FOR FOREST RESEARCH & DEVELOPMENT

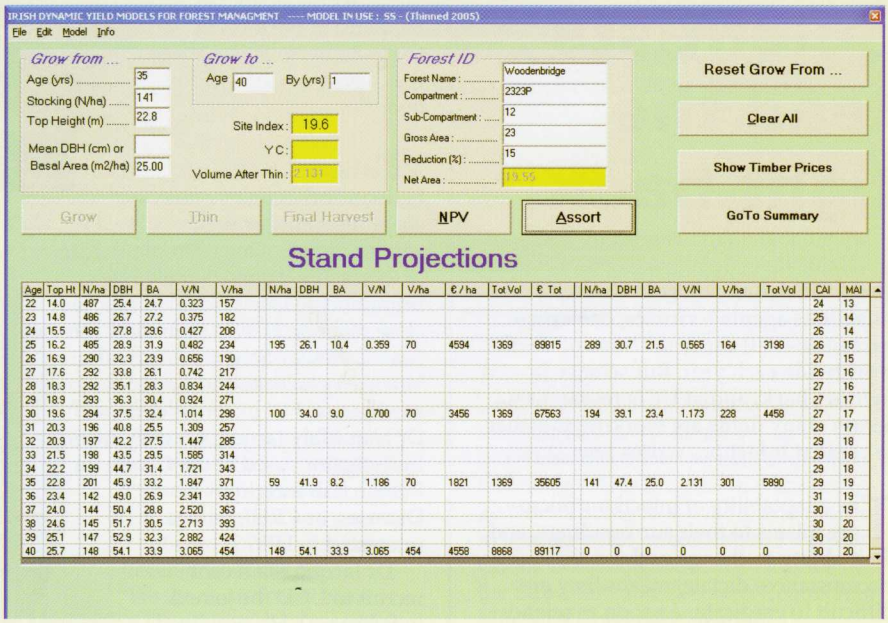
A new approach to modelling forest growth in Ireland

Forestry is a long term enterprise in which trees are planted as saplings and mature as timber crops over a period, typically, of forty years. In such a scenario, it is imperative that accurate models are available to predict what volume of timber can be expected and how it is affected for different species by different management systems and site types.

Until recently, forest growth and yield modelling in Ireland was carried out using Forestry Commission Yield Models for Forest Management developed in Britain. In the absence of Irish models, these models served the Irish forestry sector well. However, since 1999, the Irish forest industry, with support from Coillte and COFORD, has led a project to develop dynamic yield models which are based on Irish research data and which offer greater flexibility in terms of both inputs and outputs. More specifically, dynamic models use individual site data as input, and generate output based on user-defined forest management regimes. This greater flexibility is of huge significance to foresters and forest owners who can now model the potential effect of managing their forests in different ways.

To date this project called DynamicYield, which is part funded by COFORD, has delivered a dynamic yield model for Ireland's principal commercial timber species, Sitka spruce. In addition, models for lodgepole pine, Norway spruce, Douglas fir and Scots pine are at an advanced stage, and are undergoing a validation and refinement exercise prior to their launch. Most of the modelling work was carried out in Coillte by Dr Lance Broad and Ted Lynch.

Coillte is currently integrating the new dynamic models into its forest inventory and planning system. For the private sector, COFORD has funded the development of a PC-based, user-friendly interface which allows users to access and utilise the full functionality of the



Age	Top Ht	N/ha	DBH	BA	V/N	V/ha	N/ha	DBH	BA	V/N	V/ha	€ / ha	Tot Vol	€ Tot	N/ha	DBH	BA	V/N	V/ha	Tot Vol	CAI	MAI
22	14.0	497	25.4	24.7	0.323	157															24	13
23	14.9	486	26.7	27.2	0.375	182															25	14
24	15.5	486	27.8	29.6	0.427	208															26	14
25	16.2	485	28.9	31.9	0.482	234	195	26.1	10.4	0.359	70	4594	1369	89815	289	30.7	21.5	0.565	164	3198	26	15
26	16.9	290	32.3	23.9	0.656	190															27	15
27	17.6	292	33.8	26.1	0.742	217															26	16
28	18.3	292	35.1	28.3	0.834	244															27	16
29	18.9	293	36.3	30.4	0.924	271															27	17
30	19.6	294	37.5	32.4	1.014	298	100	34.0	9.0	0.700	70	3456	1369	67563	194	39.1	23.4	1.173	228	4458	27	17
31	20.3	196	40.8	25.5	1.309	257															29	17
32	20.9	197	42.2	27.5	1.447	285															29	18
33	21.5	198	43.5	29.5	1.585	314															29	18
34	22.2	199	44.7	31.4	1.721	343															29	18
35	22.8	201	45.9	33.2	1.847	371	59	41.9	8.2	1.186	70	1821	1369	35605	141	47.4	25.0	2.131	301	5890	29	19
36	23.4	142	49.0	26.9	2.341	332															31	19
37	24.0	144	50.4	28.8	2.520	363															30	19
38	24.6	145	51.7	30.5	2.713	393															30	20
39	25.1	147	52.9	32.3	2.882	424															30	20
40	25.7	148	54.1	33.9	3.065	454	148	54.1	33.9	3.065	454	4558	8868	89117	0	0	0	0	0	0	30	20

An example page of the user interface of the Dynamic Yield Model generated for Sitka spruce in Ireland.

models. The Sitka spruce model and user interface were launched at a series of workshops held during 2005. The interface is being developed to add other features, including a forest valuation tool.

The development process for the dynamic models has involved the use of extensive data from Coillte managed forest research plots, collected over the last 40 years. This illustrates the long-term nature of forestry and the importance of strategic research such as this.

The project is now entering a new phase with dynamic models planned for a wider range of species and species mixtures. There is also work planned to develop a goal programming function, whereby users can set targets for forest output and use the models to propose an optimal strategy towards achieving such targets. It is also planned to explore the potential for further model development and validation using data from the National Forest Inventory (NFI) which is currently being conducted by the Forest Service of the Department of Agriculture and Food.

For further information contact:
Paddy Purser,
Purser Tarleton Russell Ltd.,
36 Fitzwilliam Square, Dublin 2.
Telephone 01 6625621.

A clearfelled stand of Sitka spruce, Ireland's principal commercial plantation species. Dynamic yield models are based on actual data collected at sites such as this.