

# **Old Growth Site Index (OGSI) Adjustment Project**

## **Improving Site Productivity Estimates**

### **Frequently Asked Questions**

#### **Why is accurate site productivity estimates important?**

The productivity of a forest site is expressed by its site index, which is an estimate of top height at a reference age. Many foresters believe that our existing inventory and site index tools underestimate the potential for growing new forests for many mature or recently-logged stands. Underestimated productivity could have an impact on projections of future stand volumes, and on management objectives such as cut block adjacency and green-up. These are important factors in determining the allowable annual cut (AAC).

Site productivity information is also important for making land-use decisions, determining operability, planning, forest management and formulating silviculture strategies.

#### **How can we achieve better estimates?**

The Site Productivity Working Group (SPWG), a joint government and industry research effort funded largely by Forest Renewal BC, is coordinating a number of projects to develop better estimates of site productivity. The Old Growth Site Index (OGSI) adjustment project is designed to develop tools to more accurately estimate site index.

Initially, OGSI research involves a province-wide series of field samples covering four major tree species. This research should provide a forest-level adjustment to existing site indices for managed stands. These adjustments will be applied to stands that will be regenerated on sites currently supporting mature stands.

Other studies being initiated will provide longer-term and more site-specific solutions. Examples of these projects include:

1. site index curve validation and development,
2. growth intercept models,
3. biogeoclimatic ecosystem classification (BEC) site series/ site index models,
4. site index estimation in uneven-aged stands, and

5. biophysical site index estimation.

## **How are old growth site indices determined and why are they thought to be underestimated?**

Site index is the estimated top height of a forest stand fifty years after the trees reach breast height. Currently this figure is calculated from age and top height for the leading species in a stand. These data are usually interpreted from aerial photos.

Existing site indices for old growth stands may be underestimated because the height of old growth stands is frequently affected by factors other than site productivity. For example, broken or damaged tops (possibly from wind storms or insect attacks), repression (from overly-crowded stands) or suppression (from shade by taller trees) could have contributed to a lower top height. To an extent, these factors may be controllable in a managed young forest. In addition, the models used to estimate site index may be biased for older stands, since most of the original data was taken from samples in much younger (up to 150 years old) forests.

Recent research in the Morice and Lakes forest districts has shown that site index for lodgepole pine was significantly underestimated in many situations. These results have underscored the need for province-wide research on old growth site indices.

## **What are the objectives and scope of the OGSi adjustment project?**

The OGSi project's objectives are:

1. to collect data and derive regional old growth site index adjustment equations for use in forest management planning, and
2. to determine the applicability of the adjustment equations.

The adjustment equations will be used primarily in timber supply analyses and in forming silviculture strategies at the management unit level (timber supply areas or tree farm licences). These adjustment equations may not be adequate for more localized use that will require more extensive field sampling and the type of analysis being developed in other SPWG studies (such as the BEC site series/ site index research).

OGSi project sampling will take place for Douglas-fir and hemlock on the Coast, and spruce and lodgepole pine in the Interior. All six forest regions will be

participating in this project. Adjustment equations will be developed for the indicated species in the respective region.

## **How will the OGSi adjustments be determined?**

The primary sampling technique for this project will be paired-plot sampling. Alternative methodologies will be explored and initiated if results show limited sampling success. Using a rigorous sampling procedure, over 1000 samples will be installed across the province. Each sample consists of one pair of plots along a connected stand edge. One plot in each pair will be in old growth forest; its mate will be in an adjacent logged and reforested (LAR) area. Care is being taken to ensure that the site conditions are matched as closely as possible for plot pairs in each sample. Sample sites will be classified using the biogeoclimatic ecosystem classification (BEC) system. Heights and ages will be accurately measured at each plot.

Once the field data have been gathered, statistical analysis methods will be used to derive an equation for adjusting the current old growth site indices, to be used during timber supply analysis and other large area planning.

## **What is the schedule?**

In each forest region, a regional sampling coordinator has been hired to assist the regional growth and yield forester in supervising field work. District inventory officers and forest licensees' staff are providing key information to meet specific sampling goals. During the 1995 field season, coordinators were trained and small pilot projects started. Training will be extended soon to include sampling contractors, more Forest Service staff and industry contacts.

Most of the sampling will occur during the 1996 field season, with statistical analysis scheduled to be completed by the spring of 1997.

## **What are potential limitations on results?**

Since the samples chosen are limited by past timber harvesting, they may not be representative of all old growth stands of that species in the operable land base. Any bias in the models used to estimate site index in managed stands will be carried to the site index adjustment. The magnitude of these biases will be confirmed through future inventory monitoring programs. As well, if insufficient paired-plot samples are taken, it may not be possible to produce valid adjustment equations. However, as mentioned above, alternative methodologies may be explored and initiated.

There is no guarantee that analysis will produce statistically significant adjustments possibly because there is no difference between the old growth and second growth site indices or because of variation in the data. The decision to collect more data will depend on availability of sample sites, time and costs.

It is difficult to quantify the application bias when results are derived from one situation and applied to a somewhat different situation. For example, future forest practices may be quite different from past practices which shaped the exhibited site index difference between the old growth and LAR stands. The adjustment equations produced will become the best estimates until better methods are developed.

## **Will other local and industry-driven sampling projects be part of the OGSi project?**

Encouraged by the test results in the Morice and Lakes districts, a number of companies and forest districts have expressed interest in conducting detailed, localized sampling to develop local old growth site index adjustment equations. Although the Forest Service does not have the resources to fully support these initiatives, particularly through the OGSi project, efforts will be made to provide technical reviews to ensure methods used will be consistent with provincial goals. Companies and districts should wait until the OGSi sampling design is field tested before proceeding with local studies.

Forest Service approval of any local projects will be necessary for these results to be incorporated into future timber supply analysis and forest planning.

## **More information**

Professional staff from three branches (Research, Forest Inventory and Monitoring and Forest Practices), six forest regions and industry are participating in site productivity research. For details on the Old Growth Site Index adjustment project, or on other progress by the Site Productivity Working Group, contact:

Site Productivity Coordinator  
Resource Information Branch  
Land Information BC  
Ministry of Sustainable Resource Management  
395 Waterfront Cres.  
Victoria, B.C. V8T 5K7  
Telephone: (250) 356-7185  
Fax (250) 387-5999