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Ministry of Forests
and Range

Forest Stewardship Division

MEMORANDUM

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SEP 24 2009

To: Distribution List

From: Jim Snetsinger, R.P.F.
Chief Forester

Re: Guidance on Tree Species Composition at the Stand and Landscape Level

British Columbia is an acknowledged world leader in reforestation with over six billion trees planted since reforestation programs began in the 1930s. Over this time we have developed a better understanding of stand establishment that has led to increased survival and growth of managed stands. We now also recognize that reforesting areas with a dominant single species can increase the risk of reduced yield due to forest health impacts. On a stand-by-stand basis this risk may not always seem significant, however, if single species or simplified stands are established over large geographic areas, it may reduce species diversity and resiliency of our managed stands which may have implications regarding the future options from our forests.

Recent forest health epidemics have focused attention on how vulnerable single species stands can be to pest infestations. The current mountain pine beetle infestation and the recent increase in mortality of lodgepole pine as a result of *Dothistroma* needle blight are examples of vulnerability accentuated by climate change and a dominant single species. While the evolving reforestation legislation has promoted and resulted in early and full stocking it did not specifically prescribe species composition within individual cutblocks or over larger geographic areas. Under the current legislation, Forest Planning and Practices Regulation section 26, Forest Stewardship Plan stocking standards must now address both immediate and long-term forest health issues when selecting desirable species that are ecologically suited to the site.

This memo is to provide guidance to professionals and tenure holders on how to address the potential risks to immediate and long-term forest health associated with species selection decisions.

Immediate and Long-Term Forest Health

My vision for British Columbia's future forests is to provide a diversity of well-adapted, healthy, resilient stands across the landscape that will fulfil the needs of future generations. To achieve this, it is important to learn from what we have experienced recently with respect to the vulnerability of single species stands to forest health epidemics and use this information

to address both immediate and long-term forest health in the development and implementation of future stocking standards.

Managing for diversity is meant to reduce the forest health risks to future timber supply by providing a diversity of species should one or more become susceptible to pests or other damaging agents. Also, diversifying the growing stock increases the opportunities to produce a range of products over time. I recognize there is no single right answer therefore a range of approaches will be necessary.

The Ministry of Forests and Range has begun a series of initiatives to help professionals identify issues and opportunities of species selection.^{1,2} The Future Forest Ecosystems Initiative³, for example, provides scientific understanding on issues associated with climate change. Other pilot projects such as the Kamloops Future Forest Strategy⁴ help frame what are termed 'ecological sensitivities' that project species suitability into future climate scenarios. This type of approach allows for an informed strategic view for species deployment to meet the demands of future generations and conditions.

Species Selection and Stocking Standards

It is my expectation that professionals and tenure holders will think about the challenges and opportunities for species selection when developing and implementing stocking standards. I encourage you to use the best science available, including emerging information on climate change and species suitability, to develop and adapt stocking standards at scales ranging from cutblocks through to a watershed or landscape unit or to a management unit (TSA or TFL)⁵. In order to address immediate and long-term forest health risks, tree species diversity at multiple scales needs to be considered when developing stocking standards and making stocking decisions. In the interim I expect that we will utilize the diversity of desirable tree species that are currently recognized as ecologically suitable when addressing immediate and long-term forest health. As more information becomes available through ongoing climate change research on topics such as facilitated migration, vulnerability, and seed transfer, this new information should be used to adapt stocking standards accordingly.

Some science-based factors that could be considered when developing stocking standards:

- the existing species diversity by BEC unit in both managed and unmanaged stands
- climate change information that could influence species vulnerabilities
- the life cycle of forest health agents and their ability to affect young stands, now and into the future
- insect and disease hazard and risk rating systems by BEC unit
- species that complement each other, e.g., Coastal Douglas-fir and Western red cedar
- appropriate density ranges and variability
- maintenance of natural diversity at the forest level

¹ Species selection working group website link - <http://www.for.gov.bc.ca/hfp/silviculture/TSS.htm>

² Chief Forester's Standards for Seed Use - <http://www.for.gov.bc.ca/code/cfstandards/>

³ FFEI website link - http://www.for.gov.bc.ca/hts/Future_Forests/

⁴ KFFS website link - <http://www.for.gov.bc.ca/hcp/ffs/kamloopsFFS.htm>

⁵ Discussion of adaptation strategies - <http://www.forrex.org/publications/jem/Article.asp?Article=53>

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- objectives for a site including but not limited to timber, water, and wildlife values
- timber supply implications, taking into account hazard and risk assessments
- other locally important factors.

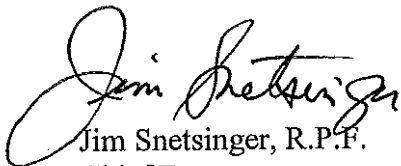
In some areas there are Sustainable Forest Management Plans, silviculture strategies, or other strategic plans that have begun the task of creating species targets at a range of scales. I support the continuance of these types of initiatives and note that the current planning framework provides us with the flexibility to improve the diversity and resilience in our managed stands to address both immediate and long-term forest health.

Monitoring

Monitoring is critical to ensure we meet our goal of species diversity across multiple scales. A number of tools are being developed, such as the recently published FREP report #14⁶ and the Species Monitoring Reports available through the Ministry of Forests and Range RESULTS system⁷, to assist you in monitoring to determine whether strategic goals are being met.

I am confident that our community of practice is up for the challenge of moving forward with stocking standards that address the issues of diversity and resilience thereby maintaining our forest management options. The attached case study begins exploring how climate change may impact species that are currently considered good choices for a site but may not be as suitable in the future.

I look forward to hearing about and seeing how both immediate and long-term forest health is addressed through the incorporation of species diversity in stocking standards and stocking decisions as we move forward.



Jim Snetsinger, R.P.F.
Chief Forester

Attachment

⁶ FREP Report #14 website link - http://www.for.gov.bc.ca/hfp/frep/site_files/reports/FREP_Report_14.pdf

⁷ RESULTS Species Monitoring reports - <http://apps28.for.gov.bc.ca/crsrm/browse.do?cat=228>

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B. McNaughton, General Manager, Federation of BC Woodlot Associations
J. Gunter, Executive Director, BC Community Forest Association

Figure 1 – Scenario showing biogeoclimatic climate environments in 2050 based on a conservative scenario (PCM B1). For more information on this modelling see the Kamloops Future Forest Strategy (<http://www.for.gov.bc.ca/hcp/ffs/kamloopsFFS.htm>).

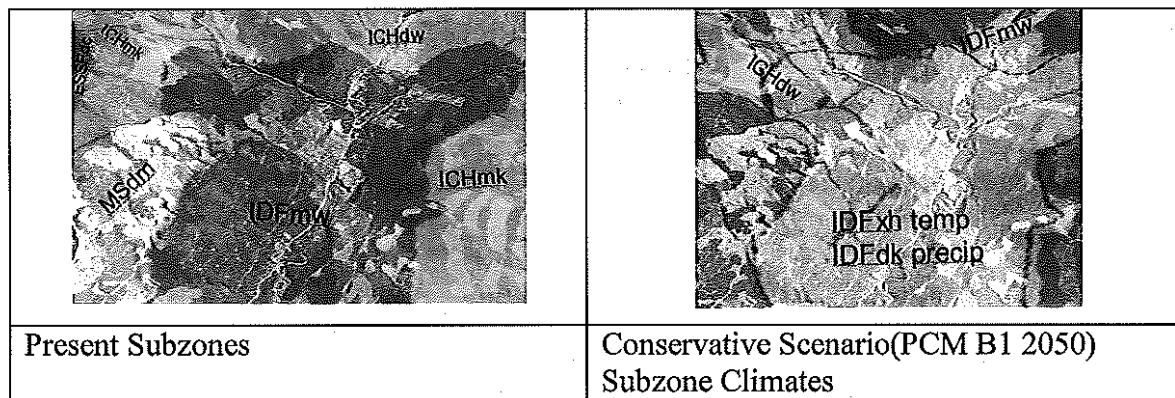
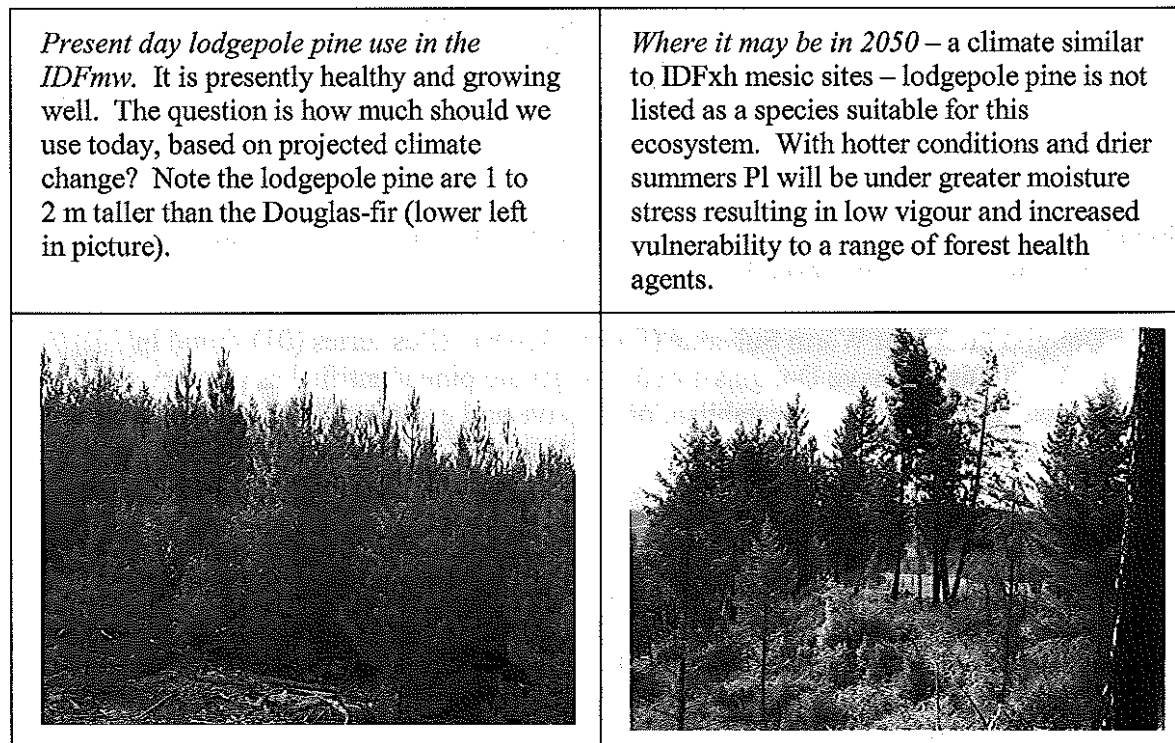


Figure 2 – Potential future climate envelope.



It is therefore prudent to begin assessing species options by looking forward with climate change as a filter or lens. Lodgepole pine, while achieving present objectives, is much less certain under projected future conditions, thus the increased use of a mix of species, including more Douglas fir and the introduction of ponderosa pine to augment stocking, could be considered for this case study area.

Kamloops Future Forest Strategy

Managing Risk – A Climate Change Example

It is now accepted that our climate is changing and will continue to change as more CO₂ enters the atmosphere. The amount of change remains uncertain, as are the resultant effects on species and ecosystems. The Intergovernmental Panel on Climate Change has provided a number of scenarios from which to gauge potential impacts. The following case examines a conservative climate change scenario.

Tree species are chosen for a number of reasons. A key objective is to provide resilient stands that can adapt to the changing future and will allow for an economically valuable crop of timber. Other objectives may influence tree species choices and going forward these choices may be further influenced by climate predictions and non timber objectives. With new information emerging on climate change, we need to look at whether the species suited to the site in the past will remain productive in the future.

Professionals must integrate a number of objectives when choosing the regeneration method, species selection and deployment. The feasibility of establishment remains a key consideration.

Climate Change case study

The following case study provides an example of how a climate change lens could be applied when making species selection decisions.

The Interior Douglas-fir Moist Warm Subzone (IDFmw) mesic sites series (01) found in the Kamloops Forest District have Douglas-fir and lodgepole pine identified as primary species, which are both considered feasible to establish, productive and ecologically suited to the site.

Under this scenario, the present day IDFmw appears to be moving towards a warmer climate with drier summers (Figure 1).

Presently lodgepole pine is being used with Douglas-fir and other species in the IDFmw to provide for suitable stocking. While both species are currently considered suitable, climate change may shift the balance in favour of Douglas-fir and possibly even ponderosa pine. Figure 2 provides a glimpse into a possible future where lodgepole pine may not be as suited to the climate of the scenario.