

Non-restricted

CREATING CLIMATE RESILIENT RESOURCE ROADS: PLANNING AND CONSTRUCTION

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Introduction

The planning, construction and maintenance of resource roads are required in support of various industrial and resource management activities and are often the primary access for remote communities and public recreational experiences.

This is the second Info Note in a series of five focused on the key issues of creating climate resilient resource roads.

Creating resiliency

Climate change is anticipated to have important impacts on the forest sector in Canada principally as a result of forecasted changes in temperature and precipitation patterns. Warmer summer and winter temperatures and an increase in high intensity, short duration rainfall events are expected in many regions. Developing and implementing adaptation practices that reduce the negative impacts and the vulnerability of resource road infrastructure to climate change needs to be a priority for resource road managers.

Planning and construction

The planning and design stage of a resource road represents the first opportunity where climate change adaptation strategies can be identified and implemented. Implementing strategies effectively requires that the risks and vulnerabilities have been identified, and that the future climate conditions have been recognized. The following practices could be considered during the planning, design, and construction phases:

1. Implement a “safe to fail” design approach that allows the infrastructure to fail in a controlled and predictable manner (Figure 1).



Figure 1. Designing resource roads and infrastructure to resist all climate events is not practical or economically feasible.

2. Design and build roads and infrastructure to minimize the potential negative impacts from failures. Examples would include minimizing fill volumes and/or constructing with erosion resistant materials.
3. Planners should identify routes for emergency access and evacuation, and prioritize funding to improve the resiliency of these routes.

4. Be familiar with hauling regulations, allowable truck weights and truck haul configurations. Regulations such as spring haul restriction periods and winter weight premiums can be important factors when planning heavy vehicle hauls and management of the resource road infrastructure (Figure 2).



Figure 2. The use of tire pressure control systems (TPCS) and widebase tires can prolong road use and reduce impacts to the road surface.

5. Optimize the amount of roads, often measured as roaded area or road density, to ensure that the least amount of road of the highest standards is constructed and maintained in order to support the required access activities in a given area.
6. Be aware of road locations and conditions at the watershed management level to ensure that the infrastructure is managed effectively. For example, if water crossings located at higher elevations are redesigned to account for increased streamflow, those at lower elevations must also be reevaluated.
7. Locate new roads in areas that are considered to be of low-risk to climate change-induced influences. For example, prevent the location of new roads in areas that are of higher risk to flooding such as immediately adjacent to waterbodies or at lower watershed elevations.

8. Where economically feasible, consider upgrading winter roads to be all-season roads so that access is reliably provided during all times of the year.
9. In regions that are anticipated to have lower levels of precipitation and increased temperatures, it would be prudent to surface roads with a well graded material that remains compact and relatively dust free, and be prepared to implement an enhanced dust abatement program.

Summary

This Info Note is part of a series of short reports focused on the key issues of creating climate resilient resource roads. The series includes the following reports:

1. Adapting to climate change
2. Planning and construction
3. Water management
4. Water crossings
5. Road maintenance

For further information, please consult the following publication, Partington, M. Bradley, A.H., Durand-Jezequel, M., Forrester, A. (2017). *Adapting Resource Road Infrastructure to Climate Change* (Technical Report 61). Pointe-Claire, Quebec: FPIInnovations.