OFFICE OF THE
Auditor General
of British Columbia

MANAGEMENT OF FOREST SERVICE ROADS

An independent audit report

November 2020

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The Honourable Raj Chouhan
Speaker of the Legislative Assembly
Province of British Columbia
Parliament Buildings
Victoria, British Columbia
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Dear Mr. Speaker:

I have the honour to transmit to the Speaker of the Legislative Assembly of British Columbia the report *Management of Forest Service Roads*.

We conducted this audit under the authority of section 11(8) of the *Auditor General Act*. All work in this audit was performed to a reasonable level of assurance in accordance with the Canadian Standard on Assurance Engagements (CSAE) 3001—Direct Engagements, set out by the Chartered Professional Accountants of Canada (CPA Canada) in the *CPA Canada Handbook—Assurance.*

Michael Pickup, FCPA, FCA,
Auditor General of British Columbia
Victoria, B.C.
January 2021

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The Office of the Auditor General of British Columbia would like to acknowledge with respect that we conduct our work on Coast Salish territories. Primarily, this is on the Lkwungen-speaking people's (Esquimalt and Songhees) traditional lands, now known as Victoria, and the W̱SÁNEĆ people's (Pauquachin, Tsartlip, Tsawout, Tseycum) traditional lands, now known as Saanich.

REPORT HIGHLIGHTS

What we found

The ministry did not manage safety and environmental risks on forest services roads (FSRs) in accordance with its policies. It did not complete necessary maintenance and repairs on roads, bridges and major culverts.

Districts received about a quarter of their budget request for maintenance on priority roads.

Almost $9 million worth of high-priority maintenance work went unfunded.

Information on inventory, inspections and maintenance for FSRs was inconsistent, difficult to share and at times inaccurate.

What this means

The shortcomings in maintenance work and lack of reliable information increase the risk to road users and the environment.

Recommendations

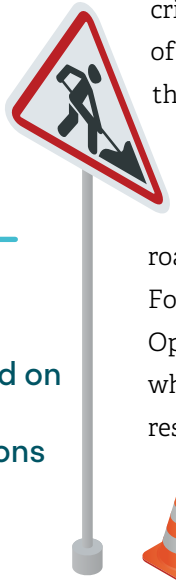
We made nine recommendations, which focused on asking the ministry to review its policies and practices so it can meet its own expectations for inspecting and maintaining FSRs.

About FSRs

FSRs are built for forestry operations, but are often used for other purposes, including access to communities and recreation areas—even when no longer needed for industrial use.

There are approximately 58,000 kilometres of FSRs in British Columbia.

FSRs aren't built or maintained the same way as public roads, but proper upkeep is critical to help ensure the safety of road users and reduce risks to the environment.



Maintenance is the responsibility of forest industry users with road use permits, or the Ministry of Forests, Lands, Natural Resource Operations and Rural Development when there is no industrial user responsible for maintenance.

AUDITOR GENERAL'S COMMENTS

MICHAEL A. PICKUP, FCPA, FCA
Auditor General of British Columbia

Forest service roads (FSRs) are a highly valued part of British Columbia's transportation network. While FSRs are built primarily to access timber for forestry operations, they are often used for other industrial and commercial purposes, such as mining, trapping and guide outfitting.

With around 58,000 kilometres of FSRs across the province, they also provide important access to communities, private residences, and recreation and wilderness areas—even when no longer needed for industrial use.

And while FSRs aren't built or maintained to the same standards as roads intended for public use, proper upkeep is critical to help ensure the safety of road users and reduce risks to the environment.

In B.C., the Ministry of Forests, Lands, Natural Resource Operations and Rural Development oversees the management of all FSRs. Maintenance, however, is the responsibility of forest industry users with road use permits, or the ministry when there is no industrial user responsible for maintenance.

About this audit

Our audit focused on assessing whether the ministry managed safety and environmental risks by inspecting, maintaining and deactivating FSRs as required by legislation and policy.

We determined what inspection and maintenance work had occurred by analyzing ministry data, reviewing ministry records, and interviewing and surveying ministry staff. We did not assess in the field whether roads were safe and environmentally sound.

What we found

Our audit concluded that the ministry did not manage safety and environmental risks on FSRs in accordance with its policies. Specifically, it did not complete necessary maintenance and repairs on roads and crossing structures such as bridges and major culverts.

We also found that the ministry's information on inventory, inspections and maintenance for FSRs was inconsistent, difficult to share and at times inaccurate. This made it challenging for

the ministry to know if required inspections and maintenance work was completed, and done so on time.

The ministry was also challenged to ensure that industrial users were adequately maintaining FSRs because of limited oversight and confusion over roles and responsibilities for monitoring.

These shortcomings in maintenance work and lack of reliable information increase the risk to road users and the environment.

For more information, see Audit at a Glance.

Looking ahead

We made nine recommendations, which focused on asking the ministry to review its policies and practices so it can meet its own expectations for inspecting and maintaining FSRs.

After reviewing the recommendations, you may want to consider asking the following questions of government:

1. How will the government prioritize investing more money in maintenance for forest service roads given the shortfalls that were identified?
2. How will the ministry balance public expectations to keep forest service roads safe for public use, with a mandate that does not require it do so?
3. How will the ministry assess which roads to deactivate to reduce maintenance costs, safety risks and environmental impacts when pressure exists to keep them open?

Acknowledgements

I would like to thank the staff at the Ministry of Forests, Lands, Natural Resource Operations and Rural Development for their support and co-operation throughout our work on this audit. We are particularly grateful to ministry staff for continuing to work with us to complete the audit during the pandemic.

Michael A. Pickup, FCPA, FCA
Auditor General of British Columbia
Victoria, British Columbia
November 2020

AUDIT AT A GLANCE

Why we did this audit

- There are 58,000 km of forest service roads (FSRs) in B.C. on Crown land built to access timber for forestry operations
- While not built or maintained for public use, FSRs are also used for other commercial purposes and by communities and recreational users, so safety is important
- FSRs are an important part of B.C.'s transportation systems and help keep the province connected, including linking First Nations and remote communities to towns and cities
- If not adequately maintained, FSRs can impact the environment

Audit purpose

- To determine whether the Ministry of Forests, Lands, Natural Resource Operations and Rural Development managed safety and environmental risks on forest service roads (FSRs) in accordance with policy

Overall audit conclusion

- The ministry did not manage safety and environmental risks on FSRs as required by its policies
- The shortcomings in maintenance work and lack of reliable information increase risks to road users and to the environment

We made 9 recommendations focused on asking the ministry to review its policies and practices so that it can meet its own expectations for inspecting and maintaining FSRs.

What we found

Identifying and assessing risks on FSRs

Inventory information on FSRs inconsistent and difficult to share	Inspection/ maintenance policy requirements not aligned	Districts lacked consistent or complete inspection records	BC Timber Sales not inspecting as required and data unreliable	87% of bridges and major culverts inspected
▪ Inconsistent information between systems—hard to know if inventories complete/up to date ▪ BC Timber Sales lacked ready access to information on whether road use permit holders responsible for maintenance	▪ FSRs managed by districts—Engineering Manual and Funding Policy contradictory ▪ Engineering Manual requires more frequent inspections for some risk categories	▪ Sampled 8 of 23 districts—records didn't show if FSRs inspected per policy ▪ No standard/required processes or system for tracking inspections	▪ System data showed ~40% of BC Timber Sales roads not inspected at required frequency ▪ Ministry data was inaccurate, so extent of inspection deficiency was unclear	▪ Past decade—5,789 of 6,640 bridges/culverts inspected at required frequency ▪ 851 not inspected—mostly bridges on active crossings ▪ As of May 2019, 340 overdue for inspection, by average of 635 days
RECOMMENDATION 1	RECOMMENDATION 3	RECOMMENDATIONS 4, 5	RECOMMENDATIONS 7, 8	RECOMMENDATION 2

Mitigating risks on FSRs

Districts not keeping consistent or complete maintenance records

- We reviewed records from 8/23 districts
- Unknown if maintenance work met policy timelines, as records incomplete
- 2 districts had no maintenance records

RECOMMENDATIONS 4, 5

Districts not maintaining roads as required by policy

- From 2017/18 to 2019/20, districts received between 14% and 20% of their total budget requests for FSR maintenance
- In 2019/20, districts received 26% of their requests for maintenance on priority FSRs (e.g., providing access to communities)
- Unfunded work included almost $9M in high-priority maintenance/repairs

RECOMMENDATION 6

BC Timber Sales lacked reliable data on maintenance

- System data and local records didn't provide accurate information on maintenance to determine if policy was met
- System data showed that BC Timber Sales completed 43% of its planned maintenance
- System data was inaccurate, and system used by only 10 of 12 business areas because not mandatory

RECOMMENDATIONS 7, 8

High-priority repairs overdue on 48% of bridges and major culverts

- 3,178 of 6,640 structures—high-priority repairs overdue by over 2 years on average
- 1,734 structures—repairs outstanding for 2 inspection cycles
- 583 structures— replacement overdue by 5 years on average
- Load ratings reduced on 585 structures to reduce safety risks
- In 2019/20, $2.7M of districts' requests for high-risk bridge and culvert repairs/replacements unfunded

RECOMMENDATION 2

Ministry oversight of FSRs under road use permit limited

- No requirements for districts to monitor maintenance done by road use permit holders; limited authority to order maintenance
- Road use permit holders expected to self-monitor, yet ongoing challenges to ensure adequate maintenance of FSRs under permit
- Ministry indicated limited oversight due in part to unclear roles and responsibilities (districts and Compliance and Enforcement Branch)

RECOMMENDATION 9

Ministry deactivated FSRs based on risk, but faces pressure to keep them open

- Districts and BC Timber Sales deactivate FSRs no longer needed for industrial use, according to risk
- Since 2016/17, districts deactivated 116 km, BC Timber Sales 529 km
- Pressure from non-industrial users (e.g., communities) to keep FSRs open increasing ongoing maintenance costs

RECOMMENDATION 6

SUMMARY

Forest service roads (FSRs) are roads built on Crown land to access timber for forestry operations. Once built, they are often used for other industrial and commercial purposes, such as mining, trapping and guide outfitting. FSRs also often provide access to communities, private residences, and recreation and wilderness areas, even when they are no longer needed for industrial use. The Government of British Columbia considers FSRs essential to the province's economic development and a highly valued part of its transportation network.

There are approximately 58,000 kilometres of FSRs in B.C. They are maintained by forest companies under road use permits, or by the B.C. government when there is no industrial user responsible for maintenance. FSRs aren't built or maintained to the same standard as roads intended for public use. Almost all FSRs have gravel surfaces and often have more and tighter curves and steeper road grades than are found on public roads.

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development oversees the management of all FSRs. The ministry's district managers and BC Timber Sales (BCTS) managers are required to oversee FSRs within their respective natural resource districts and business areas until they deactivate them. District managers are responsible for issuing road use permits to industrial users and designating which permit holders are responsible for road maintenance. The ministry's Engineering Branch develops and monitors the forest road engineering program to ensure that the ministry complies with all relevant acts, regulations, policies and engineering standards. Its professional engineers oversee inspections and maintenance on FSR bridges and major culverts.

The level of maintenance required on an FSR depends on how it is being used. Forest legislation requires at least a minimum level of road and structure maintenance on all FSRs; referred to as "wilderness road" status, this level protects against material adverse effects on forest resources, such as fish, wildlife, soil and water. Forest legislation requires road use permit holders to maintain FSRs so they are safe for industrial purposes, but does not require permit holders to make them safe for public use.

FSRs that provide access for communities (of 50 or more year-round residents), rural residences or high-value recreation sites and trails are financially capitalized (and referred to as "capital roads"). These FSRs are linked to the public highway network and provide an ongoing service to the public. Capital roads are therefore unlikely to be deactivated by the ministry and require ongoing maintenance. There are approximately 12,000 kilometres of capital roads.

Our audit assessed whether the Ministry of Forests, Lands, Natural Resource Operations and Rural Development managed environmental and safety risks by inspecting, maintaining and deactivating FSRs as required by legislation and policy. We determined what inspection and maintenance work had occurred by analyzing ministry data, reviewing ministry records and interviewing and surveying ministry staff. We did not assess in the field whether roads were safe and environmentally sound.

The ministry's information on inventory, inspections and maintenance for forest service roads was inconsistent, difficult to share and at times inaccurate

We found that the ministry used multiple and sometimes unconnected systems to track information on FSRs. The ministry's operational land resource management systems were not consistently used by all natural resource districts and BCTS business areas. The districts and business areas did not keep consistent or complete inspection and maintenance records and the business areas did not have ready access to information to determine whether it or a road use permit holder was responsible for maintaining a road. The lack of reliable information makes it difficult for the ministry to assess whether the roads are inspected and maintained. We could not determine from these records if the districts and business areas were meeting the ministry's required frequencies for inspections and timelines for repairs.

The ministry inspected 87% of bridges and major culverts, of which 48% were overdue for high-priority repairs

The Engineering Branch is responsible for inspecting FSR bridges and major culverts, including those under road use permits. If an inspector determines that repairs or replacements are needed, Engineering Branch staff review the inspector's report and send it to the road use permit holder, BCTS or the district to complete the recommended work. The ministry inspected 87% of bridges and major culverts according to the frequencies set in policy, but 48% of the structures were overdue for high-priority repairs by just over two years on average.

Districts did not maintain forest service roads as required by policy

Natural resource districts did not receive the funding from the ministry that they identified as needed to maintain and repair roads according to policy. From 2017/18 to 2019/20, the districts received between 14% and 20% of their total budget requests for FSR maintenance.

During this period, budget allocations for district road maintenance remained stable at $5.5 to $5.7 million, while district requests ranged from $28.6 million to $40.2 million.

To make the most of the funding it had available to distribute to districts, the Engineering Branch prioritized maintenance funding for capital roads providing access to communities, rural residences and high-value recreation sites. However, in 2019/20, the funding allocated by the Engineering Branch covered only 26% of the total amount requested by districts for priority capital road maintenance. According to some district staff, funding for maintenance was inadequate to maintain FSRs providing access to rural residences or high-value recreation sites.

We also found that key policy documents provided contradictory requirements for inspection frequency and timelines for completing repairs.

Ministry roles and responsibilities for monitoring road maintenance by industrial users are unclear

While policy sets out expectations for the Engineering Branch to inspect bridges and major culverts, we found that there are no legislative or policy requirements for the districts to monitor road maintenance by road use permit holders, and that the ministry's monitoring of FSR maintenance by road use permit holders was limited and informal. According to ministry officials, the district managers' limited authority to order road use permit holders to conduct maintenance, and confusion over roles and responsibilities for monitoring, make it challenging to ensure that industrial users adequately maintain and do not damage FSRs through use.

The ministry has prioritized forest service roads for deactivation based on risk, but faces pressure from non-industrial users to keep them open

Ministry policy recognizes that wilderness roads not being used industrially deteriorate and need to be deactivated to reduce environmental risk, address public safety and reduce ongoing maintenance costs. However, there is no trigger or timeline for deactivation and FSRs can remain open indefinitely if they are maintained as wilderness roads. We found that the natural resource districts and BCTS followed risk-based planning processes to identify FSRs that were not needed for future industrial use and prioritize them for deactivation. Nevertheless, pressure to keep roads open for non-industrial users is increasing both the need for ongoing maintenance and the resources needed to meet the ministry's maintenance requirements.

SUMMARY OF RECOMMENDATIONS

Inventory

We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development:

1 Develop and implement policy, procedures and practices designed to ensure that information on forest service roads, including those under road use permits, is complete, accurate and easily accessible to ministry staff, including BC Timber Sales staff. This includes location, length, the ministry entity responsible for administration, and the permit holder responsible for maintenance.

Inspections and maintenance

We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development:

2 Develop and implement a plan to inspect and maintain bridges and major culverts on forest service roads in accordance with its policy.

3 Review and reconcile the Engineering Manual and Engineering Program Funding Policy to provide consistent guidance for determining forest service road inspection frequency, scheduling maintenance work, and closing and deactivating roads.

4 Review existing or implement new policy, procedures and practices to enable natural resource districts to accurately and consistently track ministry inspections and maintenance on forest service roads.

5 Assess whether the natural resource districts are inspecting forest service roads as required by policy and take action to reconcile any gaps.

6 Take action to reconcile the discrepancy between policy requirements for maintaining forest service roads and the extent of maintenance that actually occurs, given resource allocations.

We recommend that BC Timber Sales:

7 Develop and implement policy, procedures and practices that enable business areas to accurately and consistently track inspections and maintenance on forest service roads.

8 Assess whether it is inspecting and maintaining forest service roads as required by policy and take action to reconcile any gaps.

Road use permit oversight

We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development:

9 Develop and implement an approach to support the effective oversight of forest service roads under road use permits, including defining the roles and responsibilities of the natural resource districts, BC Timber Sales and the Compliance and Enforcement Branch in overseeing maintenance by road use permit holders.

RESPONSE FROM THE AUDITEE

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development thanks the Office of the Auditor General (OAG) for its audit report titled, *Management of Forest Service Roads (FSR),* which focused upon the period between 2016 and 2019.

The OAG audit report has captured the industrial nature and management of FSRs, and the important role these economic corridors play for commercial users, remote communities, rural residences and wilderness access.

The Ministry Engineering Program (Engineering Branch, Resource Districts and BC Timber Sales) and the forest industry undertake considerable effort to collectively and effectively manage the FSR network to mitigate risk and facilitate user safety and environmental protection commensurate with legislation, regulation, policy, road data systems and available resources.

A central facet of the audit is the evolving nature of FSR use, expectations and management. Historically, FSRs were built, maintained and deactivated by the forest industry for log-haul purposes. However, FSRs are now more broadly used by the public, and government has had to re-examine its mandate, placing more focus on access to rural communities and residences, and wilderness access for commercial and recreational purposes.

As a result, in the last three years we have adjusted our risk-based operational maintenance funding model to focus primarily upon communities and rural residences and are working more closely with BC Recreation Sites and Trails to better prioritize high value recreation maintenance.

We acknowledge the audit was completed in accordance with assurance standards as set out by CPA Canada. As noted within the Audit Scope, auditors assessed whether the ministry managed FSRs as required by legislation and policy by analysing ministry data, reviewing ministry records, and interviewing and surveying ministry staff; and that the assessment was not to include fieldwork. As you are aware, all works are not captured within the road data systems reviewed so not all data was captured in the audit despite efforts to secure materials. The Land Resource Management (LRMOPS) system, which has been in development since May 2019, will address the gap in the data systems.

We agree there are opportunities for improvement in FSR management and systems policies and data collection to address OAG findings and recommendations. We will further examine and finalize our electronic data systems and associated policy to ensure data entry accurately captures FSR inventory and responsibility and tracks road permits. We will ensure these data systems and related road policies record FSR and bridge risk assessment, inspections, maintenance and deactivation to better support service plan development and delivery.

We offer the following responses to the audit recommendations:

RECOMMENDATION 1: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development develop and implement policy, procedures and practices designed to ensure that information on forest service roads, including those under road use permits, is complete, accurate and easily accessible to ministry staff, including BC Timber Sales staff. This includes location, length, the ministry entity responsible for administration, and the permit holder responsible for maintenance.

RECOMMENDATION 1 RESPONSE: We accept the recommendation to improve our FSR inventory information and ensure corporate consistency and accessibility. Engineering Branch has been leading the development and implementation of the LRMOPS data system for roll-out spring 2021, which will better-capture FSR management information.

RECOMMENDATION 2: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development develop and implement a plan to inspect and maintain bridges and major culverts on forest service roads in accordance with its policy.

RECOMMENDATION 2 RESPONSE: We understand and accept the intent of the recommendation and intend to address it through review and revision of the Ministry's Bridge and Major Culvert policy, to clarify FSR bridges and major culvert inspection and maintenance planning, implementation and tracking. This will include refining the clarification and categorization of priority repairs and tracking completed repairs.

RECOMMENDATION 3: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development review and reconcile the Engineering Manual and Engineering Program Funding Policy to provide consistent guidance for determining forest service road inspection frequency, scheduling maintenance work, and closing and deactivating roads.

RECOMMENDATION 3 RESPONSE: We accept the recommendation to provide consistent engineering guidance and are in the process of review and reconciliation of our Engineering Manual and Engineering Program Funding Policy. This will eliminate conflicting guidance for FSR inspection frequency, timing of maintenance works and deactivation.

RECOMMENDATION 4: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development review existing or implement new policy, procedures and practices to enable natural resource districts to accurately and consistently track ministry inspections and maintenance on forest service roads.

RECOMMENDATION 4 RESPONSE: We accept this recommendation to ensure corporate consistency and accessibility related to tracking FSR inspections and maintenance. We will review and revise policy by Spring 2021 to address FSR inventory, risk assessment, inspections, maintenance activity, documentation and tracking through systems development and implementation.

RECOMMENDATION 5: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development assess whether the natural resource districts are inspecting forest service roads as required by policy and take action to reconcile any gaps.

RECOMMENDATION 5 RESPONSE: We understand and accept the intent of the recommendation and as per Response 4 as it relates to FSR inspections, we are reviewing and expect to revise policy and practices (LRMOPS) associated with road inventory, risk assessment, inspections, maintenance activity, documentation and tracking to ensure consistency. We anticipate this will be in place by Spring 2021, which will better enable Resource Districts to plan and track FSR inspections.

RECOMMENDATION 6: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development take action to reconcile the discrepancy between policy requirements for maintaining forest service roads and the extent of maintenance that actually occurs, given resource allocations.

RECOMMENDATION 6 RESPONSE: We understand and accept the intent of the recommendation and we will review current policy requirements for maintaining FSRs, prioritize maintenance in accordance with our revised Engineering Program Funding Policy criteria (Recommendation 3) and continue to seek appropriate levels of funding consistent with government priorities.

RECOMMENDATION 7: We recommend that BC Timber Sales develop and implement policy, procedures and practices that enable business areas to accurately and consistently track inspections and maintenance on forest service roads.

RECOMMENDATION 7 RESPONSE: BC Timber Sales accepts this recommendation. BC Timber Sales commits to improving the tracking of inspections and maintenance in its LRM system, to ensure corporate consistency. OAG recommendation relating to RUP holder information being readily available to BC Timber Sales is key to addressing this recommendation.

RECOMMENDATION 8: We recommend that BC Timber Sales assess whether it is inspecting and maintaining forest service roads as required by policy and take action to reconcile any gaps.

RECOMMENDATION 8 RESPONSE: BC Timber Sales accepts this recommendation. BC Timber Sales commits to taking action to address the recommendation. OAG recommendation relating to RUP holder information being readily available to BC Timber Sales is key to this assessment.

RECOMMENDATION 9: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development develop and implement an approach to support the effective oversight of forest service roads under road use permits, including defining the roles and responsibilities of the natural resource districts, BC Timber Sales and the Compliance and Enforcement Branch in overseeing maintenance by road use permit holders.

RECOMMENDATION 9 RESPONSE: We understand and accept the intent of the recommendation. The ministry intends to re-invigorate discussions between Engineering Branch, BC Timber Sales, Resource Districts and Compliance and Enforcement Branch to establish and clarify roles and responsibilities associated with RUP oversight and to review and revise legislation and policy, if required.

The Auditor General has asked the right questions within the "Looking Ahead" section of the audit, considering a reduction in industrial use and maintenance coupled with increased public usage and expectations of improved maintenance by the Province. We will use this opportunity to consider the Auditor General's statements in the context of our priorities and seek guidance from the forthcoming government to help provide that direction. In the meantime, we will continue to rely upon existing legislation, regulations and policy guidance and our dedicated professional and technical Engineering Program experts on the ground to ensure our FSRs are safe for all users while being mindful of the environment.

ABOUT THE AUDIT

Background

What is a forest service road?

Forest service roads (FSRs) are one- or two-lane gravel roads built on Crown land to access timber for forestry operations. Once built, they are often used for other industrial and commercial purposes, such as mining, trapping and guide outfitting. FSRs also often provide access to communities, private residences, and recreation and wilderness areas, even when they are no longer needed for industrial use. For example, the Finlay FSR provides the only road access to two First Nations communities.

MAINTAINING THE FINLAY FSR

The Finlay FSR, north of Prince George in the Mackenzie natural resource district, is the longest FSR in B.C., at around 420 kilometres. Since it provides the only road access to the remote Kwadacha (formerly Fort Ware) and Tsay Keh Dene Nations, and the only land-based escape route in the event of flooding or wildfires, maintaining it is important. The district maintains approximately 208 kilometres of the road, with the rest maintained by industrial road use permit holders.

Finlay FSR (left) and Kwadacha Nation (right), at the end of the Finlay FSR.
Photo credit: Office of the Auditor General of British Columbia

FSRs are maintained by forest companies under road use permits, or by the Government of British Columbia when there is no industrial user responsible for maintenance. There are approximately 58,000 kilometres of FSRs in B.C., which is almost 10 times the distance between Victoria and Halifax.

FSRs are part of a 620,000-kilometre system of resource roads that often connect with, but are not part of, the public highway and byway system. Other types of resource roads include:

- permit roads managed by forest licensees
- other permit roads used by the oil and gas and mining industries
- non-status roads that have unknown status and origin and are not managed by the B.C. government or any users

The B.C. government considers resource roads essential to the province's economic development and a highly valued part of its transportation network.

The importance of maintaining FSRs

FSRs aren't built or maintained to the same standard as roads intended for public use. Almost all FSRs have gravel surfaces and often have more and tighter curves and steeper road grades than are found on public highways. Common hazards include loose gravel surfaces, potholes, changing road surface conditions, poor visibility, large industrial vehicles, and vehicles passing or being passed on narrow roads.

Rock falls can cause safety issues on FSRs.
Photo credit: Ministry of Forests, Lands, Natural Resource Operations and Rural Development

For members of the public using FSRs, lack of awareness of road conditions or industrial traffic can result in accidents and fatalities. BC Coroners Service data shows that between 2010 and 2018 there were 70 motor vehicle deaths on logging roads. Recently, an all-terrain vehicle accident on the Foley Creek FSR near Chilliwack resulted in two fatalities. According to data reported by police and compiled by ICBC, between 2012 and 2016 there were 499 motor vehicle accidents on forestry roads, with the top contributing factors being speed, distraction, impairment, road conditions and weather. While road users have an obligation to drive in a manner that is appropriate to the road conditions—and under the *Occupiers Liability Act* use FSRs at their own risk—maintaining FSRs can help to mitigate safety hazards for users (e.g., removing brush that impairs drivers' ability to see oncoming traffic).

Maintaining FSRs can also reduce risk of damage to the environment. According to the Forest Practices Board, resource roads can have significant and pervasive impacts on water quality and the aquatic environment. Environmental impacts include changes to natural drainage patterns, stream crossings that prevent fish passage, erosion and landslides that cause sedimentation in creeks and rivers and habitat loss, and introduction of invasive plant species.

Oversight and maintenance

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRO) oversees the management of all FSRs, as set out in the *Forest Act* and *Forest and Range Practices Act*. District managers and BC Timber Sales (BCTS) managers oversee FSRs within their respective natural resource districts and business areas (see Appendix B) and maintain the FSRs when they are not being used for industrial purposes (see Exhibit 1).

BC TIMBER SALES

BC Timbers Sales (BCTS) is a self-financing program within the ministry that plans, develops and auctions a portion of the province's annual allowable cut (available timber) and reforests harvested areas. There are 12 BCTS business areas across the province (see Appendix B).

BCTS builds FSRs to access forest land where future timber sale licences will be auctioned. It is responsible for managing and maintaining FSRs that it has constructed or that provide access to its operating areas, as set out in maintenance responsibility agreements between BCTS managers and FLNRO district managers.

EXHIBIT 1: *Kilometres of forest service road managed by natural resource districts and BCTS*

Responsible entity	Kilometres of FSR
Natural resource districts	38,000 km
BC Timber Sales	20,000 km
Total	**58,000 km**
Of the **58,000 km** of FSR, **~30,000 km** are maintained by road use permit holders	

Source: Office of the Auditor General of British Columbia, based on FLNRO data

The ministry's Engineering Branch develops, implements and monitors the forest road engineering program, in collaboration with districts and BCTS business areas, to ensure that the ministry complies with all relevant legislation, government policy, engineering standards, agreements and operational plans. Ministry professional engineers also conduct or oversee inspections and oversee maintenance on FSR bridges and major culverts.

Maintenance requirements

The level of maintenance required depends on how a forest service road is being used. Forest legislation addresses industrial use, but not other uses such as public use. It requires at least a minimum level of road and structure maintenance, referred to as "wilderness road" status, on all forest service roads, and a higher level of road and structure maintenance on FSRs being used and maintained by industry.

Wilderness road status is the minimum maintenance standard applied to all FSRs. The maintenance obligation is to protect against material adverse effects on forest resources, such as fish, wildlife, soil and water. This maintenance level does not guarantee motor vehicle access and it typically excludes surface and structural maintenance unless needed to prevent material and adverse effects on the environment.

Wilderness maintenance status requires that:

1. The structural integrity of the road prism and clearing width are protected to ensure that there is no material adverse effect on a forest resource
2. The drainage systems of the road are functional (i.e., through ditch and culvert cleaning) to ensure that there is no material adverse effect on a forest resource

Road use permit roads

Industrial users are required to obtain a road use permit from the district manager to authorize their use of an FSR for industrial purposes. The district manager will order one road use permit holder to be responsible for maintenance of an FSR for the purpose of safe industrial use. When an industrial user is not actively using the FSR under permit, the designated maintainer must maintain the road to at least the wilderness standard. The permit holder is not obligated to maintain an FSR for public users. The ministry may, at times, supplement the industrial maintenance to meet public use and safety needs, subject to the ministry's Engineering Program Funding Policy.

ENGINEERING PROGRAM FUNDING POLICY

The ministry's Engineering Program Funding Policy sets out expectations for natural resource district road maintenance. The districts do not maintain FSRs for industrial use. The policy requires districts to prioritize road maintenance funding in the following order:

1. FSRs accessing communities
2. FSRs serving rural residences
3. FSRs accessing high-value recreation sites

For other FSRs, funding is limited to providing a wilderness road level of maintenance, to protect public safety and the environment; otherwise the districts are directed to consider road closures and deactivation.

Capital roads

FSRs that provide access for communities (of 50 or more year-round residents), rural residences or "high-value" forest recreation sites and trails or "important" recreational areas (as defined by Ministry of Tourism, Culture and the Arts) are financially capitalized by the ministry. These FSRs are referred to as "capital roads." The natural resource districts are responsible for approximately 12,000 kilometres of capital roads, which are linked to the public highway network and provide an ongoing service to the public. They are therefore unlikely to be deactivated by the ministry and require continual maintenance.

Audit scope

Our office audited forest service roads (FSRs) because of their significance to industry, communities (including First Nations), recreationists and the environment. Maintaining FSRs can help to mitigate safety hazards for users and reduce risks to the environment.

Our audit assessed whether the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRO) managed environmental and safety risks by inspecting, maintaining and deactivating FSRs as required by legislation and policy. We determined what inspection and maintenance work had occurred by analyzing ministry data, reviewing ministry records and interviewing and surveying ministry staff. We did not assess in the field whether roads were safe and environmentally sound.

This audit focused on the ministry's management of risks on forest service roads from 2016 to 2018, and activities in 2019. We also looked at older data as needed to provide relevant context and to assess trends over time (e.g., deactivation rates). We focused on forest service roads—the resource roads for which the ministry has direct responsibility for maintaining and overseeing industrial use.

Audit method

Our work involved:

- interviewing and surveying ministry staff (Engineering Branch, Regional Operations Division, BC Timber Sales, Compliance and Enforcement Branch)
- reviewing relevant legislation, regulation and policy
- analyzing ministry records, reports and databases, including a sample of inventory, inspections and maintenance records from eight FLNRO natural resource districts
- visiting a selection of natural resource districts and BC Timber Sales business areas to observe FSRs and understand management complexities on the ground
- speaking with organizations such as the Forest Practices Board, BC Forest Safety Council, WorkSafe BC and BC Coroners Service, and representatives from industry, First Nations and municipalities to understand diverse perspectives on the management of FSRs
- consulting with two subject matter experts, who reviewed our draft findings and report

The report is dated November 29, 2020. This is the date on which the audit team finished obtaining the evidence used to determine the findings and conclusions of the report.

AUDIT OBJECTIVE AND CONCLUSION

Audit objective

To determine whether the Ministry of Forests, Lands, Natural Resource Operations and Rural Development managed safety and environmental risks on forest service roads (FSRs) in accordance with legislation and policy.

Audit criteria summary

We examined whether the ministry had:

- established a complete and accurate inventory of FSRs
- inspected FSRs to identify safety and environmental risks
- maintained FSRs to mitigate safety and environmental risks
- monitored road use permit holders to ensure that FSRs were maintained to the required standard
- deactivated FSRs that were not being used industrially and where maintenance was not feasible to protect public safety and the environment

Audit conclusion

We concluded that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development did not manage safety and environmental risks on FSRs in accordance with its policies.

We found that the ministry did not complete needed maintenance and repairs on roads and crossing structures (i.e., bridges and major culverts) in accordance with policy.

We also found that the ministry's information on inventory, inspections and maintenance for FSRs was inconsistent, difficult to share and at times inaccurate. This makes it difficult for the ministry to assess whether the roads are maintained as required and to estimate the resources required to meet policy expectations.

The shortcomings in FSR maintenance and lack of reliable information increase the risk to road users and the environment.

KEY FINDINGS AND RECOMMENDATIONS

Inventory

To manage environmental and safety risks on forest service roads (FSRs) in accordance with legislation and policy, the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (FLNRO) needs a reliable inventory. It needs to know what FSRs exist, who is responsible for managing them (i.e., natural resource districts, BC Timber Sales or an industrial user with a road use permit), and the standard to which they are maintained (i.e., roads being actively used by permit holders are managed to the industrial standard, whereas all other roads, except capital roads, are managed to the wilderness standard).

We found that the ministry's use of multiple and sometimes unconnected systems to track information for FSRs resulted in data that was inconsistent, difficult to share and at times inaccurate. The ministry's operational land resource management systems were not consistently used by all districts and BC Timber Sales (BCTS) business areas.

THE MINISTRY'S CORPORATE SYSTEMS FOR MANAGING INFORMATION ABOUT FSRs

- The Forest Tenure Administration system is used and managed by the Forest Tenures Branch to support the harvesting licence approval process and monitor forest tenures, including tracking the location of FSRs.
- The Land Resource Management—Operations system pulls tenure data directly from the Forest Tenure Administration system and is used by some districts to track the operational management of roads for which they are responsible.
- The BCTS Land Resource Management system is used by business areas to track the operational management of roads that they are responsible for.
- The Corporate Bridge Register is used and managed by the Engineering Branch to track information on bridges and major culverts on FSRs across the province, including inspections and maintenance.

Tracking the inventory

Inventory information on FSRs was inconsistent and difficult to share

We found that the ministry's approach to managing its inventory meant that it could not ensure accuracy of the data or get a complete picture of its FSR inventory. For example, we found inconsistencies between the ministry's tenure records in the Forest Tenure Administration system —which indicate whether a district or BCTS is responsible for an FSR—and the BCTS Land Resource Management system (BCTS-LRM). As a result, there were BCTS FSRs that we couldn't find in BCTS-LRM, or where the designated responsibility did not match the information in the Forest Tenure Administration system. This was predominantly caused by mismatched file information, such as road name, which made it difficult to determine if the inventories were complete. District and BCTS business area staff told us that because there isn't a harmonized system for tracking responsibility, they rely on responsibility designation lists, which we found were not always up to date. Of the seven lists we reviewed, one was last updated in 2010, another in 2013 and two in 2014.

BCTS also did not have ready access to information to determine whether it or a road use permit holder was responsible for maintaining an FSR. FLNRO districts administer road use permits, but did not consistently track and share reliable information about which FSRs were under road use permits. We sampled eight of 23 districts, finding that they used a variety of ways to track permit information, and this information wasn't centrally accessible or easy to share.

Discrepancies in inventories and the absence of easily accessible and up-to-date information on which roads are under road use permits increases the risk of districts and BCTS staff not knowing which roads they are responsible for, and of maintenance consequently not happening.

RECOMMENDATION 1: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development develop and implement policy, procedures and practices designed to ensure that information on forest service roads, including those under road use permits, is complete, accurate and easily accessible to ministry staff, including BC Timber Sales staff. This includes location, length, the ministry entity responsible for administration, and the permit holder responsible for maintenance.

Inspections and maintenance

Road and crossing-structure inspection and maintenance are essential for providing the safety, service life, return on economic investment and environmental protection expected for FSRs. The Ministry of Forests, Lands, Natural Resource Operations and Rural Development is required to maintain an FSR until it is deactivated, unless the district manager has designated a road use permit holder as responsible for maintenance.

The ministry prioritizes inspections, maintenance and upgrades to roads, bridges and major culverts in accordance with risks. Its Engineering Manual provides policy and technical guidance for inspecting, maintaining and deactivating roads, bridges and culverts. It also outlines the safety and environmental outcomes that inspections and maintenance are expected to achieve, in alignment with legislation and regulations.

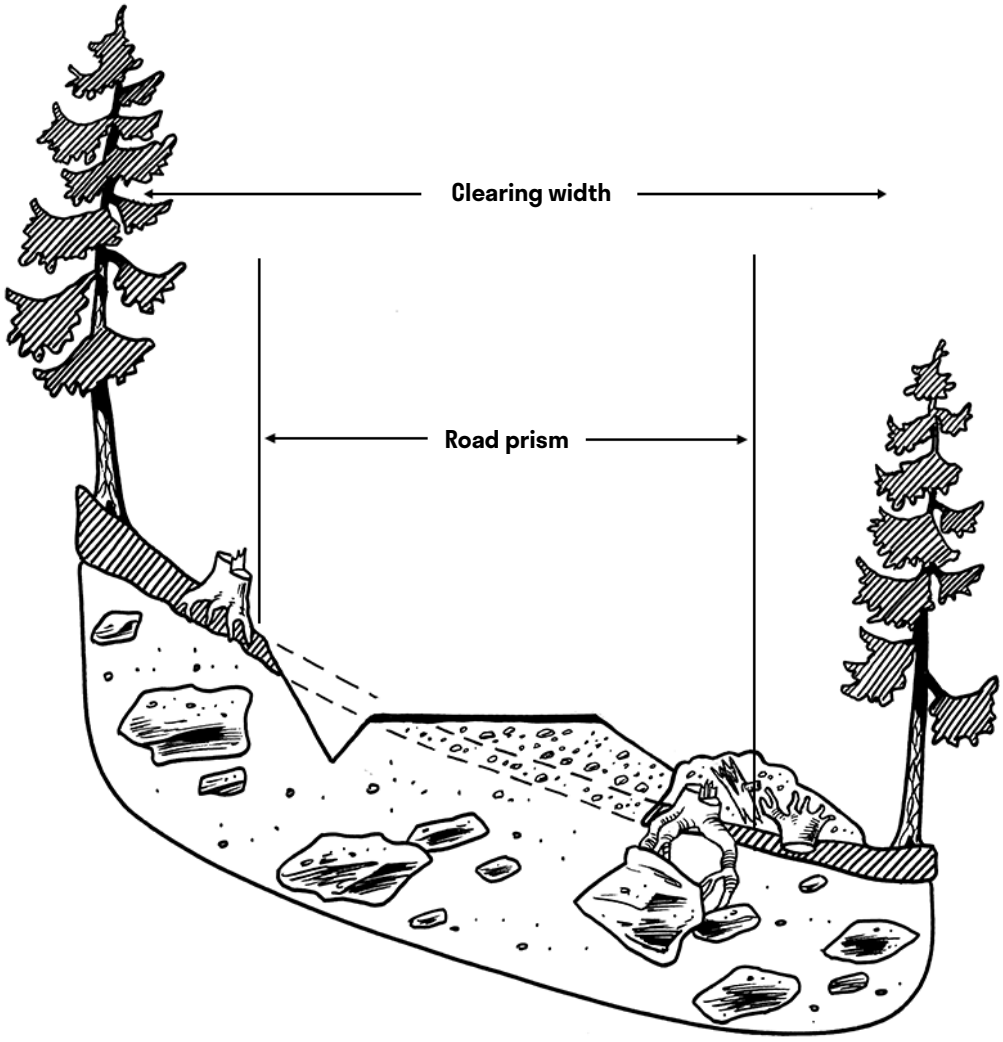
DESIRED RESULTS OF FSR INSPECTIONS AND MAINTENANCE

The ministry inspects and maintains roads and structures to ensure that the following requirements of the Forest Planning and Practices Regulation are met:

- protection of drinking water quality
- protection of riparian management areas
- protection of fish passage and fish habitat
- protection of the structural integrity of the road prism and clearing width (see Exhibit 2)
- functional road drainage systems
- safe use by industrial users
- protection of wildlife and other resource features

Road inspections focus on the structural integrity of the road prism and clearing width (see Exhibit 2), the effectiveness of drainage systems, and the condition of the road surface, as well as road user safety (e.g., signage) and any environmental values at risk. Inspecting engineered structures involves checking the integrity of the structure—for example, to see if there is any rotten wood that would affect safe passage.

EXHIBIT 2: *Road prism and clearing width*



Source: FLNRO Engineering Manual, adapted by the Office of the Auditor General of British Columbia

Maintenance activities include routine maintenance (e.g., surface grading and snow plowing), as well as road upgrades and repairs, and repair or replacement of structures. Maintenance work that addresses deficiencies identified by inspections needs to be carried out in a time frame commensurate with the risk to the road or structure; its users; forest resources such as water, wildlife and fish; and other environmental values.

EXAMPLES OF ROAD MAINTENANCE

- Brushing and controlling vegetation and dangerous trees along the road
- Maintaining ditches and culverts
- Stabilizing the road prism by repairing washouts and landslides, removing loose rocks, and so on
- Repairing soft subgrades and frost heaves
- Repairing ruts, potholes and broken road surfaces
- Summer grading and winter snowplowing

Repairing a culvert embankment armoured with rock. *Photo credit: FLNRO*

EXAMPLES OF BRIDGE AND MAJOR CULVERT MAINTENANCE

- Repairing or replacing structural elements of bridges (e.g., bolts, girders, beams)
- Replacing bridges and major culverts that are unable to carry service loads
- Repairing major culvert headwalls and spillways
- Maintaining surfaces, such as repairing or replacing signs and guardrails, clearing logs and debris from waterways, removing gravel build-up on bridge decks
- Ensuring that stream culverts allow the stream to flow and fish to pass

Carrying out road and crossing structure inspections, based on the schedules set out in its policies, helps the ministry to prioritize maintenance activities in order to manage environmental and safety risks. We examined whether the ministry inspected and maintained FSRs, bridges and major culverts according to policy. We found the following:

- The ministry inspected 87% of bridges and major culverts according to policy. Of these structures, 48% were overdue for high-priority repairs by, on average, just over two years.
- Natural resource districts did not keep consistent or complete inspection or maintenance records.
- Policy requirements for inspecting and maintaining FSRs are contradictory in key matters like inspection frequency.
- Districts did not maintain roads as required by policy because of resource constraints.
- BCTS did not keep accurate inspection and maintenance records; its data indicates that it did not inspect or maintain roads as required, but the extent of the deficiency is unclear.
- Ministry roles and responsibilities for monitoring road maintenance by industrial users were unclear and monitoring was limited and informal.

Inspecting and maintaining bridges and major culverts

The ministry inspected 87% of its bridges and major culverts according to policy

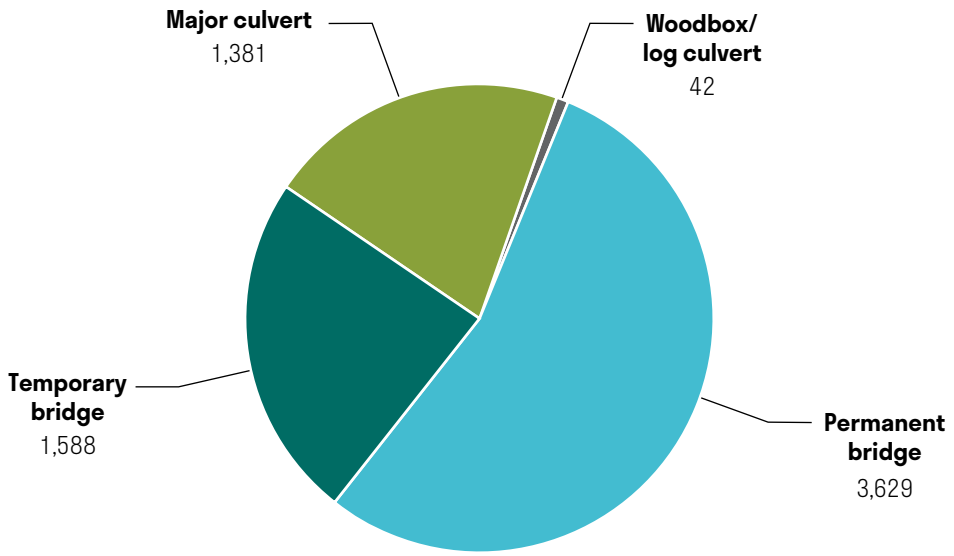
The ministry's Engineering Branch is responsible for inspecting FSR bridges and major culverts, including those under road use permits. Routine structure inspections identify any structural deficiencies that require fixing. The Engineering Manual requires that a qualified inspector inspect permanent structures (except log or woodbox culverts) at least once every three years and temporary structures and log or woodbox culverts once every two years. Exceptions are made for structures where access is prevented. Where warranted, structure inspection frequency can be increased—for example, when a structure is nearing the end of its service life, or where an inspector or professional engineer determines that conditions merit more frequent inspections.

According to the ministry's Corporate Bridge Register (CBR), there are 6,640 crossing structures on FSRs. Of those, 6,569 structures are on active crossing sites (see Exhibit 3).

TYPES OF BRIDGES AND CULVERTS

- Permanent bridge—a bridge that has structural components (e.g., girders and abutments) made of permanent materials (steel, concrete or treated wood)
- Temporary bridge—a bridge that has structural components made of temporary materials (untreated logs or untreated timbers)
- Major culvert—a culvert having a pipe diameter of 2,000 millimetres or greater
- Woodbox or log culvert—a culvert with a gravel deck, spans of less than six metres and abutment heights of less than four metres

EXHIBIT 3: *Number of crossing structures by type*

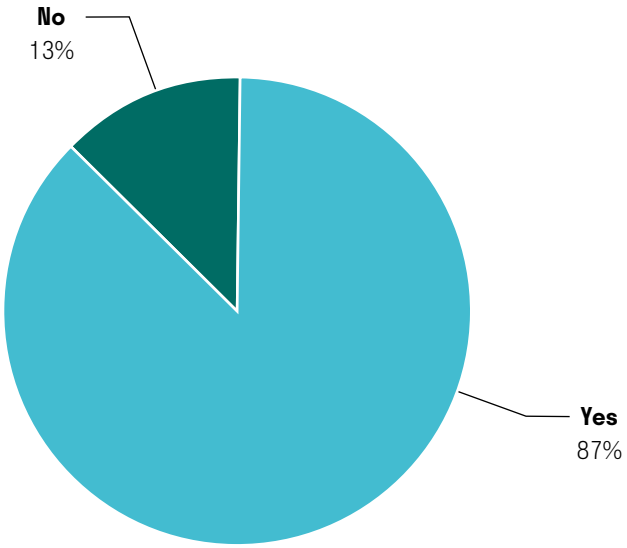


Source: Office of the Auditor General of British Columbia based on CBR data

We analyzed the ministry's CBR data to determine whether the Engineering Branch had inspected structures at the frequencies required by the Engineering Manual over a 10-year period. We found that from 2009 to 2019, the Engineering Branch had inspected most bridges and culverts (87%, or 5,789 of 6,640) according to the required frequency (see Exhibit 4). Of the 13% of structures (851 of 6,640) that were not inspected at the required frequency, almost

all (810) were on active crossing sites and the majority were bridges. Seventy-two structures had not been inspected at all over the 10-year period, despite not having any special access requirements (e.g., boat, helicopter) that would impede inspecting them.

EXHIBIT 4: *Proportion of structures inspected at the required frequency, 2009–2019*



Source: Office of the Auditor General of British Columbia based on CBR data

We also found that, as of May 2019, 5% of structures (340 of 6,640) were overdue for inspections, based on a review of the planned inspection dates in the CBR. Those inspections were overdue by an average of 635 days. Most of the structures overdue for inspection (311 of 340) were on active crossing sites.

Not inspecting all of these structures according to policy increases the risk of not identifying and addressing safety and environmental concerns. We provide a recommendation (recommendation 2) to address this finding.

High-priority repairs were overdue on 48% of bridges and major culverts

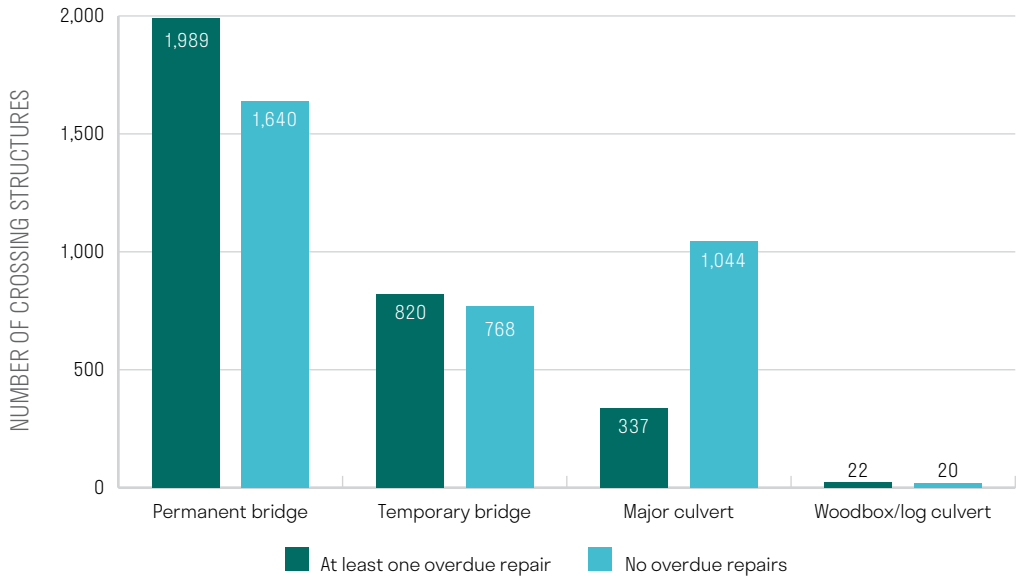
If an inspector determines that repairs or replacements are needed, Engineering Branch staff review the inspector's report and send it to either the road use permit holder, the district or BCTS to complete the recommended work. Timelines for completing the work are based on risk: high-priority repairs need to be done in 30 days (see Appendix C: Inspection and Maintenance Frequencies and Timelines). If repairs to address structural deficiencies cannot be completed in a timely way to reduce safety risks, the load limit for the structure can be downrated.

A new bridge is placed on the Zeballos FSR in the Campbell River Natural Resource District. The bridge replaces an old structure that had been downrated for safety reasons. *Photo credit: FLNRO*

Follow-up inspections ensure that structural repairs have been completed in accordance with the inspection report recommendations.

We assessed whether the ministry had completed high-priority repairs and replaced FSR structures on time by analyzing CBR data. We found that, as of May 1, 2019, one or more high-priority repairs were overdue on 3,178 of 6,640 structures (see Exhibit 5), or 48%, by an average of just over two years (851 days).

EXHIBIT 5: *High-priority repairs on crossing structures, by type*

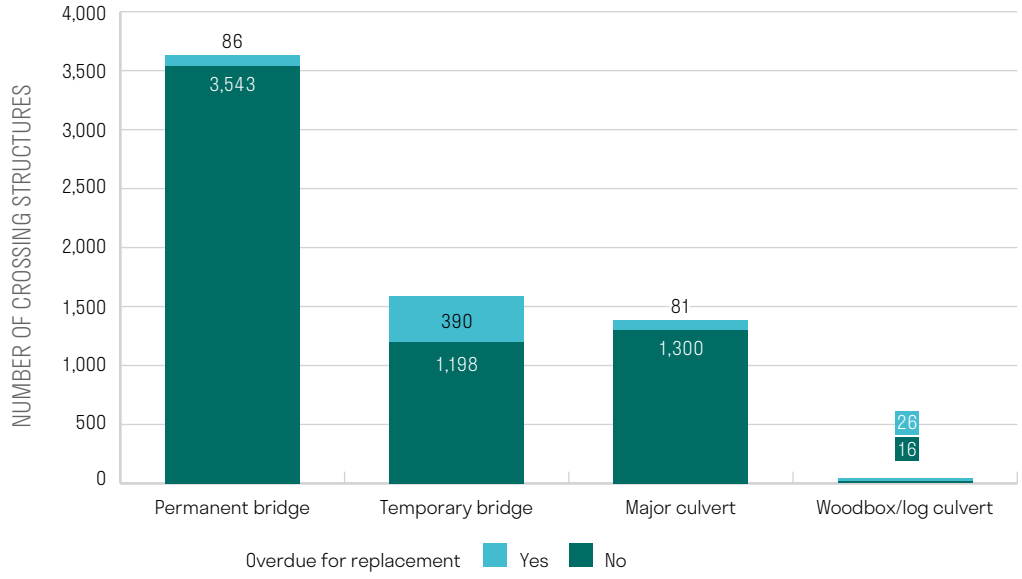


Source: Office of the Auditor General of British Columbia based on CBR data

Ministry staff told us that some of these structures have likely been repaired, but the Engineering Branch had not yet inspected the work or entered the results into the CBR as of May 2019. However, we found that 1,734, or 26%, of total structures had overdue high-priority repairs that were outstanding for two inspection cycles. Most of these overdue high-priority repairs were on active, permanent bridges.

We also found that, as of May 30, 2019, replacement was overdue on 583 structures, or 9%, by an average of five years. Of these, 561 were on active sites and the majority were temporary bridges (see Exhibit 6). Engineering Branch officials explained to us that temporary bridges are often found on wilderness roads and are not replaced with permanent bridges until the road is being used by industry.

EXHIBIT 6: *Number of crossing structures overdue for replacement, by type*



Source: Office of the Auditor General of British Columbia based on CBR data

District staff told us they lacked funding to meet maintenance requirements for crossing structures. In 2019/20, $2.7 million of the districts' requests for very high- and high- risk bridge and culvert operational funding (for repairs and replacements) was unfunded. Ministry officials told us that district managers can, if needed, reduce the load rating or close bridges in order to limit access and mitigate safety risks. Data analysis showed that, as of May 30, 2019, the ministry had reduced load ratings to reduce safety risk on 585 structures on active sites. Closed and down-rated structures remain an environmental risk (e.g., fish passage) and a financial liability.

RECOMMENDATION 2: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development develop and implement a plan to inspect and maintain bridges and major culverts on forest service roads in accordance with its policy.

Inspecting and maintaining district FSRs

Policy requirements for inspecting and maintaining FSRs are contradictory in key matters like inspection frequency

In order for natural resource districts to implement them, policy requirements for inspecting and maintaining FSRs must be clear and consistent. We found that the criteria for determining inspection frequencies and timelines for completing repairs in the ministry's Engineering Manual and Engineering Program Funding Policy (EPFP) are not aligned.

The Engineering Manual calls for more frequent inspections than the EPFP for most road risk ratings (see road engineering risk analysis and Exhibit 7). According to the ministry, the inspection frequencies specified in the Engineering Manual are the goal and remain constant over time, whereas the EPFP represents what is practically accomplishable in a specific year, given staffing and funding levels.

EXHIBIT 7: *Differences in inspection frequencies between the Engineering Manual and EPFP*

Engineering Manual		EPFP	
Road risk rating	**Minimum inspection frequency for non-industrial use, environmentally maintained FSRs (wilderness roads)**	**Road risk rating**	**Recommended inspection frequency**
Very high or high	At least once a year plus additional inspections after major storms and prior to annual freshets (also applies to all non-industrial use capital roads)	Very high or high	Every year and after major events where there is public access
Medium-high	N/A	Medium-high	Every year and after major events where there is public access until the risk is reduced. After work is completed, inspect every 2 years.
Medium	At least once a year plus additional inspections after major storms and prior to annual freshets	Medium	Every 2 years
Low	At least once every 2 years	Low	Every 3 years

Source: Office of the Auditor General of British Columbia, based on Engineering Manual and Engineering Program Funding Policy (see Appendix C for full excerpts)

Similarly, we found that the Engineering Manual and the EPFP differed in their requirements for maintenance. For example, the Engineering Manual says that very high-urgency maintenance work must be addressed within a week and high-urgency maintenance work within 30 days, but the EPFP says that repairs need to be completed as soon as practical to reduce risk to a tolerable level for very high- and high-risk roads. The EPFP also recommends closing medium- and low-risk roads that require maintenance and considering them for deactivation.

RECOMMENDATION 3: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development review and reconcile the Engineering Manual and Engineering Program Funding Policy to provide consistent guidance for determining forest service road inspection frequency, scheduling maintenance work, and closing and deactivating roads.

Districts did not keep consistent or complete inspection and maintenance records for roads

Natural resource districts are responsible for inspecting and maintaining FSRs that are not under road use permit by an industrial user. For each road, districts are expected to develop an inspection schedule based on a road engineering risk analysis, in accordance with the Engineering Manual. Inspection frequencies are established by the Engineering Manual and the Engineering Program Funding Policy (EPFP), which, as already discussed, are contradictory (Appendix C). Inspection results are then used to determine required maintenance activities, with timelines set out in the Engineering Manual and the EPFP.

ROAD ENGINEERING RISK ANALYSIS

A road engineering risk analysis estimates the likelihood of hazardous events (such as slope failures, washouts and blocked culverts) and their potential impact on known values (such as road user safety, stream flows, fish habitat and water quality). For example, a road on steep terrain within a community watershed that is rated as having a high likelihood of a slope failure resulting in impacts to water quality would have a correspondingly high inspection frequency.

We found that record keeping was so inconsistent and incomplete that we could not determine whether districts inspected and maintained FSRs according to policy. Districts did not consistently record inspections and maintenance in the ministry's Land Resource Management—Operations database (LRM-Ops), as it was a new and not mandatory system that was being rolled out across the districts over the course of our audit.

For our sample of eight of 23 districts (one from each region), we found that each district tracked inspections and maintenance using a variety of in-house tools, including Excel spreadsheets, paper forms and Word documents.

For inspections, seven of the districts did not track historical inspection data, enter completion dates, or record other information needed to understand whether FSRs were inspected according to policy. The remaining district did not conduct scheduled inspections in 2018, contrary to policy.

For maintenance, six of those districts tracked varying levels of detail in Excel spreadsheets. Two districts didn't use any form of tracking. This means there was no record of required maintenance being completed.

This is consistent with the findings from a 2008 Internal Audit & Advisory Services report—that documentation processes were informal and inconsistent, and that the ministry couldn't ensure that risks were mitigated.

The lack of standard processes, such as requiring districts to use LRM-Ops to track maintenance, makes it hard for the ministry to demonstrate that it is completing required maintenance activities on its FSRs.

Not keeping complete, accurate and consistent inspection and maintenance records means that funding and resource allocation decisions for road maintenance might be based on information that is incomplete or inaccurate. Not inspecting FSRs in accordance with policy increases the likelihood that maintenance needed to address safety and environmental risks is not identified and addressed.

RECOMMENDATION 4: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development review existing or implement new policy, procedures and practices to enable natural resource districts to accurately and consistently track ministry inspections and maintenance on forest service roads.

RECOMMENDATION 5: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development assess whether the natural resource districts are inspecting forest service roads as required by policy and take action to reconcile any gaps.

Districts did not maintain roads as required by policy

Districts are responsible for maintaining FSRs that are not being used by industry to a wilderness standard. Districts are also responsible for maintaining FSRs to provide safe public access to year-round communities, rural residences, and high-value recreation sites, as set out in the Engineering Manual and the Engineering Program Funding Policy.

To fund this work, the Engineering Branch directs districts to build their budget requests for maintenance based on inspection results and requirements set out in the funding policy. The branch prioritizes the allocation of funding to districts for maintenance work on high-risk capital roads.

We found that the districts did not receive the funding from the ministry that they identified as needed to maintain and repair roads according to policy. From 2017/18 to 2019/20, the districts received between 14% and 20% of their budget requests for FSR maintenance. During that time, budget allocations for district road maintenance remained stable at $5.5 to $5.7 million, while the districts' requests ranged from $28.6 million to $40.2 million (see Exhibit 8).

EXHIBIT 8: *Proportion of maintenance funding requests allocated to district areas*

	2017/18			2018/19			2019/20		
Area	Budget request ($M)	Budget allocation ($M)	Proportion of request received	Budget request ($M)	Budget allocation ($M)	Proportion of request received	Budget request ($M)	Budget allocation ($M)	Proportion of request received
Coast	$11.3	$1.7	15%	$11.5	$1.8	16%	$10.8	$1.9	17%
South	$5.7	$1.8	31%	$5.7	$1.7	31%	$6.3	$1.7	26%
North	$11.5	$2.1	18%	$21.8	$2.1	10%	$23.1	$1.9	8%
Total	**$28.6**	**$5.6**	**20%**	**$39.0**	**$5.7**	**15%**	**$40.2**	**$5.5**	**14%**

Source: Office of the Auditor General of British Columbia, based on FLNRO documents

Note: District requests are summarized at the area level. A map of natural resource areas and districts is included in Appendix B.

In 2019/20, the funding that the Engineering Branch allocated to the districts did not cover their requests for maintenance—including summer and winter maintenance (grading, dust abatement, snow plowing) and operational road work and repairs—on their capital FSRs, which provide access to communities, rural residences and high-value recreation sites. Overall, the districts received 26% of their budget requests for priority capital road maintenance (see Exhibit 9). Unfunded work included $8.9 million in high-priority maintenance and $1.6 million in medium-priority maintenance.

EXHIBIT 9: *Area requests for priority capital road maintenance compared to actual funding (2019/20)*

Area	Request for community FSRs ($M)	Request for rural residence FSRs ($M)	Request for high-value recreation FSRs ($M)	Total request for capital roads ($M)	Budget allocation ($M)	Proportion of request received
Coast	$1.8	$1.6	$2.8	$6.2	$1.9	30%
South	$0.3	$1.1	$3.1	$4.5	$1.7	36%
North	$7.1	$1.1	$2.6	$10.8	$1.9	18%
Total	**$9.2**	**$3.8**	**$8.5**	**$21.5**	**$5.5**	**26%**

Source: Office of the Auditor General of British Columbia, based on FLNRO documents

Note: District requests are summarized at the area level. A map of natural resource areas and districts is included in Appendix B.

Some district staff corroborated, via testimonial and survey evidence, that resources were not adequate to maintain high-value recreation-use roads and adequately maintain their FSR networks. Some also noted that inadequate maintenance work increases environmental and safety risks. Engineering Branch officials told us that the figures in Exhibits 8 and 9 likely overstate the extent of the funding shortfall, as it may include funding for roadwork to meet public expectations that exceeds policy requirements (see text box on the Zeballos FSR network). Given the level of funding, the ministry prioritized the highest-risk FSRs for maintenance funding.

THE ROAD TO ZEBALLOS: A COMMUNITY ACCESS FSR

The 72-kilometre Zeballos FSR network (Zeballos and Fair Harbour FSRs) provides the only road access to the communities of Zeballos and Fair Harbour and the Nuchatlaht, Ehattesaht and Ka:'yu:'k't'h'/Che:k'tles7et'h' First Nations on the northern west coast of Vancouver Island. The FSR is used by locals, visitors seeking recreation opportunities, and industrial users associated with commercial fishing, fish farming and industrial forestry.

The road network was originally constructed for resource development in the mid-20th century, when no standards existed for resource road construction. According to the district (Campbell River), the road and bridge infrastructure has been susceptible to storm damage, flooding and washouts on a regular basis, leaving the communities isolated for significant periods of time.

A section of the road, between the Zeballos and Fair Harbour FSRs, is not part of the FSR network. It is under road permit (not road use permit), and the permit holder, not the ministry, is responsible for maintaining it. This section is narrow, steep and winding and is regularly used by the public, including the community school bus, as well as industrial users. For the rest of the road, the district and a road use permit holder share maintenance responsibilities. Because it is an FSR that provides community access, the district maintains the road when the road use permit holder is not actively operating, to provide a consistent level of maintenance for public use. According to district officials, the ministry also does supplementary maintenance (grading, filling potholes, etc.) when the road use permit holder is operating and maintaining the road, to help bridge the gap between industrial requirements and public expectations.

The Ministry of Transportation and Infrastructure also provided a one-time funding increase to FLNRO for road surfacing upgrades in 2018/19–2019/20.

The road to Zeballos. *Photo credit: Office of the Auditor General of British Columbia*

Not carrying out road maintenance and repairs as required by policy increases environmental and safety risks. As well, if moderate- to low-risk roads are not maintained, they can deteriorate and pose greater risk.

RECOMMENDATION 6: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development take action to reconcile the discrepancy between policy requirements for maintaining forest service roads and the extent of maintenance that actually occurs, given resource allocations.

Inspecting and maintaining BC Timber Sales FSRs

BC Timber Sales did not inspect roads as frequently as required, but the extent of the deficiency is unclear

BC Timber Sales (BCTS) builds FSRs to access the land that it manages for timber harvesting. BCTS is responsible for inspecting its FSRs that aren't under road use permit. We found that BCTS did not inspect its FSRs at the frequencies stipulated in the Engineering Manual, but the extent of the deficiency is difficult to determine because of limitations in the available data.

BCTS uses the Land Resource Management system (BCTS-LRM) to plan and record the results of inspections. The system data showed that, between January 2016 and June 2019, approximately 40% of BCTS FSRs were not inspected as frequently as required. As of June 2019, the same proportion of roads were overdue for inspection, by an average of two years.

BCTS officials explained that while all of the business areas used the system to track inspections, it was not mandatory and there was no guidance for ensuring consistent data entry. They also told us that the BCTS-LRM records overstate the extent of shortcomings in inspections, as it includes roads that are under road use permit, and permit holders are responsible for inspecting and maintaining them. FLNRO districts are responsible for administering road use permits, and we found that they track them in local systems not accessible to BCTS. BCTS business areas rely on communications with the district managers to determine which FSRs are under permit. Business areas do not enter permit information in BCTS-LRM or update the inspection plan to reflect changes in permit status and responsibility for maintenance. BCTS staff estimated that as many as 30–35% of its FSRs were under road use permit at any given time. Staff in three business areas estimated, based on a review of district data, that on average, 58% of their overdue roads were under permit.

Not having readily accessible and reliable information on which roads are under permit creates the risk that FSRs are not being inspected or maintained by either BCTS or the permit holder responsible for maintenance, or that BCTS is inspecting and maintaining roads that are the responsibility of a permit holder. Not having the data to determine whether the business areas are inspecting FSRs in accordance with policy increases the likelihood that maintenance needed to address safety and environmental risks is not identified and addressed.

BC Timber Sales data did not provide a reliable picture of the status of maintenance activities

BCTS roads are either under road use permits and maintained by the industrial user, or maintained by BCTS as wilderness roads. BCTS uses the maintenance standards of the Engineering Manual, including the risk-based timelines for completing maintenance activities (Engineering Manual timelines for addressing maintenance deficiencies are outlined in Appendix C). We found that BCTS-LRM data and business area records did not provide an accurate picture of the status of maintenance activities.

According to BCTS-LRM data, between January 2016 and June 2019, BCTS had completed only 43% of its planned maintenance activities for forest service roads. However, BCTS-LRM does not accurately reflect the extent of road maintenance, because it does not capture whether a BCTS road is under road use permit and completing the required maintenance is therefore the permit holder's responsibility. Also, business areas were not required to track maintenance activities in BCTS-LRM. Staff in 10 of the 12 business areas told us that they used BCTS-LRM to track maintenance activities, and we found that those who used it did not do so consistently. For example, they had not assigned a priority rating to one-quarter of the activities in the system, so we could not determine if they were completed on time, based on the Engineering Manual standards. Between January 2016 and June 2019, one business area had not entered any planned maintenance activities in BCTS-LRM, and another had only completed 4% of its planned maintenance, according to the data in the system.

With no other guidance for ensuring consistent data entry, each business area and some field teams within the business areas had developed their own processes. The maintenance records from the two business areas where staff said they were not using BCTS-LRM were inconsistent, so we could not determine whether they were completing maintenance work according to the timelines in the Engineering Manual. For example, staff from one business area provided us with their maintenance plans and separate maintenance completion reports from engineering technicians, which made it difficult to cross-check to see if all planned work had been completed, and completed on time. Staff from the other business area used paper files to track required maintenance work and we did not review these files.

The lack of both standard processes and a requirement for business areas to use BCTS-LRM to track maintenance, as well as lack of up-to-date information on the status of permit holders responsible for maintenance, means that BCTS has difficulty showing that it is completing maintenance activities on its FSRs as required to manage environmental and safety risks.

RECOMMENDATION 7: We recommend that BC Timber Sales develop and implement policy, procedures and practices that enable business areas to accurately and consistently track inspections and maintenance on forest service roads.

RECOMMENDATION 8: We recommend that BC Timber Sales assess whether it is inspecting and maintaining forest service roads as required by policy and take action to reconcile any gaps.

Overseeing maintenance by industrial users of FSRs

FSRs are provincial assets and, according to regulation, the government must maintain them, including crossing structures associated with them, until the roads are deactivated. The exception is when an FSR is being used and maintained by industrial users under road use permits. While FSRs can go in and out of industrial use, the ministry is ultimately responsible for FSRs; road damage from industrial use can pose safety and environmental risks and increase costs to both the natural resource districts and BC Timber Sales.

We looked at whether the ministry monitored road use permit holders' maintenance of FSRs, in accordance with legislation and policy. While policy sets out expectations for the Engineering Branch to inspect bridges and major culverts, we found that there are no legislative or policy requirements for the districts to monitor road maintenance by road use permit holders, and that the ministry's monitoring of FSR maintenance by permit holders was limited and informal. According to ministry officials, the district managers' limited authority to order road use permit holders to conduct maintenance and confusion over roles and responsibilities for monitoring make it challenging to ensure that industrial users adequately maintain and do not damage FSRs through use.

Ministry roles and responsibilities for monitoring road maintenance by industrial users are unclear

We found that the ministry's oversight of road use permit holders was limited to inspections of structures by the Engineering Branch, informal staff observations, and responses to complaints of potential non-compliance by the Compliance and Enforcement Branch.

There are no legislative or policy requirements for district managers to monitor the maintenance carried out by permit holders. We found that the ministry had no formal process for monitoring maintenance by permit holders. According to ministry officials, it collects limited documentation of FSR condition prior to, during and after use. Instead, the ministry expects all road use permit holders to self-monitor and avoid causing damage to the FSR—especially during spring freshet or wet weather—and to maintain the road for safe industrial use and environmental protection, as required under the legislation.

LEGISLATIVE MAINTENANCE OBLIGATIONS OF ROAD USE PERMIT HOLDERS

- Industrial use—the designated maintainer of the FSR must ensure that the structural integrity of the road prism and clearing width are protected, the drainage systems of the road are functional, and the road can be used safely by industrial users.
- Wilderness—during periods of no industrial activity, the designated maintainer must ensure that the structural integrity of the road prism and clearing width are protected and that the drainage systems of the road are functional only to the extent necessary to ensure that there is no material adverse effect on a forest resource.

Ministry officials attributed the district managers' limited oversight of road maintenance by road use permit holders to their limited authority. District managers cannot order permit holders to conduct maintenance and cannot suspend or cancel a permit if the permit holder has not fulfilled maintenance responsibilities unless the tenure agreement associated with the permit is cancelled. District managers may close or restrict use of an FSR—for example, by reducing the load rating on a bridge—if road use permit maintenance obligations are not met. However, officials told us that closing roads is not ideal and rarely happens because of economic and social pressure to keep them open.

While the district managers' authority is limited, the Compliance and Enforcement Branch is responsible for enforcing legislated road use and maintenance requirements under the *Forest*

and Range Practices Act. However, branch officials told us it was not doing many proactive inspections in this area because other, higher-priority inspection and investigation tasks require the full capacity of its officers.

According to a ministry working group examining road use permit oversight issues, the ministry has been experiencing ongoing challenges in ensuring that industrial users adequately maintain and do not damage FSRs through use. Limited oversight of maintenance by industrial users increases safety and environmental risks and can increase costs to the ministry, BCTS and other industrial users.

The working group attributed the limited extent of oversight in part to unclear roles and responsibilities of ministry staff. It recommended clarifying roles and responsibilities and reviewing how integrated monitoring and collaboration between Engineering Branch, Compliance and Enforcement, Regional Operations and BCTS would benefit FSR maintenance and improve safety.

RECOMMENDATION 9: We recommend that the Ministry of Forests, Lands, Natural Resource Operations and Rural Development develop and implement an approach to support the effective oversight of forest service roads under road use permits, including defining the roles and responsibilities of the natural resource districts, BC Timber Sales and the Compliance and Enforcement Branch in overseeing maintenance by road use permit holders.

Deactivation

The Engineering Program Funding Policy recognizes that wilderness roads not being used industrially deteriorate and need to be deactivated to reduce environmental risk, address public safety and manage liability associated with FSRs that are not maintained because of inadequate funding. The intent of road deactivation is to place a road in a self-maintaining state that will indefinitely protect adjacent resources. We found that the ministry was deactivating roads according to risk, as required by its policies; however, pressure to keep roads open for non-industrial users increases the need for ongoing maintenance.

The ministry prioritized FSRs for deactivation based on risk, but faces pressure from non-industrial users to keep them open

Road deactivation includes removing bridges and stream culverts, stabilizing the road prism, and barricading the road surface width in a clearly visible manner to prevent access by motor vehicles (other than all-terrain vehicles).

A deactivated FSR and crossing structure in the Alberni Valley. *Photo credit: Office of the Auditor General of British Columbia*

The Engineering Manual states that, when no longer required, FSRs that are the responsibility of either the natural resource districts or BC Timber Sales will be deactivated in a planned manner that considers future access needs, road user safety, cost efficiency and values at risk of damage or loss. The Engineering Program Funding Policy advises districts to deactivate roads that they are unable to maintain at the wilderness standard in order to mitigate risks and manage roads within available maintenance funding. However, there is no trigger or timeline for deactivation. FSRs can remain open indefinitely if they are maintained as wilderness roads.

We found that the districts and BCTS followed risk-based planning processes to identify FSRs that were not needed for future industrial use and prioritize them for deactivation to reduce safety and environmental risks. Since 2016/17, districts deactivated around 116 kilometres of FSR. Over the same period, BCTS deactivated 529 kilometres of FSR. In recent years, the total kilometres of FSR has been fairly consistent, ranging from 57,158 kilometres in 2016 to 57,419 kilometres in 2019.

Pressure for districts to keep roads open for non-industrial users is increasing the need for ongoing maintenance and resources. However, the districts are unable to meet policy requirements to maintain FSRs because of funding constraints.

CLAYTON FSR

The Clayton FSR, in the North Island – Central Coast Natural Resource District, near Bella Coola, provides access to several high-value recreation sites. The district has deactivated the back section of the road to manage risks to public safety and the environment, but faces pressure from the community and recreational stakeholder groups to keep access to the recreation sites open. Because of limited funding, the district does very little maintenance on the FSR, and it is only accessible by four-wheel drive vehicles.

The back end of the Clayton FSR is deactivated.
Photo credit: FLNRO

A cyclist heading up the pass on Clayton FSR.
Photo credit: FLNRO

AUDIT QUALITY ASSURANCE

We conducted this audit under the authority of section 11(8) of the *Auditor General Act*. All work in this audit was performed to a reasonable level of assurance in accordance with the Canadian Standard on Assurance Engagements (CSAE) 3001—Direct Engagements, set out by the Chartered Professional Accountants of Canada (CPA Canada) in the *CPA Canada Handbook—Assurance*. These standards require that we comply with ethical requirements and conduct the audit to independently express a conclusion on whether or not the subject matter complies in all significant respects to the applicable criteria.

The Office applies the CPA Canadian Standard on Quality Control 1 (CSQC), and accordingly, maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements. In this respect, we have complied with the independence and other requirements of the code of ethics applicable to the practice of public accounting issued by the Chartered Professional Accountants of BC that are founded on the principles of integrity, objectivity and professional competence, as well as due care, confidentiality and professional behaviour.

APPENDIX A: COMPLETE AUDIT CRITERIA

Line of Enquiry 1: Identifying and assessing risks on FSRs

1.1 FLNRO had a complete and accurate inventory of FSRs in the province

1.2 FLNRO inspected FSRs in accordance with requirements (i.e., regulation, policy and prioritization) in order to identify safety and environmental risks

Line of Enquiry 2: Mitigating risks on FSRs

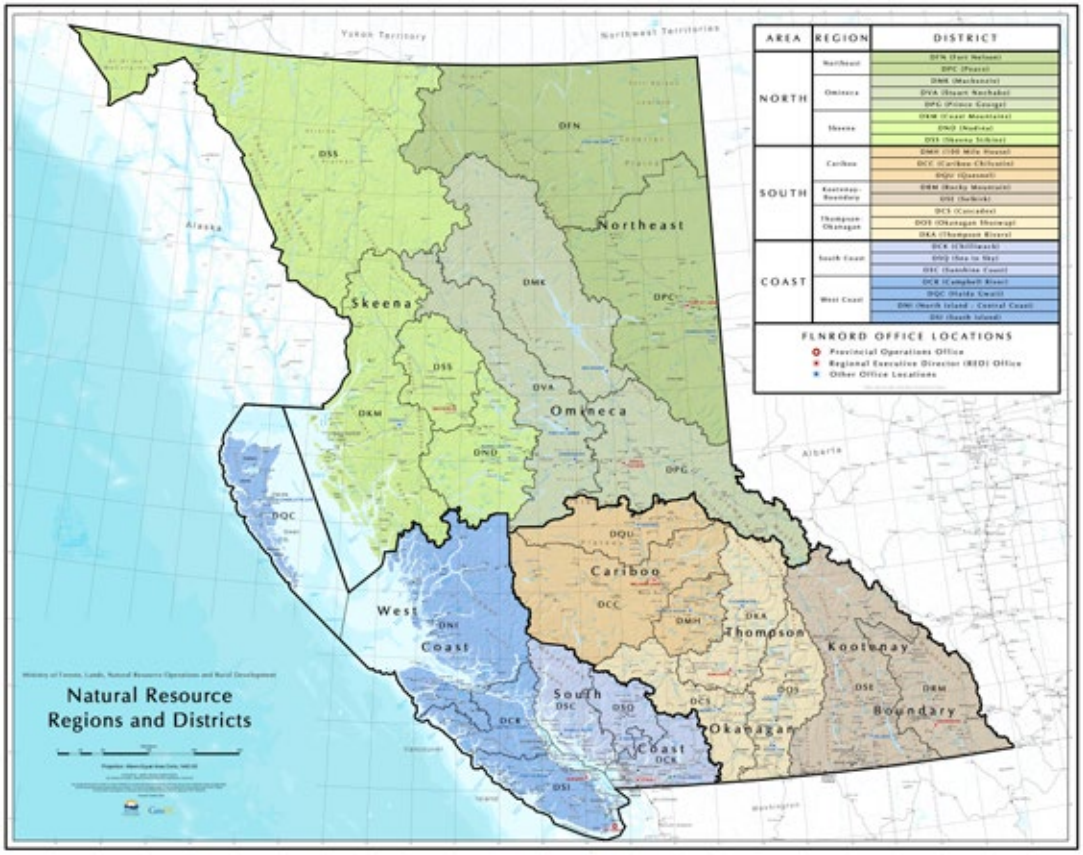
2.1 FLNRO addressed risks on FSRs in accordance with requirements (i.e., legislation, policy and prioritization)

2.2 FLNRO deactivated FSRs to reduce safety and environmental risks

2.3 FLNRO monitored industry road use permits on FSRs

APPENDIX B: MAPS OF FLNRO NATURAL RESOURCE DISTRICTS AND BCTS BUSINESS AREAS

Natural resource areas, regions and districts



Source: FLNRO

BC Timber Sales business areas

Source: FLNRO

APPENDIX C: INSPECTION AND MAINTENANCE FREQUENCIES AND TIMELINES

The following information is taken directly from the Ministry of Forests, Lands, Natural Resource Operations and Rural Development's (FLNRO) Engineering Manual and Engineering Program Funding Policy.

Engineering Manual

Table 6-3 Inspection Frequency Levels for FSRs Maintained by the Ministry

Minimum Inspection Frequency Level for Non-industrial Use Environmentally Maintained FSRs (Wilderness Roads)	Road Risk Ratings
1 - At least once a year plus additional inspections after major storms and prior to annual freshets	A current road risk rating of **Moderate, High, or Very High**
2 - At least once every two years	A current road risk rating of **Low or Very Low**
3 - At least once every three years	A current road risk rating of **Low or Very Low AND** where the road is closed to public access by a man-made or naturally occurring barricade or blockage

Source: FLNRO

Section 6.7 Scheduling Maintenance Works

After completing a road or engineered structure inspection, carry out any recommended maintenance works to address deficiencies in a time period that is commensurate with the risk to the road or structure, its users, and forest resources and other values, as determined by the appropriate manager upon review of the inspection report.

Specify the time frames for road maintenance works in the inspection report (see Maintenance Inspection Report). It shows that the time frames may be expressed as "urgency ratings" (VH = within 1 week; H = within 30 days; M = preferably within current field season but before the next field season; L = reassess situation next inspection). "Reasonable time" to carry out maintenance works varies according to the specific site and problems identified. For example, waiting until equipment is in the area is inappropriate if the road fill is already

failing and washing into a stream. However, waiting for equipment may be appropriate where a raveling cut slope is filling in a ditch that has a low likelihood of transporting sediment to a stream. Ensure that the ministry bridge engineer describes the time frames for engineered structure repair/remedial works in the comments section, to differentiate critical works from more routine works.

Source: FLNRO

Engineering Program Funding Policy 2018/19

Table 5. Response/Action given associated risk

Risk	Response	Recommended action	Recommended inspection frequency
VH or H	Risk is unacceptable in the short term such that risk reduction is required; long-term risk reduction plan to be developed and implemented.	Repairs to be completed as soon as practically reasonable. Reduce risk to a tolerable level.	Every year and after major events where there is public access.
MH	Risk is unacceptable in the long term such that risk reduction is required; long-term risk reduction plan to be developed and implemented. In the short term reduce risk to Moderate and monitor as appropriate.	Repairs to be completed to lower risk to Moderate and plan to reduce long-term risk to a tolerable level within the following 12 months.	Every year and after major events where there is public access until the risk is reduced. After works are completed, inspect every 2 years.
M	Risk may be tolerable; reduce risk to Low where reasonably practicable, otherwise continue to monitor.	Close road and consider deactivation*	Every 2 years
LM	Risk is tolerable; continue to monitor if resources allow.	Close road and consider deactivation*	Every 2 years
L	Risk is broadly acceptable; no further monitoring or risk reduction required.	Close road and consider deactivation*	Every 3 years

Source: FLNRO

*In the case of a capitalized FSR maintenance (operating) funding for repairs may be considered.

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