Forest Practices Board

Mitigation of Forestry Impacts to Natural Range Barriers

Special Investigation

FPB/SIR/42

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Executive Summary

Along with fences, natural range barriers—which include steep mountains, rocky terrain, rivers and standing timber—are important for the proper management of livestock and stewardship of the range resource. However, certain types of natural range barriers, especially standing timber, can be impacted by forestry operations.

Under the *Forest and Range Practices Act* (FRPA), if forestry operations will impact a natural range barrier, the forest licensee must include measures to mitigate those impacts in their forest stewardship plan (FSP) or woodlot licence plan (WLP) and must carry out the measures. This special investigation examined how well forest licensees are meeting FRPA's requirements to plan and implement mitigation of impacts to natural range barriers. The investigation included an examination of 10 case studies of range barrier mitigation on the ground and looked at the mitigation measures in 56 operational plans (46 FSPs and 10 WLPs).

The case studies revealed a range of issues involving one or more of the three steps of effective mitigation of natural range barriers identified by the Board (notification, assessment and implementation). Issues were most common in the assessment and implementation steps of mitigation and generally arose because of poor communication between range users and forest licensees or disagreements about whether harvesting or road construction would impact a natural range barrier and whether mitigation was required.

Of the 56 plans examined, the Board found measures in seven plans met all three steps required to support effective mitigation (notification, assessment and implementation). Thirty-two plans had measures that partially supported effective mitigation because they had measures that met two of the three steps. Seventeen plans had measures that met one or none of the three steps and, therefore, did not support effective mitigation. There were several significant weaknesses in the way the measures were written and only one of the plans included measures that were verifiable (i.e., capable of being enforced). Most measures included terms that limited the effort that forest licensees would commit to for notifying range users of planned forestry operations, assessing impacts to range barriers or implementing required mitigation work.

Through the course of the investigation, which included hearing perspectives of range users, forest licensees and staff from the Ministry of Forests, Lands and Natural Resource Operations, the Board found there are several additional factors that may be limiting the effective mitigation of impacts to natural range barriers. The factors include the stumpage appraisal system, which has rules that are not well aligned to the need for monitoring the effects of forest practices on range barriers; the need for more pro-active forest planning and better information on the location of range barriers; and the cumulative effects on range barriers when multiple forest licensees and other land users are working in the same area. The Board also found that inconsistent guidance provided by government on the content of measures may be contributing to problems encountered with the measures in some operational plans.

Overall, the Board concludes that improvements are required in how forest licensees plan and implement mitigation of impacts to natural range barriers. Range users also need to provide licensees with information on timbered range barriers on their tenures. Government also has a role to ensure that its policies and guidance support effective mitigation of impacts to range barriers. Ultimately, effective mitigation of timbered range barriers requires forest licensees and range users to maintain open communication and respect for each other's tenured rights and responsibilities.

Board Commentary

Mitigation of forestry impacts to natural range barriers is important to achieving effective stewardship of Crown land. While there have been some successes and recent innovations, this special investigation found that forest stewardship plans and woodlot licence plans do not ensure that effective mitigation occurs. It also found that effective mitigation does not happen in some instances or it is achieved only through mediation between the parties.

In some of the cases examined, the parties generally had good intentions but poor communication, multiple licensees, competing interests and unequal relationships led to misunderstandings or conflicts. When conflicts arise, it is important that the forest stewardship plan or woodlot licence plan has verifiable mitigation measures if the parties are going to resolve their issues equitably. The results of this investigation provide little assurance that the mitigation measures in forest stewardship plans or woodlot licence plans are verifiable. In such cases, and in the absence of persistent mediation and follow-up, mitigation is expected to fail.

In parts of British Columbia where forest and range resources exist on the same land base, timber tenures and range tenures do overlap. Although they use the same land base, timber licensees and range users have different interests, tenures and responsibilities.

The overlapping of tenures with such different interests predisposes forest and range licensees to conflicts and increases the need for proactive communication. For example:

- information sharing among parties to build consensus on what constitutes a barrier;
- collaborative planning that aligns tenure and cutblock boundaries with natural range barriers to avoid impacts. This would also require verifiable mitigation measures in forest stewardship plans to deal with unavoidable impacts to natural range barriers; and
- better sharing of information between parties to reach agreement on where natural range barriers exist and what the parties' responsibilities are, combined with greater commitment to follow-through on mitigation.

The Board is pleased to see the Ministry of Forests, Lands and Natural Resource Operations staff in several resource districts providing a forum where forest and range licensees can interact to discuss their shared interests on the land base. Innovative practices, such as those in the Okanagan Shuswap district (involving placement of large woody debris near streams to act as natural range barriers, while also enhancing other values) should be encouraged and monitored for effectiveness.

The Board believes that improved stewardship of the land base can be achieved by encouraging understanding and respect for the goals, responsibilities and constraints faced by all resource users. These suggested improvements will better fulfill the spirit and intent of working cooperatively on a shared land base with different tenures.

Introduction

Purpose of the Investigation

This special investigation examines how well forest licensees plan and implement mitigation of impacts to timbered natural range barriers. The investigation focuses on timbered natural range barriers because the *Forest and Range Practices Act* (FRPA) requires forest licensees to mitigate impacts to these types of barriers if they have been removed or rendered ineffective as a result of their forestry operations.

What does it mean to 'mitigate'?

Mitigate is not defined in FRPA, but generally means to *minimize* or *reduce* the effects of an impact. For natural range barriers, to *mitigate* usually means the replacement of a natural barrier with a man-made barrier, like a fence.

Approach

The investigation included two components:

1. Examination of 10 case studies in 9 Ministry of Forests, Lands and Natural Resource Operations (FLNR) districts to document how impacts to natural range barriers have been mitigated. The case studies, selected with input from FLNR district and branch range staff, provide a range of mitigation examples, including those where FLNR staff believed that mitigation was effective, where mitigation required an innovative approach and where mitigation was not effective.
2. Examination of measures in 46 forest stewardship plans (FSPs) and 10 woodlot licence plans (WLPs) to evaluate the mitigation actions forest licensees commit to undertaking if their forestry operations impact a natural range barrier. Forest licensees are legally accountable to carry-out measures in their approved plan, therefore, it is important to ensure that measures in the plans are appropriate and verifiable.

NOTE: Both components #1 and #2 above involved hearing the perspectives of range users, forest licensees and FLNR district staff about factors that may be influencing effective range barrier mitigation.

Background

Definition of a range barrier

There are approximately 1500 range tenures authorizing livestock grazing on Crown forest and range land in British Columbia. Tenures vary widely in area and number of livestock. All range tenures used for grazing have a defined boundary and many tenures have internal boundaries dividing the tenure into smaller pastures. On most tenures, range users rely on a combination of man-made and natural barriers to prevent or restrict livestock movement (see Table 1 for more detail).

Table 1. Range Barrier Types

Barrier Type	Components	Function	Installation and Maintenance Costs
Man-made	Fence and cattle guards. *Note: Fence usually consists of 4 or 5 strands of barbed-wire and posts (wire fence) but may also include log bundles, large rocks and other materials.*	Highly effective at preventing livestock movement when properly constructed and maintained.	High cost for installation and maintenance. *Note: Cattle guards can cost up to $10,000 each and wire fence ranges between $8,000 - $15,000 per kilometre.*
Natural	Topographical and vegetative landscape features. *Note: Topographical features include steep mountains, rocky terrain, rivers and gullies. Vegetative barriers (referred to as 'timbered range barriers' in this investigation) may include standing timber, often mixed with downed woody debris and/or shrubs.**	Some natural range barriers stop livestock movement and others may only reduce livestock movement from one area to another. Typically, topographical barriers like steep mountains are more effective at stopping livestock than vegetative barriers like timber.	No direct cost for installation or maintenance. Indirect costs associated with retaining a natural barrier are in lost harvesting opportunities when timber is reserved for this purpose.

** Vegetative and topographical features sometimes function together to stop or limit livestock movement. For example, a wide and deep river may provide a suitable barrier to stop livestock movement across the feature. However, a shallow river may be less effective at stopping livestock movement unless it is associated with a vegetative barrier, like a stand of timber. In some cases, a stand of timber with little understory and no forage value may be a psychological, rather than a physical, barrier to livestock.*

Importance of range barriers

Range barriers that define tenure and pasture boundaries are important for proper management of livestock and stewardship of the range resource. Unrestricted livestock movement across a tenure or pasture boundary may lead to several problems:

- a decline in rangeland health due to overgrazing, reducing forage production;
- need for the range user to locate and capture livestock that have wandered to a different pasture or tenure;
- unplanned livestock breeding, possibly leading to complications for pregnant cows and economic consequences for range users; and
- non-compliance with the range user's licence agreement and range regulations under FRPA.

Potential impacts of forestry operations on natural range barriers

Forest harvesting can either partially or entirely remove a timbered range barrier, allowing free movement of livestock into areas where they were previously restricted. Forest roads can have a similar impact when constructed through a topographical or timbered barrier. Indirect impacts can occur when forestry operations are close to a timbered range barrier. This is because livestock will move to new forage opportunities created after harvesting, increasing the likelihood they will try to move through an adjacent timbered range barrier.

In the past 10 years, substantial mitigation to impacted natural range barriers has been required due to the extensive salvage harvest of beetle-killed timber. Government data show that since 2006, forest licensees have submitted costs in stumpage appraisals for about 560 kilometres of fence and 440 cattle guards, to mitigate impacts to natural range barriers.[1] These figures do not include mitigation work funded through other sources (e.g., FLNR, federal/provincial range fencing initiatives) or not submitted by the forest licensee as an appraised cost.

FRPA's requirements to mitigate impacts to natural range barriers

Under FRPA, it is the responsibility of persons undertaking a forest practice that removes or renders ineffective a natural range barrier to mitigate the loss or ineffectiveness of the barrier. FRPA does not define mitigate or natural range barrier;[2] nor does it prescribe how forest licensees are to mitigate impacts to range barriers.[3] However, once the mitigation has been implemented by a forest licensee, the range user is responsible for its maintenance for as long as they continue to hold the range tenure.

There are two components to FRPA's requirements. Forest licensees must:

1. Carry-out measures to mitigate impacts to range barriers (section 48, FRPA). This applies to:
   - holders of a FSP or WLP; or
   - forest licensees who are not required by FRPA to have an operational plan, but are authorized by government through the licence agreement to carry out measures.
2. Propose measures in an operational plan (section 18 of the *Forest Planning and Practices Regulation* and section 15 of the *Woodlot Licence Planning and Practices Regulation*). This applies to licensees required to have a FSP or WLP. Their plans must specify measures to mitigate the effect of removing or rendering ineffective a natural range barrier.[4] Once the plan is approved, they must carry-out the measures.

What are measures?

Under FRPA, a forest licensees' operational plan must include measures to deal with natural range barriers and invasive plants. The measures are documented actions a forest licensee commits to carrying-out if their forestry operations are likely to impact natural range barriers or result in the introduction or spread of invasive plants.

Forest licensees remain responsible for mitigating impacts to natural range barriers that occurred when their plan was in effect, even after the plan has expired or they are no longer signatory to the plan.

When government considers a FSP or WLP for approval, it must ensure the plan includes measures. However, FRPA does not define measures, and there is no specific requirement for measures to be written so that they are verifiable (i.e., enforceable).

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[1] A stumpage appraisal is the process used to determine a stumpage rate for a tract of standing timber. Data for cattle guards and fencing provided by the Timber Pricing Branch, FLNR.

[2] Natural range barrier is defined in FRPA Bulletin #21 (see page 20 of this report).

[3] A person mitigating an impact to a natural range barrier must first obtain authorization from FLNR in the form of an approval to construct a range development. Once installed, the range user is responsible for maintenance of the range development (unless exempted by the district manager).

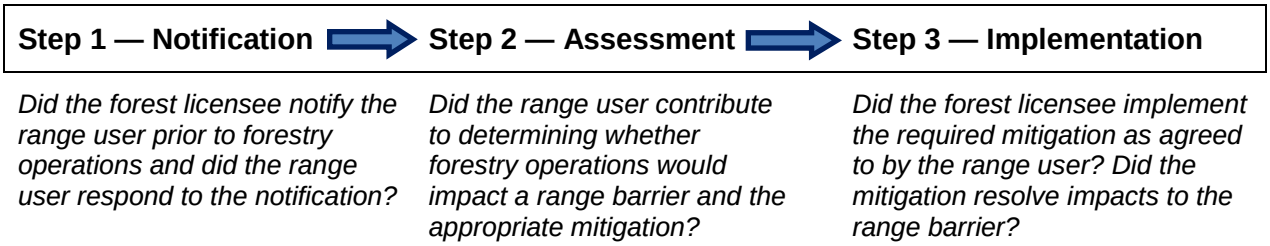
[4] The requirement to specify measures in an operational plan may not apply if a licensees' forestry operations are not likely to impact a range barrier. For example, a licensee's operations may be in an area where there are no range tenures.

Mitigating Impacts to Natural Range Barriers: Case Studies

Approach to Evaluation of the Case Studies

The Board selected 10 case studies in 9 Ministry of Forests, Lands and Natural Resource Operations (FLNR) districts to document how impacts to natural range barriers have been mitigated. The case studies, selected with input from FLNR district and range branch staff, provide a range of mitigation examples, including those where FLNR staff believed that mitigation was effective, where mitigation required an innovative approach and where mitigation was not effective. (*Note: the case studies were selected because they represent a range of outcomes. They do not represent the status of range barrier mitigation provincially*).

For each case study, the Board evaluated how well impacts to natural range barriers have been mitigated. This was done by identifying three steps and supporting questions, with input from range branch staff, representing an appropriate process of mitigating impacts to natural range barriers:



Information for each case study was obtained by on-site assessments (except for case study #7 where the information was provided by district range staff) and discussions with range users, forest licensees and district range staff.

Findings and Discussion

Table 2 provides individual results for each case study, including the issues that limited the effectiveness of range barrier mitigation. Appendix 2 includes a detailed summary for each of the 10 case studies examined.

The case studies revealed a range of issues involving one or more of the three steps of effective mitigation. Most notably, issues were common in the assessment and implementation steps of mitigation and arose because of breakdowns in communication or disagreements between range users and forest licensees. For example, in 3 case studies (#5, #8 and #10), forest professionals, acting on behalf of the forest licensee, decided that the stand of timber planned for harvesting was too open to restrict livestock access and therefore, was not functioning as a natural range barrier. Range users disagreed with the opinion of the professional foresters. The district range staff, who typically are professional agrologists, intervened and also believed that harvesting either did or was likely to cause impacts to a natural range barrier. Despite the professional opinions of range staff, the forest licensees did not mitigate impacts to the range barriers.

In most case of the studies, district range staff took an active role in resolving, or attempting to resolve, disputes, or facilitating agreements between range users and forest licensees regarding the assessment and/or implementation steps of range barrier mitigation. The nature of the disputes mostly involved disagreements between range users and forest licensees over whether forestry operations would impact a natural range barrier.

Figure 1. A range user, forest licensees and FLNR district range staff discuss options for mitigating impacts to a natural range barrier. This is an effective approach for the 'assessment' step of range barrier mitigation.

Table 2. **Summary of the Case Studies**[5]

Case Study	Were the steps in mitigation effective?			Observations Made by Board Investigators
	Notification	Assessment	Implementation	
#1	Yes	Yes	Partially	A licensee entered into a cost-sharing arrangement with two range users. One of the two range users has not yet constructed a section of fence as previously agreed.
#2	No	Partially	Partially	A range user and licensee agreed on mitigation. The licensee then decided to install less fence than agreed and did not inform the range user of its decision.
#3	Yes	Yes	No	A licensee did not construct a range barrier mitigation fence as previously agreed.
#4	No	No	No	A range user initially worked with a licensee to manage range barriers. However, to address mountain pine beetle (MPB) affected stands, multiple licensees built roads and harvested MPB-killed timber in the area and the range user stopped responding to notifications.
#5	No	No	No	A range user and licensee disagreed about whether older or more recent harvesting impacted a natural range barrier. The licensee believed the impact was from older harvesting and chose not to mitigate.
#6	Yes	Yes	Yes	Mitigation has been effective (see Figure 2 for site photo).
#7	Yes	Yes	Partially	Innovative range riding pilot project proved to be time consuming, costly and only somewhat effective.
#8	No	No	Partially	Range users and a licensee disagreed about whether harvesting would impact a natural range barrier. The licensee said the timbered stand was too open and therefore, declined to mitigate. The licensee subsequently agreed to cost-share the fence with the range user and FLNR (see Figure 3 for site photo).
#9	Yes	Yes	Partially	Mitigation was delayed. Each of the two licensees believed the other would take responsibility for mitigating impacts to the range barrier.
#10	Yes	No	No	A range user and licensee disagreed about whether harvesting would likely impact a range barrier. The licensee chose not to mitigate.

[5] Detailed case study summaries are available in Appendix 2.

Figure 2. Case study #6. This one-kilometre long rock fence, which includes short sections of wire fence to permit wildlife passage, was constructed to mitigate the loss of a timbered natural range barrier. The rock fence was chosen as the preferred mitigation because underlying rocky material made a full-length wire fence unsuitable.

Figure 3. Case study #8. This wire fence was constructed to mitigate impacts to a natural range barrier. Wire fences are the most common approach used to mitigate impacts to natural range barriers.

Are Trees Adjacent to Streams, Lakes and Wetlands Defined as Natural Range Barriers?

Example of a new approach in the Okanagan-Shuswap resource district jointly developed by FLNR district range staff and Range Branch staff

Typically, natural range barriers functioning as tenure or pasture boundaries are of greatest concern to range users. However, in the Okanagan Shuswap, FLNR district staff have adopted a broader view of the concept of natural range barriers to potentially include the timber within riparian areas.

Figure 4. Debris and logs placed along and across this stream channel have reduced concentrated livestock use in the riparian area, but still provides livestock access for water.

Harvesting timber or constructing roads near or across riparian areas allows easier livestock access to these areas (FRPA does not require trees to be left adjacent to all streams). If not properly managed, excessive livestock use can impact water quality and sensitive soils.

To mitigate these effects, FLNR district staff have completed an innovative pilot project to demonstrate how the placement of large woody debris adjacent and across streams restricts livestock access to these areas (see Figure 4). As a result of this pilot project, FLNR has added eligible costs to implement this best management practice (BMP) in the Interior Appraisal Manual. (*Note: Implementation of this BMP will not require a range development authorization, nor will range users be required to maintain the BMP*).

The technique of mitigating livestock access to riparian areas appears to have considerable potential as a BMP. However, harvesting in a riparian area, as permitted under FRPA, must be evaluated on a case-by-case basis to determine if a barrier has been impacted.

Evaluation of Measures in FSPs and WLPs

Importance of Measures in FSPs and WLPs

Measures set out what actions a forest licensee commits to undertaking if their forestry operations impact a natural range barrier. Therefore, it is important to ensure the measures are appropriate and enforceable.

A poorly worded measure in an operational plan does not necessarily mean that a forest licensee will not effectively mitigate impacts to natural range barriers. However, it can compromise mitigation and enforcement, especially when disputes arise between forest licensees and range users and the measures are unclear about how mitigation should be applied in a given circumstance.

Approach to Evaluation of the Measures

Sample selection

All FSPs were selected from seven FLNR districts with the largest number of authorized animal unit months[6] (AUMs) for grazing provincially (see map and authorized AUMs by district in Appendix 1). A total of 66 FSPs were obtained from the government FSP tracking database. Nineteen FSPs were then excluded because the content of the measure was the same as another measure being examined.[7] Also, one FSP was excluded because there were no active range tenures in the licensee's forest development unit. In total, measures from 46 FSPs were examined for the investigation.

One WLP was selected in each of the 10 districts with the largest number of authorized AUMs for grazing provincially (see Appendix 1). Selection of the WLP within the district was based on the highest cumulative total volume of timber harvested between 2011 and 2013 (data obtained from the FLNR's Harvest Billing System).

Evaluation

Board investigators examined each measure in 46 FSPs and 10 WLPs to determine if it was likely to result in effective mitigation of impacts to natural range barriers and was verifiable (which enables them to be enforced). To make this determination, two criteria, each with additional steps and supporting questions, were developed with input from range branch staff, and applied to each measure:

Criterion #1 Do the measures support effective mitigation of impacts to natural range barriers?

Criterion #2 Are the measures in the operational plans verifiable?

[6] Refers to grazing AUMs —the number of AUMs (animal unit months) authorized (licence and permit) under the *Range Act* for grazing on Crown land (2012 AUM data provided by FLNR Range Branch). An animal unit month is "the quantity of forage consumed by a 450-kg cow (with or without calf) in a 30-day period." *Source:* Fraser, D. A. 2004. Factors influencing livestock behavior and performance. Forest Practices Branch, British Columbia Ministry of Forests, Victoria, B.C. Rangeland Health Brochure 8.

[7] It is not uncommon for licensees to share or use similar measures in their operational plans.

Assessment of Criterion #1

For criterion #1, each measure was evaluated against three steps. The three steps are premised on the basis that effective resolution of natural range barrier impacts will require communication between forest licensees and range users, an opportunity for range users to provide input into required mitigation and a commitment that the licensee will implement the mitigation that is agreed to. The three steps also reflect the general guidance provided by government in "Managing Section 48 of the FRPA: Natural Range Barriers."

Step 1 — Notification	**Step 2 — Assessment**	**Step 3 — Implementation**
Do the measures commit the forest licensee to notifying the range user about planned forestry operations?	*Do the measures enable the range user to provide input into determining whether forestry operations will impact a range barrier and the appropriate mitigation?*	*Do the measures identify that the forest licensee will implement mitigation and within a specified timeframe?*

If all three steps are included in the measure, then it will likely support effective mitigation. If two of three steps are present, the measure will partially support effective mitigation and if one or none of the three steps are present, then the measure will not likely support effective mitigation.

Assessment of Criterion #2

For criterion #2, measures were evaluated on the basis they should be written so it is possible to verify if the commitments were carried out by the forest licensee (i.e., they are verifiable and therefore, enforceable). Two content elements of each measure were evaluated:

Content Element #1	Do the measures make it clear what actions the licensee is prepared to take in a given circumstance?
Content Element #2	Do the measures include a timeframe describing when the required mitigation will be implemented?

If both content elements were present, the measure is deemed to be verifiable. If one of the two elements is present, the measure is partially verifiable and if neither are present, the measure is deemed to be not verifiable.

Findings and Discussion

Criterion #1: Do the measures support effective mitigation of impacts to natural range barriers?

Measures in seven of the examined plans met all three steps and therefore would support effective mitigation. Thirty-two operational plans had measures that met two of the three steps of mitigation and therefore, would partially support effective mitigation. Measures in 17 plans had 1 or none of the 3 steps and therefore would not support effective mitigation of impacts to natural range barriers.

Criterion #1 - Key weakness in the way measures were written

Seventy-three percent of plans had measures that did not identify the forest licensee as being responsible for implementing all required mitigation or did not specify that the work would be completed in a certain period of time after forestry operations were completed.

Most plans adequately addressed the notification step of mitigation. Fewer plans addressed the assessment step and most plans did not address the implementation step of mitigation. For the assessment step, measures did not always provide for the range user to participate in decisions about whether forestry operations would likely impact a natural range barrier or the appropriate mitigation. Involving range users in these decisions helps to ensure that the best available information about natural range barriers is considered when planning forestry operations in proximity to a natural range barrier (see Table 3 for a summary of results and Appendix 3 for detailed results of the evaluation of measures).

The implementation step of mitigation was a significant weakness in most of the measures assessed and most often contributed to a measure not meeting criterion #1. To be effective, measures should specify that it is the forest licensee who is responsible for mitigating impacts to natural range barriers and that mitigation will occur within a specified timeframe. This clarity ensures separation of responsibilities under FRPA, which requires the forest licensee to mitigate impacts to natural range barriers—the range user is responsible for maintaining the mitigation after it has been installed.

Table 3. Evaluation of Measures for Criterion #1

Steps applied to natural range barrier measures in 46 FSPs and 10 WLPs		56 Plans	
		Yes	No
Step 1: Notification	Do the measures commit the forest licensee to notifying the range user about planned forestry operations?	45	11
Step 2: Assessment	Do the measures enable the range user to provide input into determining whether forestry operations will impact a range barrier and the appropriate mitigation?	34	22
Step 3: Implementation	Do the measures identify that the forest licensee will implement mitigation and within a specified timeframe?	15	41

Evaluation criterion #2: Are the measures in the operational plans verifiable?

Only 1 of the 56 plans had measures that were verifiable, suggesting that few measures for natural range barriers can be effectively enforced. Of the 56 plans, 31 had measures that were partially verifiable and 24 had measures that were not verifiable. [8] Two factors affected the verifiability of measures:

1. For 34 of 56 plans, measures included 1 or more adjectives that placed limits on the extent that a forest licensee would commit to carrying out 1 or more of the 3 steps of mitigation.[9] Examples of these adjectives (as stated in the measures) include, but are not limited to:

practicable efforts	consider
reasonable efforts	work with the range user
reasonable timeframe	measures that are reasonable
reasonable compromise	measures that are reasonable and practicable

While the term reasonable is often cited in FRPA and professional guidance documents,[10] when included in a measure, these and similar terms alter the intent of the legislation, which is to mitigate the effects of removing or rendering ineffective a natural range barrier.

Of the 56 plans, 11 included measures that defined the term natural range barrier; 6 limited where mitigation would be applied (e.g., mitigation is restricted to a range tenure or pasture boundary); and 1 defined the term mitigation. Licensees' definitions of natural range barrier varied widely. For example, in the Cascades district, all six FSPs examined defined natural range barrier in one of three ways:

Criterion #2 - Key weakness in the way measures were written

Sixty-one percent of the plans included measures with language that placed limits on the extent of effort that forest licensees would commit to in relation to notifying range users, assessing impacts to range barriers or implementing required mitigation work.

A. "….significant topographic or vegetative feature that stops or significantly impedes movement of livestock permitted to graze under that agreement, to and from an adjacent area." (2 FSPs);

B. "…significant topographic or vegetative feature that is generally impassable to livestock permitted to graze under an agreement"…(3 FSPs); and

C. "…significant vegetative or physical natural range barrier between licensed range users or pastures that he will rely on to control stock movement…"(1 FSP)

In definitions A and B above, the terms *significant* and *generally* are arbitrary and enable the licensee to limit the circumstances when impacts to a range barrier would require mitigation. For C above, the forest licensee would only be required to mitigate impacts when there are two adjacent range users or pastures. However, if one of those tenures is not currently assigned to a

[8] If one element was present, then the measure was deemed to be partially verifiable. If both elements were present, then the measure was deemed to be verifiable).

[9] In 3 of the 33 FSPs, measures also limit mitigation of range barrier impacts to eligible costs described in the Interior Appraisal Manual.

[10] Examples include the Code of Ethics and Practice Standards published by the Association of BC Forest Professionals (www.abcfp/regulating_the_profession).

range user, the measure may not require the licensee to mitigate impacts to a natural range barrier.

2. For 42 of 56 plans, the measures lacked a timeframe for implementation of mitigation. As a result, these measures are not fully verifiable because it is not possible to verify when the measures would be implemented after forestry operations.

   When a natural range barrier has been impacted by forestry operations, a period of time may lapse before: 1) weather and/or operating conditions are suitable to implement the required mitigation; 2) the necessary permits have been obtained; and 3) the required labour and equipment is available to perform the work. However, if required mitigation is delayed for reasons under the control of the forest licensee, it may create unnecessary challenges for range users in controlling livestock movement and may ultimately lead to damage of the range resource.

Notable Measures in FSPs and WLPs

Some operational plans included measures regarded by the Board as notable because they support effective mitigation of impacts to natural range barriers:

- Measures in two FSPs included a contingency in the event the range user does not respond to the initial notification sent by the licensee. This contingency avoids the likelihood that an impact to a range barrier will remain unmitigated
- Measures in four FSPs commit the forest licensee to notifying range users in writing and in three of those four FSPs, measures also commit forest licensees to providing range users with a map of planned harvesting operations within or adjacent to the range tenures. These types of specific commitments enhance the certainty about how forest licensees will notify and communicate with range users about planned forestry operations.
- Seventeen FSPs and one WLP included measures to address disputes that may arise between forest licensees and range users when determining if planned forestry operations will likely impact a range barrier, and the likely mitigation that is required. Most of these measures include a provision that enables a district manager to make a final decision about matters in the dispute. In turn, forest licensees commit to following the district manager's decision.
- Measures in nine FSPs and two WLPs commit the licensee to planning and conducting forestry operations in a manner that will minimize impacts to natural range barriers. A commitment to this type of planning may avoid the need for constructing and maintaining range barrier mitigation.
- Nineteen FSPs commit to updating range tenure information either annually or upon renewal of the FSP term. Regularly updating this information from FLNR ensures that forest licensees are made aware of range users who may have transferred tenures or if the tenure is not in use.

Other Factors Limiting the Effective Mitigation of Range Barriers

Through the case studies and analysis of measures in operational plans, Board investigators heard perspectives of range users, forest licensees and FLNR staff and gained insights into several factors that may be limiting the effectiveness of mitigating impacts to natural range barriers.

Issues with the Stumpage Appraisal System

Assessing whether forestry operations will likely impact a timbered natural range barrier involves consideration of many variables, such as the density of trees and understory vegetation, behavior and movement patterns of livestock and the likely amount and quality of forage after harvesting. When a natural range barrier is identified as likely to be impacted, there is usually no definitive evidence that, following harvesting, livestock will move off the range tenure or between pastures. Range users and FLNR district range staff say it may take several years to properly assess livestock movement patterns after forestry operations and only then is it possible to determine the extent to which a timbered natural range barrier has been impacted and the appropriate mitigation that is required.

Licensees agreed it may take time to assess whether forestry operations have impacted a timbered natural range barrier. However, the rules governing appraisal normally require costs for mitigation, like fencing, to be determined before the cutting permit is submitted to FLNR for approval. Licensees also said the appraisal rules require mitigation to be applied within the cutting authority area. District range staff, range users and forest licensees said this limits opportunities for a more strategic approach to placement of mitigation, such as fencing. They also said there are examples where fences were installed to mitigate natural range barrier impacts, but they are no longer effective. This is because newer harvesting around the ends of the fence reduced the effectiveness of the original fence (i.e., after harvesting, cattle were able to move around the ends of the fence, which is no longer tied-off to standing timber). The situation could have been avoided had the original fences been placed in a more strategic location or if the tenure boundary had been relocated to a topographical barrier.

Licensees and range users provided several additional comments regarding linkages between the appraisal system and mitigation of impacts to natural range barriers. Range users said that forest licensees are generally unwilling to mitigate impacts to natural range barriers unless they can recover the costs through appraisal. However, licensees said the schedule for recovery of range barrier mitigation costs in the Interior Appraisal Manual does not always reflect the actual costs. They also said this sometimes influences the extent of mitigation they are prepared to implement.

The Board believes that the stumpage appraisal system is likely interfering with the effective mitigation of impacts to timbered natural range barriers. Forest licensees are usually able to recover a significant potion of their costs for mitigating impacts to range barriers, but those costs must be applied for when the licensee submits the cutting permit application and often cannot be amended/adjusted later. This limits the ability for forest licensees and range users to fully assess whether, and to what extent, forestry operations have directly or indirectly removed or rendered ineffective a natural range barrier—a central requirement of FRPA regarding natural range barriers.

Proactive Forest Planning

Range users say it would be beneficial if forest licensees made greater efforts at planning forestry operations in a way that minimizes or avoids impacts to timbered natural range barriers. Under FRPA, any existing or new range development within a range tenure must usually be maintained by the range user, increasing time and labor costs to ranch operations. If timbered range barriers were left intact, the costs of mitigating impacts to range barriers and long-term maintenance could be avoided.

The Board's evaluation of the 10 case studies did not include an assessment of whether better planning could have avoided or minimized impacts to range barriers. However, the Board did find that only 11 of 56 plans included commitments to plan forestry operations in a way that minimizes impacts to natural range barriers. This type of proactive planning can improve relationships with range users and help to reduce the amount of investment required to build and maintain range barrier mitigation.

Poor Information on Location of Range Barriers

Licensees believe that some range users have unrealistic expectations about the forest licensees' obligations to mitigate impacts to range barriers resulting from their forestry operations. This is particularly the case when range users do not know the location of natural range barriers on their tenures in advance of forestry operations or are not able to demonstrate how a stand of timber is functioning as a natural range barrier. This makes forest planning difficult and leads to disputes between range users and forest licensees, and often requires the intervention of FLNR district range staff.

Current information about the location and type of natural range barriers on range tenures enables forest licenses to better plan forest operations in a way that minimizes impacts to those range barriers.

Effects of Cumulative Harvesting and Other Land Uses

Licensees said managing natural range barriers is a significant challenge when multiple forest licensees and other industry users are operating in the same general vicinity. The challenge exists because it may be the cumulative effects of forestry and non-forestry activities that cause impacts to natural range barriers. In these situations, it is sometimes unclear which licensee or other industrial user should take responsibility, or the degree that costs should be shared, to mitigate the impact.

The Board believes that a more coordinated approach to addressing range barriers may be necessary in areas where there are multiple licensees, range users or other land users.

Involvement of FLNR District Staff in Resolving Disputes

District range staff said they spend a significant amount of time working to resolve disputes between range users and forest licensees about whether forestry operations will likely impact a natural range barrier. Even more time is needed for considering applications and granting authorizations to construct range developments, like wire fences, that are used to mitigate impacts to range barriers. Some staff said their frequent involvement in resolving disputes runs counter to their understanding of how FRPA was meant to function, where tenure holders should work through disputes

independent of government. Staff also said they require more resources to map and locate range developments and natural range barriers, and this would likely provide greater certainty and possibly reduce conflicts between forest licensees and range users.

The Board found that most of the case studies examined involved a dispute between the range user and licensee, requiring the involvement of district range staff for resolution. This approach may be necessary in more complex situations, such as where multiple licensees are conducting forestry operations in the same area. However, reliance on district staff for dispute resolution does run counter to the principles of FRPA and can be reduced through more effective communication between range users and licensees.

Problems with Cost-Sharing Agreements

In case studies #1, #3 and #8, a fence was chosen to mitigate an impact to a range barrier. In each case, the range user agreed to construct the fence. At the time of the Board's assessment of the case study, the fences had either not been constructed or, according to district range staff, were not constructed to the required standard.

District range staff say that cost-sharing agreements between range users and forest licensees for mitigation works, like fencing, can create challenges. In these agreements the licensee usually provides fencing materials and the range user installs the fence. However, staff say that not all range users have the time or the ability to construct a fence to the required standard, meaning that district range staff must spend more time monitoring the progression of work.

FRPA requires forest licensees to mitigate impacts to natural range barriers. Although forest licensees sometimes make arrangements with range users to construct fences, licensees are ultimately responsible for ensuring that impacts to range barriers have been mitigated.

FLNR Guidance on Managing Natural Range Barriers

During the evaluation of the case studies, the Board became aware of guidance on mitigating range barriers developed by some FLNR districts. As a result, the Board did a more detailed assessment of the available guidance and how it might influence effective mitigation of impacts to range barriers.

At least 3 of the 10 districts included in the investigation have provided written guidance to range users and forest licensees regarding management of natural range barriers. The guidance addresses wide-ranging subjects from defining a natural range barrier to minimum standards for communication when forest licensees notify range users about planned forestry operations. In one district, the guidance identifies the range user as the 'professional' in terms of knowing where range barriers are located on the tenure and whether they will likely be impacted by forestry operations.

Guidance also exists at the provincial level in the form of FRPA Bulletin #21.[11] The bulletin emphasizes that effective mitigation of natural range barrier impacts requires good communication between forest licensees and range users. The guidance also recognizes that district range staff has a

[11] FRPA Bulletin #21 Is available for download at: http://www.for.gov.bc.ca/ftp/hth/external/!publish/web/frpa-admin/frpa-implementation/bulletins/frpa-general-no-21-managing-section-48-of-the-frpa-natural-range-barriers-feb-18-2010.pdf.

role in determining whether a natural range barrier exists on a range tenure; whether forestry operations will likely impact a natural range barrier; and, the appropriate mitigation.

The FRPA bulletin includes guidance that expands the scope of values, beyond a range tenure or pasture boundary, intended to be protected by natural range barriers. The bulletin states:

> Consult with the range agreement holder and, if necessary, the District Range Officer to discuss potential impacts and solutions if a natural range barrier is removed or rendered ineffective. Potential impacts from harvesting in a range agreement area include increased cattle access to riparian areas, winter ungulate ranges, alpine habitats, parks and protected areas, recreation areas, other range agreement areas, plantations (harvested areas that have been replanted), and private land.

FRPA Bulletin #21 suggests that licensees may define natural range barrier or the circumstances where measures would be taken in their operational plan. Of the 56 plans examined, 11 included measures that defined the term 'natural range barrier' and the definition was not always the same. Often, the definitions used place limits on the circumstances when and where a forest licensee commits to mitigating impacts to a natural range barrier.

In relation to defining, natural range barrier, the guidance provided in FRPA Bulletin #21 appears to be inconsistent with FRPA Administration Bulletin #3.[12] Bulletin #3 states that such definitions or terms written into an operational plan place limits on the legislation and are contrary to the principles of administrative law.

The Board also found that the definition of natural range barrier in FRPA Bulletin #21 may be contributing to disagreements between range users and forest licensees about whether a vegetative feature (e.g., a timbered stand) meets the definition of a natural range barrier. The bulletin defines a natural range barrier as:

> a river, rock face, dense timber or any other naturally occurring feature that stops or significantly impedes livestock movement to and from an adjacent area.

In three case studies (#5, #8 and #10) forest licensees disagreed with range users and district range staff about the status of timbered natural range barriers, suggesting the stands were too open to be considered dense timber and therefore, would not stop or significantly impede livestock movement. It is the Board's view that terms such as *dense* or *significantly* may limit the intent of the legislation and the effective mitigation of impacts to natural range barriers.

[12] FRPA Administration Bulletin #3 is available for download at: http://www.for.gov.bc.ca/ftp/hth/external/!publish/web/frpa-admin/frpa-implementation/bulletins/frpa-admin-no-3-interpretive-guidance-respecting-fsp-questions-nov-7-2005.pdf

Conclusions

This special investigation examined how well forest licensees plan and implement natural range barrier mitigation. The investigation included two components: 1) an examination of a cross-section of 10 case studies to document how impacts to natural range barriers have been mitigated; and 2) an examination of the content of natural range barrier measures in 56 operational plans (46 FSPs and 10 WLPs).

The 10 case studies examined in the field revealed a range of issues in the 3 steps of effective mitigation (notification, assessment and implementation). Most notably, issues were common in the implementation step of mitigation and generally arose because of breakdowns in communication between range users and forest licensees or disagreements about how mitigation should be implemented.

Board investigators found measures in only 7 of the 56 operational plans examined met all 3 steps required to support effective mitigation. Thirty-two plans had measures that met 2 of the 3 steps of mitigation and therefore, would partially support effective mitigation. Measures in 17 plans had 1 or none of the 3 steps and therefore, would not support effective mitigation of impacts to natural range barriers.

Several factors limited measures from fully meeting the criteria. These included measures that did not specifically enable the range user to participate with the forest licensee in the process of assessing potential impacts to a timbered natural range barrier or the appropriate mitigation required; and measures that did not commit the forest licensee to take responsibility for implementing the required works within a specified timeframe after forestry operations.

The Board also found that only 1 plan included measures that were verifiable, meaning it is unlikely that measures in the other 55 plans could be enforced. This creates a problem because forest licensees are only accountable for carrying out the measures in their plans. If the measures are not verifiable, there is little recourse for government to require a forest licensee to take actions to mitigate impacts to a range barrier. Two factors limited the verifiability of measures: 1) frequent use of adjectives such as *reasonable*, which creates uncertainty in terms of the extent a licensee is willing to commit to implementing the measure; and 2) measures lacked a timeframe for implementation of mitigation.

The investigation found there are several additional factors that may be limiting the effective mitigation of impacts to natural range barriers. The factors include:

- the stumpage appraisal system, which has rules that are not well aligned to the need for monitoring the effects of forest practices on range barriers
- the need for more pro-active forest planning and better information on the location of range barriers
- the cumulative effects on range barriers when multiple forest licensees and other land users are working in the same area
- inconsistent guidance provided by government on the content of measures may be contributing to problems encountered with the measures in some operational plans

The Board concludes that improvements are required in how forest licensees plan and implement mitigation of impacts to natural range barriers. Range users also need to be more proactive in identifying timbered range barriers on their tenures. Government also has a role in ensuring that its policies and guidance support effective mitigation of impacts to range barriers. Ultimately, effective mitigation of timbered range barriers requires forest licensees and range users to maintain open communication and respect for each other's tenured rights and responsibilities.

Recommendations

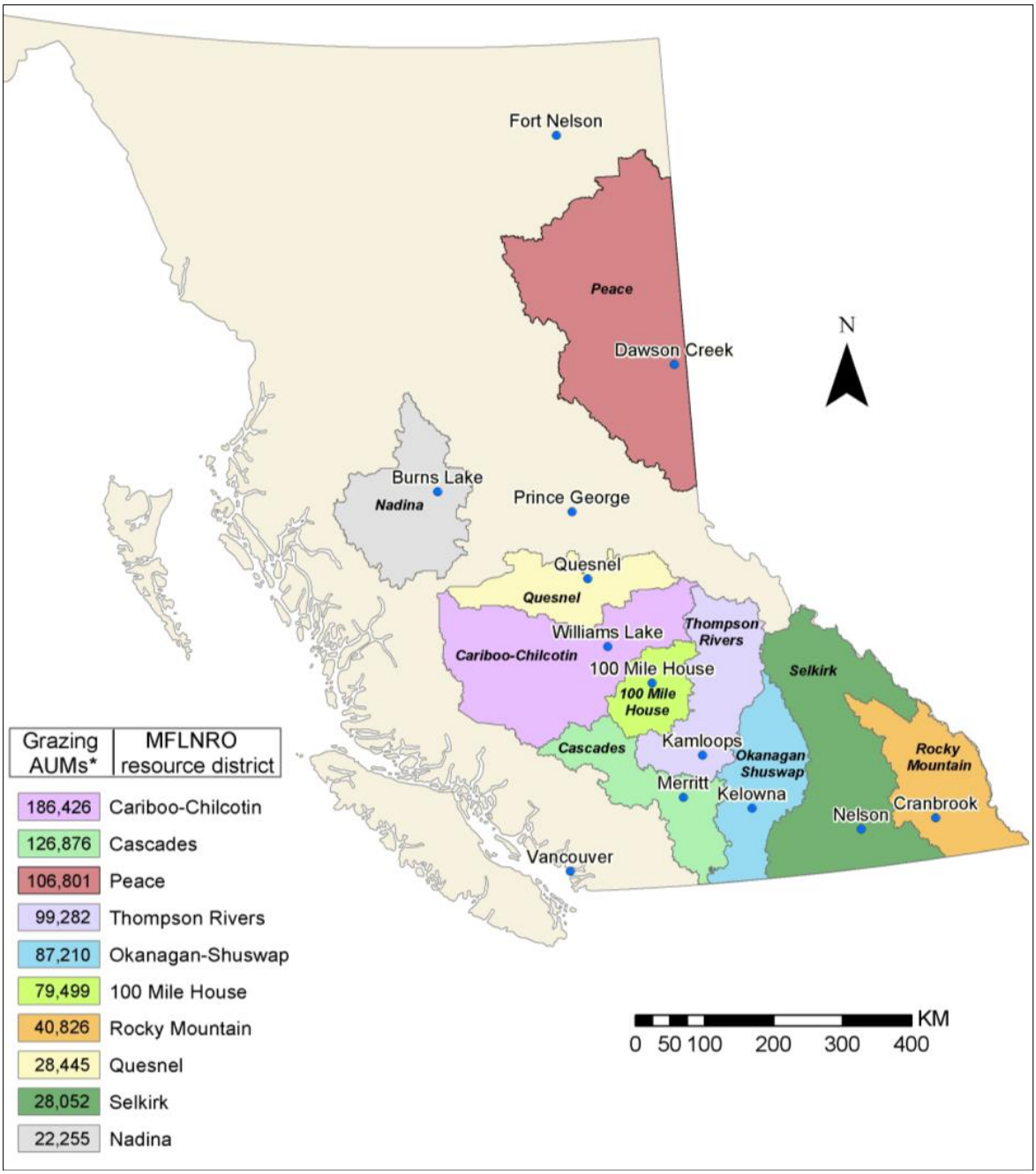
Under section 131(2) of the *Forest and Range Practices Act*, the Board makes the following recommendations to address key findings of the investigation.

1. Government should ensure that measures in operational plans support effective mitigation of impacts to natural range barriers and are verifiable. Alternatively, government could replace the requirement in FRPA to propose and carry out measures with a practice requirement.[13]
2. Government should ensure that policies governing the stumpage appraisal system provide licensees and range users with sufficient time to determine if, and to what extent, forest practices have impacted a natural range barrier and the appropriate mitigation that is required.
3. Government should ensure that guidance is developed to clarify the purpose and scope of natural range barriers, including where on the range tenure section 48 of FRPA is meant to apply (e.g., pasture or tenure boundaries) and the values the requirement is intended to mitigate.

[13] For example Section 14 of the *Environmental Management and Protection Regulation (a regulation under the Oil and Gas Activities Act)* includes the following practice requirement:

> If a person carrying out an oil and gas activity on an operating area causes the removal or the rendering ineffective of a natural range barrier, the person must, before livestock is turned out on the area, or, if turnout has occurred, as soon as practicable, construct a replacement barrier that is at least as effective as the one removed or rendered ineffective was before the removal or rendering ineffective.

Appendix 1: 10 FLNR Resource Districts with the Highest Number of Authorized AUMs for Grazing*



* Grazing AUMs —the number of AUMs (animal unit months) authorized (licence and permit) under the *Range Act* for grazing on Crown rangeland (2012 AUM data provided by FLNR Range Branch). An animal unit month is "the quantity of forage consumed by a 450-kg cow (with or without calf) in a 30-day period." *Source:* Fraser, D. A. 2004. Factors influencing livestock behavior and performance. Forest Practices Branch, Rangeland Health Brochure 8, Ministry of Forests, Victoria, B.C.

Appendix 2: Case Study Summaries

These case study summaries can be cross-referenced with Table 2. Of the 10 case studies, 9 involved impacts to natural range barriers functioning as tenure boundaries and 1 case study (#2) concerned impacts to a natural range barrier used to guide livestock on and off the Crown range from the home ranch.

Case Study #1

Harvesting by a forest licensee impacted a natural range barrier over a distance of about one kilometre, affecting the boundary between two range tenures. In 2010, at the request of the range users, the forest licensee entered into a cost-sharing agreement with the range users to mitigate impacts to the range barrier. Under this arrangement, which was facilitated by FLNR range staff, the range users decided to extend the one kilometre long fence to three kilometres, allowing the range barrier fence to close the gap with an existing range fence. The fence extension required an additional two kilometres of right-of-way to be cleared. The agreement involved the licensee paying for all fencing materials for one kilometre of fence and paying the range users the costs of installing one kilometre of fence. The two range users agreed to cost-share installation of the remaining two kilometres of fence.

Observations made by the Board

At the time of the Board's site assessment, the required right-of-way for the three-kilometre length of fence had been cleared, but not all of the fence had been installed.

Case Study #2

A range user identified that extensive harvesting of mountain pine beetle affected timber in 2010 resulted in the loss of a natural range barrier. The barrier did not define a tenure or pasture boundary, but was part of a corridor used to guide livestock on and off the Crown range from the home ranch. The forest licensee agreed to mitigate impacts to the natural range barrier by constructing 1500 metres of wire fence by September 2011. After 550 metres of fence was constructed, the forest licensee decided to stop fence construction based on the advice of its fencing contractor, who believed the 550 metres of fence would be sufficient to mitigate impacts to the range barrier. The forest licensee did not communicate its decision to the range user, but informed the FLNR range officer who agreed to take a "wait and see approach." This approach involves delaying further fence construction until changes in livestock movement patterns, in response to the extensive harvesting, can be better understood.

Observations made by the Board

Investigators found the currently constructed 550 metres of fence is not sufficient to mitigate impacts to the natural range barrier. Currently, the end of the fence is located along a road right-of-way and there is considerable evidence of livestock movement around the end of the fence.

Case Study #3

A range agreement holder believed that forestry operations scheduled for 2003 would likely impact a natural range barrier. The forest licensee committed to mitigating the impact and field-marked the location of a wire fence. However, following harvesting, the licensee did not construct the fence as agreed. The licensee sold its forest licence and the new licensee claimed that it was not their obligation to construct the fence. FLNR was aware of the original licensee's obligation to construct the fence, but did not pursue enforcement action because the licensee was facing bankruptcy. When FLNR did pursue the matter, it was determined that the statute of limitations had lapsed.

Observations made by the Board

Harvesting by the original licensee did impact a natural range barrier and no mitigation had been completed. However, following the site assessment by Board investigators and negotiations led by FLNR range staff, current and former forest licensees operating in the area entered into a cost-sharing agreement with the range user to mitigate the impact with a wire fence.

Case Study #4

Over the last 10 years, harvesting by multiple forest licensees had progressively impacted an approximately 20-kilometre long natural range barrier functioning as a tenure boundary. Initially, the range user responded to notifications from a couple of licensees resulting in the installation of cattle guards and short sections of wing fence. However, over the past five years, accelerated harvesting of mountain pine beetle infested timber by several more licensees, all operating in the same area, resulted in cumulative impacts to the natural range barrier. The increased activity made it difficult for the range user to manage communication with licensees and to keep track of planned harvesting. As a result, some notifications sent by licensees went unanswered.

After a more recent cutblock was harvested, the range user contacted FLNR range staff with concerns that a road associated with the cutblock is making it difficult to keep cows within his range tenure. The forest licensee was reluctant to implement mitigation because the range user did not respond to the notification sent by the licensee during the planning of harvesting. Also, the licensee said that the period in which it is able to appraise costs for fencing or other types of barriers had lapsed.

Observations made by the Board

During the site assessment, forest licensees, FLNR district range staff and the range user met on the range tenure to assess options to mitigate the effects of some of the most recent forest harvesting and road construction on a natural range barrier. Licensees subsequently agreed to construct some fence, move a cattle guard and to modify harvesting proposals in an effort to retain much of the remaining natural range barrier.

Case Study #5

A range user contacted a forest licensee in 2006 requesting a fence be constructed to mitigate an impact to a natural range barrier (the range user said they had not been notified of the planned harvesting). The range user did not hear back from the forest licensee so reported the issue to FLNR. As a result, FLNR determined the forest licensee was required to re-construct about 580 metres of fence and some gates by May 2007. An additional 1500 metres of wire fence was to be constructed and

FLNR would seek funding for that section of fence. Despite being asked by FLNR, the forest licensee did not construct the fence. FLNR did not pursue enforcement of the matter, but adjusted the range user's tenure boundary and provided funding directly to the range user to construct the necessary fence.

Observations made by the Board

The fence has been constructed and is functioning as planned.

Case Study #6

After being notified of planned forestry operations, a range user informed the licensee that the operations would likely impact a 1.2-kilometre long section of natural range barrier located on a tenure boundary. Due to difficult terrain conditions, including large boulder substrate, the licensee determined that installation of a wire fence was not an option. As a result, the forest licensee consulted the range user and FLNR onsite to discuss alternate options for mitigation. The consultation included an aerial helicopter overview of the area. Given the abundant availability of large boulders, the parties agreed that a rock fence would be the most suitable option (see Figure 2 for site photo).

Observations made by the Board

The rock fence has been constructed with sections of wire fence to allow for wildlife passage and is functioning as planned.

Case Study #7

Note: This case study is regarded by the Board as an innovative approach to natural range barrier mitigation. Documentation of the case study did not include a site assessment by the Board, but relied on information provided by FLNR staff.

A substantial impact to multiple natural range barriers (tenure and pasture boundaries) occurred as a result of extensive harvesting of mountain pine beetle affected timber in 2007. The harvesting took place across seven range tenures and two FLNR districts. About 12 kilometres of natural range barrier was impacted.

Some of the range users approached the forest licensee and FLNR with concerns about the amount of fencing required and the associated costs they would incur for long-term fence maintenance. The range users, licensee and FLNR worked together to discuss mitigation options. The parties agreed to undertake an informal, seven-year pilot project involving the use of range riders on horseback to control the movement of livestock between range tenures where the natural range barriers had been impacted. As part of funding the pilot project, to an amount equivalent to the cost of constructing about 12 kilometres of fence, the forest licensee was deemed by FLNR to have met its requirement to mitigate impacts to the natural range barrier.

Observations made by FLNR district range staff

To date, FLNR reports mixed results of the pilot range riding project. Ensuring that livestock are kept within the correct tenure has proven time consuming and costly, and the approach has not always been effective. One problem is the variation in the quality of forage between tenures, causing livestock to continually move to a tenure with better forage. Participants have suggested that strategic

placement of wing fences and cattle guards may be required to improve efficiency of the range riding pilot program.

Case Study #8

After an area was harvested, range users asked the forest licensee to install a fence to mitigate impacts to a natural range barrier separating three range tenures. The licensee declined to install a fence for two reasons: 1) during layout of the area planned for harvesting, the licensee identified an old range fence that was in a state of disrepair, with much of the fence lying on the ground and no longer functional. The licensee said it is the responsibility of the range user to maintain any fences; and 2) despite the presence of the fence, the area harvested consisted of an open stand and, in the licensees opinion, was not capable of functioning as a natural range barrier. Range users said that if the fence was not functional, then it was the adjacent timber that has been functioning as a range barrier because they have no records or recollection of livestock moving between range tenures in the area prior to the harvesting.

FLNR range staff negotiated a solution to mitigate impacts to the natural range barrier (see Figure 3 for site photo). The agreement includes the forest licensee and FLNR cost-sharing the fence posts and 25 percent of the fence installation costs. The three range users agreed to supply the wire for the fence and pay for the remainder of fence installation costs.

Observations made by the Board

The range users told the Board they were not notified about the planned harvesting. The forest licensee said the range users were notified, but received no response from the range users. The Board requested a copy of the notification letter that was sent by the licensee to the range users. The forest licensee produced a template notification letter, but could not locate a copy of the original letter sent to each of the three range users. As of September 2013, the fence had been partially constructed.

Case Study #9

In early 2000, two forest licensees proposed harvesting in an area that would likely impact a natural range barrier functioning as a boundary between two range tenures. At the time, range staff and range users said that a new fence would be required after harvesting and should tie-in to an existing fence.

Harvesting of the cutblocks was delayed. The fence was not constructed because neither licensee applied for appraisal costs to construct the fence and both licensees thought the other licensee was going to mitigate the impacted range barrier. With FLNR range staff involvement, the forest licensees and range users developed a mutually agreeable solution, which involved the construction of a log bundle/rock with sections of wire fence to allow for wildlife passage. All costs were shared between the two forest licensees.

Observations made by the Board

The combination log bundle/rock/wire fence has been constructed and is functioning as planned.

Case Study #10

A forest licensee notified a range user that proposed harvesting would span an old fence, which is partially in disrepair. The fence is located on the boundary between the range tenure, private land and a highway and was constructed with the wire attached from 'tree to tree' as opposed to the current standard of fence using posts and wire.

The forest licensee claims that since the fence is not functional and the surrounding timber is too open to function as a natural range barrier, it is not obligated or willing to do any mitigation work. The range user and FLNR range staff, on the other hand, said the fence, together with the adjacent timber, is functioning as a barrier. They also said that harvesting of the cutblock will result in more forage growing in the area, which will attract livestock. The existing fence is not strong enough to prevent livestock from breaking through.

Observations made by the Board

At the time of the Board's site assessment, the cutblock had not been harvested. The range user has relinquished his rights to graze livestock on the tenure. FLNR range staff are unsure about pursuing enforcement action against the forest licensee because the tenure is not in use and, in their opinion, FRPA's requirements pertain to mitigating the impacts of a natural range barriers on a tenure held by a range agreement holder (range user).

Appendix 3: Detailed Results for Evaluation Criterion #1

Do the measures in operational plans support effective mitigation of impacts to natural range barriers?

Evaluation criterion and supporting questions applied to natural range barrier measures in 46 FSPs and 10 WLPs	56 Plans Total	
	Y	N
A. **Notification** – do the measures commit the forest licensee to notifying the range user about planned forestry operations? *(to achieve a 'yes', at least 2 of 3 from A1, A2 or A3 below must be a 'yes')*	45	11
A1) Measures specify that range users will be notified about planned forestry operations?	47	9
A2) Measures identify when notification will occur?	45	11
A3) Measures include timeframe for range users to respond to notifications?	3	53
B. **Assessment** – do the measures enable the range user to provide input into determining whether forestry operations will impact a range barrier and the appropriate mitigation? *(to achieve a 'yes', both B1 and B2 below must be a 'yes')*	35	21
B1) Measures specify that range users may participate in determining whether forestry operations will impact a natural range barrier?	38	18
B2) Measures specify that range users may participate in determining appropriate mitigation?	40	16
C. **Implementation** - do the measures identify that the forest licensee will implement mitigation and within a specified timeframe? *(to achieve a 'yes, both C1 and C2 below must be a 'yes')*	15	41
C1) Measures identify that the forest licensee will implement mitigation?	31	25
C2) Measures include a timeframe for implementation of mitigation?	14	42

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