

TEMPORARY ACCESS STRUCTURES: CONSIDERATIONS FOR SITE PLANS AND POST-HARVEST ASSESSMENTS

FREP

EXTENSION NOTE #28

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INTRODUCTION

This extension note is directed to resource professionals who develop site, road, and logging plans and conduct post-harvest assessments. This note provides best practice considerations on the interpretation of “Temporary Access Structures” (TAS) as defined under British Columbia’s Forest Planning and Practices Regulation. That regulation aims to control the area permanently unavailable to the production of commercial crop trees, and to minimize risks of off-site consequences from extensive networks of unmaintained roads, while recognizing the need for an actively maintained permanent road infrastructure.

Roads are a necessary part of forest management infrastructure, but they also have negative consequences: occupancy of potential growing sites, and unpredictable off-site impacts due to drainage modification.

As time passes after deactivation, drainage structures degrade and even deactivated roads can concentrate and accelerate run-off in the same way drainage ditches do. In steep terrain, this can result in landslide failures with significant off-site consequences. In low-relief terrain, increases in the peak flow of major drainage channels is a cumulative impact of road construction (see Figure 1).

Perhaps the most important effect of unused TAS on the landscape is that these areas are unproductive and reduce

the timber-producing land base with little or no benefit to offset this loss. Therefore, TAS are regulated under the *Forest and Range Practices Act* to minimize the losses and risks associated with unmaintained temporary roads and other structures distributed across the landscape.

In 2011, the Forest and Range Evaluation Program (FREP) used high-resolution aerial imagery to conduct an assessment of soil management practices in cutblocks throughout British Columbia (B.C. Ministry of Forests, Lands and Natural Resource Operations 2011a, 2011b). In that assessment, concerns were noted with the amount of unrehabilitated temporary access structures but the issue was not specifically addressed. In 2012, an additional 45 blocks located in the Southern and Central Interior of the province were examined using the same methodology but with more focus on attempting to distinguish between temporary and permanent access. Approximately 1/3 of the blocks contained unrehabilitated access which appeared to be temporary. The recommendation of the Association of BC Forest Professionals for best soil management practices is to rehabilitate temporary access. Subsequent reviews of compliance soil surveys show that unrehabilitated TAS, sometimes incorrectly identified as permanent access structures in site plans, has often not been counted as “disturbance.” This practice is not in accordance with the definition of soil disturbance in the Forest Planning and Practices Regulation.

This extension note serves to clarify that, under the province’s current regulatory environment, unrehabilitated TAS are to be counted as soil disturbance in the net area to be reforested, regardless of how these structures might be described in the site plan. The proportion of harvested area within a standards unit that can be occupied by TAS is also subject to regulatory limits.

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Key message: An assessment of soil management practices in the southern and central interior of British Columbia showed that approximately one-third of the evaluated blocks (14 of 45) contained unrehabilitated temporary access structures. Unused and unmaintained roads are non-productive and reduce the timber-producing land base with little or no benefit to offset this loss. These roads also have significant off-site consequences by accelerating run-off and impacting large basin hydrology.

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To be a world leader in resource stewardship monitoring and effectiveness evaluations; communicating science-based information to enhance the knowledge of resource professionals and inform balanced decision-making and continuous improvement of British Columbia’s forest and range practices, policies and legislation. <http://www.for.gov.bc.ca/hfp/frep/index.htm>





Figure 1: This aerial photograph, covering approximately 8500 hectares of intensively harvested low-relief terrain in northern BC, shows unrehabilitated TAS in yellow. The photograph shows 90% of cutblocks contained unrehabilitated TAS (generally roads), this TAS accounted for 1.4% of the overall area and 4.2% of the cutblock area. At this scale, the cumulative effect of accelerated drainage from these roads and the permanent access shown in white, could be significant.

Permanent and Temporary Access Structures Defined

The following definitions appear in the Forest Planning and Practices Regulation.*

“permanent access structure” means an access structure in a cutblock that

- (a) at the time of its construction, is reasonably expected to provide access for timber harvesting and other activities that are not wholly contained in the cutblock, or
- (b) is constructed on or through, or contains, materials unsuitable for the establishment of a commercial crop of trees and is not an excavated or bladed trail,

but does not include an area that contained an access structure before rehabilitation of the area under section 36

“soil disturbance” means disturbance to the soil in the net area to be reforested in a cutblock because of

- (a) temporary access structures,
- (b) gouges, ruts and scalps, or
- (c) compacted areas

“temporary access structure” means an access structure that

- (a) is in a cutblock, and
- (b) does not conform to the criteria described in paragraph (a) or (b) of the definition of “permanent access structure” and does not include a pit or quarry

* Forest and Range Practices Act, Forest Planning and Practices Regulation (B.C. Reg. 14/2004, O.C. 17/2004).

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/14_2004 (Accessed April 2013).

LEGISLATION

Under the *Forest and Range Practices Act*, the Forest Planning and Practices Regulation defines any access structure not designated as “permanent” as a temporary structure (see sidebar, “Permanent and Temporary Access Structures Defined”).

Permanent access structures are actively maintained roads, landings, and borrow pits that provide future access for timber harvesting or other activities that are “not wholly contained in the cutblock.” Temporary structures are wholly

contained within a cutblock and provide access for a single harvest opportunity and the associated site preparation and planting operations.

Another key difference between temporary and permanent access structures is that TAS are part of the net area to be reforested and are therefore subject to the same soil disturbance assessments and assessments as all other dispersed disturbances caused by harvesting or mechanical site preparation operations. The Forest Planning and Practices Regulation sets a maximum limit for soil disturbance specific to the Standards Unit and (unless

Soil Disturbance Limits Related to Temporary Access Structures

*Section 35 (3–6) of the Forest Planning and Practices Regulation defines the soil disturbance limits related to TAS as follows.**

- (3) An agreement holder other than a holder of a minor tenure who is carrying out timber harvesting must not cause the amount of soil disturbance on the net area to be reforested to exceed the following limits:*
 - (a) if the standards unit is predominantly comprised of sensitive soils, 5% of the area covered by the standards unit, excluding any area covered by a roadside work area;*
 - (b) if the standards unit is not predominantly comprised of sensitive soils, 10% of the area covered by the standards unit, excluding any area covered by a roadside work area;*
 - (c) 25% of the area covered by a roadside work area.*
- (4) An agreement holder may cause soil disturbance that exceeds the limits specified in subsection (3) if the holder*
 - (a) is removing infected stumps or salvaging windthrow and the additional disturbance is the minimum necessary, or*
 - (b) is constructing a temporary access structure and both of the following apply:*
 - (i) the limit set out in subsection (3) (a) or (b), as applicable, is not exceeded by more than 5% of the area covered by the standards unit, excluding the area covered by a roadside work area;*
 - (ii) before the regeneration date, a sufficient amount of the area within the standards unit is rehabilitated such that the agreement holder is in compliance with the limits set out in subsection (3).*

- (5) The minister may require an agreement holder to rehabilitate an area of compacted soil if all of the following apply:*

- (a) the area of compacted soil*
 - (i) was created by activities of the holder,*
 - (ii) is within the net area to be reforested, and*
 - (iii) is a minimum of 1 ha. in size;*
- (b) the holder has not exceeded the limits described in subsection (3);*
- (c) rehabilitation would, in the opinion of the minister,*
 - (i) materially improve the productivity and the hydrologic function of the soil within the area, and*
 - (ii) not create an unacceptable risk of further damage or harm to, or impairment of, forest resource values related to one or more of the subjects listed in section 149 (1) of the Act.*

- (6) An agreement holder who rehabilitates an area under subsection (4) or (5) must*

- (a) remove or redistribute woody materials that are exposed on the surface of the area and are concentrating subsurface moisture, to the extent necessary to limit the concentration of subsurface moisture on the area,*
- (b) de-compact compacted soils, and*
- (c) return displaced surface soils, retrievable side-cast and berm materials.*

** Forest and Range Practices Act, Forest Planning and Practices Regulation (B.C. Reg. 14/2004, O.C. 17/2004), Section 35 (3–6). http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/14_2004#section35 (Accessed April 2013).*

they are rehabilitated) TAS are included in this limit (see highlighted text on page 3, “Soil Disturbance Limits Related to Temporary Access Structures”). A minimal prescription for rehabilitation of TAS and other disturbances is also set out in Section 35(6) of this regulation (see page 3).

Typically, the entire area of an unrehabilitated temporary access road prism will be counted as soil disturbance, although this depends on site-specific conditions. In exceptional cases, such as winter roads in flat terrain or where very shallow side-casts exist, the entire road prism may not be counted disturbance.

KEY POINTS IN THE LEGISLATION

- The area in unrehabilitated TAS shall not, on its own, exceed the soil disturbance limits; the total area of unrehabilitated TAS, plus other counted types of soil disturbance, shall not exceed the soil disturbance limits.
- Temporary access structures may be constructed in excess of the soil disturbance limits, but the amount constructed in excess of the soil disturbance limits shall not exceed an area equal to 5% of the standards unit minus roadside work area (see Section 35[4] in highlighted text on page 3, “Soil Disturbance Limits Related to Temporary Access Structures”).
- If the soil disturbance limits are exceeded, then TAS or dispersed disturbance in the net area to be reforested must be rehabilitated to the point where the sum of the unrehabilitated temporary access and the other counted disturbance does not exceed the disturbance limits set in regulation.

GUIDELINES FOR SITE PRESCRIPTIONS

The Forest Planning and Practices Regulation sets limits on the area that can be occupied by TAS. Best practice guidance and discussion of these regulatory goals is contained in Section 7.2 of the *2012 Forest Legislation and Policy Reference Guide* prepared by the Association of BC Forest Professionals (http://www.abcfp.ca/practice_development/continuing_education/policy_seminars.asp). **In the 2012 guide, the ABCPF recommends that TAS should be rehabilitated to establish a commercial crop of trees and to control unpredictable hydrologic responses.**

Roads should be clearly identified in the site plan as permanent or temporary access structures. This will facilitate post-harvest rehabilitation and harvest planning. ***Designating roads that are temporary as “permanent” is not an acceptable practice.***

In developing a site prescription, it is important to note that TAS are part of the net area to be reforested and site occupancy is calculated on this basis (see Section 35[4][b] on page 3, “Soil Disturbance Limits Related to Temporary Access Structures”). Site occupancy by permanent access structures is calculated on the basis of the gross cutblock area, which includes reserves and non-productive areas.

“Case Study 1: A Site Plan for Road Construction” (below) shows an example of calculations based on in-block roads proposed in a site plan. In this example, the roads identified in the site plan were incorrectly identified as permanent access structures. Temporary access structures occupied 5.2% of the net area to be reforested. Roads that have been incorrectly designated as permanent structures will be included as soil disturbance in the net area to be reforested in the event of a FREP or compliance survey.

For planning purposes, experience shows that the roadside work area will occupy about 15% of a standards unit, which implies an average 30 m roadside work area for every 200 m of skidding distance. Therefore, in a typical roadside logging system, the base area for calculating site occupancy by TAS will be 85% of the standards unit.

In addition, because road construction can increase the area of accelerated run-off, site plans should consider the incremental effects on large basin hydrology. One approach is to use the well-established concept of “equivalent clearcut area” defined in the *Watershed Procedure Assessment Guidebook* (B.C. Ministry of Forests 1999).

GUIDELINES FOR POST-HARVEST SURVEYS

Where unrehabilitated TAS occur in the standards unit at the time of the planned post-harvest survey, the recommended procedure is to map them on a high-resolution aerial photograph and then conduct a survey using one of the approaches described below.

The following three procedures are recommended for measuring TAS.

1. Where accurate measures of TAS are required, the most cost-effective approach involves the use of high-resolution aerial photography to map the entire road prism as soil disturbance (as shown in the two case studies below). The area in TAS can be measured directly from the airphoto using applications such as *OziExplorer* or *Global Mapper*. The accuracy of airphoto interpretation can be checked on the ground by measuring the width of counted disturbance in the road prism at 10–20 locations, using either randomly selected observation points or at systematic intervals. At the randomly or systematically selected location, measure the width of the perpendicular cross-section of the road prism, as described in the *Soil Conservation Surveys Guidebook* (B.C. Ministry of Forests 2001). Under the Forest Planning and Practices Regulation, “road prism” is defined as an area consisting of the road surface and any cut slope and road fill.

If significant errors were made in defining the road prism from the aerial photograph, then the area delineated can be corrected through the field determination of the true width of the road prism at the observation points.

2. If knowing the precise area in TAS is not the primary concern, the area in TAS can also be estimated as part of a soil disturbance survey such as that outlined in FREP Technical Note No. 5 (B.C. Ministry of Forests,

Lands and Natural Resource Operations 2013). During a survey, any observation points that fall on TAS are simply tallied as soil disturbance in the appropriate category. This approach is subject to the sampling error of the survey method, whereas the airphoto approach is subject to error in defining the extent of the TAS from air photos. ***If using the economical, high-resolution imagery that is currently available, delineating TAS from airphotos will normally give the more precise measure.***

3. Temporary access structures can also be measured using a traverse method, such as that outlined in the *Soil Conservation Surveys Guidebook* (B.C. Ministry of Forests 2001).

CASE STUDIES

Under the Forest Planning and Practices Regulation, any road that cannot be used to provide future access to another area is deemed “temporary.” This commonly occurs where:

- a road ends at an impassable or likely impassable barrier (e.g., a stream requiring a bridge crossing where a bridge crossing is already in place at a nearby location represents a likely impassable barrier); or
- a road ends in a cutblock that is surrounded by areas that have already been harvested, or are non-productive or designated reserve areas.

The following examples illustrate considerations for TAS in site plans and post-harvest assessments.

CASE STUDY 1: A SITE PLAN FOR ROAD CONSTRUCTION

The aerial photograph in Figure 2, which was marked up to easily track the area in roads, shows a cutblock in the planning stages. It is important to estimate in advance the proportion of the area that can be occupied by TAS or rehabilitated TAS. The areas identified here as TAS were all incorrectly designated as permanent access structures in

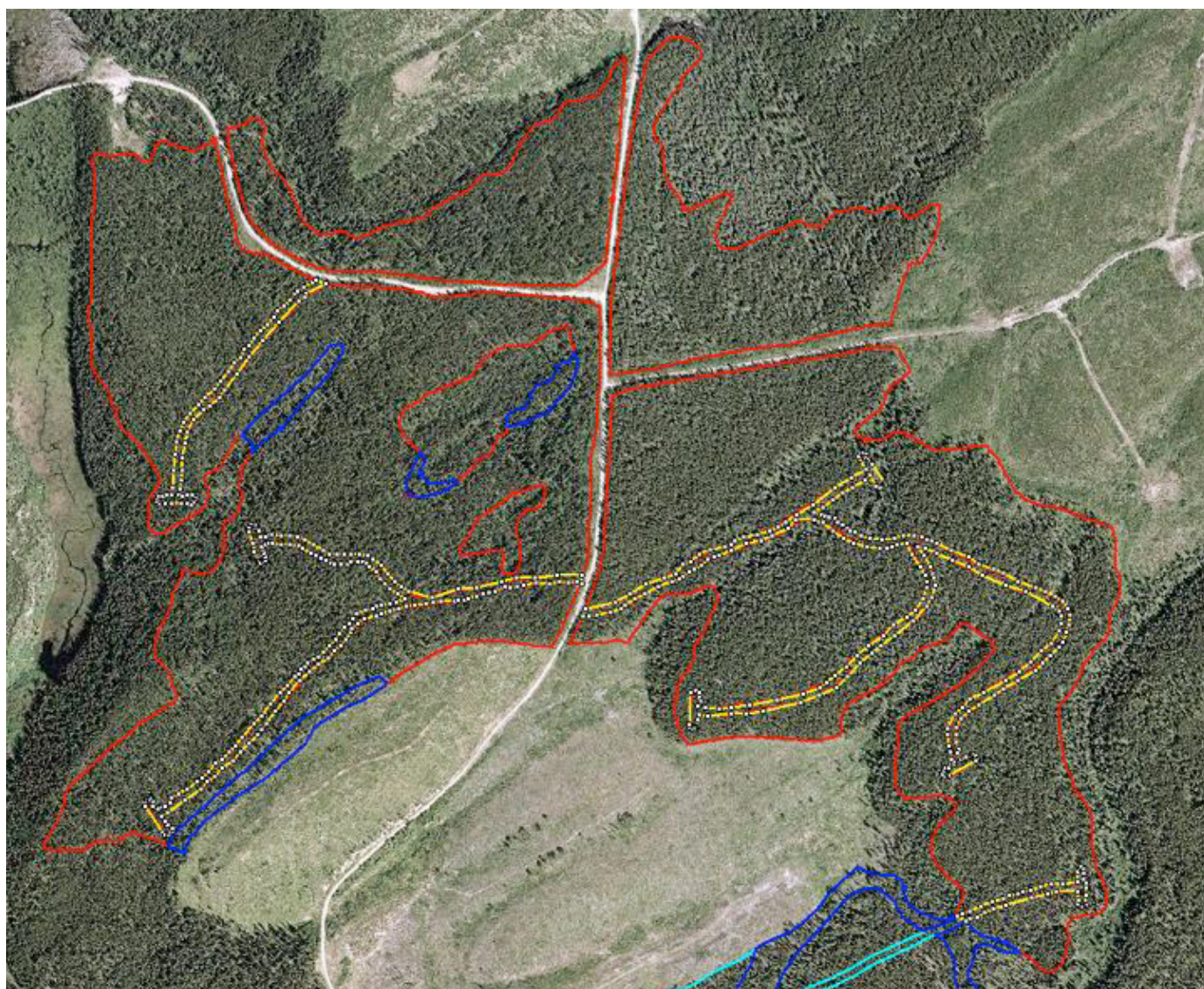


Figure 2: A site plan for road construction. The red and blue lines delineate standards units; yellow lines with white dots show TAS following the regulatory definition.

the site plan; in all cases, the roads here designated as TAS terminate within the cutblock at boundaries where no future harvest opportunities exist.

Using the mapped road locations proposed in the site plan, TAS were determined to occupy 4.7 ha. In this case, the true net area to be reforested is 106.3 ha, which is the sum of the area mapped above as TAS, plus the 101.1 ha of net area to be reforested as stated in the site plan. Based on experience, proposed road locations and the roads constructed based on these proposals usually correspond closely. The net area to be reforested (NAR) occupied by TAS is calculated as:

$$\text{Percentage of NAR in TAS} = 100 \times \frac{\text{Area in TAS}}{(\text{Area in NAR} - \text{Area in RWA})}$$

Roadside work areas (RWA) typically represent 15% of the net area to be reforested. An assumed 15% RWA site occupancy would yield a “net” NAR of 90.4 ha with the road design given in the site plan and TAS would occupy 5.2%

of the NAR (see Table 1). Depending on site sensitivity, this amount for TAS could already exceed the regulatory disturbance limits. Given that at least some other dispersed soil disturbance may be created in the block during harvesting, planning for TAS this close to the limit virtually assures that some of the TAS or disturbance will require rehabilitation.

Table 1: *An example of a temporary access structure calculation^a*

	Area (ha)	Area (% of NAR)
NAR from site plan	101.1	
NAR + TAS	106.3	
RWA (estimated 15%)	15.9	15
NAR (net)	90.4	
TAS	4.7	5.20

^a In this example, some roads were incorrectly designated as permanent access structures. Therefore, it was necessary to recalculate the “true” NAR of 106.3 ha by adding these roads to the net area to be reforested stated in the site plan.

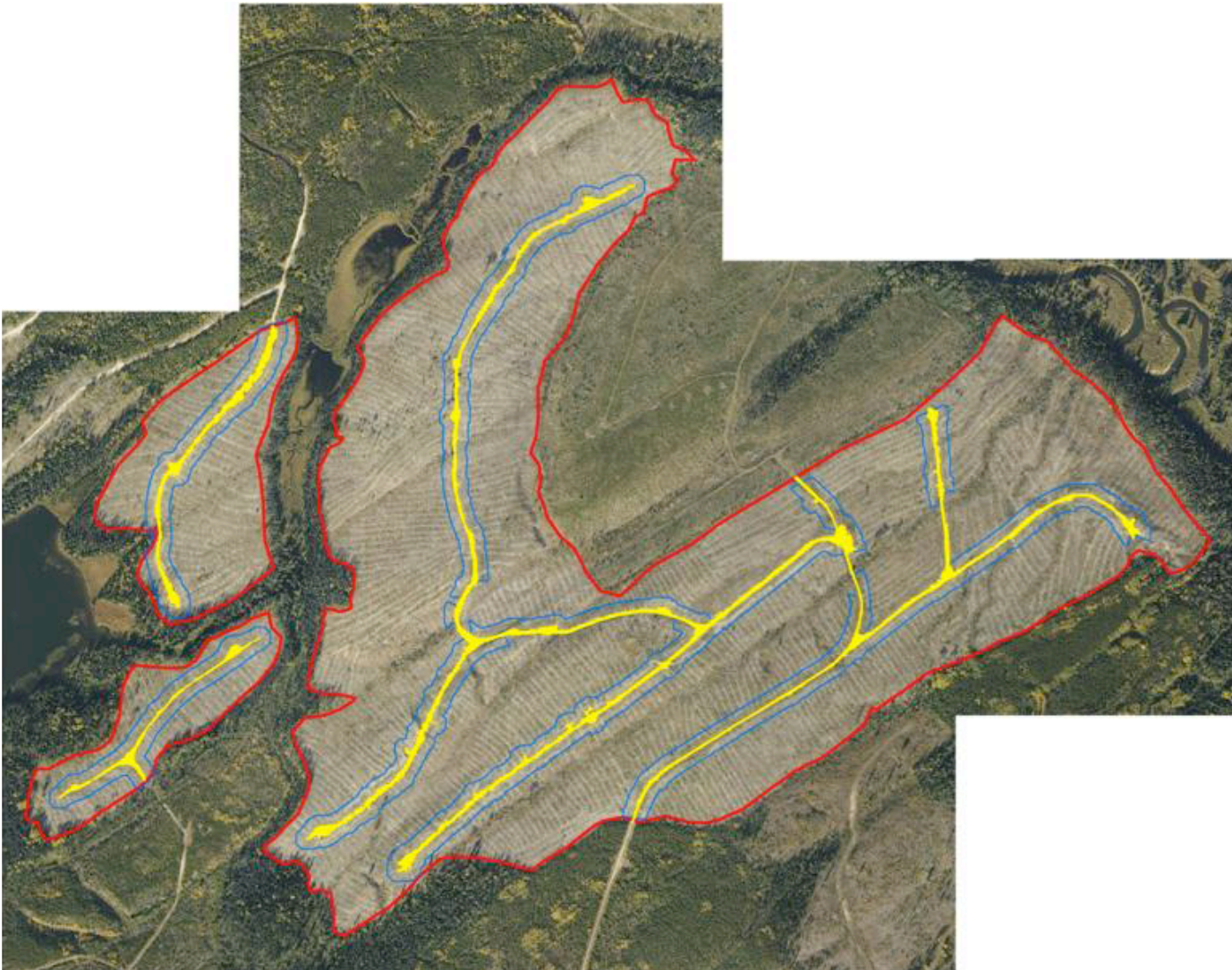


Figure 3: *A cutblock after harvest, showing roads and roadside work areas. The block is outlined in red, the roads in yellow, and the roadside work area in blue.*

CASE STUDY 2: POST-HARVEST TEMPORARY ACCESS STRUCTURES

The aerial photograph in Figure 3 outlines a cutblock after harvest with roads and roadside work areas. It is unlikely that any of the roads in this block would be used for future activity as they end at creeks, wetlands, or recently harvested areas. Therefore, all the roads in this example should be designated as TAS. The TAS occupy 4.7% of the net area to reforested less the roadside work areas. Since no sampling error occurs with this type of measurement, no confidence limits are calculated. Depending on the sensitivity of the soil in the block, the area in TAS could be approaching the maximum soil disturbance limits without any contribution from other disturbances.

CONCLUSION

The examples of observed practices regarding TAS provided in this extension note represent a failure of operational practice to adequately protect the soils resource value and to address government objectives for soil conservation (i.e., to “conserve soil productivity and hydrologic function”). Clearly identifying both temporary and permanent access structures in the site plan is crucial to achieve British Columbia’s stated objectives for soil conservation/stewardship and timber management and to ensure compliance with the provincial Forest Planning and Practices Regulation.

The following critical points of definition and regulation pertain to TAS in British Columbia.

- Temporary access structures are wholly contained within a cutblock and are distinguished as providing access for a single harvest opportunity.
- The entire road surface of the unrehabilitated TAS is almost always counted soil disturbance (though winter roads are highly variable and may not be disturbed); side-cast may or may not be counted, depending on its suitability for growing trees. The area in TAS is limited by regulations regarding maximum allowable levels of disturbance.
- If the area in TAS, plus other counted soil disturbance, exceeds the prescribed limits set for a standards unit, then a sufficient amount of this area or other soil disturbance must be rehabilitated before the

regeneration date so that the prescribed limits are no longer exceeded.

- Temporary access structures may be constructed in excess of the soil disturbance limits but only up to a maximum excess equal to 5% of the net area to be reforested minus the roadside work area.

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