



Level 1 Water quality monitoring in areas grazed by livestock

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Abstract

The British Columbia Ministry of Forests and Range manages livestock grazing on about 60 million ha of Crown rangeland. In southern British Columbia a significant proportion of grazed rangeland falls within community and domestic watersheds, where drinking water is drawn from surface sources. Over the past decade two water borne disease outbreaks have been linked either directly or indirectly to livestock use. The Forest and Range Evaluation Program (FREP) has developed a level 1 (coarse filter) checklist of range indicators. This checklist can be used with a minimum of training by generalist monitoring staff. Where a level 1 assessment indicates that livestock use may be compromising water quality, level 2 monitoring (functionality assessment) is triggered.

BRITISH COLUMBIA Forest and Range Evaluation Program Resource Stewardship Monitoring Sample Area Information Card - Form 2 Side 1

1 Checklist of Range Indicators Potentially Affecting of Water Quality

Opening ID _____ Road ID _____ Sample Site ID _____

Observations of Livestock Disturbed Component of Sample Site with Demonstrated Connectivity to Receiving Waters (refer to Range Resources Assessment Procedures, 2006)

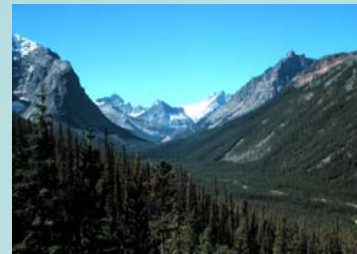
Yes / No	Condition of Plant Community
<input type="checkbox"/> <input type="checkbox"/>	1. Riparian vegetation absent or highly modified by grazing or trampling
<input type="checkbox"/> <input type="checkbox"/>	2. Herbaceous stubble height <10 cm noted (from 10 samples over 100 meters)
<input type="checkbox"/> <input type="checkbox"/>	3. Browsing of >70% of leaders noted (from 10 samples over 100 meters)
Yes / No	Condition of Ground Surface
<input type="checkbox"/> <input type="checkbox"/>	4. Bare soil and compaction common (10% of component by area)
<input type="checkbox"/> <input type="checkbox"/>	5. Recent pugging and unvegetated hummocks common (10% of component by area)
Yes / No	Condition of Stream Bank and Channel
<input type="checkbox"/> <input type="checkbox"/>	6. Bank erosion/collapse apparent resulting from heavy cattle
<input type="checkbox"/> <input type="checkbox"/>	7. Evidence of cattle standing in stream bed
<input type="checkbox"/> <input type="checkbox"/>	8. Macro-invertebrates indicate degraded water quality
<input type="checkbox"/> <input type="checkbox"/>	9. Algal mats occur in receiving waters
<input type="checkbox"/> <input type="checkbox"/>	10. Water run-off along livestock trails
Yes / No	Presence of Livestock Dung
<input type="checkbox"/> <input type="checkbox"/>	11. Livestock feces noted within 3 m of water's edge, or on trails, ditch lines or other surface drainage features leading to water
Yes / No	Specific Range Management Practices
<input type="checkbox"/> <input type="checkbox"/>	12. Livestock drink directly from water source
<input type="checkbox"/> <input type="checkbox"/>	13. Absence of cattle control structures limiting access to water source
<input type="checkbox"/> <input type="checkbox"/>	14. Observed presence of calves (<4 months) in or adjacent to water source
<input type="checkbox"/> <input type="checkbox"/>	15. Salt, minerals, oils within 100 of water body

BRITISH COLUMBIA Forest and Range Evaluation Program Resource Stewardship Monitoring Sample Area Information Card - Form 2 Side 2

1 Checklist continued

If at least three of the five preceding indicators receive at least one yes response, the possibility exists that livestock presence may be compromising water quality. The assessment of these 14 indicators provides a record of possible range management issues that may require further evaluation by the Range Division.

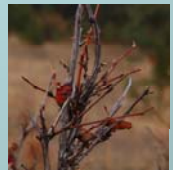
Are range conditions suggesting livestock is compromising water quality? Yes No
(risk will be proportional to distance downstream to water intake)



A watershed



Healthy riparian filter



Browsing of shrubs



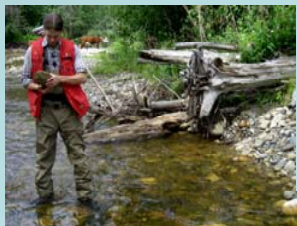
Highly at risk stream



At risk stream



Healthy riparian area



Monitoring



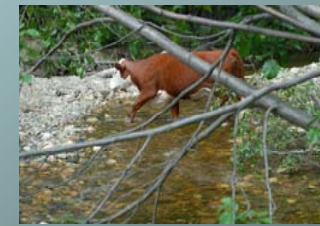
Embedded stream channel



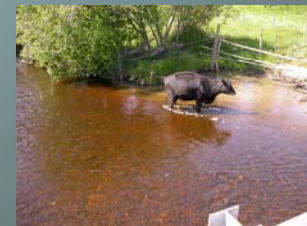
Macro invertebrates indicating good water quality



Shallow-rooted upland grasses provide poor filtering and rooting strength



Cattle with direct access to water source



Cattle urinating and defecating within 3m of water edge