



Adaptive Management of Reinecker Creek Trail Environmental Monitoring Plan



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First Monitoring Report

October 18, 2010

Background and Rationale

Trail monitoring efforts will include: 1. Compilation and review of trail user forms, 2. General notes made during routine trail maintenance and 3. Site-specific details collected at a pre-defined monitoring site during scheduled monitoring visits in the spring and fall. General notes made during routine trail maintenance will record conditions of the natural features and functions in the Reinecker Creek area that were determined to be vulnerable to impact by trail use through the Environmental Screening process (see Reinecker Creek Trail 2010 Environmental Screening Report).

The first monitoring of the South Bridge Crossing site has been completed and results are provided near the end of this report. A field form has also been developed along with a sketch of the site and directions for future monitoring.

The Reinecker Creek Trail long-term adaptive management plan follows this framework:

Results: What we are attempting to achieve?

1. Avoid removal of large standing dead trees and coarse woody debris on the forest floor
2. Avoid trampling and trail widening near riparian areas.
3. Avoid sediment and erosion into streams
4. Minimize spread of invasive plant species.
5. Minimize physiological or behavioural disruption of wildlife.
6. Avoid increased threat to wildfire along the private land interface.

Desired Behaviours: Actions most likely to achieve results?

1. Promote the conservation of wildlife habitat trees.
2. Use existing trails, boardwalks and bridges, avoid heavy use during muddy conditions, obey all trail closures.
3. Monitor stream banks at crossing points. Conduct a baseline inventory.
4. Learn to identify invasive plants, monitor for new introductions and spread. Conduct a baseline inventory.
5. Do not harass wildlife. Record wildlife encounters on trail use forms provided at trail heads.
6. No open fires except in designated campsites, no trail use during high fire risk periods when back country closures are in effect. No smoking.

Indicators: Measurables to determine if results are achieved?

1. Loss of standing snags and nest trees along the trail corridors.
2. Trail widening, trail braiding. Reports of trail use during closed periods.
3. Evidence of erosion and bank instability within riparian areas (30 m from water course).
4. Introduction of new invasive species within 5M of trails.
5. Proportions of wildlife encounters resulting in an alarm response (movement by animals to safer locations), population abundance and distribution trends (check with Min. of Environment for updates on wildlife inventory data)
6. Observations of fire rings and fire scars along the trails.

Limits: Acceptable bounds of the measured indicator?

1. No trees with large open nests removed as a consequence of trail activities.
2. No increase in trail width.
3. No erosion near waterways, no bank instability as a consequence of trail construction (including concentration of cattle at trail stream crossings)
4. No increase in invasive species stem densities or spatial extent of current infestations.
5. No increase in rate of alarm responses over time, no harassment reported, no abandonment of habitats caused by trail activities
6. No increase in fire scars outside of campsites.

Monitoring Schedule: How often the indicators will be measured?

1. Specific monitoring information will be collected at a single monitoring site on the Reinecker Creek Trail (see Monitoring Plan below).
2. During maintenance inspections trail stewards should be aware of all of the concerns listed above and note any changes to the natural features and functions surrounding the trail.
3. Both general and site-specific monitoring will be conducted during the two scheduled maintenance inspections (spring and fall).
4. The first fall environmental monitoring was conducted October 7, 2010.
5. Trail user survey forms will also encourage local user-stewardship of the trail. Forms should be made available at trail heads and include a column for wildlife observations. This form may also provide a process for people to record and report observations non-conforming use of the new trail (e.g., motorized use in riparian area, open fires outside of campsites) without being adversarial. It may be useful to digitally enter pertinent information on trail user forms into excel templates. This would allow a more convenient method to summarize and analyze trail use and observations over time. The average number of hikers (and dogs), peak use periods, and the proportion of visits where wildlife was observed are all examples of useful information for long-term adaptive management.

6. A critical component of adaptive management is planning a protocol for storing, accessing and reporting on monitoring information. A central repository is required to store and access this information. A protocol for reviewing and reporting on environmental monitoring information will complete this effort. Staff with the CSRD Area C Parks should consider these aspects of how to manage and organize this information.

Corrective Actions: Actions triggered if limits are surpassed?

1. Increase user education efforts
2. Seasonal trail closures (e.g., high water in spring, invasive plant seed dispersal periods)
3. Invasive plant removal programs (support is available through the BC Invasive Plant Council)
4. Construction of structures to limit cattle use of trail, concentrating crossings and resulting in sediment and erosion as well as riparian vegetation trampling
5. Trail relocation (specific thresholds that would trigger this level of corrective action will require more discussion)

Site Specific Monitoring: South Crossing Bridge on Reinecker Creek

Concern

We have selected a single monitoring site at the South Crossing bridge on Reinecker Creek. This site will allow long-term monitoring of the most sensitive feature on this trail (Reinecker Creek) and the risk of the new trail increasing sediment and erosion into the creek. The risk of degrading water quality through increased sediment and erosion is an unintended consequence of the hiking trail concentrating cattle at this crossing. There is also a concern with invasive species at this site and the possibility of trail use increasing spread of invasive plants.

Methods

Photo documentation will be the primary method to document change over time. Monitoring of this site will be conducted during the 2 scheduled maintenance inspections (spring and fall). The first fall environmental monitoring has been conducted (October 7, 2010). A secondary measurement of change will be to list invasive species at the site and monitor for the introduction of new species.

Results

We need to make sure that we avoid creating sediment flow and erosion into Reinecker Creek, and that we protect the structural integrity of the trail's clear-span bridge abutments. Although invasive weeds are pervasive adjacent to Reinecker Creek due to historic ranging of cattle in this area, we also want to avoid the further introduction and spread of invasive species through increased recreational use of this area.

Desired Behaviours

To protect water quality and the bridge structure and to prevent further spread of invasive plants, we will need to make sure that cattle do not congregate at the crossing adjacent to this bridge. Concentrating cattle in this area because of the trail bridge will destabilize the stream banks, add sediment to the water column, and could undermine the bridge abutments over time. We also want to prevent any further introduction or spread of invasive plants as a consequence of trail use.

Indicators

Any increase in area of bank instability adjacent to the bridge crossing (such as sloughing banks, lack of vegetation, or trampled vegetation) will indicate that we are not meeting the objective of avoiding impact and protecting water quality of Reinecker Creek. New invasive plants or the spread of current invasive species away from the immediate bridge area will indicate that trail use is negatively impacting the natural features in the Reinecker Creek area.

Limits

The following is a list of acceptable limits for the indicators that we will be monitoring at this site. If we observe indications that we have surpassed these limits, corrective actions will be required.

- No increase in size or number of trampled and unstable banks on Reinecker Creek adjacent to hiking trail bridge.
- No bank instability at clear-span bridge abutments.
- No new invasive species.
- No spread of invasive species beyond the bridge area.

Corrective Actions

Options for corrective actions if we observe that acceptable limits have been surpassed include:

- Design and construct structures (e.g., styles) to limit cattle movements along hiking trails and avoid concentrating cattle at hiking trail crossing point.
- Pull new invasive species and those spreading beyond the bridge area by their roots.
- Contact the Invasive Plant Council of BC for advice when needed.

Results of Site Monitoring – October 7, 2010

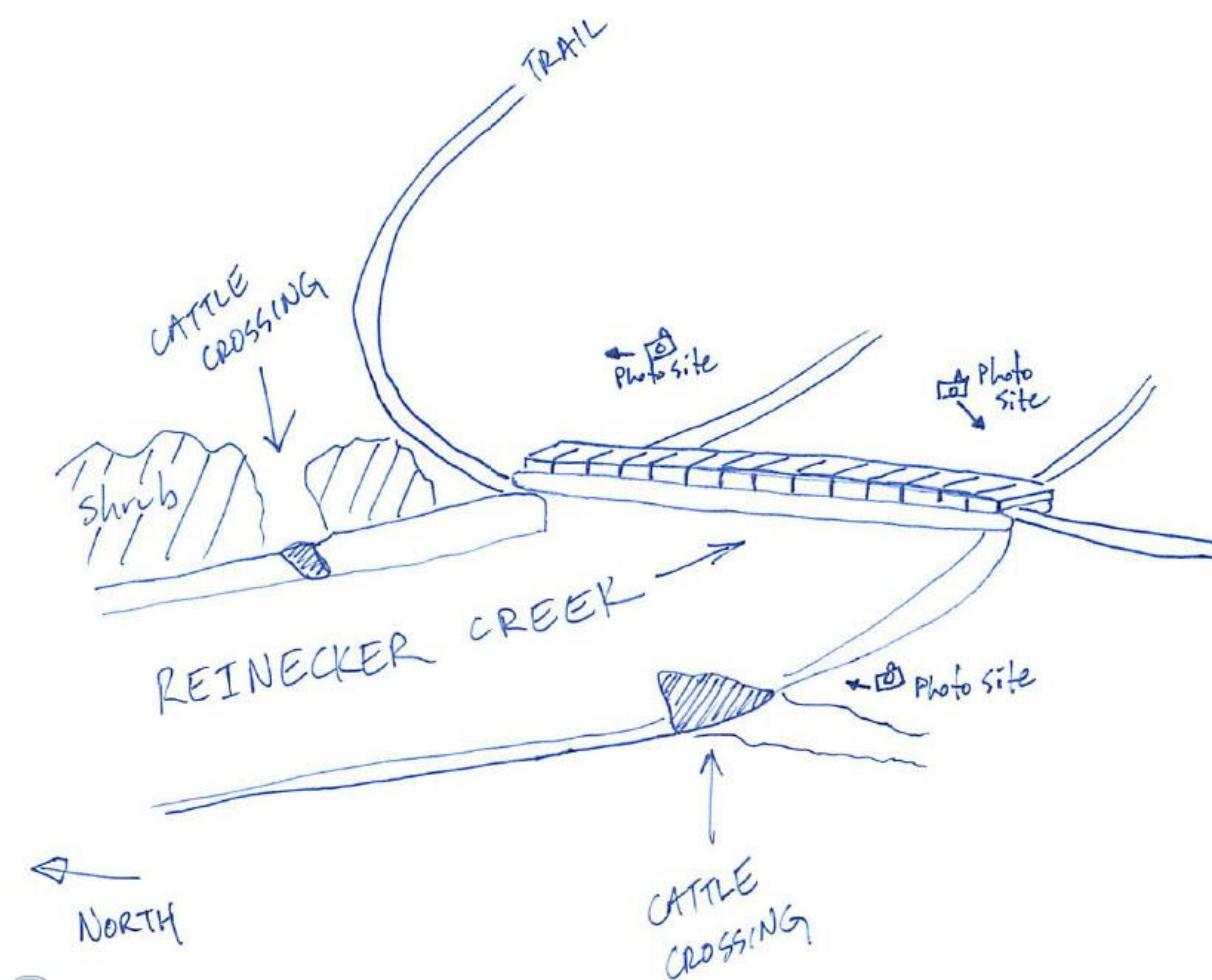
Site Description

The South Crossing bridge over Reinecker Creek is located km from the trail head on the Sunnybrae-Canoe Point Road. The site is relatively level with short banks (< 1 m high) confining Reinecker Creek. The vegetation is lush near the creek where soil appears mainly organic (not rocky) and moist. The trail passes through the riparian area on either side of the creek continuing to upland areas.

During the first monitoring of this site (Oct. 7, 2010) there was one area on each side of Reinecker Creek that was trampled with cow tracks, where the banks had collapsed into the stream and the vegetation was gone. The bank on the west side of the stream is steeper and has the most damage. The area of instability on the west side was **1 m by 1.3 m**.

Photos were taken of the unstable banks where cattle are crossing adjacent to the bridge as well as both ends of the bridge to monitor integrity of bridge abutments. An inventory of invasive plants was conducted adjacent to Reinecker Creek within 30 m of the stream.

Sketch of Monitoring Site:



Site Photos (see field form for photo locations)

2 photos of single cattle crossing location on west side of Reinecker Creek:



1 photo of single cattle crossing location on east side of Reinecker Creek:



2 Photos of currently stable banks on west side of Reinecker Creek crossing



2 Photos of currently stable banks on east side of Reinecker Creek crossing



List of Invasive Species

As observed during the first monitoring of this site (Oct. 7, 2010):

- Great burdock
- Canada thistle
- Dandelion
- Meadow buttercup
- Field Chickweed
- Clasping bedstraw
- Great mullein
- Burstick (Single fleabane like flower that morphs into a bur)
- Hound's-tongue

Reinecker Creek Trail - Environmental Impact Monitoring Form

Evaluator:

Date of Evaluation:

Trail Location:

Location of Sample Site(s):

GPS coordinates: Zone _____
 Easting _____
 Northing _____

Bank Instability Site	Width (m)	Length (m)	Area Impacted (m ²)	Location and Comments

Photo Documentation:

Photo #	Location	View Content	Comments
1	Bank Instability Site #1 - WEST	unstable bank and erosion	
2	Bank Instability Site #1 - EAST	unstable bank and erosion	
3	West Bridge abutment	end of bridge and bank	
4	East Bridge abutment	end of bridge and bank	

Invasive Plant Species List:

Site sketch for field form (Add details where appropriate)

