

Effectiveness Monitoring Resources

General

Douglas, T. 2002. [Ecological Restoration Guidelines for British Columbia](#). Forest Renewal BC.

Step-by-step guide for planning ER projects. Describes implementation monitoring and effectiveness monitoring. An outline for an effectiveness monitoring plan is included as an appendix, as well as an example of a restoration plan. Specific to BC context. Includes list of resources.

Forest & Range Evaluation Program (FREP). [Forest and Range Evaluation Program Monitoring Protocols](#).

For each of the 11 resource values identified under the Forest & Range Practices Act, resource value protocol documents have been created to provide background information and instructions for data collection under the Forest & Range Evaluation Program mandate.

Foundations of Success. 2019. [Designing Monitoring and Evaluation Approaches under the Open Standards: How-To Guide](#). Foundations of Success, Bethesda, Maryland, USA.

A how to guide for the development of a monitoring plan. Key questions: Who is the audience? Process vs. impact monitoring? Qualitative vs. quantitative? Also approaches the topic of sampling. Part of a series of guides on ER and monitoring based on the open standards for the practice of conservation.

Gayton, D.V. 2001. **Ground Work: Basic Concepts of Ecological Restoration in British Columbia.**

Southern Interior Forest Extension and Research Partnership, Kamloops, B.C. SIFERP Series 3.

This guide provides an introduction to ecological restoration for individuals, companies, students, non profit groups, and government agencies involved in or contemplating restoration projects. It emphasizes the underlying concepts common to all restorations—the ecological concepts of succession, disturbance, and historical range of variability.

Machmer, M., Steeger, C. 2002. [Effectiveness Monitoring Guidelines for Ecosystem Restoration](#).

Prepared for the Habitat Branch, Ministry of Land Water and Air Protection.

A framework for planning and communicating an effectiveness monitoring plan for ecological restoration projects. Includes direction on planning qualitative monitoring for relatively small-scale projects with simple prescriptions, and quantitative monitoring for larger, more complex projects. Proposes a repeatable process for planning and communicating effectiveness monitoring plans and includes a template for an effectiveness monitoring plan.

Miller, M., Trudeau M. 2022. [Effectiveness Monitoring: Why it's important and how to do it](#). Kootenay Conservation Program.

Webinar that discusses the importance of effectiveness monitoring and setting quantifiable goals and objectives during project design. Project examples are presented and discussed.

Parks Canada. 2007. [Principles and Guidelines for Ecological Restoration in Canada's Protected Natural Areas](#). Technical report, Parks Canada Agency on behalf of the Canadian Parks Council.

Canada wide guidance for ecological restoration practices resulting from collaboration among experts and managers from Canada's federal, provincial and territorial parks and protected areas agencies, universities, US National Park Service, the Society for Ecological Restoration International (SER) and SER's Indigenous Peoples Restoration Working Group.

Society for Ecological Restoration International Science and Policy Working Group, 2004. [The SER International Primer on Ecological Restoration, Version 2](#). www.ser.org & Tucson: Society for Ecological Restoration International.

A conceptual framework which provides structure for the fundamental principals of ecological restoration in any ecosystem or landscape. This framework and the ideas within reflect the unifying principles of ecology and ecosystem management that form the basis of our understanding, planning, and execution of restoration activities.

The Nature Conservancy. 2007. [Conservation Action Planning Handbook. Developing strategies, taking actions and measuring success at any scale](#). The Nature Conservancy, Arlington, VA.

The CAP framework helps practitioners focus conservation strategies on clearly defined elements of biodiversity or conservation targets and threats to these targets and to measure their success to enable them to adapt and learn over time.

Terrestrial

Greene, A, and Harris, R. 2015. [Ecosystem Restoration Program – Intensive Monitoring Protocols](#). Prepared for Ministry of Forest Lands and Natural Resource Operations.

Describes effectiveness monitoring protocols for use throughout Dry Forest Ecosystems of British Columbia, adapted from Machmer and Steeger (2002).

Greene, A, and Harris, R. 2015. Ecosystem Restoration Program – Routine Monitoring Protocols. Prepared for Ministry of Forest Lands and Natural Resource Operations.

Provides standardized methods for assessing ecosystem restoration projects in British Columbia.

Machmer, M., Page, H., and Steeger, C. 2002. [An Effectiveness Monitoring Plan for NDT4 Ecosystem Restoration in The East Kootenay Trench](#). Prepared for the Habitat Branch, Ministry of Land Water and Air Protection.

Provides direction for monitoring of East Kootenay Trench restoration projects within NDT4 ecosystems. Summarizes existing projects and monitoring efforts. Proposed monitoring protocols for forest structure, understory plant species composition (including rare and exotic taxa), forage production, wildlife trees, coarse woody debris, and soil erosion are detailed, while protocols to monitor wildlife usage, and soil fertility are briefly discussed and referenced. Unclear - the extent to which these protocols have been adopted.

Ministry of Forests, Lands, Natural Resource Operations and Rural Development Province of BC. 2022. [Prescribed Fire and Invasive Plants – A Reference Manual of Best Practices](#).

This document provides land managers with practical ways to incorporate invasive plant prevention and management actions into prescribed fire projects so that project objectives can be met, while ensuring negative impacts of invasive plants are prevented or minimized.

Roberts-Pichette, P. and Gillespie, L. 1999. Terrestrial Vegetation Biodiversity Monitoring Protocols. Prepared for the Ecological Monitoring and Assessment Network.

A quantitative approach to long-term monitoring of changes vegetation (richness, abundance, and community structure) at a high level of precision. The protocols are to be used with other Ecological Monitoring and Assessment Network protocols which measure other terrestrial biotic and abiotic variables.

Wilson, S.F. and Steeger, C. 2006. [A Framework for Monitoring the Effectiveness of Habitat Management for Mule Deer](#). Prepared for the Ministry of Forest and Range Forest Practices Branch.

Provides a series of indicators to measure the effectiveness of habitat management for mule deer under FRPA. Recommended effectiveness indicators address a number of key monitoring questions and are stratified by the resources required to measure. Indicators focus on: suitable habitat, forest cover, forage quality and availability, snow depth and consolidation and sustained winter use.

Wetland

Ambrose, N., G. Ehlert, K. Spicer-Rowe. 2009. [Riparian Health Assessment for Lakes, Sloughs, and Wetlands - Field Workbook Second Edition](#). Modified from Fitch, L., B. W. Adams, and G. Hale, 2001. Riparian Health Assessment for Streams and Small Rivers - Field Workbook. Lethbridge, Alberta. Cows and Fish program. 96 pgs.

A simple method for riparian health assessment for lakes, sloughs and wetlands that relies on observations of categorical variables. The main variables relate to vegetation and channel morphology. Suitable for application by those without biological expertise.

Fletcher, N. 2019. Wetlands Restoration Review. An Analysis of 26 Restored Sites Across Southern British Columbia. Prepared by the BC Wildlife Federation.

Recent work assessing effectiveness of BC Wildlife Federation wetland restoration sites. Primary indicators are native plant richness and native/exotic plant relative abundance. This project resulted in the development of a vegetation sampling protocol for restored wetlands (Stewart, 2019.) and an index to measure the floristic quality of wetlands in BC based on expert review of close to 900 wetland plant species (Nadeau, 2019).

Fletcher, N.F., Tripp, D.B., Hansen, P.L., Nordin, L.J., Porter, M., and Morgan, D. 2023. Protocol for the Wetland Health Management Routine Effectiveness Evaluation. Forest and Range Evaluation Program, B.C. Ministry of Forests, Lands, Natural Resources Operations and Rural Development, Victoria, B.C.

This Wetland Protocol is a coarse-level filter for assessing the health of wetlands. The assessment form is intended to be completed mainly in the field, promote consistency among users, gather pertinent data to inform the health of the wetland, and be cost effective as a tier 2 approach for monitoring (i.e., relatively quick to use in the field (1-4 hours). One of the advantages of the protocol is that it is a relatively low-cost method to assess wetlands in the field and can enable comparative analysis among numerous sites.

Nadeau, M. 2019. Floristic Quality Index: Extension Note. Prepared for the BC Wildlife Federation.

A quantitative approach to rating wetland health based on vascular plant species composition. Each species on a plant list is given a “conservatism” rating based on the persistence of the species on sites under varying degrees of human caused disturbance. Conservatism values of species present are used to calculate Floristic Quality indices which are interpreted as indicators of overall wetland health.

Quamme, D. et. al. 2018. [Assessing and enhancing wetland species in the West Kootenays](#). May 31, 2018. Prepared for Fish and Wildlife Compensation Program.

Provides quantitative biotic benchmarks to track wetland recovery that can be used to assess wetlands in the Columbia Basin. The benchmarks along with an adaptive management approach can be used to make management decisions about restoration and conservation.

Stewart, D. 2018. Vegetation Sampling Protocol for BCWF Wetland Monitoring Project. Prepared for the BC Wildlife Federation.

A simple approach to wetland vegetation sampling within broadly defined strata (open water, marsh, upland). To be used in before/after comparisons on wetland restoration sites, or comparison of restored sites with reference sites. Fletcher (2019) used data gathered with this protocol to compare native species richness and relative cover of native/exotic plant species between restored sites and reference sites.

Cows and Fish. 2020. [Alberta Lentic Wetland Health Assessment \(Survey\) User Manual.](#)

The health assessment survey is a method for rapidly addressing the overall condition of a site. It provides site ratings for setting management priorities and stratifying riparian sites for remediation. It is intended to be utilised as a coarse filter to identify lentic wetlands in need of attention so managers can focus their efforts.

Aquatic and Riparian

Cows and Fish. 2020. [Alberta Lentic Wetland Health Assessment for Large River Systems \(Survey\) User Manual.](#)

This is a method for rapidly addressing the overall condition of a site. It provides site ratings for setting management priorities and stratifying riparian sites for remediation. It is intended to be utilised as a coarse filter to identify riparian areas along rivers in need of closer attention so managers can focus their efforts.

Cows and Fish. 2020. [Alberta Lentic Wetland Health Assessment for Streams and Small Rivers \(Survey\) User Manual.](#)

The health assessment survey is a method for rapidly addressing the overall condition of a site. It provides site ratings for setting management priorities and stratifying riparian sites for remediation. It is intended to be utilised as a coarse filter to identify lotic wetlands in need of attention so managers can focus their efforts.

Fitch, L., B.W. Adams and G. Hale, 2009. [Riparian Health Assessment for Streams and Small Rivers - Field Workbook.](#) Second Edition. Prepared for the Cows and Fish Program.

A simple method for riparian health assessment that relies on observations of categorical variables. The main variables relate to vegetation and channel morphology. Suitable for application by those without biological expertise.

Gaboury, M. and R. Wong. 1999. [A framework for conducting effectiveness evaluations of Watershed Restoration Projects.](#) Province Of British Columbia, Ministry of Environment, Lands and Parks and Ministry of Forests, Watershed Restoration Technical Circular No. 12: 40 p.

Strategic framework for conducting effectiveness evaluations for all watershed restoration treatments (up-slope, stream and riparian) implemented under the Watershed Restoration Program (WRP).

Koning, C.W. 1999. [Riparian Assessment and Prescription Procedures](#). Watershed Restoration Technical Circular No. 6. Province of British Columbia, Ministry of Environment, Lands and Parks and Forest Renewal B.C. Vancouver B.C.

Procedure for conducting riparian assessments funded under the Watershed Restoration Program of Forest Renewal BC.

Ministry of Water Land and Air Protection [MWLAP]. 2003. [Guidelines for In-Stream and Off-Channel Routine Effectiveness Evaluation](#).

Guide for developing FIA Aquatic Restoration and Rehabilitation outputs as per the FIA Aquatic Restoration and Rehabilitation Standards. Describes the Routine Effectiveness Evaluation procedures to be implemented for stream and off-channel components of watershed restoration work in target watersheds.

Grassland

Fraser, D.A. 2007. [Rangeland Health Field Guide BC](#). Ministry of Forests and Range. Range Branch. Kamloops, BC. Updated 2009.

Qualitative assessment method that provides a consistent approach for assessing ecosystem function. Provides a starting point for determining and prioritizing areas which require more intensive monitoring, restoration, or management.

Herrick, J.E., Van Zee, J.W., Havstad, K.M., Burkett, L.M., and Whitford, W.G. 2005. [Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems](#). Volume II: Design, Supplementary Methods and Interpretation. United States Department of Agriculture.

A comprehensive manual for the design and implementation of restoration and conservation projects. Includes methods to monitor vegetation, soils and geomorphology. Special monitoring topics including riparian areas, wildlife habitat, ORV use, fire, invasive species, etc. are discussed. Analysis and data interpretation are also treated in this document.

McKenzie, E. and Hill, T. 2023. Conservation, Restoration and Stewardship of Low Elevation Brushland (GB), Grassland (Gg) and Dry Forest Ecosystems in the West Kootenay Region. Prepared for Okanagan Nation Alliance and Fish & Wildlife Compensation Program.

Best management practices that can be used by industry and other stakeholders when conducting work in brushlands and other sensitive ecosystems on dry sites at low elevations. Describes goals, objectives

and provides information related to guiding work activities in low elevation Gb, Gg and dry forest ecosystems.