

Glossary

Adaptive Management: is a formal process for continually improving (resource) management policies and practices by learning from the outcomes of operational programs. Its most effective form, active adaptive management, is characterized by management programs that are designed to experimentally compare selected policies or practices by testing alternative hypotheses about the system being managed. From Glossary of Forestry Terms: adaptive management rigorously combines management, research, monitoring, and means of changing practices so that credible information is gained and management activities are modified by experience

Avulsion: the abrupt natural diversion of stream flow from an established channel into a new channel. The abandoned channel may be left dry with flow passing through it only during high flow periods. The new channel may be a re-occupied channel or may be a newly eroded channel. Avulsion may occur as a result of log jams or landslide debris re-directing flow away from the established channel.

Bankfull width: the width of flow within a stream channel that is just contained within the channel banks. Commonly bankfull width is taken to be the distance perpendicular to stream flow between the limits of terrestrial vegetation on both sides of the stream.

Best Management Practices (BMPs): a practice or combination of practices that are determined to be the most technologically or economically feasible means of preventing or managing potential impacts.

Bio-Standards: are estimates of abundance or output that are used to predict responses, in terms of increases in fish numbers or biomass, due to specific watershed restoration activities. Typically measured in terms of number or biomass of a species per unit area or kilometer of stream.

Biotechnical slope stabilization: defined by Gray (1991) as the combined use of mechanical elements (or structures) and biologic elements (or plants) to arrest and prevent slope failures and erosion. Both biological and mechanical elements must function together in an integrated and complementary manner. Biotechnical stabilization can be characterized by the conjunctive use of live vegetation with retaining structures and revetments. It is also characterized by the combined use of vegetation with structural-mechanical elements in ground cover systems. (McCullah, 1999).

Bonded Fibre Matrix Material (BFM): “a bonded fiber (sic) matrix is a continuous layer of elongated fiber (sic) strands held together by a water-resistant bonding agent. It eliminates direct rain drop impact on soil (it has no holes larger than 1 mm in size) it allows no gaps between the product and the soil and it has a high water-holding capacity.” (from http://www.revex.com/rvx_bfl.htm). Bonded fibre matrices will not address soil instability problems or sheet, rill, gully or other erosional processes except raindrop erosion (Polster, 1999 - Soil Bioengineering course manual).

Component Level Objective: restoration objectives for watershed components, including hillslopes, riparian areas, stream channels and fish habitat. Sub-components could include roads, landslides and gullies for hillslopes; streambank and floodplain for riparian; and off-channel and in-channel for streams.

Coppice: “small wood of underwood and small trees, grown for periodical cutting;” (The Concise Oxford Dictionary of Current English. 4th Edition, 1951). Coppice is also used as a verb meaning “to form a coppice by cutting small trees and brush and allowing it to resprout with many stems”.

Debris Flow: involve the rapid downstream movement of liquefied sediment and woody debris. When confined in linear slope depressions or gullies they referred to as channelized debris flows or debris torrents. Debris flows usually start as relatively small events, but quickly swell in volume as they move downstream and entrain sediment, woody debris, slide debris, sidewall material, and road prism material into the flow matrix. Debris flows can travel for long distances and can be very destructive.

Debris Flood: involve the transport of large volumes of sediment and woody debris down gully systems by large volumes of water. Usually the flowing mass associated with debris floods is less dense and moves slower than for channelized debris flows, but is more dense and moves faster than normal water transport.

Edatopic: an edatopic grid is a two-dimensional display of site series according to soil moisture and nutrient regime classes." (Green and Klinka, 1994)

Effectiveness Evaluations: assessments that answers the question of whether or not restoration has been effective in attaining or initiating the process to achieve the desired future condition and in meeting restoration objectives. Effectiveness evaluations are more complex than compliance inspections and requires an understanding of the physical, biological and sometimes the social factors that influence ecosystems. The word monitoring may also be used by other agencies, for example the U.S. Forest Service, to refer to evaluations

Erosion Control Revegetation Mat (ECRM): are blankets composed of a variety of materials designed to protect the surface of the soil from erosion. When coupled with seeding prior to blanket installation, the erosion control mat is said to protect the seed from erosion. Erosion control mats may be made of coir (coconut fibres) straw with polypropylene (fishing line type material), paper strips woven in polypropylene, etc.

Evaluation Objective: an objective that identifies the reason(s) for conducting effectiveness evaluations.

Gully System: is a steep headwater channel on a hillslope and comprised of a headwall, a transport zone and in some cases a fan. It acts as a conduit for water, sediment and woody debris.

Headscarp: A steep surface on the undisturbed ground at the head of a landslide, caused by movement of slide material away from the undisturbed ground.

Hydrophytic: moisture loving, as a hydrophytic plant is one that thrives on moist sites.

Inspections: are conducted during the course of watershed restoration activities to ensure that the work is completed as prescribed or to the standards defined in the contract. The main purpose is to ensure that errors and omissions are corrected prior to payment. Inspections are typically required for all projects with field inspections, and are generally carried out both during and at the completion of restoration works. Inspections may also be referred to as implementation monitoring or compliance monitoring.

Intensive Effectiveness Evaluations: a relatively detailed intensive effectiveness evaluation involving specialized study design with comprehensive data collection and analysis; generally quantitative measurements, but can include qualitative information. In comparison to routine evaluations, intensive evaluations are more focused and provide statistically defensible results. Focus can range from evaluation of specific treatments for single restoration objectives to integrated restoration treatments for multiple restoration objectives throughout entire watersheds.

Mesic: “conditioned by temperate moist climate, neither xeric (dry) nor hydric (wet).” (from A Dictionary of Scientific Terms. D. Van Nostrand Company, Inc. Princeton, New Jersey. 595 pp.)

Oligotrophic: “providing or pertaining to inadequate nutrition; opposite of eutrophic.” (from A Dictionary of Scientific Terms as above). Many coastal streams are considered oligotrophic as they are low in nutrients. Similarly ravelling gravel slopes or rock outcrops would typically be considered oligotrophic while cedar-alder-skunk cabbage-nettle-devil’s club sites would be considered eutrophic or rich sites.

Operational Techniques Refinement: a special category of effectiveness evaluations that requires control and manipulation of restoration treatments in order to answer the questions: did a new treatment work, how well did it work relative to other treatments, and at what cost did it work.

Permanent Deactivation: deactivation carried out when the road will no longer be used by the person required to deactivate it under section 64 of the Forest Practices Code of B.C. Act. Permanent deactivation includes measures to stabilize the road prism and clearing width and to restore and maintain natural surface and subsurface drainage patterns. Stream and cross-drain culverts are removed, bridge superstructures and in some cases bridge substructures are removed, and where practicable measures to increase site productivity are carried out.

Qualified Registered Professional: means, with respect to an activity for which this regulation requires a qualified registered professional, a person who:

- a) has appropriate education and experience to carry out the activity, and
- b) is a member of, or licensed by, a regulatory body in British Columbia that has the legislated authority to regulate its members or licensees performing the activity.

Qualitative Data: the assignment of a value, such as good or bad, to a variable that would normally lack a means of quantification by standard measurement methods (length, width, volume)

Quantitative Data: the measurement of a value or quantity using standard measurement methods (length, width, volume)

Response Indicators: a variable that acts as an indirect indicator of treatment effectiveness.

Response Variable: a variable measured to assess the outcome of an experiment.

Routine Evaluations: a relatively low intensity evaluation, based on answering the question ‘Is the treatment present, structurally stable, in need of remedial work and functioning as intended?’ It doesn’t require a specialized study design and may include qualitative and/or quantitative measurements.

Semi-Permanent Deactivation: deactivation carried out if

- i) regular use of the road is to be suspended for more than one year but less than 3 years, and

either the road is in a remote location accessible only by air or water or in an area that has a moderate or high likelihood of landslides as determined by a terrain stability field assessment, or

ii) regular use of the road is to be suspended for more than 3 years.

Sidescarp: A steep surface on the undisturbed ground at the side of a landslide, caused by movement of slide material away from the undisturbed ground.

Soil bioengineering: defined by Sotir (1995) as involving the use of plants exclusively for soil and slope stabilization. The plant parts themselves, roots and stems, serve as the main structural and mechanical elements in a slope protection system. Live cuttings and rooted plants are imbedded in the ground in various arrays that the serve as soil reinforcements, hydraulic drains, and barriers to earth movement. (McCullah, 1999).

Variable: an evaluation parameter that changes measurably in character or number in response to environmental conditions, either through restoration treatments or natural events.

Watershed Level Objective: an objective that describes a desired future condition for the watershed typically achieved by attaining component level restoration objectives.

List of Acronyms

AMM	ACCESS MANAGEMENT MAP
ATV	All-Terrain Vehicle
BCFCSN	British Columbia Forestry Continuing Studies Network
CAP	Channel Assessment Procedure
FDP	Forest Development Plan
FERIC	Forest Engineering Research Institute of Canada
FPC	Forest Practices Code
FRBC	Forest Renewal British Columbia
GAP	Gully Assessment Procedure
GPS	Global Positioning System
IWRP	Integrated Watershed Restoration Plan
LRAP	Landslide Rehabilitation Assessment Procedure
LRMP	Land and Resource Management Plan
SOP	Standard Operating Procedure
TRIM	Terrain Resource Inventory Mapping
TSM	Terrain Stability Mapping
USDA	United States Department of Agriculture
WAP	Watershed Assessment Procedure
WRP	Watershed Restoration Program

Annotated Bibliography

References

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Provides a discussion on the influence that slope geometry and slope materials play on the potential runout of a landslide initiated from a road fill failure.
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Recommended Reading

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This reference work provides a detailed classification of site types and salient management characteristics. The use of edatopic grids to define management interpretations.

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Best Management Practices Handbook: Hillslope Restoration in British Columbia

Feedback Request

The authors would appreciate any feedback on information presented in this handbook including discussion of techniques, design and format of the document, subjects that may require further clarification and additional topics that should be considered for inclusion.

For any of the restoration techniques discussed, site specific conditions will be the main factors that influence their effectiveness. Experiences, either positive or negative, with any of the techniques discussed may prove valuable for inclusion in future or updated versions of this document. As well, any photographs depicting relevant activities or work will be considered for inclusion.

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