

Columbia River Project Water Use Plan
Monitoring Program Terms of Reference
KINBASKET RESERVOIR
FISH AND WILDLIFE INFORMATION PLAN

- **CLBMON-8 Kinbasket Reservoir Monitoring of the Valemount Peatland**

24 October 2007

Terms of Reference for the Columbia River Project Water Use Plan Monitoring Programs Kinbasket Reservoir Fish and Wildlife Information Plan

1.0 OVERVIEW

This document presents Terms of Reference for monitoring programs under the Kinbasket Reservoir Fish and Wildlife Information Plan (Table 1). These programs will evaluate the potential effects of Mica Dam and Kinbasket Reservoir operations on fish habitat and fish populations, wildlife habitat and wildlife populations.

This document provides detailed Terms of Reference for the following programs:

- 1) CLBMON-1 Mica Dam Total Gas Pressure Monitoring and Abatement Program: a 2-year study to determine dissolved gas supersaturation with synchronous condense operation of Units 3 and 4 in relation to Units 1 and 2, which have been previously monitored.
- 2) CLBMON-2 Kinbasket and Revelstoke Reservoirs Kokanee Population Monitoring: a 12-year program to monitor trends in the biological characteristics, distribution and abundance of kokanee populations in Kinbasket and Revelstoke reservoirs, and provide information required to link the effects of reservoir operation to population levels.
- 3) CLBMON-3 Kinbasket and Revelstoke Reservoirs Ecological Productivity Monitoring Program: a 12-year study to define the trophic web mechanisms and dynamics of Kinbasket and Revelstoke reservoirs, and determine if changes in pelagic productivity are associated with reservoir operations.
- 4) CLBMON-4 Kinbasket Reservoir Fish Stranding Assessment: a 3-year study to qualitatively evaluate the extent of fish stranding caused by the annual drawdown of Kinbasket Reservoir.
- 5) CLBMON-5 Kinbasket Reservoir Burbot Life History and Habitat Use Assessment: a 3-year study to obtain baseline data on the biological characteristics of burbot populations in Kinbasket Reservoir, and provide information to evaluate potential effects of reservoir operation on burbot population productivity
- 6) CLBMON-6 Kinbasket Reservoir Bull Trout Life History and Habitat Use Assessment: a 3-year study to obtain baseline data on the life history and habitat characteristics of juvenile bull trout in Kinbasket Reservoir, and provide preliminary information to determine if reservoir operations could have an effect on bull trout populations.
- 7) CLBMON-7 Kinbasket Reservoir Rainbow Trout Life History and Habitat Use Assessment: a 3-year study to obtain baseline data on the biological characteristics of rainbow trout in Kinbasket Reservoir, and provide the information required to evaluate the impacts of reservoir water levels on the productivity of rainbow trout populations.
- 8) CLBMON-8 Kinbasket Reservoir Monitoring of the Valemount Peatland: a 3-year monitoring program to address key uncertainties regarding the relative contribution and importance of the current reservoir operating regime to the erosion processes affecting the

wetland, obtain an inventory of plant and wildlife species, and determine whether the long-term viability of the wetland, and associated plant and animal species, are being affected by erosion processes related to reservoir operations, and how these effects may be mitigated.

Table 1 Kinbasket Reservoir Fish and Wildlife Information Plan Monitoring Program Terms of Reference Submission Information

Name of Monitoring Program	Order Clause Fulfilled	Submitted with this Package	Previously Submitted To CWR	Submission Date	Leave to Commence
CLBMON-1 Mica Dam Total Gas Pressure Monitoring and Abatement Program	Schedule A: 5.a	Yes	No	24 October 2007	No
CLBMON-2 Kinbasket and Revelstoke Reservoirs Kokanee Population Monitoring	Schedule A: 5.b Schedule B: 1.a	Yes	No	24 October 2007	No
CLBMON-3 Kinbasket and Revelstoke Reservoirs Ecological Productivity Monitoring Program	Schedule A: 5.c Schedule B: 1.b	Yes	No	24 October 2007	No
CLBMON-4 Kinbasket Reservoir Fish Stranding Assessment	Schedule A: 5.d	Yes	No	24 October 2007	No
CLBMON-5 Kinbasket Reservoir Burbot Life History and Habitat Use Assessment	Schedule A: 5.e	Yes	No	24 October 2007	No
CLBMON-6 Kinbasket Reservoir Bull Trout Life History and Habitat Use Assessment	Schedule A: 5.f	Yes	No	24 October 2007	No
CLBMON-7 Kinbasket Reservoir Rainbow Trout Life History and Habitat Use Assessment	Schedule A: 5.g	Yes	No	24 October 2007	No
CLBMON-8 Kinbasket Reservoir Monitoring of the Valemount Peatland	Schedule A: 5.h	Yes	No	24 October 2007	No

2.0 MONITORING PROGRAM RATIONALE

Early on in the Columbia River Water Use planning (WUP) process, the WUP Consultative Committee (WUP CC) recognized that there was a great deal of uncertainty regarding whether the lack of constraints on operation of Kinbasket Reservoir was having a significant impact on fish and wildlife and associated habitat. A number of key hypothesized impacts were identified during the issue scoping phase (e.g., entrainment at Mica Dam, and interruption of natural sturgeon recruitment processes).

However, a general lack of data on the relative abundance, distribution, life history and seasonal patterns of habitat use and supporting ecosystem processes in the upper Columbia River and Kinbasket Reservoir, precluded incorporation of these concerns into Water Use Plan assessments.

The WUP CC explored alternative ways of operating Kinbasket Reservoir to provide benefits to fish and wildlife by imposing minimum elevation constraints. However, the ability to track the performance of the alternatives was limited to use of habitat-based measures (pelagic productivity), which were developed based on limited site-specific data and professional judgment. Initial modeling results showed that some improvements to pelagic productivity could be achieved through a minimum elevation constraint, but that this constraint would incur a high cost in foregone power generation. While the WUP CC agreed to stop exploring water management options for Kinbasket Reservoir for more cost-effective non-operational works, it was acknowledged that this decision was based on a number of uncertain assumptions about reservoir ecology and the influence of reservoir operations. The WUP CC underscored the need for better information to support future decision-making as a key outcome of the Columbia River Water Use planning process.

The operational link for many of the proposed monitoring studies, developed to address current data gaps, was considered tenuous given that there were no operational changes being considered for Kinbasket Reservoir. However, the WUP CC recognized that a large obstacle to recommending operational or physical works for the reservoir was the lack of quantitative data on fish and wildlife populations. Therefore, the proposed monitoring studies were accepted as meeting the Water Use Plan monitoring criteria, because they are the only tool available to validate the assumptions made by the WUP CC when deciding on operational changes.

Although no operating changes were considered for Revelstoke Reservoir, the WUP CC recommended that some of the fish-related studies in Kinbasket be linked to studies in Revelstoke to provide a comparison of trends to inform on operational impacts.

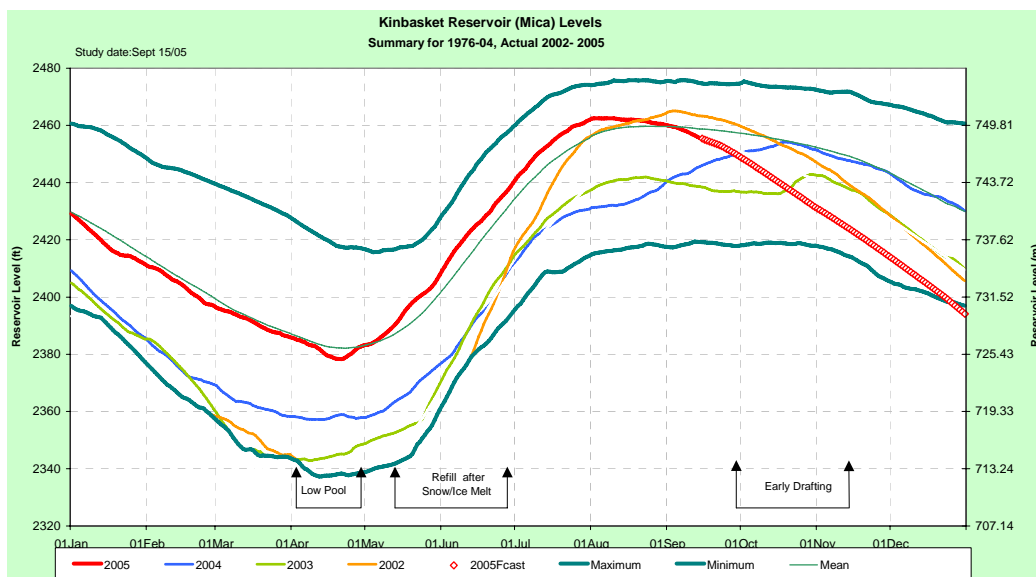


Figure 1 Seasonal pattern of water level drawdown and refill for Kinbasket Reservoir

Monitoring Study No. CLBMON-8 Kinbasket Reservoir Monitoring of the Valemount Peatland

1.0 MONITORING PROGRAM RATIONALE

1.1 Background

The Columbia River Water Use Plan Consultative Committee (WUP CC) recognized the value of riparian vegetation surrounding Kinbasket Reservoir for enhancing littoral productivity, providing physical, structural and biological character for wildlife habitat, protecting cultural heritage sites, and providing aesthetic benefits (e.g., reduction of dust storms) within the drawdown zone. In addition, because valley bottom habitat is limited in the Columbia River system, riparian and wetland habitats were considered to be critically important for a range of wildlife species. As a result, the protection and enhancement of high quality riparian vegetation emerged as a key environmental objective for Columbia River Water Use Plan.

At the request of the WUP CC, a study was undertaken to evaluate the potential for vegetation enhancement in Kinbasket Reservoir (Moody and Carr 2003), during which a remnant wetland¹ was identified near Valemount at the north end of the reservoir (Figure CLBMON-8-1). The diversity of plant species at this site was abundant, and vegetation was found to extend for some distance into the inundated zone. Based on recent information (Moody, A. et al. 2006), it is believed that this area was a large fen adjacent to the Canoe River prior to inundation, which had developed substantial peat deposits over time. Portions of the original fen still remain in the upper drawdown zone of the reservoir, extending from the full pool level to an unidentified lower limit. The appearance of disrupted peat deposits in the central portions of the fen indicate that this area may be eroding. Bands of eroded peat were observed during a site visit in the upper and central portions of the wetland; however, the extent and rate of loss of the deposits were not quantified, nor were investigations into potential mechanisms of erosion conducted.

The WUP CC expressed concern regarding the potential impacts of the current operating regime of Kinbasket Reservoir on the distribution, species composition and spatial extent of riparian and wetland vegetation in the peatland, and its utilization by wildlife. Specifically, concerns focused on whether water level fluctuations were causing significant erosion of the peatland and, if so, whether this erosion was affecting the long-term viability of the wetland. First Nations Committee members also expressed concern regarding the potential for erosion of archaeological sites that could exist within the drawdown zone.

The WUP CC identified a need to better understand the potential impacts of reservoir operations on this wetland and the associated plant and wildlife species that it supports, with the goal of determining whether: a) erosion is caused by current operations, b) this erosion is affecting the long-term viability of the site and c) control measures are required to stabilize the area against erosion caused by reservoir operations.

¹The terms peatland and wetland will be used interchangeably in these Terms of Reference.

Therefore, the goal of the Kinbasket Reservoir Monitoring of the Valemount Peatland program, as outlined in these Terms of Reference, is to determine whether erosion, created or being contributed to by on-going reservoir operations, is influencing the long-term viability of the wetland, to assess the functionality of this area to support riparian vegetation and associated wildlife, and to recommend mitigative measures, if current reservoir operations are found to create or contribute to the observed erosion of the wetland.



Figure CLBMON-8-1: Valemount Peatland area (about 454 ha) in Kinbasket Reservoir (from Moody 2003).

1.2 Management Questions

The primary management questions to be addressed by the Kinbasket Reservoir Monitoring of the Valemount Peatland program are:

- What are the processes and associated rates leading to the observed erosion of the wetland? Are erosion rates increasing or decreasing?

- Are current reservoir operations creating or contributing to conditions that are leading to the observed erosion processes?
- Are the erosion processes, which are caused or being contributed to by on-going reservoir operations, affecting the long-term viability of the wetland and associated riparian vegetation and wildlife species? If so, how can these impacts be mitigated?
- What are the riparian vegetation species that have been successfully surviving long-term inundation? What are the wildlife species that utilize the habitat provided by the Valemount Peatland?

1.3 Management Hypothesis

The management hypotheses and the sub-hypotheses that will be tested directly with the proposed monitoring program are aimed at determining if the functionality and value of the Valemount Peatland is limited by erosion processes directly related to current operations of Kinbasket Reservoir. The specific hypotheses are:

H₁: Current operations of Kinbasket Reservoir are related to the erosion of the Valemount Peatland.

H_{1A}: Ongoing seasonal fluctuations in water levels from current reservoir operations are contributing to ongoing, quantifiable erosion of the wetland.

H_{1B}: Ongoing seasonal inundation from current reservoir operations is contributing to ongoing, quantifiable erosion of the wetland.

H₂: The long-term viability of the wetland to support riparian vegetation and associated wildlife species is compromised by erosion processes.

H_{2A}: Ongoing seasonal water level fluctuations and/or inundation are negatively affecting wetland vegetation and wildlife communities.

H_{2B}: Erosion is occurring at a rate and scale that will result in a complete loss of the wetland in a defined period of time.

1.4 Key Water Use Decision Affected

The key operating decision affected by this monitoring program is the current operating regime of Kinbasket Reservoir. During development of the Columbia River Water Use Plan, efforts were made to explore alternative ways of operating Kinbasket Reservoir through imposing minimum elevation constraints that would effectively support a variety of interests, including riparian vegetation and wildlife habitat. Given the lack of quantitative data for vegetation resources within the drawdown zone and their use by wildlife species, the WUP CC was unable to make informed decisions related to the potential benefits of alternative operations on these interests.

Implementation of the proposed monitoring program will provide information to determine if current reservoir operations are contributing to or establishing conditions for erosion processes affecting of the Valemount Peatland, and to support future decisions around recommendations to mitigate erosion-related impacts on the wetland, if on-going operations of the reservoir are creating or contributing to the observed erosional processes.

2.0 MONITORING PROGRAM PROPOSAL

2.1 Objective and Scope

The objectives of Kinbasket Reservoir Monitoring of the Valemount Peatland study are to:

- Address key uncertainties regarding the relative contribution and importance of the current reservoir operating regime to the erosion processes affecting the wetland;
- Obtain an inventory of plant species that have been successfully surviving long-term inundation;
- Obtain an inventory of wildlife species that utilize this habitat; and
- Determine whether the long-term viability of the wetland, and associated plant and animal species, are being affected by erosion processes related to reservoir operations, and how these effects may be mitigated.

2.2 Approach

The general approach of the monitoring program is to:

- a) Determine the processes and rates of erosion of the wetland, and determine if current reservoir operations are contributing to or establishing conditions for the observed erosion processes;
- b) Conduct an inventory of wetland vegetation and wildlife to determine the riparian vegetation species that have been surviving long-term inundation successfully, and which wildlife species utilize the habitat provided by the wetland;
- c) Make recommendations for mitigative measures that may be required to retain the wetland's long-term viability, if reservoir operations are contributing to the observed erosional processes.

During the first year of the program, a study will be initiated to determine the relative contribution and importance of the current reservoir operating regime to the erosion processes affecting the wetland. In addition, the scope and requirements for the vegetation and wildlife inventories will be determined in Year 1, and a study area will be delineated. It is recommended that detailed vegetation and wildlife inventories be conducted in Year 2 of the program.

It is expected that all field data collection for the erosion study can be carried out in Year 1, and that an analysis of erosion processes over time will be conducted in Year 10 of the program through the use of a Digital Elevation Model (DEM) and 1:5,000 scale

colour aerial photos (obtained under CLBMON-10 Kinbasket Reservoir Inventory of Vegetation Resources on a biannual basis). This analysis, in conjunction with field data obtained in Year 1, should provide information on which processes are causing the observed erosion, rates at which erosion is progressing, and whether the current reservoir operating regime is creating conditions that are causing or contributing to the observed erosion of the wetland.

2.3 Methods

2.3.1 Task 1: Project Planning and Coordination

Project coordination will involve general administrative and technical oversight of the program, which will include, but not be limited to: 1) budget management, 2) study team management, 3) logistic coordination, 4) technical oversight in field and analysis components, and 5) facilitation of data transfer among other investigations associated with the Columbia River Water Use Plan monitoring (including CLBMON-10 Kinbasket Reservoir Inventory of Vegetation Resources) and physical works programs (including CLBWORKS-16 Kinbasket Reservoir Debris Inventory, Management Strategy and Removal).

This project will require close collaboration between a geomorphologist, vegetation biologist and wildlife biologist for the first two years of implementation. The proposal shall outline how this collaboration will be accomplished to make the most efficient use of time and resources.

A safety plan must be developed and submitted to the BC Hydro contact, for all aspects of the study involving field work, in accordance with BC Hydro procedures and guidelines. Specific safety training may be required.

2.3.2 Task 2: Field Sampling

Overview Assessment and Sampling Design

The proposal shall outline how the scope of the study, as it relates assessing ongoing erosion of the peatland and underlying processes, will be defined, and how the study area(s) will be delineated. In addition, specific metrics shall be proposed with which changes to the peatland's size and structure can be quantified over the course of the monitoring period.

It is recommended that a reconnaissance level survey for the vegetation and wildlife inventory be conducted in Year 1, in conjunction with field sampling for the erosion assessment, to determine the level of biological sampling required for the inventory. Development of a detailed sampling design for the biological inventories will occur in Year 1, and will be provided to BC Hydro for review and acceptance.

It should be noted that an extensive vegetation inventory of the Kinbasket Reservoir drawdown zone is occurring under CLBMON-10 Kinbasket Reservoir Inventory of Vegetation Resources. The consultant shall obtain any mapping and/or inventory information on the Valemout Peatland collected under the CLBMON-10 inventory program prior to planning the wetland study to ensure no duplication of work occurs.

Evaluation of Erosion Processes

The proposal shall describe how processes that are leading to ongoing erosion of the wetland will be identified. Consideration should be given to climate, groundwater and stream flow factors, and the current reservoir operating regime. The proposal shall clearly demonstrate how the assessment methods will determine whether erosion is caused by natural processes or current reservoir operations. Evaluation of erosion processes will occur in Years 1 and 10 of the program, but all field work shall be completed during Year 1 of implementation. Evaluation of erosion over time will utilize information from the Kinbasket Reservoir DEM and large scale (1:5,000) aerial photography, obtained through CLBMON-10 (Kinbasket Reservoir Inventory of Vegetation Resources), to assess potential links between reservoir operations and ongoing erosion. It is recommended that a helicopter overflight be undertaken to identify specific problem areas, obtain photographic documentation of these sites, and determine the severity and extent of erosion. Field work should include determining the surficial geology of the wetland, any underlying deposits, current fluvial processes and impacts related to reservoir operations (e.g. wave action). Consideration should also be given to anthropogenic impacts such as roads, tracks, paths and boat landings. Field visits will be timed to correspond with low reservoir elevations to ensure that the lower extents of the wetland can be delineated and assessed.

BC Hydro also carries out a debris removal program in the vicinity of the wetland at irregular intervals. Because debris accumulation and associated removal efforts may be adding to the degradation of the wetland (J. Krebs, pers. comm.), this risk will be investigated as part of CLBMON-23 Kinbasket and Arrow Lakes Reservoirs Debris Environmental Review. Information gained through this review should be considered in determining possible causes of erosion and mitigative actions that may be required to reduce erosion-related impacts on the wetland.

Vegetation and Wildlife Inventory

A detailed field assessment of vegetation and wildlife resources will be undertaken in Year 2 of the program. The proposal shall describe methods and sampling designs proposed for the inventory of vegetation and wildlife resources, and how this inventory will be carried out within the budget constraints. In addition, the proposal shall outline how efficiencies may be realized through the use of existing inventory information obtained under CLBMON-10 Kinbasket Reservoir Inventory of Vegetation Resources.

As there is a relatively limited time window to undertake the field assessment (between early May after snow melt has occurred and late June before the lowest limit of vegetation growth is inundated by rising water levels), it is recommended that this program be one of intensive field observation. Field work should include a detailed vegetation inventory of the site, and a simultaneous inventory of wildlife use. It is recommended that the vegetation inventory follow procedures outlined in MacKenzie and Moran (2004) for characterizing wetland components, including assessment of site, soil and vegetation characteristics. This methodology was developed specifically for BC wetlands to address the lack of a wetland assessment protocol, and is supplemental to the standard procedures for photo interpretation and ground sampling in the RISC standards for Vegetation Resources Inventory². Plot size and layout should follow recommendations provided in these two documents. Additional classification methods,

² <http://ilmbwww.gov.bc.ca/risc/pubs/teveg/>

developed as part of CLBMON-10 (Kinbasket Reservoir Inventory of Vegetation Resources) may also be considered.

A wildlife biologist will be required to conduct the wildlife inventory, which should include surveys on insects³, amphibians, reptiles, waterbirds, waterfowl, songbirds and mammals. There may be some winter use by mammals that should also be considered. Particular attention will be paid to Species at Risk (SAR). The proposal shall identify appropriate, species-specific survey methods, which may include spring calling surveys and/or visual encounter survey for amphibians, and spring point counts or area-based searches for breeding birds. For migratory birds at risk and those in decline, nest surveys should be conducted, as well as an assessment of the potential for successful nesting attempts during the spring (May-June) window. Similarly, for any non-avian at-risk species in the project area that are known to breed within the zones of fluctuating water levels or areas of erosion (e.g., painted turtles), nest searches may be appropriate to determine possible direct impacts of changes in water levels and associated erosion on the breeding success of affected species. Prior to finalizing survey types and methods, a list of species of interest (including SAR) should be completed to establish priorities for survey. Survey methods and species lists will be provided to BC Hydro for review and acceptance prior to field implementation.

2.3.4 Task 4: Data Interpretation

The proposal shall describe the methods used to demonstrate which processes may be contributing to the observed erosion of the wetland, the associated rates at which erosion is occurring, and whether current reservoir operations are contributing to or establishing conditions for the observed erosion processes. It is recommended that aerial photography be used to re-map eroded areas for each set of air photos obtained over the 10-year monitoring period. To assess the impact of current reservoir operations, reservoir levels, the effect of storm events on the study area, and other possible mechanisms should be considered. If mechanisms other than reservoir operations are contributing to erosion, these shall be identified and prioritized in order of significance.

If changes to the study area as a result of reservoir operations are documented, data analysis shall identify which processes are most significant (e.g. specific reservoir levels or seasonal inundation at which wind and wave erosion is most significant). Water level records and a DEM for Kinbasket Reservoir are available from BC Hydro for use in the analysis. Aerial photography at a 1:5,000 scale will be available bi-annually from 2008 to 2010 through CLBMON-10.

For inventory data, interpretation shall demonstrate which riparian vegetation species have been successfully surviving long-term inundation, and which wildlife species utilize the habitat provided by the wetland.

2.3.5 Task 5: Reporting

A technical report will be prepared after Year 1 of the monitoring program to summarize the findings of the overview assessment for the vegetation/wildlife inventories, and to describe findings for the erosion study. Comprehensive reports will be prepared at the conclusion of Year 2 for the Vegetation and Wildlife Inventories and Year 10 for the

³ Inventory should be limited to species listed by the BC Conservation Data Centre (CDC)

Erosion Assessment. These reports will include:

- an executive summary;
- a description of the methods employed;
- a data summary, including maps of the study area(s) showing:
 - zones of erosion over the course of the monitoring period,
 - vegetation structure and locations/types of structural changes over the course of the monitoring period,
 - locations of wildlife and vegetations inventory sites, and associated findings;
- a detailed summary of the findings as they relate to the key management questions;

For erosion component only:

- a discussion of the processes leading to erosion of the wetland, associated rates of erosion, and the contribution of current reservoir operations to the observed erosion processes; and,
- any recommendations for mitigation of erosion impacts, including control measures (e.g., operational changes, physical works) that may be effective in stabilizing the site, if erosion processes are linked to the current operating regime of Kinbasket Reservoir.

All maps produced should be integrated with the DEM in a GIS platform that is compatible with current BC Hydro GIS standards. Any spatial data that is collected/produced will conform to BC Hydro's GIS Data Capture Standards (Version 1.4).

For the Vegetation and Wildlife Inventories, SAR data will be provided to the Conservation Data Center using appropriate forms, and data on other wildlife species will be provided to the Wildlife Species Inventory (WSI) database using appropriate forms. Contractors will provide the data directly to CDC and WSI.

Reports will follow the standard format that is being developed for WUP monitoring programs. All reports will be provided in hard-copy and as Microsoft Word and Adobe Acrobat (*.pdf) format, and all maps and figures will be provided either as embedded objects in the Word file or as separate files.

2.4 Interpretation of Program Results

Data collected during the erosion monitoring component of the program will be used to determine the current processes and rates leading to the erosion of the wetland, and the contribution of current reservoir operations to the observed erosion processes. Data collection during the vegetation and wildlife inventory component will describe the wetland and riparian vegetation and associated fauna of the Valemount Peatland area. An analysis of vegetation and erosion patterns will provide an understanding of the relationship between reservoir water levels, erosion potential, and vegetation survival and distribution. The findings from the inventory of the wetland's vegetation community may also help in identifying revegetation strategies for the Revegetation Program of the Kinbasket Reservoir drawdown zone (CLBWORKS-1) under the Kinbasket and Arrow Lakes Reservoirs Revegetation Management Plan.

2.5 Schedule

The monitoring program will be conducted in Years 1, 2 and 10 of implementation of the Columbia River Water Use Plan. This schedule differs from the one set out by the WUP Consultative Committee, which envisioned a 2-year study only; however, to ensure that sufficient data are collected to assess erosion processes, the erosion monitoring component of the program has been expanded to include an additional year of assessment.

Table CLBMON-8-1: Schedule of tasks for the Kinbasket Reservoir Monitoring of the Valemout Peatland

Task/Year	2008	2009	2016
Collection of Aerial Photography (under CLBMON-10)	√	√	√
Overview Assessment and Sampling Design	√		
Vegetation and Wildlife Inventory		√	
Evaluation of Erosion Processes	√		√
Data Analysis	√	√	√
Reporting	√	√	√

2.6 Budget

The total annual cost of the monitoring program is estimated at \$68,354 (in 2004 dollars), and the average annual cost over three years is approximately \$34,500. These costs exceed the original estimate of \$55,000 over two years recommended by the WUP Consultative Committee; however, this increase in study cost and duration is believed to be necessary to enable a more definitive assessment of ongoing erosion processes. Table CLBMON-8-1 provides annual budget estimates assuming a 2% rate of inflation and a 5% contingency for the duration of the program.

3.0 REFERENCES

MacKenzie, W.H. and J.R. Moran. 2004. Wetlands of British Columbia: a guide to identification. Research Branch, B.C. Ministry of Forests, Victoria, B.C. Land Management Handbook Number 52.

Moody, A.I. and W.W. Carr, 2003. Mica - Revelstoke - Keenleyside Water Use Plan: Potential Areas for Vegetation Establishment in Kinbasket Reservoir. BC Hydro Contract Report.

Moody, A.I., J. Stockner and P. Slaney. March 2006 draft. Footprint Impact of BC Hydro Dams on Aquatic and Wetland productivity in the Columbia Basin. Prepared for the Columbia Basin Fish & Wildlife Compensation Program.

Personal Communication

John Krebs. Columbia Basin Fish & Wildlife Compensation Program, BC Hydro, Nelson, B.C. October 2006.