A1.1 Addendum Rationale

There are currently two separate protocols in place to manage fish stranding in the lower Columbia and Kootenay rivers: (1) Strategy for Managing Fish Impacts Associated with Flow Reductions at Hugh Keenleyside Dam (HLK) (Vonk 2003); and (2) Kootenay River Fish Salvage Protocol (Wilson 2005). At a 24 June 2008 COFAC meeting, the Committee supported updating and combining these stranding protocols into one integrated and coordinated document. Based on the knowledge gained to date from ramping studies and available fish stranding data, the Committee agreed that the protocols should be revised to ensure that the most appropriate mitigation strategies are being employed. On 31 October 2008, BC Hydro again met with COFAC to present a draft outline of the proposed scope of work and process for conducting the stranding protocol revisions. The Committee accepted the draft outline and recommended a scope of services for the review be developed.

In addition, the COFAC members agreed that the ramping studies in the lower Columbia River should be suspended until a review of the available fish stranding data is complete and determination can be made as to whether further ramping studies are required.

A1.2 Objectives and Scope

The key objective of the work is to revise the current stranding protocols (Columbia and Kootenay) based on the knowledge gained to date (ramping studies, stranding assessment data, literature review), and determine if there are data gaps that need to be addressed through further ramping studies with the goal of reducing the incidence of stranding on the lower Columbia and Kootenay rivers. Specifically, this will involve:

a) Ensuring that the mitigation strategies for reducing flows at HLK and reducing base flows at Brilliant (BRD/BRX) are based on the most up-to-date and comprehensive fish stranding data and analysis available;

b) Ensuring that the combined Columbia and Kootenay protocol document is an effective tool for implementing the appropriate flow reduction mitigation and monitoring strategies for the lower Columbia River; and

c) Ensuring that the protocol document outlines what future monitoring will be required to confirm the effectiveness of the mitigation strategies, and identify and address any data gaps for the lower Columbia and lower Kootenay rivers.

A1.3 Tasks

The specific tasks of the work will include the following.

1. Review of the data in the Golder/BCH fish stranding database and data collected from the 2004-2007 ramping experiments on the lower Columbia and Kootenay rivers. Evaluate the stranding risk associated with identified stranding locations with current dam operational practices, and identify any data gaps.
2. Conduct a literature review of applicable published (and unpublished) stranding and flow reduction research that focuses on evaluating the risk of factors that affect fish stranding. The literature review will focus on how factors such as fish species, fish density, conditioning reductions, habitat characteristics, water temperature, seasonality, wetted history, day versus night, river stage and and incidence of fish stranding. Ensure the literature review and historic data review (Task #1 above) address the management questions presented in the Terms of Reference for CLBMON 42 as approved by the Comptroller.

3. Develop future mitigation strategies for reducing fish stranding (e.g., recontouring, stranding assessments) and long-term monitoring assessments of these strategies. Include specific details as to how these mitigation strategies are to be applied (e.g., specific site locations, flows levels). This task may involve a field component to determine the most appropriate and effective sites for physical mitigation.

4. Conduct a workshop with COFAC industry members (BC Hydro, Fortis and CPC) to review findings of literature review and incorporate findings into the Draft Protocol.

5. Review and revise current communication protocols that focus on flow change correspondence, annual reporting requirements and major flow reduction event reporting (this task will be primarily completed through the workshop component of this project).

6. Revise and combine into one document the current Columbia (Vonk 2003) and Kootenay (Wilson 2005) stranding protocols to provide a revised approach to reducing flows through such methods as ramping rates, conditioning reductions and duration of reductions. The evaluation of flow reduction risks should be based on the river stage for the Columbia River at Birchbank.

A1.4 Schedule

The fish stranding data review and protocol revision will be initiated in March 2009 and will be completed in January 2010. The tasks/deliverables and associated timelines are summarized below.

<table>
<thead>
<tr>
<th>PROPOSED TIMELINES:</th>
<th>DATE:</th>
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<tbody>
<tr>
<td>1. Consultant initiates protocol review</td>
<td>April 2009</td>
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<tr>
<td>2. Deliverable #1: submission of a Draft Report including findings from literature review, database analysis, and recommendations for future monitoring and mitigation strategies.</td>
<td>August 3, 2009</td>
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<tr>
<td>3. Deliverable #2: conduct a Workshop with BCH, CPC, and Fortis Representatives to incorporate findings into Protocol.</td>
<td>September, 2009</td>
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<tr>
<td>5. Deliverable #4: present Summary of protocol changes and findings to COFAC</td>
<td>October 2009</td>
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<tr>
<td>7. Deliverable #5: Incorporating agencies comments production of a Finalize Protocol</td>
<td>January 2010</td>
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</table>
A1.5 Budget

The project budget has been revised to reflect the amended scope of the work as detailed above.

Total = $1,268,061

A separate budget is provided for the 2009 data review and protocol revision. This details the total cost by task, as well as the cost allocations for the Columbia and Kootenay portions of the work as agreed to by BC Hydro, FortisBC and CPC.