AGENDA ITEM 9

APPENDIX 2a

2018/0063/DET

REPRESENTATIONS OBJECTIONS

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19th March 2018

To whom it may concern,

2018/0063/DET - 2MW run of river hydroelectric scheme and associated infrastructure

Buglife - The Invertebrate Conservation Trust objects to the plans for a 2MW run of river hydroelectric scheme and associated infrastructure on the River Muick near Ballater. Our objection is based on insufficient evidence being provided to allow the assessment of the impact of the proposed scheme on the aquatic invertebrate communities in the River Muick.

The aquatic invertebrate survey provided by the developers is insufficient for the following reasons:

1. The report aims to provide a baseline of the aquatic macro-invertebrates present in the River Muick however the majority of invertebrates have been identified to family only. The stonefly fauna of the River Muick is known to be particularly important, potentially of national importance, with three endemic taxa (*Capnia vidua anglica*; *Taeniopteryx nebulosa britannica*; *Perlodes mortoni*) known from the watercourse, however with the exception of two easily identified species, no attempt has been made to identify stoneflies, or any other groups to species.
2. The surveys were undertaken on a single occasion only (14th October 2017). The report notes that surveys should be undertaken on at least two occasions - in the autumn (October/November) and also in the spring (February/March). Ideally, a third sample should also be taken in the summer (July/July). Sampling on one occasion only risks missing species that have short development cycles or are not active in the autumn, as they are in the egg stage or are present as tiny larvae only.
3. The report focuses on the use of two biotic indices: the Biological Monitoring Working Party (BMWP) score and the Average Score Per Taxon (ASPT) to assess the general health of the River Muick. The use of these indices is completely inappropriate as they are designed to detect the impact of organic pollution and have no relevance to flow conditions in the watercourse. Unsurprisingly, the analysis shows that there is no impact from organic pollution in this upland watercourse. It would have been more appropriate to use the Lotic-invertebrate Index for Flow Evaluation (LIFE) and the Drought Effect of Habitat Loss on Invertebrates (DEHLI) index. In addition, the Community Conservation Index (CCI) should be used to assess the importance of the invertebrate assemblage.

Flow diversion for hydro-power generation results in a reach downstream of the intake where river flow is depleted. Aquatic habitats in this depleted reach are typically reduced which limits the space available for

aquatic macroinvertebrate species. This can lead to competition for food and space (McIntosh et al. 2002; Riley et al. 2009), and may lead to migration of species to more suitable habitat downstream (Davey et al. 2006). Species which lay eggs on exposed stones (eg *Baetis* sp. and *Brachycentrus subnubilus*) may have their eggs exposed if egg-laying happens before flow diversion occurs.

Several studies of aquatic invertebrate response to small scale run of river hydro-power schemes have shown negative responses to flow diversion:

- Jesus et al. (2004) reported notable reductions in Ephemeroptera, Plecoptera and Trichoptera species;
- Copeman (1997) found reductions in Ephemeroptera species;
- Wang et al. (2016) reported significantly lower aquatic macroinvertebrate richness, density and diversity in depleted stretches;
- Dewson et al. (2007) found that Ephemeroptera, Plecoptera, and Trichoptera decreased in response to reduced flows;
- McIntosh et al. (2002) found that the mean density of total macroinvertebrates above a hydro-scheme diversion was 46% greater than below the diversion;
- Cazaubon & Giudicelli (1999) found macroinvertebrates in regulated sites had lower densities and diversity compared with natural sites in the same district;
- McKay & King (2006) compared reaches above and below a diversion and found low family richness in the depleted reach.

A further concern is the potential impact of climate change on upland watercourses. The Scottish Environment Protection Agency (SEPA) predicts that summer water temperatures in the Cairngorms will rise by almost 4 degrees by 2050 (Gosling, 2011). In addition, SEPA predicts that summer flows in some rivers may reduce by more than 25%. Reduced flows and increased water temperatures are likely to have a significant detrimental effect on aquatic macroinvertebrates. These effects may be exacerbated by the development of hydro-power schemes in these watercourses. It is essential that the impact of climate change on water flows and temperatures in the River Muick is taken in to account when assessing the proposed scheme to ensure that there are no detrimental impacts on the ecology of the watercourse during the lifetime of the proposed hydro-power scheme. It is also important that the feasibility of the scheme in terms of power output is assessed both on the basis of current flow conditions, but also on those that might occur in 20-30 years time.

In the absence of comprehensive, species level, baseline data it is impossible to determine the impact of the proposed scheme on the aquatic macroinvertebrate community of the River Muick. We therefore urge the Cairngorms National Park Authority to **refuse permission** until a comprehensive species list is provided together with information on the impact of the scheme now, and in the future, on the species present.

I would appreciate being kept informed of any progress and please do contact me if I can be of any further help.

Yours faithfully,

Craig Macadam
Conservation Director