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Supplement to the B-WK1 criterion:

Preliminary vetting criteria for *naturemade star* certification of new hydroelectric power plants

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Table of contents

Legal information:
This report is largely based on the corresponding report prepared by BG Ingenieure und Berater AG, Brunnhofweg 37, 3000 Bern 14, dated 21 December 2012.

1. Introduction

The following list of criteria forms the basis for applicants providing evidence of compliance with the prohibition of deterioration rule, which is required for *naturemade star* certification of new or extended hydroelectric power plants under criterion B-WK1. This evidence must be provided to the VUE Board as part of the preliminary vetting process.

The criteria set out below should be used as a check list to ensure that relevant documentation is provided in full. The applicant must provide necessary information and data on all criteria relevant for its project. Any criteria not mentioned in the application will be considered not to be relevant for the applicant's project.

2. Criteria for evidence of compliance with the prohibition of deterioration rule

2.1 Hydrology and morphology

2.1.1 Explanations

The objective is to preserve the hydrologically and morphologically natural or near-natural state of watercourses and watercourse sections that are still largely unimpaired.

Two factors must be taken into account here:

- **integrity of a watercourse and its catchment area**
- **integrity of the watercourse section to be utilized**

It is imperative that the impact a project will have on any body of water is assessed from both of these angles.

Integrity is defined as follows:

- A watercourse or watercourse section is considered to be morphologically intact if it is natural or near-natural (ecomorphological classification 1) or with only minor impairment (ecomorphological classification 2) over 80% of its length.
- A watercourse is considered to be hydrologically intact if its flow patterns are not already impaired by the following:
    - hydropeaking;
    - residual water sections;
    - damming;
    - removal or introduction of substantial volumes of water;
    - substantial impact of urbanization.

These definitions have already been used in the 2011 synthesis report "Assessment and management of hydroelectric power in the Canton of Fribourg".

2.1.2 Prohibition of deterioration

The prohibition of deterioration rule requires that the construction or extension of a hydroelectric power plant must not impact negatively on the hydrology and morphology of affected watercourse sections, i.e. their condition must not be poorer than before. Where watercourse sections are subject to statutory rehabilitation requirements or officially

earmarked for rehabilitation, the relevant assessment must be based on their morphological target condition.

The prohibition of deterioration rule applies to both hydrologically and morphologically intact watercourses/catchment areas and to ecomorphologically intact watercourse sections. It applies to all watercourse sections affected by the power plant (e.g. residual water and discharge sections, dammed and surge sections, etc.).

A hydroelectric power plant could, for example, be awarded *naturemade star* certification if it used and made passable an existing barrier without rehabilitation potential while improving its local environment at the same time. However, if cantonal network planning requires the barrier to be rehabilitated, the prohibition of deterioration applies in relation to the condition of the rehabilitated barrier.

2.1.3 Identification of watercourses and watercourse sections to be examined

Hydrologically and morphologically intact watercourses

The entire watercourse and/or catchment area must be taken into account when determining whether a watercourse is hydrologically and morphologically intact.

The main body of water upstream of the power plant or its reservoirs must be examined (through to an upstream power plant or lake or the source). Sections between the power plant and its reservoirs must also be examined. Watercourses downstream of the power plant must be examined through to where they join another watercourse of the same or a larger size.

Morphologically intact watercourses

When examining whether morphologically intact watercourse sections are affected, the watercourse must be examined in its entirety from the point where water is removed through to the point where it is returned.

2.1.4 Documentation to be submitted

The following information/documentation must be submitted for the "Hydrologically and morphologically intact watercourses" criterion:

- Morphology:
  - Map of the watercourse including an ecomorphological diagram as per the sequential modular approach
  - Aggregated watercourse lengths in the various ecomorphological classifications: absolute numbers and percentages

If the watercourse is hydrologically and morphologically intact, the following information/documentation must also be submitted:

  - Map and watercourse lengths indicating the ecomorphological classifications expected to apply after power plant construction
  - Reason why the power plant will improve or at least not impair watercourse morphology

- Hydrology:
  - Description of the hydrological condition before and after power plant construction and reasons why the power plant will not impair watercourse hydrology

2.2 Habitats and populations of fish and crustaceans

2.2.1 Explanations

The **objective** is to prevent any impairment of special fish and crustacean habitats and populations. These are identified using the following criteria:

- **Fish spawning and crustacean areas of national significance**

  Areas of national significance for greyling, common nase and crustaceans have been surveyed: greyling watercourses of national significance, common nase spawning areas of national significance, survey map and list of freshwater crayfish species with distribution by cantons. Where fisheries are affected, projects must always be approved under Art. 8 and 9 of the Federal Fisheries Act of 21 June 1991 (BGF, SR 923.0). Relevant areas are identified in the following implementation guidelines of the Swiss Federal Office for the Environment (BAFU):

  - Greyling populations of national significance; fisheries communication No. 70
  - Monitoring of common nase populations in Switzerland; fisheries communication No. 82
  - National freshwater crayfish action plan, January 2006

- **Special fish habitats**

  Special fish habitats include:

  a. Spawning areas of [1]brown trout, goby, brook lamprey, bitterling and greyling

  Red-listed, "highly endangered" species: These fish species cannot tolerate any additional impairment, which would also run counter to any conservation efforts and, in the case of brown trout, commercial interests.

  b. Brown trout migration corridors

  Brown trout depends on passable watercourses for its upstream and downstream migration.

  c. Bodies of water for salmon reestablishment programmes

  Bodies of water that are potentially suitable for salmon have been surveyed by the WWF. The relevant map can be requested from info@naturemade.ch.

- **Bodies of water potentially home to red-listed species that are highly endangered or in danger of extinction**

  Fish species in danger of extinction include:

  - Fish species in danger of extinction: apron, south-west European nase, Italian nase, marble trout and common nase
  - Highly endangered fish species: alborella, bitterling, goby, brook lamprey, brown trout

These criteria are based on the 2011 recommendations for developing cantonal protection and utilization strategies issued by the Swiss Federal Office for the Environment (BAFU), Federal Office of Energy (BFE) and Federal Office for Spatial Development (ARE).

2.2.2 Prohibition of deterioration

The prohibition of deterioration for special fish and crustacean habitats and populations entails the following:

- **Fish spawning and crustacean areas of national significance**

[1] Information on any relevant areas are usually available from cantonal authorities and fishery associations. Where this is not the case, a relevant expert opinion must be submitted.

The *naturemade star* certification can only be awarded if the applicant is able to demonstrate that there will be an improvement or at least no additional impairment of fish spawning and crustacean areas compared to the current situation. Spawning areas must be preserved in full.

- **Special fish habitats**

  Power plants to be built or extended in such areas can be awarded *naturemade star* certification if:

  a. Spawning areas of brown trout, goby, brook lamprey, bitterling and greyling

  are not impaired by the project. Spawning areas must be preserved in full.

  b. Brown trout migration corridors

  are kept passable for upstream and downstream migration of brown trout.

  c. Bodies of water for salmon reestablishment programmes

  are kept passable for upstream and downstream migration of salmon, and it can be ensured that potential spawning areas in such bodies of water are not impaired.

- **Bodies of water home to red-listed species that are highly endangered or in danger of extinction**

  Power plants to be built or extended in such areas can be awarded *naturemade star* certification if the applicant is able to demonstrate that they will not result in any deterioration in the power plant surroundings compared to the ecological target condition. The target condition is a body of water that is in a state where the natural habitat requirements of the endangered species are met over its various developmental stages (i.e. passability, habitats for various developmental stages etc.) and the survival of the population is secured. If the body of water is to be rehabilitated in order to achieve this target condition, any power plant to be certified may not prevent associated rehabilitation measures (i.e. it may not perpetuate any existing negative effects such as, for example, barriers).

2.2.3 Documentation to be submitted

Expert opinion regarding the affected and/or potentially affected fish and crustacean species and their habitat requirements. It must be shown how the condition is prevented from deteriorating and how the habitat requirements of the relevant species can be fulfilled in line with the natural target condition.

2.3 Waterfalls

2.3.1 Explanations

Waterfalls are often a defining feature of the landscape and have emotional value for locals, tourists and recreational visitors. Waterfalls that are out of sight may provide habitats for special organisms such as mosses, lichens and invertebrates. They are mostly under no legal protection.

The objective is to protect significant waterfalls. The VUE Board assesses the significance of waterfalls in consultation with the VUE nature protection organizations.

2.3.2 Prohibition of deterioration

The prohibition of deterioration depends on the significance of individual waterfalls. The VUE Board defines the prohibition of deterioration on a case-by-case basis in consultation with the VUE nature protection organizations.

2.3.3 Documentation to be submitted

The following documentation is to be submitted for the "Waterfalls" criterion:

- Map of the watercourse with the waterfall marked
- Photos of the waterfall as part of the surrounding landscape and at various outflows
- Information on the habitat for special organisms within the splash water zone: mosses, lichens, invertebrates, others
- Volumes of water before and after utilization

2.4 Protected areas

2.4.1 Explanations

The objective is to ensure that projects in protected areas do not impair the objectives of protection.

2.4.2 Prohibition of deterioration

The prohibition of deterioration relates to the need for the objectives of protection to be fulfilled and protected habitats to be preserved: the project may not impair the objectives of protection or the protected habitats compared to the baseline situation. If concrete rehabilitation plans have been developed for the protected area, the power plant to be certified may not place the rehabilitation objectives and projects at risk.

2.4.3 Documentation to be submitted

The following documentation is to be submitted for the "Protected areas" criterion:

- Map of the protected area
- Objectives of protection (copy)
- Description of how the project will ensure that the relevant objectives of protection and the condition of the protected habitats will not be impaired
- Description of existing rehabilitation objectives or projects and how the project will support these

3. Exceptions

In exceptional cases, it should also be possible to award *naturemade star* certification for projects that substantially improve the condition of natural or near-natural habitats, populations and landscapes (improvement requirement), even if a particular criterion will suffer a minor deterioration.

The documentation to be submitted with the application should be discussed with the VUE executive office.