Guidance for run-of-river hydropower

December 2013

Water Framework Directive, nature conservation and heritage

This document is part of our set of advice notes to help you design your hydropower scheme. You should read our Guidance for run-of-river hydropower development first, which contains an overview of our guidance and a glossary of technical terms.

1. River basin management planning and hydropower

Water in rivers, lakes and estuaries, around our coasts and under the ground in aquifers are protected and improved under measures set out in our river basin management plans. They describe the main issues affecting the water environment and the actions we all need to take to deal with those issues.

The Water Framework Directive (WFD) is European legislation that requires Member States to plan and act to protect and improve the water environment. The WFD requires a management plan to be drawn up for each river basin district. We publish river basin management plans, reviewing and updating them every six years.

WFD status and objectives

The principal objectives of the Water Framework Directive are to:

- achieve good status or potential in inland and coastal waters and groundwater
- prevent deterioration in the status or potential of water bodies
- achieve compliance with standards and objectives set for designated sites. These are listed in the Register of Protected Areas under the Water Framework Directive and include all Natura 2000 Protected Areas designated for water-dependent species or habitats.

The Water Framework Directive applies to:

- all inland surface freshwaters, including lakes, streams, canals and rivers
- all groundwater
- all transitional waters and estuaries
- all coastal waters out to one nautical mile from the low-tide mark

For the purposes of implementing the Water Framework Directive, waters are divided into water bodies. Each river water body has a defined catchment.

Each water body is classified in terms of its condition or 'status'. A range of biological and non-biological elements are assessed to determine the current status of the water body.

What you need to do

You can find out the baseline status or potential of the river where you are proposing your scheme on the 'What's in Your Backyard' facility on our website. Your Account Manager may have access to current data.

You need to understand the scale and the nature of the potential changes to the environment that your scheme may cause.

- Follow our guidance. This will help to reduce the risks.
- Submit a pre-application form and talk to your Account Manager. This will help you to develop the scope for your environmental report.

Your environmental report will need to include sufficient information to satisfy us that your scheme will not compromise the objectives set out in the river basin management plan.

- Your report must address the potential effects of your scheme by including:
  - details of provision for fish passes (see our advice note on Fish passage)
  - details of the bywash channel (see our advice note on Fish screening)
  - details of fish screening measures (see our advice note on Fish screening)
  - an ecological survey (see our advice note on Monitoring)
  - a geomorphology/weir pool assessment (see our advice note on Geomorphology (including weir pools))
  - a hydrology assessment (see our advice note on Flow and abstraction management)
  - for some schemes, a water quality assessment
- You will need to draw on all of this information to produce a WFD assessment as a section within your environmental report. Your assessment should demonstrate that your proposed hydropower scheme will not:
  - contribute to a deterioration in the current status or potential of the water body or water bodies affected by your scheme
  - prevent the achievement of objectives set for the water body or water bodies affected by your scheme

How we assess the effects of your scheme

The Water Framework Directive requires that we assess all the impacts of your scheme, including biological, chemical, morphological and flow-related aspects. We have to look at any activity that could affect these elements, either now or in the future.

We need to establish that all new modifications, and certain existing ones:

- will not contribute to a deterioration in status or, for water bodies that have been designated as artificial or heavily modified, potential
- do not prevent the achievement of the status objective set for a water body

We will not normally accept a change to the environment which will reduce the status of any element, for example from good to moderate. Our assessment is based on expert judgement, supported by the environmental report that you provide.

If, as a result of our initial assessment, we consider that your proposal may prevent the achievement of WFD objectives then we will require you to carry out further detailed investigation and provide us with an additional report. We are unlikely to approve your

application if your additional report indicates that your scheme will prevent the achievement of the WFD objectives.

2. Nature conservation and heritage

We have a duty, when exercising our functions, to conserve biodiversity, through the following legislation:

- Conservation of Habitats and Species Regulations 2010
- Countryside and Rights of Way (CRoW) Act 2000
- Environment Act 1995
- Natural Environment and Rural Communities Act 2006 (Sections 41 (England))
- Wildlife and Countryside Act 1981

We must determine if developments within or close to heritage and nature conservation sites could result in harm.

The heritage and nature conservation sites that we screen for include:

- the Natura 2000 network of European sites, such as, Special Areas of Conservation (SACs), Special Protection Areas (SPAs), candidate Special Areas of Conservation (cSACs), potential Special Protection Areas (pSPAs), Ramsar sites; and Marine Conservation Zones (MCZs). Refer to magic.defra.gov.uk for further details of designated sites
- Sites of Special Scientific Interest (SSSI)
- National Nature Reserves (NNR), which are also SSSI
- local nature reserves (LNR)
- national parks (NP)
- areas of outstanding natural beauty (AONB)
- scheduled ancient monuments (SAM)
- heritage coast
- local wildlife sites (LWS)
- ancient woodland

We also screen for internationally and nationally protected species and habitats, wherever they occur. We need to ensure that an application will not, for example:

- damage or destroy their habitat, for example, breeding site or areas used for shelter or protection
- disturb them in a way that will significantly affect their ability to survive
- impair their ability to hibernate or migrate
- affect their local distribution or abundance

Hydropower schemes have the potential to affect species and habitats, during all stages of scheme development. These include:

- Construction effects, such as impacts on habitat, damage and disturbance to protected species, changes to vegetation and drainage caused by pipeline construction, ancillary construction damage to site for example sediment release.

- Operational effects, such as low flows, depleted reaches of the river, obstruction to migration of aquatic animals and desiccation of mosses and liverworts.

Table 1 lists some of the adverse effects on species and habitats which your scheme must avoid by including suitable mitigation measures (limits or controls that prevent harm).

Table 1 Potential effects of hydropower on species and habitats	
River habitats	Hydropower can affect river ecosystems by: • making physical modifications to the river channel • altering the natural flow Schemes can adversely affect riverine and riparian habitats, both downstream and upstream of the installation, and associated flora and fauna, including fish, invertebrates, lower plants (mosses and liverworts) and higher plants (rooted, flowering). This can occur from changes to high and low flows, as well as flow variability.
Biological connectivity	The natural movement within river systems of animals, plants ('biota') and sediments is critical to maintaining healthy aquatic communities. Together with fish, many invertebrates which do not have a flying life stage are affected by obstructions to movement. Examples include crustaceans and molluscs. Maintaining or re-establishing biological connectivity increases the resilience of biological populations to climate change.
Lower plants	Reduced flows in a depleted reach can reduce the amount of spray or humidity that is essential for some lower plants to survive. These plants include some ferns and flowering plants but also a significant number of mosses, liverworts and lichens (collectively known as 'lower plants'). The humid environment required by these species limits the number of places where they can grow. Some of these species are very rare across the UK, Europe and globally. Certain lower plants grow on rocks that are covered by water when river levels are high, but exposed on low flows. Changes to flow levels in a depleted reach can leave streamside rocks drier for longer.
Adjacent terrestrial habitat	Working corridors and access may affect nature conservation and heritage sites and species. For example, woodlands and wet flushes.
Species	Changes to the bank side or modifications to water level can have negative effects on species. Otter, for example, can have their food source disrupted and their holts (breeding areas) flooded.

What you need to do

Before you formally apply we recommend that you:

- Use our Environmental site audit checklist as part of the pre-application process to help identify any potential environmental effects.
- Talk to your Hydropower Account Manager as soon as possible. We will pick up on any specific issues associated with your development to help you understand the issues and what is involved before you apply. If your scheme is in or near a designated site, you should also contact Natural England at an early stage. Contact Natural Resources Wales if the designated site lies wholly or partly in Wales.

When you formally apply, you will need to:

- Provide an environmental report which addresses the issues identified in pre-application discussions and in our hydropower guidance. You may need to employ suitably qualified ecologists and geomorphologists to carry out surveys and advise on design options and mitigation measures.

How we will assess your proposal

We use a risk-based screening tool, using electronic maps and records, to identify applications that could pose a risk to nature conservation sites and species. The assessment approach we take varies according to the type of heritage and nature conservation sites identified.

Natura 2000 sites

We will consult Natural England and/or Natural Resources Wales where we identify likely significant effects of a scheme on Natura 2000 sites.

We will take account of the likely impact of your scheme on these designated sites in light of their conservation objectives. We assess schemes using two tests:

- firstly, that the proposed project is not likely to have a significant effect alone or in combination
- secondly, if a significant effect is likely, that the development will not adversely affect the integrity of the site

All relevant competent authorities (including us, Natural England, Natural Resources Wales and your Local Planning Authority) will need to assess your proposal, working together to complete the Habitats Regulations Assessment for the scheme. Only those schemes which will not have an adverse effect on the integrity of a European site will be permitted.

Typically, the standards of environmental protection relevant to designated sites are more protective than elsewhere, especially for Natura 2000 sites. We therefore have to be more cautious in our permitting decisions, due to the precautionary nature of the tests in the Conservation of Habitats and Species Regulations 2010.

We may also need to apply these more protective flow targets to areas outside non-designated sites, for example to protect migratory fish species that may use the entire river system and migrate to and from the sea.

SSSI sites

We will consult Natural England and/or Natural Resources Wales where we identify that a scheme is likely to damage SSSI sites.

We will take account of the likely impact of your scheme on these sites in light of the condition status of the features for which the SSSI is designated.

Other Nature Conservation and heritage sites

Our screening exercise may identify a variety of other nature conservation and heritage sites and species, each of which we have a duty to conserve. We will gather information about these sites and assess the potential risks from your proposal, in consultation with the relevant organisation for each protected site.

You can find more information about this in our Environmental site audit checklist.

3. Cumulative and in-combination effects

We do not look at proposals for hydropower schemes in isolation. We will need to consider how they will affect the environment in combination with other past, present and future developments.

These changes could bring benefits to the environment, or harm it, or do both. They are sometimes divided into 'cumulative' and 'in-combination' effects:

- Cumulative effects are the effects of the same type of activity or stress in a number of locations added together. The relevant 'competent authority' (the Environment Agency or Natural England) will consider cumulative effects as and when appropriate.
- In-combination effects are the effects of different types of activity or stress added together. When assessing a proposal for a hydropower scheme we will consider these effects with other activities that can reasonably be expected to interact, either in an additive or synergistic way, to adversely affect the environment. This includes activities:
    - of a similar and/or different type
    - authorised by other authorities
    - that may not have a significant effect when considered alone
    - for which permission is currently being sought
    - proposed or authorised but not yet fully implemented
    - that are regularly exercised and have continuing effects

How do we assess cumulative and in-combination effects?

Key pieces of legislation require us to look at the cumulative or in combination effects of hydropower schemes. These include the Water Framework Directive and the Conservation of Habitats and Species Regulations 2010.

We are required to carry out a specific assessment of 'in-combination' effects for SACs, SPAs and Ramsar sites. This involves evaluating your scheme in combination with other permissions, plans or projects. We do not have an explicit legal obligation to assess in-combination effects for Sites of Special Scientific Interest but we apply similar technical considerations as for SACs, SPAs and Ramsar sites.

We consider the magnitude of the environmental effects that each current or planned scheme causes and the size of the area that would be affected. Effects may include:

- reductions in fish stocks, for example through damage to or loss of habitat or obstructions to migration

- the loss of natural changes to morphology caused by static flows and the flushing of nutrients and sediment at times of low flow

We will assess each scheme on its own merits. You may not have all the evidence or information that we need to consider cumulative or in-combination effects. However, you will need to contribute to our assessment, which will consider:

- the number of existing hydropower schemes in a catchment
- the number of known proposals for hydropower schemes in a catchment
- the environmental objectives for the catchment
- whether the proposed scheme, in combination with other activities, could impact on water body objectives under the Water Framework Directive (namely cause deterioration in ecological status/potential or prevent the achievement of improvements in status)
- whether the proposed scheme, in combination with other activities, could affect a designated site
- whether there are other impacts, such as impoundment or flow depletion, independent of your own scheme