

ENVIRONMENTAL PERMITTING (ENGLAND & WALES) REGULATIONS 2016

Appeal by NNB Generation Company (HPC) Limited

Water discharge activity at Hinkley Point C, Somerset

Permit variation application relating to acoustic fish deterrent

Reference EPR/HP3228XT/V004

**STATEMENT OF CASE ON BEHALF
OF THE ENVIRONMENT AGENCY**

Introduction

1. This Statement of Case is submitted on behalf of the Environment Agency (“**the EA**”) in response to an appeal by NNB Generation Company (HPC) Limited (“**the Appellant**”). The Appellant appeals against the non-determination of its application to vary the Hinkley Point Water Discharge Activity Environmental Permit (“**the WDA Permit**”).
2. On 15 February 2019, the Appellant applied to vary the WDA Permit under application reference EPR/HP3228XT/V004 (“**the Application**”) (**CD Ref EA1**). On 4 August 2020, the Appellant served notice of deemed refusal under Schedule 5, Part 1, paragraph 15(1) of the Environmental Permitting (England and Wales) Regulations 2016 (“**EPR**”) (**CD Ref L.1**). The Appellant appeals against that deemed refusal.
3. The development of Hinkley Point C (“**HPC**”) is an ongoing project relating to the new nuclear power station to be sited next to, abstracting from and discharging to, the Severn Estuary and Bristol Channel in Somerset. A summary of the cooling water system is appended (**CD Ref EA2**). As part of authorisation for the operational phase of the project the EA granted a water discharge activity permit for discharges from the cooling water outlet in 2013 (EPR/HP3228XT (**CD Ref I.3**)); at the same time the Marine

Management Organisation (“**MMO**”) granted a marine licence and the Secretary of State granted a Development Consent Order (“**DCO**”) for the project. Construction is underway and operation is planned to commence in 2025.

4. The cooling water system for HPC will affect the Severn Estuary European Marine sites made up of Severn Estuary/Môr Hafren SAC, Severn Estuary SPA, Severn Estuary/Môr Hafren Ramsar, River Usk/Afon Wysg SAC and River Wye/Afon Gwy SAC. The details of those sites are set out in the Regulation 33 advice package from Natural England and the Countryside Council for Wales (**CD Ref EA3**) and in Usk and Wye SAC documents **CD Ref EA4, EA5 and EA6**).
5. By the Application the Appellant sought to remove the requirement to install an Acoustic Fish Deterrent (“**AFD**”). The installation of AFD was a condition in the WDA Permit which was granted by the EA, as well as in the DCO and marine licence. AFD in combination with Low Velocity Side Entry (“**LVSE**”) intake heads and a Fish Return and Recovery (“**FRR**”) system were seen as necessary mitigation for the effects of the cooling water system on fish species in the Severn Estuary European Marine sites which are designated under the Habitats Directive and Ramsar Convention.
6. The EA has completed its appropriate assessment in relation to the Application (“**the AA**”) (**CD Ref EA7**). The AA had not been completed by the time of the deemed refusal. In summary, the AA demonstrates that it has not been possible to conclude no adverse effect on the integrity of the Severn Estuary SAC and Ramsar, the River Wye SAC and River Usk SAC due to the effects of the proposed removal of the AFD on the following features (all of which are in unfavourable condition according to currently published data):
 - (1) Twaité shad;
 - (2) Allis Shad;
 - (3) Atlantic Salmon;
 - (4) European Eel;
 - (5) Migratory fish assemblage; and

(6) Assemblage of the fish species (117 were identified) (which is a sub-feature of the estuaries feature in the SAC and a feature of the Ramsar).

7. Accordingly, it is not possible to issue the WDA Permit variation, unless a derogation is successfully sought under Article 6(4) of the Habitats Directive and regulations 64 and 68 of the Conservation of Habitats and Species Regulations 2017 (“**the 2017 Regs**”).
8. The Water Framework Directive (WFD) is a European directive (2000/60/EC) which was transposed into UK law in 2003. The WFD imposes legal requirements to protect and improve the water environment. Under the WFD, all water bodies are classified based on quality elements which encompass a range of physical, biological and chemical parameters. The target is for all water bodies to achieve a minimum of good status and to avoid deterioration in their status. The Water Framework Directive also specifies that areas requiring special protection under other EU Directives are identified as protected areas. These include areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection including relevant Natura 2000 sites (water dependent SACs and SPAs). Where water body boundaries overlap with protected areas, the most stringent objective applies – that is the requirements of one particular EU Directive should not undermine the requirements of another. The EA has concluded that there is minimal risk of the activities assessed of jeopardising compliance with WFD but the assessment of potential impacts on Natura 2000 protected sites is dependent on the EA’s Habitats Regulations Assessment. Therefore the AA also provides the assessment and conclusion of potential impacts on these protected areas in relation to compliance with WFD requirements.
9. The EA opposes the Appellant’s appeal and submits that the appeal should be dismissed because it cannot be concluded, beyond reasonable scientific doubt, that there would not be an adverse effect on the integrity of the Severn Estuary / Môr Hafren SAC, Severn Estuary / Môr Hafren Ramsar, River Wye / Afon Gwy SAC or River Usk / Afon Wysg SAC from the operation of Hinkley Point C without an AFD.

10. Should the Appellant's appeal be upheld the following conditions would need to be considered and applied to the varied permit:

- a. The FRR waste stream, sample point and outlet would need to be added to the permit. This is due to the increased polluting matter (dead biota) that will be present in the FRR system and discharged to the Bristol Channel due to the removal of the AFD.
- b. The inclusion of (a) would also require the inclusion of the relevant limits to minimise the risk to the receiving environment from that polluting matter and any relevant monitoring conditions required to ensure the activity remains compliant with those limits.

The relevant limits would be based on the levels of polluting matter currently assessed as part of the application.

11. The EA's Statement of Case will address the following matters:

- (1) The Application;
- (2) The necessity for the Application;
- (3) History of engagement between the EA and the Appellant;
- (4) The regulatory position;
- (5) The EA's position;
- (6) The EA's response to the Appellant's case;
- (7) Conclusion
- (8) List of Documents in addition to those referred to in the Appellant's Statement of Case (its section 9)

The Application

12. The EA agrees with the Appellant's description of the Application, the submitted documentation and the chronology in Section 2 of the Appellant's Statement of Case.

The Necessity for the Application

13. The EA does not comment on the claimed necessity for the Application as described in Section 3 of the Appellant's Statement of Case on the basis that this is not legally relevant to the issues in this appeal. It should, however, be noted that the EA has advised the Appellant that it would be possible to apply for a derogation from the Secretary of State pursuant to Regulation 64 of the 2017 Regs and demonstrating imperative reasons of overriding public interest for the removal of the AFD. A conclusion that the removal of the AFD would adversely affect the integrity of European protected sites is not therefore an absolute preclusion on consent being obtained to remove the AFD.

History of Engagement with the EA

14. The EA has undertaken extensive pre-application and post application engagement with the Appellant. The EA offers advice and assistance to prospective applicants in order to improve the quality of applications that it receives. This pre-application advice can cover a wide range of issues including modelling approaches, monitoring requirements etc. Once an application has been received, engagement with the applicant is generally limited to updates on progress, in order to preserve the fairness and integrity of the decision-making process. In the present case, the EA also provided the Appellant with factual information about the approach being taken.
15. In particular, the EA has documented its approach in a series of detailed technical briefs (Technical Briefs TB000 to TB020) throughout the permit variation determination which have been shared with the Appellant to ensure the Appellant understood the grounds on which the EA was basing its provisional Habitats Regulations Assessment ("**HRA**") conclusions on.
16. A history of the AFD and timeline containing a chronology of the engagement between the EA and the Appellant is included in this Statement of Case (**CD Ref EA8**).

The Regulatory Position

Appropriate Assessment under the Habitats Regulations

17. Article 6(3) of Council Directive 92/43/EEC on the conservation of natural habitats and wild fauna and flora (“**the Habitats Directive**”) provides:

3. Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

18. Article 1(i)(b) of the Habitats Directive defines the favourable conservation status of a protected species to be when, amongst other things:

...population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitat.

19. The Habitats Directive is transposed into English law by the 2017 Regs. Regulation 63 of the 2017 Regs provides:

63.— Assessment of implications for European sites and European offshore marine sites

(1) A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which—

(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects), and

(b) is not directly connected with or necessary to the management of that site,

must make an appropriate assessment of the implications of the plan or project for that site in view of that site's conservation objectives.

(2) A person applying for any such consent, permission or other authorisation must provide such information as the competent authority may reasonably require for the purposes of the assessment or to enable it to determine whether an appropriate assessment is required.

(3) The competent authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specifies.

(4) It must also, if it considers it appropriate, take the opinion of the general public, and if it does so, it must take such steps for that purpose as it considers appropriate.

(5) In the light of the conclusions of the assessment, and subject to regulation 64, the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).

(6) In considering whether a plan or project will adversely affect the integrity of the site, the competent authority must have regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which it proposes that the consent, permission or other authorisation should be given.

(7) This regulation does not apply in relation to—

(a) a site which is a European site by reason of regulation 8(1)(c);

- (b) a site which is a European offshore marine site by reason of regulation 18(c) of the Offshore Marine Conservation Regulations; or
- (c) a plan or project to which any of the following apply—
 - (i) the Offshore Petroleum Activities (Conservation of Habitats) Regulations 20011 (in so far as this regulation is not disapplied by regulation 4 (plans or projects relating to offshore marine area or offshore marine installations) in relation to plans or projects to which those Regulations apply);
 - (ii) the Environmental Impact Assessment (Agriculture) (England) (No. 2) Regulations 20062;
 - (iii) the Environmental Impact Assessment (Agriculture) (Wales) Regulations 2017; or
 - (iv) the Merchant Shipping (Ship-to-Ship Transfers) Regulations 2020

(8) Where a plan or project requires an appropriate assessment both under this regulation and under the Offshore Marine Conservation Regulations, the assessment required by this regulation need not identify those effects of the plan or project that are specifically attributable to that part of it that is to be carried out in the United Kingdom, provided that an assessment made for the purpose of this regulation and the Offshore Marine Conservation Regulations assesses the effects of the plan or project as a whole.

(9) In paragraph (1) the reference to the competent authority deciding to undertake a plan or project includes the competent authority deciding to vary any plan or project undertaken or to be undertaken.

20. The assessment provisions in Regulation 63 of the 2017 Regs apply to decisions in respect of an environmental permit by virtue of Regulation 101 of the 2017 Regs:

101.— Environmental permits

(1) The assessment provisions apply in relation to the granting of an environmental permit under the Environmental Permitting (England and Wales) Regulations 2016.

(2) Where in such a case the competent authority considers that any adverse effects of the plan or project on the integrity of a European site or a European offshore marine site would be avoided if the permit were subject to conditions, it may grant a permit, or cause a permit to be granted, subject to those conditions.

(3) The review provisions apply to a permit described in paragraph (1).

(4) Where, on the review of such a permit, the competent authority considers that any adverse effects on the integrity of a European site or a European offshore marine site of the carrying out or, as the case may be, the continuation of activities authorised by it would be avoided by a variation of the permit, it may vary it, or cause it to be varied, accordingly.

(5) Where any question arises as to agreeing to a plan or project, or affirming a permit on review, under regulation 64 (considerations of overriding public interest), the competent authority must refer the matter to the appropriate authority which must determine the matter in accordance with that regulation and give directions to the competent authority accordingly.

21. A project is ‘likely to have a significant effect’ so as to require an appropriate assessment if there is a real risk of a likely significant effect occurring i.e. the risk of it occurring cannot be excluded on the basis of objective information: *Landelijke Vereniging tot Behoud van de Waddenzee and Another v Staatssecretaris van Landbouw* [2004] E.C.R. I-7405 (“*Waddenzee*”), at [44] (CD Ref M.1)

22. The competent authority may only grant consent for a project following an appropriate assessment if it is “convinced” that the project will not adversely affect the integrity of the site concerned. Where doubt remains as to the absence of adverse effects on the integrity of the site, the competent authority will have to refuse authorisation: **Waddenzee** at [56]-[59].
23. The essential questions for the competent authority carrying out an appropriate assessment are: “what will happen to the site if this plan or project goes ahead; and is that consistent with ‘maintaining or restoring the favourable conservation status’ of the habitat or species concerned?”: C-258/11 **Sweetman v An Bord Pleanála** [2014] P.T.S.R. 1092, [50] of AG Sharpston’s Opinion (**CD Ref M.2**).
24. The Supreme Court has held that “no special procedure is prescribed” for an appropriate assessment, but “a high standard of investigation is demanded” and “the issue ultimately rests on the judgment of the authority”: **R (Champion) v North Norfolk District Council** [2015] 1 W.L.R. 3710, at [41] (**CD Ref EA9**).
25. In Case C-164/17 **Grace v An Board Pleanála (ESB Wind Developments intervening)** at [39] (**CD Ref EA10**), the CJEU held that an appropriate assessment may not have lacunae and must contain complete, precise and definitive findings and conclusions capable of dispelling all reasonable scientific doubt as to the effects of the proposed works on the protected area concerned. Furthermore, in Case C-461/17 **Holohan v An Board Pleanála**, at [33] and 37 (**CD Ref EA11**), the CJEU held that all aspects of a project which might affect the site’s conservation objectives must be identified and all the habitats and species for which the site is protected must be catalogued.
26. The carrying out of an appropriate assessment “requires evaluative judgments to be made” and the conclusion reached “cannot realistically require the attainment of absolute certainty that there will be no adverse effects; the assessment requires ‘is of, necessity, subjective in nature’”: **Smyth v Secretary of State for Communities and Local Government** [2015] PTSR 1417, at [78] (**CD Ref EA12**).

27. In carrying out an appropriate assessment, if no scientific certainty can be established even having exhausted all scientific means and sources, it will be necessary to work with identified and reasoned probabilities and estimates: **Waddenzee** AG Kokott's Opinion [97]-[98].
28. It is unlawful to rely on the provision of mitigation in the absence of information regarding the effectiveness of the mitigation: Case C-142/16 **Commission v Germany** (26 April 2017), [34]-[38] (CD Ref EA13). In Case C-293/17, C-294/17 **Coöperatie Mobilisation for the Environment and Vereniging Leefmilieu**, at [126] and [130] (CD Ref EA14), the CJEU held that it is only when it is sufficiently certain that a measure will make an effective contribution to avoiding harm to the integrity of the site concerned, by guaranteeing beyond all reasonable doubt that the plan or project at issue will not adversely affect the integrity of that site, that such a measure may be taken into consideration in the 'appropriate assessment. Additionally, the CJEU held that the appropriate assessment of the implications of a plan or project for the sites concerned is not to take into account the future benefits of such 'measures' if those benefits are uncertain, *inter alia* because the procedures needed to accomplish them have not yet been carried out or because the level of scientific knowledge does not allow them to be identified or quantified with certainty.
29. The views of expert statutory consultees in the field of nature conservation are to be given weight by decision-makers and that cogent and compelling reasons are required for departing from such advice: e.g. **Hart DC v SSCLG** [2008] 2 P. & C.R. 16 at [42] (CD Ref EA15) and **R (Akester) v DEFRA** [2010] EWHC 232 (Admin) at [112] (CD Ref EA16). Decision makers, such as the EA in undertaking its AA, have an enhanced margin of appreciation in cases involving scientific, technical and predictive assessments: **R (on the application of Mott) v Environment Agency** [2016] EWCA Civ [2016] 1 WLR 4338 at [64, 69 and 74] (CD Ref EA16a).

Relevant Sites and Species

30. The EA disagrees with paragraph 5.7 of the Appellant's Statement of Case insofar as it argues that the Severn Estuary SAC and Severn Estuary SPA are "the most relevant

sites". Any European protected site (or Ramsar site with equivalent protection as a matter of policy) in respect of which there is an effect pathway is relevant to the Habitats Regulations Assessment ("HRA") including in particular the Usk and Wye SACs. The AA sets out all such sites and their conservation objectives. The next section of this Statement of Case summarises all sites and species in respect of which the EA assessed that it was not possible to conclude no adverse effect on integrity.

The EA's position

31. The EA's position is set out in the AA. Underpinning the AA is a body of technical work about the predicted effects on migratory fish species (sea lamprey, river lamprey, allis shad, twaite shad, sea trout, European eel and Atlantic salmon) and marine fish assemblage (over 100 species collectively). This work has been documented in a series of documents called Feature Impact Assessment Templates ("FIATs") which have been produced, and shared with the Statutory Nature Conservation Bodies (Natural England ("NE") and Natural Resources Wales ("NRW")).
32. The EA has had regular engagement with NE and NRW to aid the development of its AA. NE & NRW were consulted on the draft AA report and the EA updated it having regard to their comments (NE response (**CD Ref EA17**) and NRW response (**CD Ref EA18**)). NE stated in its response to the EA that that it believed the EA's documents 'are the product of sound scientific judgement and take into account the best and most recent science and evidence'.
33. This section summarises the particular marine fish species and migratory fish species in respect of which the EA cannot conclude no adverse effect on integrity.
34. The approach the EA took to assessing the numerical data and evidence, to predict the potential levels of fish that may be removed from the populations associated with the Bristol Channel is known as the 'Quantitative Impact Assessment (QIA) Model', see TB020 (**CD Ref EA19**). The model uses intake data from the existing Hinkley Point B (HPB) station, alongside survey data from the Bristol Channel, to estimate the

potential fish losses. Uncertainty has been analysed at each step to ensure that conclusions drawn from the results are proportionate and reasonable.

35. The EA took the basis of the assessment model provided by the Appellant to support the permit variation application and reviewed the evidence, data, and justifications presented for each step of the process. The EA also considered detail supplied during the original permit application and other sources of available evidence and data.
36. The EA adopted the Appellant's model but made various adjustments to ensure the assessment used the most up to date evidence and data, and to ensure it meets the requirements of the AA. These adjustments and their implications to the assessment model results are summarised step by step in a flow diagram (**CD Ref EA20**).
37. The most significant adjustments are:
 - a. The inclusion of entrainment losses to ensure assessment is based on overall potential impacts from the cooling water system (CWS), not just the impingement proportion. Although entrainment is not affected by the AFD system, new evidence on glass eel densities in the Bristol Channel was submitted as part of the application. This produces an additional 10 tonnes of equivalent adults, resulting in an increase of two orders of magnitude % loss from the population, see TB004 (**CD Ref EA21**).
 - b. The application of the LVSE Intake Design factors. The Appellant applied these to reduce to numbers of individuals entering the CWS due to the efficient design of the intakes. These factors were not included in the original permit application and were not discussed during the pre-application process. On reviewing these factors the EA has reassessed the intake intercept area over the full tidal cycle, taking account of the slight misalignment of the intakes with the tide, see TB006 (**CD Ref EA22**). The EA has also devised an alternative ratio due to the capped design of the intakes by calculating the difference in the proportion of the water column HPB & HPC will be abstracting from over a full tidal cycle, see TB007 (**CD Ref EA23**). These adjustments result in a range of

increases to the predicted impacts depending on species, ranging from 15 – 200%.

- c. The calculation of Equivalent Adult Value (EAV) factors. EAVs are models by which large numbers of younger fish can be equated to an equivalent number of adults. This allows entrapment mortality to be compared with population measures of adults to give proportional losses to populations. The EA conducted a detailed review into the Appellant's method which was broadly accepted, however, found that the Appellant's method systematically undervalued species of fish that can survive to spawn in multiple years (repeat spawning). The EA developed an extension to the appellant's method, the Spawning Production Foregone (SPF) extension in TB010 (**CD Ref EA24**). This uses the same processes and assumptions as the Appellant to calculate the total number of spawning fish (first-time and repeat spawners) that would have been present in the population, had they not been impinged. By applying the SPF extension the majority of EAV factors have been increased, some by an order of magnitude (e.g. Atlantic cod, Atlantic herring). This has a varying degree of effect on the final impact figures with the most notable being Atlantic cod with an order of magnitude increase, while Dover sole, European sea bass and twaite shad have shown a 4 fold increase.
- d. Defining the appropriate scale of assessment areas for marine fishes. The stock units used by the Appellant were developed by ICES to manage near shore and offshore commercial fish stocks, not for an estuarine environmental impact assessment or HRA. The Appellant justifies the use of the ICES areas as marine fish move over these very large areas and the local population in the Severn Estuary in fact moves freely out into the Atlantic and English Channel, and is replenished by fish from those areas. However there has been no evidence provided in the application to substantiate this. The EA's review of information and data from 90 peer reviewed academic articles in TB011 (**CD Ref EA25**), agrees that most fish move freely in and out of the SAC but highlights that many species do not move over large distances. This literature based review concludes that there is evidence to support more fine scale structures within these biological stock unit areas for many of the species, producing re-scaling

reduction factors between 4.00 (herring) and 32.42 (sea bass) to develop more appropriate population sizes for the ecological impact assessments.

38. The EA also undertook an additional step to analyse the inherent uncertainties involved in each of the steps of the QIA model using a Monte Carlo Simulation model in TB013 (**CD Ref EA26**). This was raised with the Appellant during the pre-application advice as an important step to undertake to acknowledge and consider the combined uncertainty involved in developing such predictions, particularly in providing an AA.
39. The QIA model results in TB020 (**CD Ref EA19**) and uncertainty analysis have informed the assessments required as part of the permit variation determination including the AA.

Twaite Shad (Alosa Fallax)

40. Twaite shad is an Annex II listed feature of the following sites requiring appropriate assessment:
 - (1) Severn Estuary SAC
 - (2) River Wye SAC
 - (3) River Usk SAC
 - (4) Carmarthen Bay SAC
 - (5) River Tywi SAC
 - (6) Pembrokeshire Marine SACand in accordance with the connections identified via The Unlocking the Severn project,
 - (7) Blackwater River (Cork / Waterford) SAC
 - (8) River Barrow and River Nore SAC
 - (9) Slaney River Valley SAC
41. Twaite shad is also a feature of the Severn Estuary Ramsar migratory fish assemblage.

42. In the AA, the EA assessed the potential for an adverse effect alone on the integrity of the abovementioned sites from the direct effects of entrapment (impingement plus entrainment).
43. The Severn Estuary twaite shad population is classed as “unfavourable inadequate” in the latest Article 17 Habitats Directive reporting. The decline from historic levels has primarily been due to barriers (e.g. weirs) preventing access to available spawning habitat for this species. However abstractions may well be the major pressure on existing numbers given that the barriers have been in place for a very long time and have, or are being removed or modified.
44. The conservation objective for the Annex II twaite shad feature of the Severn Estuary SAC is to maintain the feature as a whole in a favourable condition. The feature will be considered to be in favourable condition when, subject to natural processes, the following condition is met:
- (a) The size of the twaite shad population within the Severn Estuary and the rivers draining into it is at least maintained and is at a level that is sustainable in the long term.
 - (b) The abundance of prey species forming the twaite shad’s food resource within the estuary, in particular at the salt wedge, is maintained (this will be considered in the assessment of the fish assemblage).
45. The conservation objective for the “estuaries” feature of the Severn Estuary SAC is to maintain the feature in favourable condition. The feature will be considered to be in favourable condition when, subject to natural processes, the following condition is met: the abundance of the notable estuarine species assemblages is maintained or increased.
46. The conservation objective for the migratory fish assemblage of the Severn Estuary Ramsar states that twaite shad will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- (a) The size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;
 - (b) The abundance of prey species forming the principle food resources for the assemblage species within the estuary, is maintained.
47. The conservation objectives for the River Wye SAC and the River Usk SAC are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring for qualifying species (relevant to this assessment): the populations of qualifying species.
48. The AA assessed the impact of removing the AFD using the QIA Model. Due to the size of twaite shad found within the estuary as either adults, sub adults or juveniles it has been assumed that they will all be impinged and none will be small enough to fit through the 5mm mesh screen to be entrained.

Results for QIA: Severn Estuary SAC and Ramsar

49. The results of the QIA Model of the removal of the AFD on the population of twaite shad within the Severn Estuary SAC and Ramsar is provided in Table 7 of the AA. The EA predicts that it is most likely 0.1% of the Severn Estuary population will be impinged each year that HPC operates. Uncertainty analysis showed that in any given year of operation of HPC, the EA would usually expect mortality to be above <0.1% (1st percentile) and below 1.1% (99th percentile) of the Severn Estuary population. Extreme high or low percentile values can occur but would be unlikely to happen consistently.
50. At p.55 of the AA, the EA's assessment was that:
- The scale of the predicted impingement of twaite shad using the best evidence is low but at the 99th percentile level could be at a level that would prevent the Severn Estuary / Môr Hafren SAC and Ramsar from achieving favourable status. HPC is scheduled to operate for sixty years, therefore any impact that the station has will be long-lasting, and continuous over that period.

The population varies cyclically naturally as good recruitment leads to a peak in the Severn Estuary population before natural mortality sees a reduction until the next recruitment peak takes over, however despite these good recruitment years the population has shown a long term decline over the last 40 years, meaning any new exploitation pressure could further continue this decline preventing favourable status being achieved.

Figure 8 illustrates the impacts of losses to twaite shad populations and how they would negatively impact on a healthy population in the long term. However our predicted losses are against a background of declining populations with the feature currently in unfavourable condition, further impacting on the twaite shad's ability to recover from small percentage losses. It is considered that these losses could prevent the species reaching favourable status.

51. Consequently, the EA's conclusion in the AA was that:

- (1) When considering the target to ensure that the abundance of the notable estuarine species assemblages is maintained or increased it is **not possible to conclude no adverse effect** on the Severn Estuary SAC;
- (2) When considering the target to ensure that the size of the Annex II twaite shad population within the Severn Estuary and the rivers draining into it is at least maintained and is at a level that is sustainable in the long term it is **not possible to conclude no adverse effect** on the Severn Estuary;
- (3) When considering the target to ensure that the size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term it is **not possible to conclude no adverse effect** on the Severn Estuary Ramsar.

Results for QIA: River Wye SAC

52. The results of the QIA Model of the removal of the AFD on the population of twaite shad within the River Wye SAC is provided in Table 8 of the AA. The EA predicts that impact levels are expected to be a small percentage (0.3%) of the population of the

twaite shad within the River Wye SAC over the lifetime of the station, however HPC is scheduled to operate for sixty years, therefore any impact that the station has will be long-lasting, and continuous over that period.

53. At p.57 of the AA, the EA's assessment was that:

The river Wye, having currently the largest available spawning habitat, is likely to be the least affected by shad mortality pressure from HPC. Figure 8 illustrates how losses can negatively impact twaite shad populations in the long term. Our predicted losses of 0.3% are against a background of declining populations with the feature currently in unfavourable condition- factors which will further impact on the twaite shad's ability to recover from small percentage losses. It is considered that these losses could prevent the species reaching favourable status.

54. Consequently, the EA's conclusion in the AA was that when considering the target to maintain or restore the populations of qualifying species it is **not possible to conclude no adverse** effect on the River Wye SAC.

Results for QIA: River Usk SAC

55. The results of the QIA Model of the removal of the AFD on the population of twaite shad within the River Usk SAC is provided in Table 9 of the AA. The EA predicts that it is most likely 0.6% of the River Usk population will be impinged each year that HPC operates. Although higher and lower impacts will be expected in any given year over the life time of the power station.

56. At p.58 of the AA, the EA's assessment was that:

The long term decline in the twaite shad population means that these population losses are an additional pressure on the population, preventing the feature from being restored to favourable condition. Figure 8 illustrates how losses can negatively impact twaite shad populations in the long term the impacts of losses to twaite shad populations and how they would negatively impact on a healthy population in the long term. However, our predicted losses are against a background of declining populations with the feature currently in unfavourable condition, factors which will further impact on the twaite shad's ability to recover from small percentage losses.

It is considered that these losses could prevent the species reaching favourable status.

57. Consequently, the EA's conclusion in the AA was that when considering the target to maintain or restore the populations of qualifying species it is **not possible to conclude no adverse effect** on the River Usk SAC.

Allis Shad (Alosa alosa)

58. Allis shad is an Annex II listed feature of the following sites requiring appropriate assessment:

- (1) River Wye SAC
- (2) River Usk SAC
- (3) Carmarthen Bay SAC
- (4) River Tywi SAC
- (5) Pembrokeshire Marine SAC
- (6) Plymouth Sound and Estuaries SAC

59. Allis shad is also a feature of the Severn Estuary Ramsar migratory fish assemblage and part of the notable species sub-feature of the estuary feature of the Severn Estuary SAC.

60. The conservation objectives for the "estuaries" feature of the Severn Estuary SAC, (allis shad contributing to the fish assemblage part of notable species sub-feature of estuary) is to maintain the feature in favourable condition. The feature will be considered to be in favourable condition when, subject to natural processes, the abundance of the notable estuarine species assemblages is maintained or increased.

61. The conservation objective for the migratory fish assemblage of the Severn Estuary Ramsar states that the assemblage will be considered to be in favourable condition when, subject to natural processes, each of the following condition relevant to this assessment is met:

- (1) The size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;
 - (2) The abundance of prey species forming the principle food resources for the assemblage species within the estuary, is maintained
62. The conservation objectives for the River Wye SAC are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring for qualifying species.

Results of the QIA: Severn Estuary and Ramsar

63. The results of the QIA Model of the removal of the AFD on the population of allis shad within the Severn Estuary SAC and Ramsar is provided in Table 10 of the AA. The EA predicts that impact levels are expected to be a small annual percentage (0.9%) of the population of the allis shad within the Severn Estuary SAC and Ramsar over the lifetime of HPC. Uncertainty analysis showed that in any given year of operation of HPC, mortality would usually be expected to be above 0.3% (the 1st percentile from the uncertainty analysis) and below 8% (99th percentile). Extremely high or low percentile values can occur but would be unlikely to happen consistently.
64. At p.63 of the AA, the EA's assessment was that:
- HPC is scheduled to operate for sixty years, therefore any impact that the station has will be long-lasting, and continuous over that period. The entrainment of allis shad is unlikely as given their size they will not be able to pass through the 5mm screen mesh proposed at HPC. Therefore the entrapment value for this feature is based on the impingement predictions only.
- Historically allis shad populations have been much higher than they are now, although there is still genetic evidence for a remnant local population (TB016). The modelled losses at HPC are likely to put further pressure on a declining population, while also preventing population recovery. The predicted impingement losses are 0.9%, with uncertainty putting the margins between 0.3% and 8%. This predicted impact, coupled

with the small population size, could prevent the feature from being maintained at a sustainable level.

Figure 8 illustrates the impacts of losses to twaite shad populations and how they would negatively impact on a healthy population in the long term. Similar percentage impacts could act upon allis shad in a similar way. Our predicted losses are against a background of declining populations with the feature currently in unfavourable condition, further impacting on the allis shad's ability to recover from the predicted losses, particularly when considering the 99th percentile prediction of 8% of the population. If modelled mortality increases by 5 – 10% then the population is predicted to decline by 6.5 and 13% respectively, over the long term. Unlike twaite shad which have the ability to spawn in successive years, allis shad typically spawn only once in their lifetime – a behavioural trait that may make allis shad populations more vulnerable to local extinction (Roberts & Hawkins, 1999).

65. Consequently, the EA's conclusion in the AA was that:

- (1) When considering the target to ensure the structure and function (including typical species) of qualifying natural habitats, it is **not possible to conclude no adverse effect** on the Severn Estuary SAC alone;
- (2) When considering the target to ensure the abundance of the notable estuarine species assemblages is maintained or increased, it is **not possible to conclude no adverse effect** on the Severn Estuary SAC alone;
- (3) When considering the target to ensure that the size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term it is **not possible to conclude no adverse effect** on the Severn Estuary Ramsar alone.

Results of QIA: River Wye SAC

66. The results of the QIA Model of the removal of the AFD on the population of allis shad within the Severn Estuary SAC and Ramsar is provided in Table 11 of the AA. The EA predicts that impact levels are expected to be at 2% of the population of the allis shad

annually within the River Wye SAC, although higher and lower impacts will be expected in any given year over the life time of the power station.

67. At p.64 of the AA, the EA's assessment was that:

The modelled losses of allis shad at HPC are likely to put further pressure on a declining population, while also preventing population recovery. Losses could have been assigned on a proportional basis to each river of origin, based on their number in each river.

However, without evidence that impingement is proportional in this way, it is possible that impingement could be underestimated for some rivers. A precautionary approach is therefore to assume that all impinged allis shad originate from the River Wye / Afon Gwy SAC (there being no data on the proportion of allis shad impinged at HPB that originated from each population). Although we are adopting this as a precautionary approach we do recognise that there is a low probability of all impinged twaite shad originating from the same river.

The predicted impingement losses are 2%, with uncertainty putting the margins between 0.7% and 20%. Given how unlikely it is that all impinged allis shad would originate from a single river, we will not consider the 99th percentile value in our assessment of potential impacts on the River Wye / Afon Gwy SAC, as to do so would be overly precautionary.

Figure 8 illustrates the impacts of losses to twaite shad populations and how they would negatively impact on a healthy population in the long term. Similar percentage impacts could act upon allis shad in a similar way. Our predicted losses are against a background of declining populations with the feature currently in unfavourable condition, further impacting on the allis shad's ability to recover from the predicted losses. Unlike twaite shad which have the ability to spawn in successive years, allis shad typically spawn only once in their lifetime – a behavioural trait that may make allis shad populations more vulnerable to local extinction (Roberts & Hawkins, 1999).

68. Consequently, the EA's conclusion in the AA was that when considering the target to maintain or restore the populations of qualifying species it is **not possible to conclude no adverse effect** on the River Wye SAC.

Salmon (*Salmo salar*)

69. Salmon is an Annex II listed feature of the River Wye SAC and River Usk SAC, it is also a feature of the Severn Estuary Ramsar migratory fish assemblage, and is a notable feature of the estuaries sub-feature of the Severn Estuary SAC.
70. The conservation objective for the Estuary feature of the Severn Estuary SAC (salmon contributing to the sub feature fish assemblage) is to maintain the feature in a favourable condition. The feature will be considered to be in favourable condition when, subject to natural processes, the following condition is met the abundance of the notable estuarine species assemblages is maintained or increased.
71. The conservation objective for the migratory fish assemblage of the Severn Estuary Ramsar states that the assemblage will be considered to be in favourable condition when, subject to natural processes, each of the following condition relevant to this assessment is met:
- (1) The size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;
 - (2) The abundance of prey species forming the principle food resources for the assemblage species within the estuary, is maintained (this will be considered in the marine assemblage assessment below)
72. The conservation objectives for the River Wye SAC and the River Usk SAC are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring for qualifying species the populations of qualifying species.

Results for QIA: Severn Estuary SAC and Ramsar

73. The results of the QIA Model of the removal of the AFD on the population of Atlantic salmon within the Severn Estuary SAC and Ramsar is provided in Table 12 of the AA.

The EA predicts that the annual entrapment mortality for the Severn Estuary would be 76 Atlantic salmon which equates to 17 adult equivalents using the simplified EAV factor (0.10% of the adult salmon running the estuary). The uncertainty analysis shows that in any given year of operation of HPC, the EA would usually expect mortality to be above 0.08 adult equivalents (<0.01% of run, the 1st percentile from the uncertainty analysis) and below 254.3 adult equivalents (1.6% of run, 99th percentile).

74. At p.72 of the AA, the EA's assessment was that:

Impingement of this scale is comparable to historic records elsewhere in the Severn Estuary. The annual estimates of impingement of smolts at Oldbury Power Station in the 1970s (Claridge & Potter, 1994) would have corresponded to 174, 67, 128, 58 and 21 adult equivalents (1972 to 1976), and at Berkeley 107, 174 and 43 adult equivalents (1974 – 1976). This is an illustration of the scale of losses only, as marine survival of smolts would have been different in the 1970s. Oldbury and Berkeley are in different locations to HPB and HPC, and so the numbers of Atlantic salmon migrating past the intakes may differ - also, Atlantic salmon population sizes are not the same now as in the 1970s. However, comparison with the figures of Claridge & Potter (1994) does show that predicted impingement of 76 Atlantic salmon (17 adult equivalents) at HPC, is similar to, but lower than, previously described ranges for power stations in the Severn.

At present (2019), a byelaw prevents netting/trapping Atlantic salmon in the Severn Estuary, to allow stocks to recover. In 2018, the Total Allocated Catch for Atlantic salmon in the net/trap fishery in the Severn Estuary was 188 Atlantic salmon (1.1% of mean Severn estuary spawning run, 1997-2017), although the declared catch was just 93 Atlantic salmon (0.5% of mean Severn Estuary run, 1997-2017). The Environment Agency's Appropriate Assessment for the fishery could not conclude no adverse effect on site integrity, given the 'probably at risk' status of the fishery and projected further declines in population size. From our uncertainty analysis, in any given year, there is a 1% chance of an impact greater than 254.3 adult equivalents (99th percentile). Although we predict impingement losses of 17 adult equivalents impacts of a scale comparable to that of the (now suspended) net/trap fishery might be possible in some years (99th percentile from uncertainty analysis).

In 2019, the Welsh Government held an inquiry into NRW's proposed Wales Rod and Line (Salmon and Sea Trout) Byelaws 2017 and the Wales Net Fishing (Salmon and Sea

Trout) Byelaws 2017. The inquiry recommended that the Byelaws be confirmed (Planning Inspectorate, 2019). The byelaws proposed a mandatory requirement for all Atlantic salmon caught by rod and line or nets to be returned to the river (mandatory catch and release), as well as other changes to control bait types, tackle types and fishing seasons.

Principle [*sic*] objections to these byelaws included that the measures would not make any difference, or that the difference (1% to 2% of the spawner stock) would be so negligible as to not be worthwhile (Section 119, Planning Inspectorate, 2019). This was countered by an expert witness independent from NRW (a fisheries scientist from Cefas) who said that ‘every spawning fish matters’ and that ‘it’s important to note that any additions to the spawning stocks are particularly valuable when stocks are at low levels. Even relatively small numbers of fish are crucial to recover stocks in as short a time as possible.’ (Section 134, Planning Inspectorate, 2019). Although the measures would result in relatively modest increases in the short term, ‘every little bit helps’ when stocks are at such low levels and even relatively small numbers of fish are crucial in order to recover stocks in as short a time as possible (Section 135, Planning Inspectorate, 2019).

There would also be accumulated benefits of spawner numbers over time - egg deposition would result in increased numbers of adults and even relatively low increases of stock levels year on year may have a significant effect in terms of restoration of fish stocks (Section 136, Planning Inspectorate, 2019)

75. Consequently, the EA’s conclusion in the AA was that:

- (1) When considering the target to ensure the structure and function (including typical species) of qualifying natural habitats, it is **not possible to conclude no adverse effect** on the Severn Estuary SAC alone;
- (2) When considering the target to ensure the abundance of the notable estuarine species assemblages is maintained or increased, it is **not possible to conclude no adverse effect** on the Severn Estuary SAC alone;
- (3) When considering the target to ensure that the size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at

least maintained and is at a level that is sustainable in the long term it is **not possible to conclude no adverse effect** on the Severn Estuary Ramsar alone.

Results for QIA: River Wye SAC

76. The results of the QIA Model of the removal of the AFD on the population of Atlantic salmon within the River Wye SAC is provided in Table 13 of the AA. The EA predicts that if all HPC entrapment mortalities are assumed to come from the River Wye salmon population, then 0.28% of the river's spawning adults will be killed (= 17 equivalent adult salmon). Although higher and lower impacts will be expected in any given year over the life time of the power station.

77. At p.72 of the AA, the EA's assessment was that:

All quantitative predictions of Atlantic salmon losses are affected by the data-deficiency for this species. For example, Atlantic salmon smolts (seaward-migrating juveniles) move through estuaries quickly and impingement could be underestimated if sampling times did not coincide with these periods (see Salmon FIAT). Although the RIMP programme may potentially underestimate impingement, nevertheless it has shown that HPB does impinge Atlantic salmon and therefore the operation of HPC is also expected to result in Atlantic salmon being impinged.

HPC is scheduled to operate for sixty years. Any impact that the station has will be long-lasting, and continuous over that period, and may begin when the River Severn, River Wye and River Usk populations are all categorised as being 'probably at risk'.

We do not know which population Atlantic salmon impinged at HPC will come from. Losses could have been assigned on a proportional basis to each river of origin, based on their number in each river. However, without evidence that impingement is proportional in this way, it is possible that impingement could be underestimated for some rivers. A precautionary approach for the River Wye / Afon Gwy SAC and River Usk / Afon Wysg SAC is to assume that all impinged Atlantic salmon originate from each population in turn (there being no data on the proportion of Atlantic salmon impinged at HPB that originated from each population). Although we are adopting this as a precautionary approach we do recognise that there is a low probability of all impinged Atlantic salmon originating from the same river.

Our calculated estimate for annual entrapment mortality for the River Wye was 76 Atlantic salmon which equates to 17 adult equivalents using our simplified EAV factor (0.3% of the adult Atlantic salmon running the Wye, Table 13). The uncertainty analysis shows that in any given year of operation of HPC, we would usually expect mortality to be above 0.08 adult equivalents (<0.01% of run, 1st percentile). Given how unlikely it is that all impinged Atlantic salmon would originate from a single river, we will not consider the 99th percentile value in our assessment of potential impacts on the River Wye / Afon Gwy SAC, as to do so would be overly precautionary.

The River Wye stock is currently not achieving its Conservation Limit, and the low densities of fry and parr recorded in the river in recent years indicate this situation will not be reversed soon. Given the 'probably at risk' status of the River Wye stock there is currently no exploitable excess of Atlantic salmon. As such any new exploitation is considered to present a risk to allowing present numbers of Atlantic salmon to be maintained or restored.

When stocks are at low levels even relatively small numbers of fish are crucial to recover stocks in as short a time as possible.

78. Consequently, the EA's conclusion in the AA was that when considering the target to maintain or restore the populations of qualifying species it is **not possible to conclude no adverse effect** on the River Wye SAC.

Results for QIA: River Usk SAC

79. The results of the QIA Model of the removal of the AFD on the population of Atlantic salmon within the River Usk SAC is provided in Table 14 of the AA. The EA predicts that if all HPC entrapment mortalities are assumed to come from the River Usk salmon population, then 0.26% of the river's spawning adults will be killed (\equiv 17 equivalent adult salmon). Although higher and lower impacts will be expected in any given year over the life time of the power station.

80. At p.75 of the AA, the EA's assessment was that:

We do not know which population Atlantic salmon impinged at HPC will come from. Losses could have been assigned on a proportional basis to each river of origin, based on their number in each river. However, without evidence that impingement is proportional in this way, it is possible that impingement could be underestimated for

some rivers. A precautionary approach for the River Wye / Afon Gwy SAC and River Usk / Afon Wysg SAC is to assume that all impinged Atlantic salmon originate from each population in turn (there being no data on the proportion of Atlantic salmon impinged at HPB that originated from each population). Although we are adopting this as a precautionary approach we do recognise that there is a low probability of all impinged Atlantic salmon originating from the same river.

Our calculated estimate for annual entrapment mortality for the River Wye was 76 Atlantic salmon which equates to 17 adult equivalents using our simplified EAV factor (0.3% of the adult Atlantic salmon running the Wye, Table 13). The uncertainty analysis shows that in any given year of operation of HPC, we would usually expect mortality to be above 0.08 adult equivalents (<0.01% of run, 1st percentile). Given how unlikely it is that all impinged Atlantic salmon would originate from a single river, we will not consider the 99th percentile value in our assessment of potential impacts on the River Wye / Afon Gwy SAC, as to do so would be overly precautionary.

The River Wye stock is currently not achieving its Conservation Limit, and the low densities of fry and parr recorded in the river in recent years indicate this situation will not be reversed soon. Given the 'probably at risk' status of the River Wye stock there is currently no exploitable excess of Atlantic salmon. As such any new exploitation is considered to present a risk to allowing present numbers of Atlantic salmon to be maintained or restored.

When stocks are at low levels even relatively small numbers of fish are crucial to recover stocks in as short a time as possible.

81. Consequently, the EA's conclusion in the AA was that when considering the target to maintain or restore the populations of qualifying species it is **not possible to conclude no adverse effect** on the River Usk SAC.

European Eel (*Anguilla Anguilla*)

82. The European eel is a feature of the Severn Estuary Ramsar migratory fish assemblage, and is a notable feature of the estuaries sub-feature of the Severn Estuary SAC.
83. The conservation objective for the estuary feature of the Severn Estuary SAC (eel contributing to the sub feature fish assemblage) is to maintain the feature in a favourable condition. The feature will be considered to be in favourable condition

when, subject to natural processes, each of the following conditions are met: the abundance of the notable estuarine species assemblages is maintained or increased.

84. The conservation objective for the migratory fish assemblage of the Severn Estuary Ramsar states that the assemblage will be considered to be in favourable condition when, subject to natural processes, each of the following conditions relevant to this assessment are met:

(1) The size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;

(2) The abundance of prey species forming the principle food resources for the assemblage species within the estuary, is maintained.

Results of QIA

85. The results of the QIA Model for the removal of the AFD on the population of European eel within the Severn Estuary SAC and Ramsar is provided in Table 16 of the AA. The EA predicts that entrapment (impingement plus entrainment) levels will be 3.270% percentage of the population of the European eel leaving the Severn Estuary SAC and Ramsar each year on their spawning migration, over the lifetime of the station. The results of the uncertainty analysis predict a mean loss of 2.36% of the annual population with margins between 1% (1st percentile) and 7% (99th percentile).

86. At p.86 of the AA, the EA's assessment was that:

Putting the expected HPC annual impact on European eel in the Severn SAC/Ramsar of 3.3% (Table 16) into context, it is appropriate to consider the current stock indicators for the Severn RBD and their compliance with conservation targets. It is not possible to delineate the River Parrett from the reported SW RBD indicators and so these are not included here.

For the entrainment impact element (and ignoring the smaller predicted impact from impingement), by focussing on pre-fishery & pre-barrier escapement potential (SE equivalents), the HPC mean annual predicted impact is 3.2%.

However it is also appropriate to consider the current Severn RBD Bcurr stock indicator is failing the escapement target (40% of Severn B0) – it is at just 9% of B0. In addition, the 40% European Stock management target itself recognises difficulty in bringing stock back to historical levels and expects the 40% target to happen “in the long term”. If the 40% escapement target is taken as a measure of sustainability for European eel in the Severn RBD, then it is not possible to conclude that current levels of silver eel escapement are currently “sustainable” – contrary to the aims of the Conservation Objectives.

There has been a steep downward trend for European eel recruitment over the last 30 years. ICES (2019a) reported a change in 2011 in the trend of glass eel recruitment indices; the recruitment stopped decreasing and has been increasing in the period 2011–2019 “at a rate that statistically differs significantly from zero”. This change in the trend is not being viewed by WGEEL as a recovery; recruitment has increased over the last few years but that does not mean it will continue to do so and it remains very low.

The latest management advice (ICES 2019a) states “ICES advises that when the precautionary approach is applied for European eel, all anthropogenic impacts (e.g. caused by recreational and commercial fishing on all stages, hydropower, pumping stations, and pollution) that decrease production and escapement of silver eels should be reduced to, or kept as close as possible to, zero in 2020”.

Against this background, it is not possible to conclude that the levels of silver eel escapement would be sustainable “in the long-term” – again contrary to the aims of the Severn Estuary / Môr Hafren Ramsar Conservation Objectives.

The current HPB European eel impingement trend and the UK and Severn Estuary glass eel fishery returns are consistent with the widespread recruitment declines seen across the population range. Therefore the current component of the population which features in the SAC/Ramsar would not be considered sustainable by any measure already. While this is clearly not a product of HPC operation, it is not expected to be purely “natural variation” either (i.e. some anthropogenic impact from the fishery, barriers and other intakes). The additional impact of entrainment (particularly) and impingement from HPC cannot be seen to reduce anthropogenic pressure in any way, or maintain a sustainable population size within the Severn Estuary and the rivers that drain into it.

Considering our estimate that HPC will reduce annual recruitment (via entrainment) and escapement (via impingement) by a combined mean of 3.3% within the SAC/Ramsar over the 60+ year life of the project, on a measure which is failing its sustainability targets by a long way and is forecast to do so for some time, it is not possible to conclude no impact upon site integrity.

87. Consequently, the EA's conclusion in the AA was that

- (1) when considering the target to ensure the structure and function (including typical species) of qualifying natural habitats, it is **not possible to conclude no adverse effect** on the Severn Estuary SAC alone;
- (2) When considering the target to ensure the abundance of the notable estuarine species assemblages is maintained or increased, it is **not possible to conclude no adverse effect** on the Severn Estuary SAC alone;
- (3) When considering the target to ensure that the size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term it is **not possible to conclude no adverse effect** on the Severn Estuary and Ramsar alone.

Assemblage of the fish species

88. The assemblage of fish species (117 species were identified) is part of the notable species sub-feature of the estuary feature of both the Severn Estuary SAC and Ramsar.

The assemblage of fish species includes:

- (1) Migratory species;
- (2) river lamprey, sea lamprey, twaite shad, Allis shad, sea trout, Atlantic salmon, European eel;
- (3) Estuarine species;
- (4) species typically occurring and breeding in estuaries (Bird, 2008);
- (5) marine species occurring in large numbers in estuaries (Bird, 2008);
- (6) Marine species;

- (7) predominantly marine species occurring infrequently in the Severn (Bird, 2008);
- (8) freshwater species;
- (9) species typically occurring and breeding in freshwater and recorded within the Severn SAC.

- 89. The conservation objective for the “estuaries” feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SAC “estuaries” feature in so far as these objectives are applicable to the area designated as Ramsar site.
- 90. The conservation objective for the “estuaries” feature of the Severn Estuary SAC is to maintain the feature in favourable condition. The feature will be considered to be in favourable condition when, subject to natural processes, the abundance of the notable estuarine species assemblages is maintained or increased.
- 91. In the AA the EA applied a screening process (described in Annex 4 of the AA and summarised at pp.90-91). This resulted in the potential impacts of the cooling water system for HPC being assessed for 16 fish species within the marine fish assemblage, as well as brown shrimp.
- 92. The EA’s quantitative analyses identified cause for concern over the impacts of the cooling water system on Atlantic cod, European sea bass, Atlantic herring and Whiting.
- 93. Due to concerns over predicted losses on individual marine species, and the potential for these losses to impact the structure of the assemblage the EA was unable to conclude that there will be no impacts upon marine species within the assemblage of fish species. In addition to the marine species, the EA also had concerns over impacts on species within the migratory species group of the assemblage (Atlantic salmon, Sea lamprey, Twaite shad, Allis shad and European eel).

94. Consequently, when considering the target to ensure that the abundance of the notable estuaries species assemblages is maintained or increased, it is **not possible to conclude no adverse effect** on the Severn Estuary SAC and Ramsar.

The EA's Response to the Appellant's case

95. The EA's reasons for assessing that it is not possible to conclude no adverse effect are fully set out in the AA. In this section, the EA additionally responds to specific paragraphs of the Appellant's Statement of Case which it disagrees with.
96. Cefas has a separation within its organisation resulting in one arm that acts as the government's fisheries expert body, and another arm that acts as a commercial consultant. The EA would like it noted that, contrary to that stated in the Appellant's Statement of Case, paragraph 3.17, it is the commercial arm of Cefas that is acting as a consultant to the Appellant and not the government's advisory body.
97. The EA disagrees with the Appellant's claim at paragraph 3.4 that the LVSE, without an AFD, will be highly effective in reducing the number of fish entering the system. No evidence has been produced to demonstrate this. On the contrary, the documents referenced in TB006 Appendix 1 (**CD Ref EA22**) clearly state the LVSE intake heads will need a behavioural cue to deter fish from entering.
98. The Appellant is incorrect to state at paragraph 3.9 of its Statement of Case that eels "have no hearing". The EA agrees the AFD system being proposed as it is designed would not provide mitigation against entrapment of eels. However the development of AFD technology continues. Furthermore at paragraph 3.8 the Appellant states "small organisms suffer an extremely high rate of natural mortality and the Appellant and the EA agree that the additional mortality caused by entrainment at Hinkley Point C is not significant". The EA disagrees, particularly in the case of eel, where new data has been submitted as part of the application that enables assessment of the predicted glass eel entrainment, resulting in an additional 3.22% proportional loss compared to 0.05% for impingement alone.

99. At paragraph 4.4 of its Statement of Case, the Appellant says that it carried out the initial assessment in support of the WDA permit variation based on the methodologies which had been agreed with the EA for the original WDA permit application. However the EA notes that Cefas (on behalf of the Appellant) has now changed certain parameters since the original permit application. Further to this there are many elements of the pre-application advice the EA provided that the Appellant did not choose to follow in the preparation of its permit application. In addition to this the LVSE factors applied to the impingement assessment by the Appellant was not part of the original WDA permit application and was not discussed with the EA during the pre-application process for the current variation application.
100. In paragraph 4.6 of its Statement of Case the Appellant states “during the process of the EA reviewing Application in draft in 2018 it became clear that the EA were considering alternative ways to challenge the assessment methodology”, “the EA was unwilling to share details of the exact nature of these methodologies” and that “this hampered any meaningful technical engagement between the parties”. The EA strongly disagrees with these statements. During review of the draft permit application the EA could only advise on the information available at that point in time, which did not include all the relevant data or information to be able to develop any alternative methods. The EA did provide several suggestions, along with NE and NRW, on ways the Appellant could improve its application, some of which the Appellant chose to incorporate, others it did not.

The Focus of the Appeal

101. In paragraph 7.2 of its Statement of Case, the Appellant appears to dispute the inclusion of the fish assemblage in the EA’s assessments on the basis that there is no mention of them in the SAC citation. However, as the Appellant acknowledges in section 5 of its Statement of Case, the fish assemblage is a Ramsar feature which is accorded the same status as SAC features as a matter of Government policy. Additionally, the conservation objectives for the estuaries qualifying habitat make clear that “the structure and function (including typical species) of qualifying natural habitats” must be maintained or restored at favourable conservation status and this

includes the fish assemblage which is a sub-feature of the estuaries qualifying habitats. Indeed, the Severn Estuary European Marine Sites Regulation 33 advice treats the fish assemblage as a sub-feature of estuaries qualifying habitat (see row A13 on page 76, **CD Ref EA3**).

102. As set out in the AA, the EA used published literature and impingement data to identify 117 species within the fish assemblage. In order to reach a conclusion on whether the EA could rule out an adverse effect on the fish assemblage, it was necessary to consider species individually, and how potential effects on these species may affect the assemblage as a whole. It was not proportionate to consider all 117 species in detail, especially as it is the assemblage and not the individual species that are recognised in the site features and so the EA employed a screening process to focus its assessment upon species that reflect the whole fish assemblage and/or are considered to be potentially at risk from the development.

103. The EA also notes that the Appellant's description of the relevant legal test in paragraph 7.2 is incorrect. The test is not "whether there would be a significant adverse effect". As set out above, the test is that "*the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).*" In other words, the test is a prohibition on consent unless the competent authority can conclude beyond reasonable scientific doubt that there will not be an adverse effect on integrity. That is an important point in context of the uncertainties within both the EA HRA and the Appellant's assessments.

Effects predicted by Cefas

104. The EA does not agree that the assessment by Cefas is suitably precautionary or robustly evidenced in order to constitute a satisfactory HRA. The EA has carried out extensive technical work on each step of the assessment to ensure that all the relevant evidence is considered and the inherent uncertainties are taken in to account where there is a lack of evidence. This work is set out in a series of technical documents called Technical Briefs (TB000 to TB020).

105. Paragraph 7.3 states that a comprehensive assessment of the effectiveness of the LVSE has been undertaken. But in light of the removal of the AFD no evidence has been provided to substantiate whether the LVSE will still effectively reduce the fish entering the system without a behavioural cue.
106. Paragraph 7.7 states that calculations for the “HRA species” (a term the EA does not agree with and the selection of which is disputed - see paragraph 101 above) local populations have been used which were favoured by the EA. Defining local populations is favoured by the EA, however the EA has subsequently calculated its own local population estimates for the migratory species (Sea trout, River lamprey, Sea lamprey, Twaite shad, Allis shad, Atlantic salmon and European eel) which are documented in TB012 and TB015 – TB018 (**CD Ref. EA27 and EA28, EA29, EA30 & EA31**).
107. Paragraph 7.9 states that this still produced impacts below the “1% threshold”. The EA disagrees with the use of a 1% impact as a blanket threshold across all species and does not consider that such a fixed threshold is consistent with the CJEU case law set out above. Many of these diadromous species are data deficient, with the sampling programme not designed to sample their migration period (with the exception of glass eel - specific trawl data).
108. Also, the current state of these populations needs to be taken into account. ICES have described the status of the global eel stock as “critical”, on the basis that the annual glass eel recruitment to European waters in 2018 remained low. The European eel global stock was listed (in 2008, 2014 and again in 2020) as Critically Endangered in the IUCN Red List (Pike et al., 2020). In line with the wider population declines in recruitment of juvenile eel and yellow eel, all of the available data suggest these trends have been followed in the Severn SAC/Ramsar.
109. The estimated populations of Twaite shad in the Severn Estuary have shown a decline trend over the last 40 years, despite the removal of significant pressures on the species. There is also evidence (see TB016, **CD Ref EA29**) that a small remnant Allis

shad population persists in the rivers Severn and Wye. Work is currently underway to remove barriers to migration to help restore these populations.

110. Atlantic salmon are currently declining in almost every region of the North Atlantic and the rivers of the Severn Estuary are no different. Stock management decisions have concluded there is “no exploitable surplus” of salmon, which has resulted in the closure of net fisheries in the Severn Estuary and the implementation of an emergency byelaw in 2019 and its extension in 2020 prohibiting net fishing for salmon in Severn estuary and mandating catch-and-release for rod caught salmon in the River Severn. A byelaw requiring mandatory 100% catch-and-release of salmon has applied to the Wye rod fishery since 2012. A mandatory 100% catch and release byelaw was applied to the Usk rod fishery by Natural Resources Wales (NRW) in 2019.

Differences in assessment methodology

111. The EA agrees that differences in assessment parameters constitute the principal technical disagreement between the parties. The EA’s position on quantitative assessment of fish mortality; the method of adjustment made for juvenile fish to arrive at an Equivalent Adult Value figure (“EAV”) and the assumption made about the area and scale of the population of which the affected fish are members, is summarised below.

(A) Number of fish mortalities: quantitative assessment

112. The steps of the quantitative assessment followed by the Appellant and the EA is outlined in the flow diagram (**CD Ref EA20**). This document also summarises how, and briefly why, the EA’s assessment differs from that of the Appellant, and highlights the degree of effect these adjustments have on the assessment results. The most material adjustments the EA made are:

- (1) the inclusion of full entrapment assessment. This ensures the HRA conclusions are drawn for the overall system and not just the part most affected by the proposed permit variation;
- (2) the extension to the EAV approach which takes into account the value of repeat spawning fish (TB010, **CD Ref EA24**);

- (3) the effectiveness of the LVSE in reducing the number of fish entering the intakes without an AFD (TB006, **CD Ref EA22** and TB007, **CD Ref EA23**);
- (4) the scale and area of the appropriate fish populations the losses will occur from (TB011, **CD Ref EA25**).
- (5) and consideration of a full uncertainty analysis using a Monti Carlo Simulation (TB013, **CD Ref EA26**).

(B) Adjustment to account for juvenile fish

113. In paragraphs 7.20 and 7.21 the Appellant does not dispute the use of the extension the EA has applied to the EAV approach, however it disputes the way it has been applied. But the core method and its extension are both:

- (1) Based upon the same assumptions (including consistent impingement number and consistent stock spawning biomass ("**SSB**"));
- (2) Considering the survival of fish in years subsequent to the year of impingement.
- (3) Forecasting future numbers of fish and comparing these to the population measure.
- (4) Comparable with SSB when considered over multiple years of operation.
- (5) Considering actual numbers of fish which would have been part of the SSB had they not been impinged.

114. As both the core method and the extension are considering actual numbers of fish which would have been part of the SSB had they not been impinged, neither the core nor the extension method require the stock comparator (SSB or landings data) to be modified to account for its future spawning potential in TB010 (**CD Ref EA24**).

115. The SSB is a measurement of the total spawning stock, which is comprised not only of fish which would be entering the spawning stock for the first time, but also fish which matured in previous years and are now spawning for a second, third, fourth time, or more. Consequently, by calculating the number of maturing fish and the number of repeat spawners that would have been present in the population had they not been impinged, the extension provides an EAV figure which is more comparable to the SSB

than that which is calculated using the core method. To compare the core method with the SSB, the SSB needs to be scaled down so as to count only the number of fish maturing and entering the spawning stock for the first time.

(C) Comparison of mortality as a proportion of population

116. The EA's position on scale of assessment is that this must be at the designated site level as the test of no adverse effect is in relation to the integrity of the site (as CJEU case law and EU Commission guidance makes that clear). The EA does not accept that the use of the ICES fishery stock management units as an ecological assessment to judge effects as the Appellant maintains, without undertaking a rigorous literature review of each species to make sure there is no risk of more fine scale population structure or site fidelity.

117. The EA accepts that for the marine species that inhabit the Severn SAC/Ramsar within the fish assemblage it has not always been possible to assess against the SAC/Ramsar alone as the fish travel beyond the SAC/Ramsar boundary at different stages of their lifecycle. The larger units that the EA has used are the smallest possible to account for those mobile species and it has not accepted the much larger ICES units in most cases for the marine species. The outcome of this difference in view on scale of assessment is that the Appellant's estimates of the proportion of the population lost are in some cases magnitudes smaller than the EA's. A summary of the EA's impact results on fish species is provided in **CD Ref EA32**, table 2 provides a comparison between the EA's QIA Model results and the Appellant's results.

118. The stock units used by the Appellant were developed by ICES to manage near shore offshore commercial fish stocks, not for an estuarine Environmental Impact Assessment or HRA. The ICES stock areas are 90-15,000 times larger than the Severn SAC. In TB011 (**CD Ref EA25**), section titled 'Risks associated with use of fisheries management units for ecological impact assessments', the EA sets out its reason on the use of such a method for the purposes of an environmental impact assessment or HRA. For example, there is evidence of more localised population units at a biological level, including tagging studies suggesting that few fish would ever travel over such

vast distances. The Appellant's response to this is that many species show a genetically homogenous structure over the entirety of these stock areas. But it is scientifically recognised that very few individuals would have to mix across district populations to produce such a genetic structure. The application provides no evidence (such as a tagging study) to demonstrate that losses within the SAC area would be replenished adequately from a larger interspersed population due to fish migrating in to that SAC area.

119. The latest advice from ICES for divisions 7e-k from 2019 for cod is that it is clear that the stock is well below a biologically sustainable level. It also clearly states that their own assessment is highly likely to have overestimated SSB and highlights concern over the health of the stock which must be taken into the precautionary assessment required under the 2017 Regs. In addition to cod the status of the Atlantic herring stock in the Bristol Channel is uncertain and not assessed, but adjacent ICES stocks are considered to be at increased risk from fishing pressures and have a reduced reproductive capacity. ICES also determine that the European Bass stock development is decreasing over time and is presently functioning at a reduced reproductive capacity.

Cefas's SPP106 Alternative Analysis

Reasonableness Tests -Worked Example for Cod

120. The Appellant provided Cefas's SPP106 Alternative Analysis in July 2020 (**CD Ref G.3**). SPP106 compares the difference in approaches between the EA and the Appellant using cod (*Gadus morhua*) as an example and presents two 'reasonableness tests' for this species.

121. The EA has reviewed SPP106 (**CD Ref EA33**) and responds as follows:

- (1) the extensive literature review and analysis of stock identities undertaken by the EA in TB011 (**CD Ref EA25**) not only highlights significant uncertainties in the Appellant's approach, but also presents a credible and representative stock analysis relevant for an EIA and HRA for an application in the Severn Estuary and Bristol Channel;

- (2) the Appellant has misinterpreted the EA's approach to EAV calculations as explained in appendix E of TB010 (**CD Ref EA24**);
- (3) both reasonableness tests rely on inaccurate assumptions of both how the intake structure will impact cod stocks and the reliability of using the Routine Impingement Monitoring Programme (RIMP) data as a forecasting tool for HPC impacts;

The effect of Hinkley Point B ceasing to operate & the effect of the closure of Hinkley Point A

122. In paragraphs 7.31-7.41, the Appellant refers to its alternative approach in SPP106 to argue that the closures of Hinkley Point B ("**HPB**") and Hinkley Point A ("**HPA**") power station will more than offset any loss of fish from the proposed HPC. The analysis presented in SPP106 relies on the LVSE factors (the Appellant's intercept area factor and the EA's velocity cap factor) and the mortality factors from the FRR system. Using those two factors, an HPC equivalent cumecs (m^3s^{-1}) cooling water abstraction rate is calculated and compared to the HPB and HPA cooling water abstraction rates.
123. As the EA does not agree with the Appellant's LVSE factors and also differs in terms of the FRR mortality rates, the EA's QIA model produces very different results which shows areas of concern in relation to more of the protected species, as identified in the AA.
124. The EA does not agree with the level of effectiveness of the HPC embedded mitigation, particularly those assigned to the LVSE, and the new information provided in tables 3-5 within SPP106 cannot be validated at this time without the supporting technical report (SPP105) and the detailed calculations that are used in the report which have not been provided to the EA. This factor also goes against the published literature which suggests that the LVSE intake head will not act as a mitigation measure on its own (see TB006). The analysis behind these tables in SPP106 seems to be based upon the impact relative to the 'HPB effect' or the 'HPB and HPA' effect that the EA does not consider possible to discern from the RIMP dataset (see TB019, **CD Ref EA34**). An

additional consideration is that the RIMP data was collected over a period of decreasing abstraction in the Severn Estuary and therefore a decreasing abstraction on fish in the estuary which may make any effect from HPA and/or HPB more difficult to see. Using the LVSE factor derived by the EA in TB006, the 'alternative analysis' results in a higher impact from HPC than HPB alone contrary to that shown in SPP106. As such, the EA cannot conclude that there will be no adverse effect on the local fish assemblage with the reviewed information as stated in SPP106. Information in SPP106 regarding Atlantic salmon and sea trout do not provide enough evidence to support a change in position. The Atlantic salmon and sea trout feature impact assessments provide a detailed explanation of the EA's position on these species.

125. The Appellant also provided a further Alternative Analysis, SPP107 (**CD Ref EA35**), suggesting that the EA estimates of glass eel entrainment impact are overestimated and presents an alternative assessment and a 'reasonableness test' for the entrainment impact upon loss of equivalent silver eel biomass.

126. The EA has reviewed SPP107 (**CD Ref EA36**) and its view is as follows:

- a. The estimated biomass of silver eel equivalents entrained as glass eel in SPP107 is broadly similar to EA estimates, although some of the input values are different. The reason for EA rejecting the Appellant's entrainment mortality figure in particular is explained in the EA's Response to SPP107.
- b. The EA consider the approach taken in the "reasonableness test" to estimate the silver eel recruitment to the population from migration in the entire estuary introduces a high degree of uncertainty by extrapolating and interpolating data collected at discrete spatial scales, to a far larger area. The approach has been considered for use in this AA by the EA, and elsewhere in similar work by EA, Cefas, Defra and other organisations but has been rejected in favour different approaches. The subsequent estimates and conclusions drawn from the reasonableness test rely upon this population estimate but do not address this uncertainty.
- c. The Appellant states that "The Environment Agency conducted an Appropriate Assessment in 2012 as part of the determination of the WDA permit for HPC.

That appropriate assessment concluded that HPC would not have an adverse effect on the eel population of the Severn Estuary and Bristol Channel as a result of entrainment. Eels are not deterred by AFD systems and so the removal of the HPC AFD would have no effect on eel entrainment (nor impingement) losses”.

The EA agrees that AFDs are likely to be inefficient for yellow/silver eel and of no use in causing intake avoidance for glass eel, where intake area, hydrodynamics and velocity will be the primary determinants of entrainment. The EA does not claim that the proposed removal of AFD is the cause of a change in opinion on impact to eel in this current AA - it has been driven by analysis of new, relevant and suitable scientific data in the current AA. The EA is required to use the best scientific knowledge available as part of this assessment.

- d. The Appellant states “The results of the 2012 survey were shared with the EA so that they could use them during the preparation of their Appropriate Assessment of HPC (Environment Agency 2012). The 2012 Appropriate Assessment concluded: *“We would thus agree that such increases are not significant, and as these calculations are very conservative and are based on worst case scenario. We can therefore conclude that the abstraction at HPC alone will not have an adverse effect on the eel population of the Severn Estuary and Bristol channel as a result of entrainment”*.

The EA conclusions based on the current AA could not have been reached at the time of the 2012 AA, as the EA was not in receipt of TR274, which reported and synthesised the results of both the 2012 and the (yet-to-be-undertaken) 2013 glass eel trawl surveys.

Conclusion

127. The EA’s evidence will demonstrate that it cannot be concluded, beyond reasonable scientific doubt, that there would not be an adverse effect on the integrity of the Severn Estuary / Môr Hafren SAC, Severn Estuary / Môr Hafren Ramsar, River Wye /

Afon Gwy SAC or River Usk / Afon Wysg SAC from the operation of Hinkley Point C without an AFD.

128. On this basis, the EA submits that the Appellant's application to vary the WDA Permit must be refused.

17 November 2020

LIST OF EA DOCUMENTS

- EA1** Water discharge activity permit variation application ref. EPR/HP3228XT/V004
- EA2** Introduction to Hinkley Point C and the Cooling Water System
- EA3** Severn Estuary European Marine sites Regulation 33 package (June 2009)
- EA4** River Wye SAC conservation objectives, Natural England (November 2018)
- EA5** River Wye SAC Core Management Plan, Natural Resources Wales (September 2017)
- EA6** River Usk SAC Core Management Plan, CCW (March 2008)
- EA7** Environment Agency's appropriate assessment (final) (November 2020)
- EA8** History of the AFD and timeline containing a chronology of the engagement
- EA9** R (Champion) v North Norfolk District Council (2015)
- EA10** Case C-164/17 Grace v An Board Pleanála (ESB Wind Developments intervening)
- EA11** Case C-461/17 Holohan v An Board Pleanála
- EA12** Smyth v Secretary of State for Communities and Local Government [2015]
- EA13** Case C-142/16 Commission v Germany
- EA14** Case C-293/17, C-294/17 Coöperatie Mobilisation for the Environment and Vereniging Leefmilieu
- EA15** Hart District Council v Secretary of State for Communities and Local Government [2008]
- EA16** R (Akester) v DEFRA [2010]
- EA16a** R (on the application of Mott) v Environment Agency [2016]
- EA17** NE response to EA on draft AA dated 3 November 2020
- EA18** NRW response to EA on draft AA dated 2 November 2020

- EA19** Technical Brief: TB020 - Summary of Quantitative Impact Assessment Results.
Draft-06
- EA20** Quantitative Impact Assessment (QIA) Model flow diagram. Draft-05.
- EA21** Technical Brief: TB004 - Accounting for entrainment losses and difference in drum screen size. Draft-02
- EA22** Technical Brief: TB006 - Low Velocity Side Entry Intake Design; effect of intake intercept area. Draft-04
- EA23** Technical Brief: TB007 - Low Velocity Side Entry Intake Design; effect of intake velocity cap. Draft-03
- EA24** Technical Brief: TB010 - Converting impingement and entrainment numbers to Equivalent Adult Values and Spawning Production Foregone. Draft-06
- EA25** Technical Brief: TB011 - Scale of assessment areas for marine fishes and assessment method comparing Sprat losses with Spawning Stock Biomass. Draft-04
- EA26** Technical Brief: TB013 - HPC Entrapment Predictions – Uncertainty Analysis Report.
Draft-06
- EA27** Technical Brief: TB012 - Predicting adult sea trout populations in the Severn Estuary.
Draft-03
- EA28** Technical Brief: TB015 - Review of adult run size estimates for river lamprey and sea lamprey in the Severn Estuary, River Wye and River Usk. Draft-02
- EA29** Technical Brief: TB016 - Review of adult run size estimates for Twaite Shad and Allis Shad in the Severn Estuary, River Wye and River Usk. Draft-06
- EA30** Technical Brief: TB017 - Review of adult run size estimates for Atlantic Salmon in the Severn Estuary, River Wye and River Usk. Draft-05
- EA31** Technical Brief: TB018 - Review of European (silver) Eel escapement biomass for the Severn Estuary. Draft-04
- EA32** Summary of HPC cooling water system impact results on fish species without AFD (November 2020)
- EA33** Environment Agency's Response to SPP106
- EA34** Technical Brief: TB019 - Statistical Analysis of Routine Impingement Monitoring Programme Data. Draft-05
- EA35** SPP107 – Worst Case Glass Eel Entrainment for HPC (July 2020)
- EA36** Environment Agency's Response to SPP107