Written evidence submitted by the Royal Society for the Protection of Birds

1. Summary

1.1 The large-scale expansion of the fracking industry would pose a number of major environmental risks. It could lead to serious loss of habitats and biodiversity, as well as water pollution. 18% of the UK's Sites of Special Scientific Interest fall within land available under the 14th Licensing Round, so the impacts on out most precious sites and species could be significant. Any damage to the SSSI network could lead to the UK failing to meet its international commitments for biodiversity.. We are also concerned that developing unconventional fossil fuel resources, including shale gas, will be incompatible with the UK's commitments on climate change. Much more robust regulation is required to mitigate these risks.

1.2 The best available empirical evidence is from the US shale industry, which shows that high-volume hydraulic fracturing poses risks for water quality, wildlife and climate change. There is a paucity of published scientific evidence, but the best available suggests that these impacts in the UK could be significant. The availability of evidence has been curtailed by non-disclosure agreements. Monitoring and transparency arrangements would be needed to ensure that any shale gas extraction does not lead to undocumented damage to the natural environment.

1.3 A coalition of NGOs including the RSPB and the National Trust has a series of ten recommendations to improve the policy and regulatory regime around fracking. We are particularly keen to see protected areas and designated sites excluded from the award of licensing for shale gas exploration in order to reduce the direct threat to species and habitats of highest conservation concern. However, it is important to note that the environmental impacts of a poorly regulated fracking industry could be spread across the whole UK.

2. Background

2.1 Climate change is one of the greatest threats to wildlife and people in the UK and around the world. The UK needs to meet its commitments to reduce emissions by at least 80% by 2050 largely through energy saving and a shift to a low carbon energy sector.

2.2 Based on evidence from the US and GIS analysis of the overlap between the 14th Licensing Round area and UK protected wildlife sites, it is clear that an expanding hydraulic fracturing industry in the UK could pose significant risks to the natural environment. We recommend that the Government should adopt a precautionary and phased approach to any expansion of the shale gas industry, with a much tighter regulatory regime in place.

2.3 In particular, we are concerned about:

- Water stress;
- Contamination of ground and surface water;
- Disturbance of wildlife and habitat fragmentation and loss; and
- Methane leakage and climate change impacts.

2.4 A tighter regulatory framework could substantially reduce the risks that shale gas exploration poses to the environment.

2.5 The Infrastructure Bill offers an important opportunity for Government to rule out the issuing of licenses for fracking within a range of designated sites, particularly as decisions about the 14th Licensing Round are being made.

3. Environmental risks of fracking

Habitat loss, fragmentation and disturbance

3.1 The development of high-volume hydraulic fracturing and horizontal drilling technology has opened up large new potential areas of the UK to oil and gas drilling and extraction. While we only expect a limited number of wells and well pads during the exploratory phase, as this number grows the cumulative impacts on nature and the environment could be significant at a local level.

3.2 Government's own projections predict up to 120 well pads over the next two decades, each with between 6 and 24 wells and each occupying up to three hectares of land. This land take, combined with road building and other structures such as for water storage, will lead to direct loss of wildlife habitats. This will be particularly acute if development goes head in protected areas. Yet Government has included many protected areas and designated sites within the 14th Licensing Round, rather than opting to exclude these extremely sensitive areas. For example, 18% of the UK's Sites of Special Scientific Interest are included in the 14th Licensing Round.

3.4 In 2014, the UK Government issued additional planning guidance relating to shale gas, steering developers away from World Heritage Sites, Areas of Outstanding Natural Beauty and National Parks (except in exceptional circumstances and when the public benefit could be proved).

3.5 However, it failed to include designations such as Sites of Special Scientific Interest (SSSIs) in this additional guidance, despite the legal protections given to these sites. This omission could result in a mixed signal being sent to the industry about appropriate siting, and could result in contentious planning disputes.

3.6 In addition to the direct loss of habitat, the noise, light and truck movements associated with fracking operations could impact on wildlife. Heavy goods vehicle movements associated with the gas extraction work can cause further disturbance to wildlife in certain areas. The transportation of equipment, fluid, sand and other materials during the drilling, completion and hydraulic fracturing stages equates to between 4,300 and 6,600 truck trips per well pad.

3.7 The UK is home to 85% of the world's pink-footed geese, which spend the winter in three different areas of the UK, including the north-east of England. This area, and the sites specifically designated for the geese, overlap with the Bowland-Hodder shale, one of the areas that is a primary target of shale gas developers.

3.8 Light pollution could also pose a risk to wildlife. One proposal for exploratory drilling in the Weald Basin in the South East of England included a 45m tower that would be lit up 24 hours a day. This could have caused substantial disturbance to Barbastelle bats found in woodlands in this part of the UK and protected by European law.

Water stress and water pollution

3.9 While the overall demand for water from fracking is relatively small at a national scale, it could be significant locally, particularly in places already under water stress. There are 1,826 water stressed river basin areas or catchments across England and Wales (out of a total of 6,688), where water is available for new abstractions less than 30% of the time. Of these, 15% overlap with areas already licensed for onshore oil and gas development, and 53% overlap with areas that are under consideration for the 14th licensing round.

3.10 Excess water abstraction could negatively affect aquatic habitats that are important for wildlife. For example, the UK is home to 85% of the world's chalk streams. These ecologically important habitats, many of which are designated for their wildlife value, are vulnerable to over-abstraction.

3.11 Water pollution could come from a number of sources, including:

- Gas percolating upwards from the fractured shale formation;
- Gas or fracturing fluid leaking into groundwater due to well failure;
- Spillage of fracturing fluid or flowback water on the surface.

3.12 Methane contamination has been found in the US in groundwater aquifers overlying shale formations where fracking activities are taking place.[1]

3.13 Around 10–40% of fracking fluids return to the surface. These fluids are usually highly saline as well as containing heavy metals and naturally occurring radioactive materials (NORMs). Many water treatment facilities in the UK are not equipped to deal with water contaminated in this way. Even after treatment, water can remain highly saline. A study in Pennsylvania found that waste water from fracking led to increased salinity and levels of radioactivity in water bodies, even after treatment.[2] These changes to the water's chemistry can have adverse impacts on the wildlife that lives in these water bodies.

Fracking and climate change

3.14 The RSPB believes that pressing ahead with fracking is likely to be incompatible with the UK's international and national climate change commitments. It is unclear how the UK will meet its legally binding carbon budgets if fracking expands to the scale many expect.

3.15 Internationally, evidence suggests that while shale gas displaces other fossil fuels such as coal, these simply end up being burned elsewhere in the world, leading to, if anything, a global increase in emissions.[3] At some point, we need to begin deciding which fossil fuels to leave in the ground.

3.16 Evidence from the US shows that there is a large degree of uncertainty surrounding the scale of methane leakage from fracking operations. Shifting to natural gas from coal can have climate benefits only if the cumulative leakage rate from natural gas production is below 3.2% of the gas

[1] OSBORN, S.G., VENGOSH, A., WARNER, N.R. and JACKSON, R.B. (2011) Methane contamination of drinking water accompanying gas-well drilling and hydraulic fracturing. PNAS, 108 (20): 8172–8176, doi:10.1073/pnas.1100682108.
[2] OLMSTEAD, S.M., MUEHLENBACHS, L.A., SHIH, J-S, CHU, Z. and KRUPNICK, A.J. (2013) Shale gas development impacts on surface water quality in Pennsylvania. PNAS, 110 (13): 4962–4967, doi: 10.1073/pnas.1213871110.
[3] McJeon, H. *et. al.*, 2014, 'Limited impact on decadal-scale climate change from increased use of natural gas', *Nature*, 514: 482-485

extracted. Whilst some estimates suggest leakage rates from shale gas extraction can be below this level, there remains a considerable margin of error. For example, a recent study estimated that the total methane emissions in the Uinta Basin in Utah amounted to 6.2–11.7% of the average hourly gas production in the region.

3.17 In a groundbreaking life-cycle study of the GHG footprint of natural gas obtained by high volum hydraulic fracturing, Howarth et al. (2011) found the production of a unit of shale gas to be at least 30% more GHG-intensive than that of conventional natural gas. According to their calculations, 3.6–7.9% of CH_4 from shale gas production escapes to the atmosphere, owing primarily to venting and leaks over the lifetime of a well.

3.18 Unless extremely robust and careful baseline methane monitoring is put in place for every fracking operation, followed by independent ongoing monitoring, it is likely that the true emissions resulting from shale gas extraction will be underestimated.

3.19 Mandatory low emissions standards for the completions of wells would be needed to ensure that the emissions profile of shale gas does not far exceed emissions from conventional sources of gas.

4. Additional required regulation

4.1 This unconventional technology should be treated with an appropriate level of precaution and Government should opt for a phased, cautious roll-out rather than backing a rapid growth in the industry. The high-volume hydraulic fracturing shale industry does not have a proven track record in the UK and there is no empirical evidence about its likely risks or impacts, so tougher regulation is needed than currently proposed.

4.2 There are a minimum of ten regulatory changes needed to create an environmentally safe fracking regime. The Infrastructure Bill, currently passing through the House of Commons, is an important opportunity to introduce some of these changes, in particular the exclusion of protected areas and designated sites.

Fracking exclusion zones

4.3 As fracking is an unconventional technology and largely untested in the UK, as a sensible precautionary measure our most sensitive wildlife sites should be ruled out from being licensed for fracking. These sites include at least:

a. Special Areas of Conservation under the Conservation (Natural Habitats, &c.) Regulations 1994,

b. Special Protection Areas under the Wildlife and Countryside Act 1981 ,

c. Sites of Special Scientific Interest under the Wildlife and Countryside Act 1981,

d. National Parks under the National Parks and Access to the Countryside Act 1949,

e. The Broads under the Norfolk and Suffolk Broads Act 1988,

f. Areas of Outstanding Natural Beauty under section 82 of the Countryside and Rights of Way Act 2000, and

g. World Heritage Sites under the World Heritage Convention.

4.4 We also recommend that sites that are functionally linked to protected areas are included in exclusion zones. These are sites that support the special features of protected areas, such as field systems around an SSSI. For example, sites designated for their importance to migratory birds may be affected by the depletion or degradation of nearby greenspace.

4.5 It is important to note that there may be serious environmental consequences from fracking even outside formally protected areas. British biodiversity depends on the maintenance of viable wildlife corridors and quality habitats all across the country.

Mandatory Environmental Impact Assessments

4.6 Robust EIA processes are essential for informed decision-making during project planning and consenting. Government should make EIAs mandatory for all fracking applications. While industry have made a voluntary commitment to undertake EIAs for all projects, we have already seen some of these delivered too late to influence planning decisions, such as in the case of Balcombe. Government should ensure that all companies produce full EIAs, on time and meeting requirements, by making them obligatory.

Operators to pay for a world-class regulatory regime

4.7 In order to avoid the taxpayer bearing the burden of new regulation and enforcement, operators should be charged for permissions and authorisations at a rate that reflects these costs.

Prevent taxpayers bearing the costs of accidental pollution

4.8 Up-front financial guarantees from the industry would prevent the cost of any accidental pollution incidents during the lifetime of wells and their decommissioning falling on taxpayers.

Water companies to be made statutory consultees

4.9 Making water companies statutory consultees in the planning process would allow them to properly plan their future water management, minimising the risks of water stress and over-abstraction.

All hydraulic fracturing should operate under a Groundwater Permit

4.10 Hydraulic fracturing is excluded from requiring a Groundwater Permit unless the regulator believes there is a significant risk of contamination. However, even if the gas occurs at far greater depths than the groundwater, evidence from the US shows that faulty well casings can lead to contamination of groundwater as the gas is extracted. Therefore all hydraulic fracturing operations should be required to operate under a Groundwater Permit.

Best Available Techniques for Mine Waste Management should be rigorously defined and regularly reviewed

4.11 Hydraulic fracturing operators are required to set out a Waste Management Plan on how they will deal with fugitive emissions, flowback water and drilling waste.

4.12 Best Available Technique and monitoring protocols should be independently defined and regularly reviewed, which should be incorporated in every Waste Management Plan.

Full transparency on the industry and its environmental impact

4.13 The US experience of environmental impacts caused by fracking is poorly documented due to non-disclosure agreements. This lack of transparency and uncertainty about real impacts, informed by non-peer reviewed industry reports has merely fuelled public disquiet and opposition in many parts of the US. In the UK all regulatory conditions and monitoring data should be made available to the public.

Monitoring and testing should be rigorous and independent

4.14 Before any regulator self-monitoring is allowed, independent monitoring should be undertaken by appropriate regulators, including sufficient baseline environmental monitoring, including air and water methane levels.

Independent methane monitoring at each site

4.15 The level of fugitive methane emissions could have a significant impact on the overall greenhouse gas emissions profile of shale gas production. There should be independent monitoring of baseline methane levels and of methane levels during extraction at each shale gas operation site.

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