

A very European disaster

The Somerset Levels Flooding

Political aspects of the flooding, winter 2013-14

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Introduction

The winter just past has seen some of the most severe flooding in the Somerset Levels and Moors in living memory, triggered initially by the Christmas storms of 24-31 December. By 3 January, the village of Muchelney in the Sedgemoor district was cut off by flood waters and residents were using boats to make the mile-long journey to the village of Huish Episcopi, to pick up supplies.



Figure 1: on the road to nowhere. The A361 in the flood area was inundated to the depth of ten feet or more in some places.

With continuing rain, the flooding spread, encroaching the village of Burrowbridge. On the River Parrett, with a tidal reach of 18.6 miles to the sluice at the abandoned village of Oath, storm-driven tidal surges met flood pulses from the catchment, overtopping the protective embankments. Long before rainfall had reached record levels, the

waters had inundated the A361 Taunton to Glastonbury road to a depth of ten feet and more in places.

Some 11,500 hectares (28,420 acres) of the 65 square miles of the Levels were covered by an estimated 65 million cubic metres of water, eventually rising to over 90 million m³. By the 24 January, a "major incident" had been declared by two councils - Somerset County and Sedgemoor District - and resources were being mobilised on a major scale, including military assistance.

With the publicity attendant on the incident came a sharp debate as to why the flooding had occurred, centred on the unusually high rainfall, the winter said to be the wettest since records had begun. The flooding itself, though, was not unusual. Much of the area is natural wetland and flooding occurs periodically. Furthermore, considerable flooding had been experienced in the winter of 2012-13.

Drainage, in any event, presents special problems. The combination of circumstances presented on the Moors is not experienced to the same extent anywhere else in the world. There are several reasons why this is the case.

First, the tidal range in the Bristol Channel, at nearly 50ft is the second highest in the world. It creates the need to store large amounts of water in the rivers to be let out as the tide falls. Secondly, the total area of land which drains through the Somerset Levels is four times that of the Levels themselves, compared with a ratio, by comparison, of only two to one in the East Anglian region. And, from Langport and Bridgwater on the Parrett estuary, the fall is only one foot per mile. Then, the average annual rainfall is greater in Somerset than in East Anglia Fens

– and much more than falls in (say) Holland - imposing a greater load on the system. This makes the situation in the Levels unique.



Figure 2: Flooding on the A361 between Athelney and Burrowbridge – before and after.

Despite centuries of activity, the drainage system has never been as extensive as that undertaken on the Fens. Predominantly Class 2 or

poorer, much of the land dries out fully only during the summer and is suitable only for grazing and hay-making. The area has been used, therefore, mainly for beef rearing and dairying. Forage maize for silage is grown on drier ground.

To ensure a good grass crop in mid-summer, farmers have sought to maintain high summer water tables. Drainage ditches have been used as stock-proof field boundaries so there has been a reluctance to allow the complete disappearance of water from the ditches. This would necessitate replacement fencing with attendant costs.

As a result, drainage managers have been faced with conflicting priorities. To prevent flooding in the winter required keeping the system as empty as possible early in the season, to afford maximum storage capacity in the event of higher than average rainfall. But this had to be balanced by the need to keep a reserve to ensure a plentiful supply of water through the summer, even in times of drought.

In 1977, farmers were offered £1 million by Wessex Water Authority to spend on drainage improvement in West Sedgemoor. After much deliberation they turned it down, preferring the status quo, also fearing an increase in water costs due to the anticipated dependence upon piped water for cattle troughs.

Any opportunity then to improve drainage was effectively ended when the Nature Conservancy Council in 1982 notified its intention to designate the whole of West Sedgemoor as a Site of Special Scientific Interest. Conservation interests in this area of the Moor now predominated, with added pressure to keep the water levels up during the winter, to improve its attractiveness in the early spring to migratory

birds. This situation has continued to the present day, with the inevitable tension between farming and conservation interests remaining.¹

As the crisis over the last winter developed, however, there has been much discussion of technical issues relating to the flooding, and some analysis of financial matters. Less prominent, however, has been the exploration of this inherent conflict between the demands of human habitation and conservation. Yet, as conservation has taken on a heavily political dimension, at European, national and local levels, the inherent conflict seems to have intensified and may have had a significant impact on the crisis.

In this short paper, therefore, we attempt to explore some of the political issues, particularly in the context of European legislation and other activities which, as our researches indicate, were the main drivers of policy. Where relevant and closely intertwined, we also look at some of the technical issues, on the basis that the observed outcomes were essentially the result of a complex interaction of political and technical influences.

Policy drivers and influences

The Daily Telegraph's front page story on Friday 21 February 2014 carried an exclusive report on the views of a number of experts on the floods, its headline declaring: "The worst flood damage could have been prevented".²

¹ Kirkham, Francis William (1996), *The agricultural ecology of hay meadows within the Somerset levels and moors Environmentally Sensitive Area*, PhD thesis. University of Plymouth.

² <http://www.telegraph.co.uk/earth/flooding/10652617/David-Cameron-must-lead-planning-revolution-to-prevent-future-floods-say-experts.html>

However, not all journalists agreed, one arguing that not only could much of the damage caused by the floods have been prevented, much of the flooding itself could have been avoided. It was asserted that the floods had been deliberately engineered by the Labour Government in 2009, knowingly regardless of the property and human rights of the people whose homes and livelihoods would be affected.³

Furthermore, it was argued that a misleading Met Office forecast in November could have had a role in making the flooding more disastrous than it need have been. Addressed to public authorities such as local councils and the Environment Agency for the three months between December and February, it had predicted that the winter would most likely be drier than usual. This would be particularly so in the west, where higher rainfalls were normal.^{4,5} This, it was asserted, led the Environment Agency to take a step which turned what could have been a minor, short-lived inconvenience into a major disaster for the people on the Somerset Levels.⁶

The chain of events which led to the flooding, however, probably started much earlier, relating to decisions taken in 2005 by Labour's "floods minister", Elliot Morley, later to be jailed for fraudulently claiming £30,000 on his MP's expenses. In turn, these were affected by earlier events, and in particular those leading to the creation of the

³ <http://www.telegraph.co.uk/earth/flooding/10655005/The-flooding-of-the-Somerset-Levels-was-deliberately-engineered.html>

⁴ <http://www.telegraph.co.uk/topics/weather/10639819/UK-weather-its-not-as-weird-as-our-warmists-claim.html>

⁵ http://www.metoffice.gov.uk/media/pdf/m/8/A3_plots-precip-DJF-2.pdf

⁶ <http://www.dailymail.co.uk/news/article-2564358/Could-Met-Office-wrong-Just-floods-secret-report-told-councils-Winter-drier-normal-especially-West-Country.html>

1979 Birds Directive and the EU's Habitats Directive, 92/43/EEC in 1992.⁷

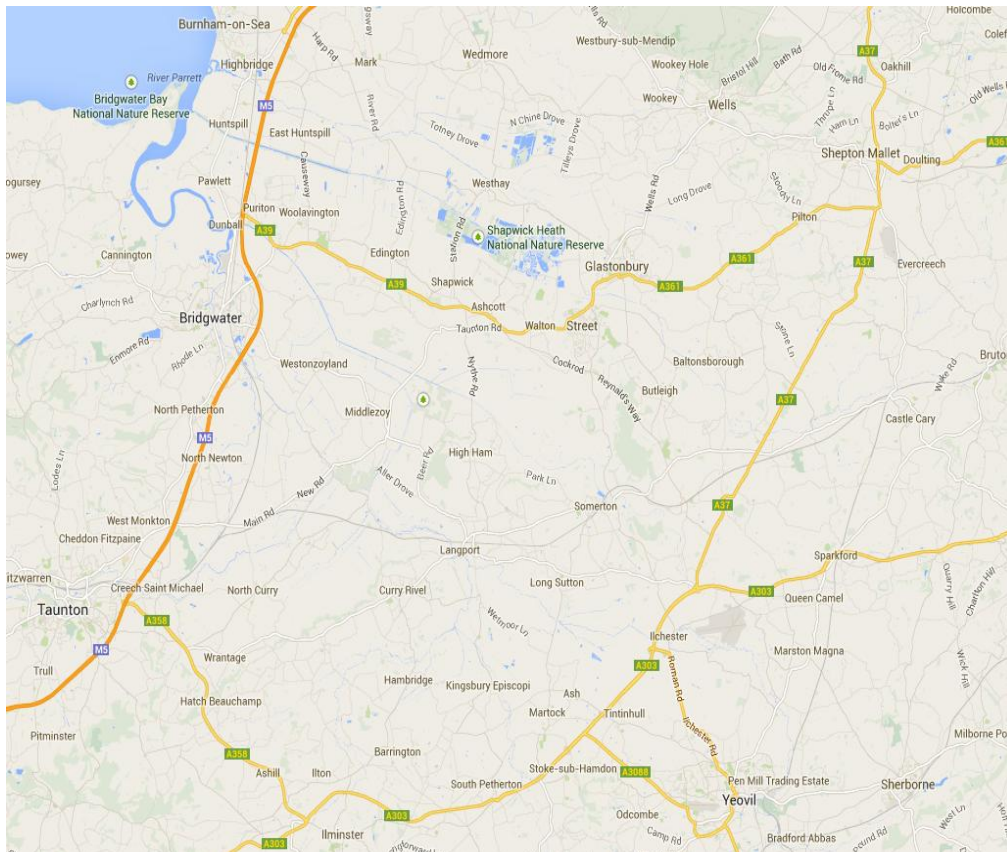


Figure 3: The Somerset Levels and Moors and the Parrett catchment area (part)

The earlier part of the sequence is dealt with in Appendix 1, with the background to the current events marked by the transposition of the consolidated Birds Directive and the Habitats Directive, the latter by the Conservation (Natural Habitats Etc.) Regulations 1994, commonly known as the Habitats Regulations.⁸

⁷ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1992:206:0007:0050:EN:PDF>

⁸ <http://www.legislation.gov.uk/ukxi/1994/2716/contents/made>

The scenario is set by this legislation, with flood management operating authorities, including the local Internal Drainage Boards (IDBs), having imposed on them a duty to comply with the Regulations. Specifically, as competent authorities under the Regulations, they were required to ensure they had regard to the requirements of the Habitats Directive when exercising their functions (Regulation 3(4)).

Legislation, however, can never be considered in isolation. It simply represents a stage in a process. In this case, the next stage was a Commission Communication on 29 May 1995 (COM(95) 189 final) on the "wise use and conservation of wetlands". This, as an expression of Commission thinking, put wetlands "restoration" (i.e., flooding) very much on the policy map.⁹

The next stage was an EU-funded research project, designed to put clothes on the legislation, preparing detailed guidance for Member States on how to implement the law. With no concessions to originality, the project was called "Wise use of floodplains", with the research coordinated by the RSPB, alongside the WWF and the Environment Agency, plus international partners.¹⁰ (The RSPB is a major beneficiary of EU funding. See Appendix 2).

Running from 1 April 1999 until 1 April 2002 and funded to the tune of €2,108,110.30, with an EU contribution of €1,052,044.45, it had been set up under the aegis of RSPB Chief Executive Baroness Young. She was shortly to become Chief Executive of the Environment Agency,

⁹ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:1995:0189:FIN:EN:PDF>

¹⁰ http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=1432

also becoming a Vice President of the RSPB.¹¹ This was to be the start of what some suggest was the "ethnic cleansing" of the Levels, a plan to remove human habitation and create a new habitat for birds.¹²

Tellingly, the study dealt specifically with the Somerset Levels and Moors, and the Parrett catchment.¹³ The concluding report set out a "Parrett Catchment Project Action Strategy", which was presented to Elliot Morley at a major conference held in Somerset in February 2000.¹⁴

That same year saw the Water Framework Directive (WFD), 2000/60/EC.¹⁵ Combined with the Habitats Directive, the effects were to be profound. In the first instance, the Habitats Directive put wildlife conservation on the EU policy map and, through the Natura 2000 programme, required progressive improvements in the conditions of designated conservation areas.¹⁶ The WFD was to extend and strengthen the provisions with respect to rivers, river basins, catchment areas and all inland bodies of water.

Completely under the radar, an "informal meeting" of EU Water Directors and the Norwegian Water Director was then held in Paris on 23-24 October 2000 under the aegis of the Swedish Presidency. Coinciding with the formal approval of the WFD, the meeting agreed to

¹¹ <http://autonomousmind.wordpress.com/2014/02/22/flooding-the-baroness-young-and-rspb-connection-is-even-stronger-than-first-identified/>

¹² <http://www.centralsomersetgazette.co.uk/Somerset-floods-EU-ethically-cleansing-people/story-20658066-detail/story.html>

¹³ <http://www.floodplains.org/>

¹⁴ http://www.floodplains.org/pdf/area_case_studies/SomersetLevelsCaseStudy.pdf

¹⁵ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF>

¹⁶ http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/commission_note2.pdf

prepare a Common Implementation Strategy (CIS), ensuring a common approach to the legislation across the entire EU. Documents prepared by the French Presidency were used as a basis for a "strategic document".



Figure 4: The River Tone at the confluence with the Parrett, above Burrowbridge. This river, in the 1800s was navigable for 40-ton barges. Local residents claim that each bank had grown inwards by over 12 feet in the past 30 years, encroaching more than 24 feet in a river that now only measures some 20 feet across near the river junction, despite draining nearly two-thirds of the rainwater that falls on the county of Somerset.¹⁷

Back in Somerset, the year 2000 had also seen the Liberal-Democrat-led Somerset County Council, with the Environment Agency, set up the Parrett Catchment Project (PCP).¹⁸ This was financially supported by

¹⁷ <http://www.westernmorningnews.co.uk/Dredging-answer-Somerset-flooding-8217-s-got/story-20529961-detail/story.html>

¹⁸ <http://web.archive.org/web/20090720045941/http://www.parrettcatchment.info/>

the European Union Regional Development Fund through the Joint Approach for the Management of Flooding (JAF) project.



Figure 5: Even without the strategic effects of EU legislation, the Habitats Directive and the Waste Framework Directive were hindering dredging, requiring expensive pre-action assessments and increasing the cost of sediment disposal. The effect are evident at the bridge over the Parrett at Burrowbridge, the top picture taken in the 1960s and the other within the last years.

That project put climate change centre-stage, aligning it with flood management policies. It was developed "to help manage deep and

prolonged flooding, which is likely to become more frequent with climate change”.

With the catchphrase, "A future when it rains", one of its objectives was to review "the feasibility of spreading floodwater across the Somerset moors". Another was: "creating new wetland habitats throughout the catchment to intercept and store floodwater during flood events".¹⁹

As part of the year 2002 spending review, Defra then issued its Public Service Agreement for the years 2003-2006. This pledged to bring into "favourable condition" by 2010 95 percent of all nationally important wildlife sites.²⁰ Although not specified, this reflected the Natura 2000 target, and was to include wetland "restoration". The code for re-flooding was to bring them to the "favourable condition".

There then followed another EU-funded research project, this one called "Ecoflood", a title which perfectly illustrated the objective.²¹ At a more modest €350,014, it ran from 1 February 2003 to 31 July 2005. The outcome was the production of draft guidelines on "how to use floodplains for flood risk reduction".²²

Soon to be adopted by the Commission as formal Ecoflood guidelines, there was no doubt about the direction of travel.²³ The Somerset Moors (or a major part of them) were to be re-flooded, turned into a

¹⁹

http://web.archive.org/web/20041026183458/http://www.parrettcatchment.info/aims_objectives.htm

²⁰ <http://www.official-documents.gov.uk/document/cm56/5698/5698.pdf>. See also:

<http://web.archive.org/web/20050302154752/http://www.defra.gov.uk/corporate/busplan/psa2002.htm>

²¹ http://cordis.europa.eu/projects/rcn/69567_en.html

²² [http://levis.sggw.waw.pl/ecoflood/contents/Guidelines\(draft_2005-10-10\).pdf](http://levis.sggw.waw.pl/ecoflood/contents/Guidelines(draft_2005-10-10).pdf)

²³ http://ecrr.org/publication/floodrisk_doc5.pdf

"washland", returned to its previous, unprotected, undrained condition, as a means of preventing floods elsewhere.²⁴ Physical intervention, such as dredging, would no longer be needed, At least, that was the theory.

Alongside this, the European Commission was consolidating its grip on flood policy, producing in July 2004 a communication (COM(2004)472 final) on flood risk management, ostensibly dealing with flood prevention, protection and mitigation.²⁵

Not least, the communication publicly revealed that, "in order to promote the coherent implementation of the Water Framework Directive across the EU, the Water Directors from the (then) 25 Member States and the European Commission were meeting regularly. This followed the launch in October 2000 of the Common Implementation Strategy (CIS). Floods policy had acquired a truly European dimension."^{26,27}

The EU initiative was followed the same month by a Defra consultation document called "making space for water".²⁸ It introduced "a new Government strategy for flood and coastal erosion risk management in England". The clue as to its provenance came on page 23, under the heading "European Dimension". This announced that flood risk management was being discussed at the EU level, and the themes

²⁴ http://levis.sggw.waw.pl/ecoflood/contents/articles/s6/html/6_8L.pdf

²⁵ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2004:0472:FIN:EN:PDF>

²⁶ http://ec.europa.eu/environment/water/water-framework/objectives/implementation_en.htm

²⁷ <http://ec.europa.eu/environment/water/water-framework/objectives/pdf/strategy.pdf>

²⁸

<http://web.archive.org/web/20040730210229/http://www.defra.gov.uk/corporate/consult/waterspace/consultation.pdf>

under discussion were "all consistent with this consultation and the current approach in England".

By 2005, EU policy was being spelled out in Defra's Guidance on Water Level Management Plans for European Sites, stressing the need to bring 95 percent of SSSIs (part of the Natura 2000 network) to "favourable condition" by 2010, in line with the PSA.²⁹

In pursuit of this, on 21 January 2005, under the heading, "Saving wetland habitats: more money for key sites", Elliot Morley announced that, in order to comply with the Habitats Directive, flooding in Somerset should be artificially promoted because, as he declared, "wildlife will benefit from increased water levels".³⁰

Co-opted into this scheme were the 13 Somerset Internal Drainage Boards (IDBs), ancient authorities responsible for keeping the Levels and the Moors drained. They were now to be suborned into reversing the process and flooding them.³¹ Nationwide, the IDBs were to be bribed with £2.3 million a year of taxpayers' money, to let the water in. In Somerset, there was to be even more.

That year, though, an independent evaluation of the Parrett Catchment Project warned that it was "still not completely clear" how much a deliberate increase in flooding would breach "the property rights and

²⁹

<http://web.archive.org/web/20050303051433/http://www.defra.gov.uk/environ/fcd/policy/pb9543v3.pdf>

³⁰ <http://web.archive.org/web/20050315005221/http://www.defra.gov.uk/news/2005/050121a.htm>

³¹ http://en.wikipedia.org/wiki/Internal_drainage_board

Human Rights" of all those whose homes and businesses would be damaged.³²

Events were now moving again in Brussels, with the emergence of a specific EU directive on flood policy. This was Directive 2007/60/EC of 23 October 2007, on the assessment and management of flood risks, the so-called "Floods Directive".³³

Recital 14 spelled out the requirement that flood risk management plans should focus on prevention, protection and preparedness. But, "with a view to giving rivers more space", planners were also required to "consider where possible the maintenance and/or restoration of floodplains", as well as "measures to prevent and reduce damage to human health, the environment, cultural heritage and economic activity". Restoration - i.e., flooding - of drained wetlands was now a specific EU policy objective.

Later, in December 2009, the Environment Agency and Defra jointly published River Basin Management Plans for the Severn River Basin District and the South West River Basin.^{34,35} In identical paragraphs, these documents noted:

There is a separate planning process for flood and coastal erosion risk management introduced by the new European Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks). This requires that the environmental objectives of the Water

³² http://www.eureferendum.com/documents/PCP_SWSLUI.pdf

³³ <http://eur->

[lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:288:0027:0034:EN:PDF](http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2007:288:0027:0034:EN:PDF)

³⁴ <http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/gemi1010btcn-b-e.pdf>

³⁵ <http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/gesw0910bstp-e-e.pdf>

Framework Directive are taken into account in flood and coastal erosion plans. Implementation of the Floods Directive in England and Wales will be co-ordinated with the Water Framework Directive. The delivery plans and timescales for the two directives will be closely aligned.

There, in plain English, was a clear statement of the link between environmental objectives and flood planning.

Environment Agency and local policy

By then, the Environment Agency needed no encouragement to make the link. In its March 2008 plan, it had already decided that, "providing a robust economic case for maintenance works on the Somerset Levels and Moors remains a challenge" (p.131), largely as a result of the increased cost burden arising from the WFD, the Habitats Directive and the Waste Framework Directive.³⁶

Responding to a Treasury requirement that flood prevention expenditure should show an 8:1 cost-benefit ratio, the Agency pronounced that it was: "appropriate to look again at the benefits derived from our work, particularly focusing more on the infrastructure and the environmental benefits, which previous studies have probably underestimated".

We have, the Agency added, "international obligations to maintain and enhance the habitats and species in the Somerset Levels and Moors, and it is within this context that all decisions have to be made".

³⁶

<http://www.tauntondeane.gov.uk/irj/go/km/docs/CouncilDocuments/TDBC/Documents/Forward%20Planning/Evidence%20Base/Parret%20Catchment%20Flood%20Management%20Plan.pdf>

With that, it was clear that the decision had been made to abandon the Levels, and to scale down the infrastructure. Thus, the Agency claimed, it was "doubtful that all the pumping stations on the Somerset Levels and Moors are required for flood risk management purposes. Many pumping stations are relatively old and in some cases difficult to maintain. It is necessary to decide which ones are necessary particularly in the context of redistributing water".

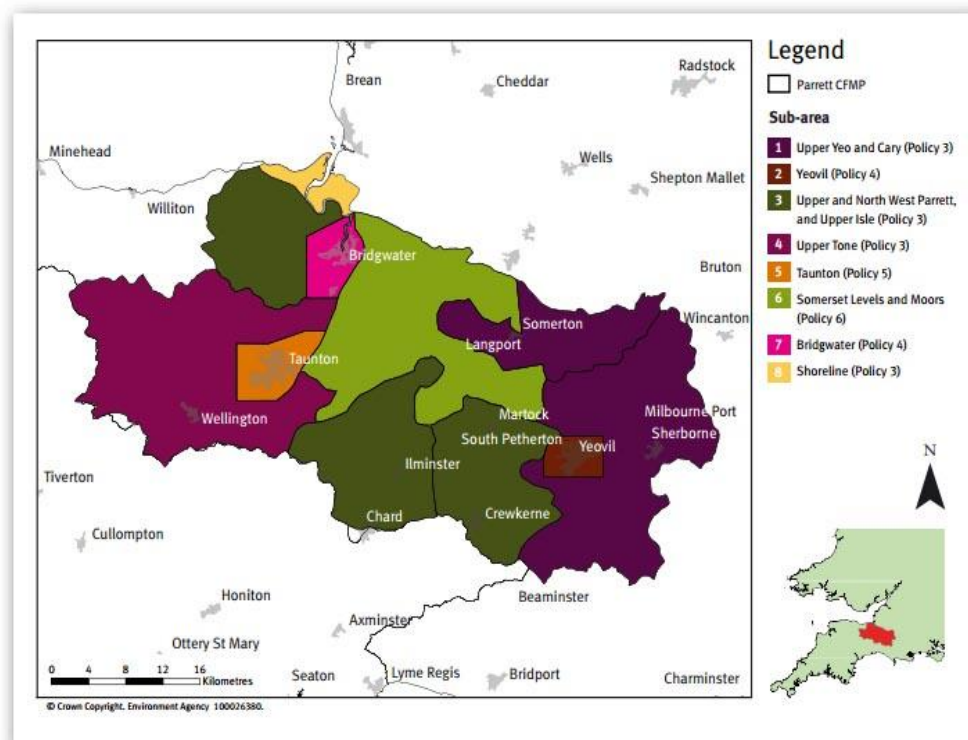


Figure 6: The Environment Agency map showing the Moors and Levels (pale green) designated as a flood area.

Moving on then to consider its policy options, the Agency had detailed six, the last and least favourable being to: "take action to increase the frequency of flooding to deliver benefits locally or elsewhere, which may constitute an overall flood risk reduction". This policy option, they said, "involves a strategic increase in flooding in allocated areas" (p.142). The Levels were to be flooded, as a matter of deliberate policy,

a policy that was to remain in place even in its 2012 flood management plan (map illustrated above).³⁷

With the Government then implementing the Floods Directive as the Flood Risk Regulations 2009, there was Defra's "making space for water" policy, writ large.³⁸ It was all that was needed, by way of legislative authority, for an already green-dominated Environment Agency to abandon the Somerset Levels to the flood waters.

The details were tersely noted in the West Sedgemoor and Wick Moor Water Level Management Plan, produced by the Parrett Internal Drainage Board and approved in November 2009.³⁹ Policy Option 6, it observed, "would involve the Environment Agency, and others, taking action to increase the frequency of flooding". The plan was that, by redistributing floodwater - primarily from upstream of Langport to the King's Sedgemoor Drain - the overall damage and disruption from flooding would be reduced. However, the Drainage Board observed that work would be required to maintain the safety of existing embankments and infrastructure.

To reinforce the plan, Defra commissioned a research project costing £105,032.⁴⁰ It was carried out by Nottingham University, which noted that "EU legislation is really driving change".⁴¹ The authors offered an "ecosystem approach", an idea at the core of EU policy, driving the

³⁷ http://www.environment-agency.gov.uk/static/documents/Leisure/_CFMP_Parrett_2012.pdf

³⁸ http://www.legislation.gov.uk/ukxi/2009/3042/pdfs/ukxi_20093042_en.pdf

³⁹ Section 3.5.1. Catchment Flood Management Plan:
http://www.somersetdrainageboards.gov.uk/approved_plans_WestSedgemoor.pdf

⁴⁰ <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=14756>

⁴¹ http://www.nottingham.ac.uk/cem/pdf/NR111_FTR_CEM-08-09-08.pdf

move away from traditional flood control into the "sustainability" camp, putting environmental and wildlife concerns above the requirement to protect (human) life and property.⁴²

The move was endorsed by the Somerset Biodiversity Partnership, a grouping which included the Environment Agency, Natural England, the Wildlife Trust and the RSPB, as well as Sedgemoor District Council and other local authorities. In May 2008, the partnership published its biodiversity strategy for 2008-2018.

Changes required for water level and land management, it said, "must balance the needs and expectations of home owners and farmers and realise the biodiversity potential of the wetlands". Creation of new wet woodland and other wetland habitat should be used as part of a range of measures to reduce flood risk to properties. New Water Level Management Plans were being developed by the local Drainage Boards for wetland areas important for wildlife.⁴³

At a European level, the shift in policy could be seen with brutal clarity on the Commission website, which gave priority to the "environment".⁴⁴ It cited the familiar EU measures, including the Water Framework Directive, the Habitats Directive, the Environmental Impact Assessment and the Strategic Environmental Assessment Directive.⁴⁵ The Floods Directive was part of the package and this, it sternly warned, had to be implemented by 2015.⁴⁶

⁴²

http://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructure_integration.pdf

⁴³ <http://www.sedgemoor.gov.uk/CHttpHandler.ashx?id=4466&p=0>

⁴⁴ http://ec.europa.eu/environment/water/flood_risk/better_options.htm

⁴⁵ <http://eur->

[lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF](http://ec.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF)

⁴⁶ http://ec.europa.eu/environment/water/flood_risk/



Figure 7: Dunball Clyce, taken from the Huntspill River Bridge on the Bristol Road, looking west, towards the Parrett Estuary.

Just so that there should be no doubts as to where the policy thrust lay, DG Environment in 2011 issued a note, stressing that flood risk management "should work with nature, rather than against it", building up the "green infrastructure" and thus offering a "triple-win" which included restoration (i.e., flooding) of the floodplain.⁴⁷

Meanwhile the Environment Agency had long since stopped properly dredging the River Parrett, which provided the main channel draining floodwater to the sea, because of the exorbitant cost of disposing of silt

⁴⁷ http://ec.europa.eu/environment/water/flood_risk/pdf/Note%20-%20Better%20environmental%20options.pdf

under EU Waste Framework Directive, and the complicated procedures required by the Habitats Directive and other EU law.⁴⁸

Deliberate flooding of the Levels

Despite the need to improve the discharge capacity of the system enabling more water, faster, to be drained into the sea, in 2002 Morley had vetoed a proposal to build a new pumping station at Dunball Clyce (sluice – pictured above), at the end of King's Sedgemoor drain. Pumping at this strategic outlet would have allowed a greater volume of discharge of floodwater. Normally, only gravity discharge was possible, and then only at low tide.



Figure 8: Southlake Moor Nature Reserve – deliberate flooding as an EU-inspired scheme to "restore" wetlands. The picture was taken over the winter of 2009/10, the first year of the scheme. Burrow Mump is in the centre foreground.

Instead of this upgrade, an £8 million scheme to "restore" – i.e. increase flooding - on the Moors was implemented.^{49,50} The first part

⁴⁸ Including the Nitrates Directive. See: <http://www.thegreenblue.org.uk/pdf/z%201075.%20Dredging%20inland%20waterways.pdf>

was the "restoration" of Southlake Moor next to Burrowbridge on the Parrett, first flooded in the winter 2009/10, thus fulfilling the requirements of the Habitat Directive (see above). It had been made possible with the money Elliot Morley had provided back in 2005.

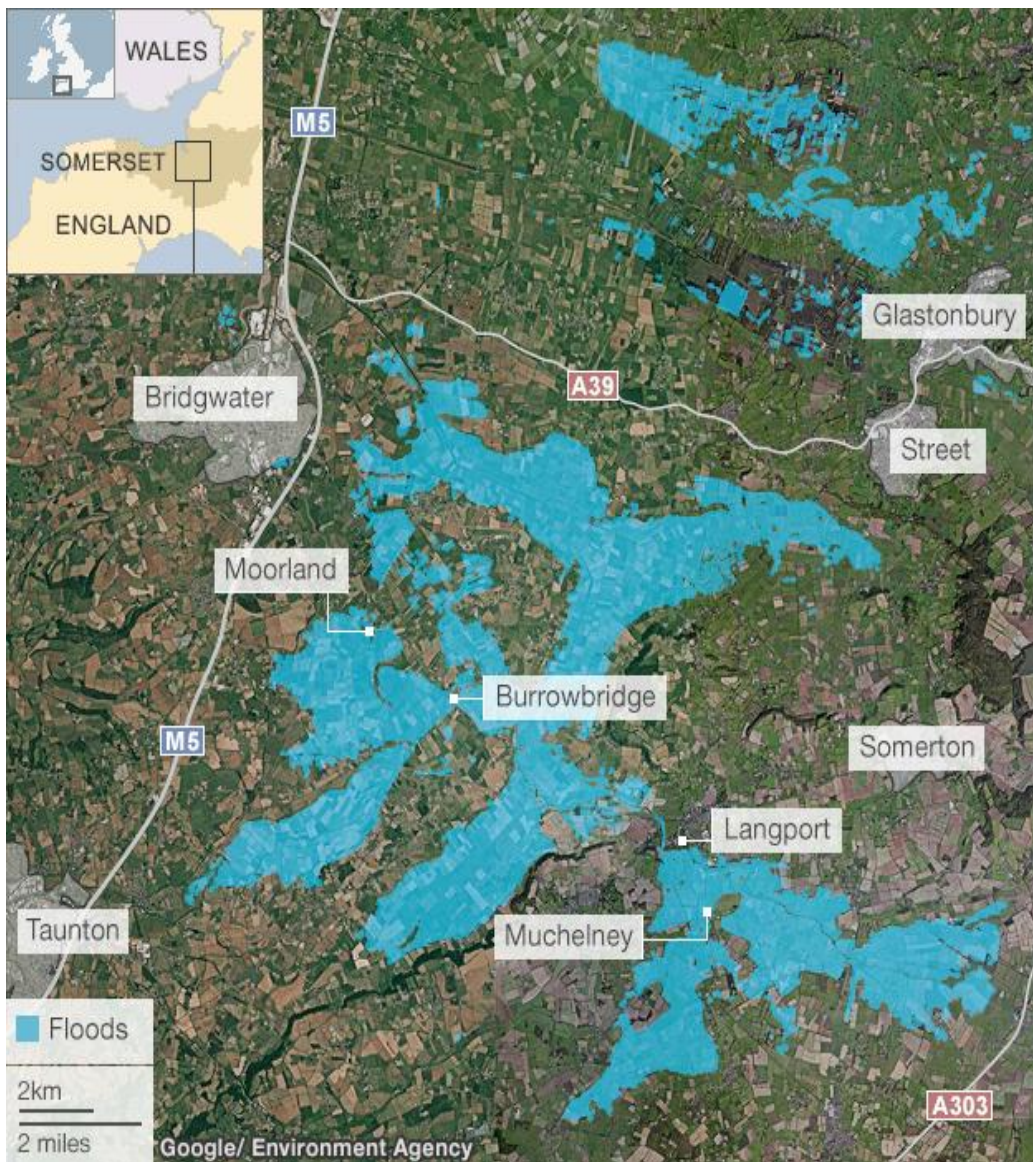


Figure 9: Satellite imagery of flooded areas (published 14 February)

49

http://news.bbc.co.uk/local/somerset/hi/people_and_places/nature/newsid_9364000/9364140.stm

⁵⁰ <http://www.somersetdrainageboards.gov.uk/media/Southlake-Moor-Project-Report-Parrett-IDB-June-11.pdf>

The Moor had been drained since the 13th century, but the plan was now to flood Somerset back into the Middle Ages. To achieve this, the scheme included the purchase of 200 hectares of farmland by Natural England, used to create a winter habitat for birds when, as the Met Office was already predicting, climate change brought drier winters.

In most places, this was to be flooded only to the depth of a few feet, but invisible groundwater percolation would meet the tidal groundwater, and form a hydraulic block, preventing water draining from the Mid Somerset Hills migrating towards the River Parrett and its associated drainage system.



Figure 10: King's Sedgemoor Drain, taken from Graylake Bridge on the A361, looking east, away from the sea, with the Mid-Somerset Hills in the distance. The Southlake Moor Nature Reserve starts on the left.

This was where the November Met Office forecast came in, because it led the Environment Agency to allow Southlake Moor to be flooded in the expectation of a dry winter, keeping the water levels high in order to "maintain the conservation interest".⁵¹ Using a special inlet built for the purpose, water was poured in from the River Sow, an artificial channel intended as part of the Parrett flood relief scheme. Originally linking the Parrett with the King's Sedgemoor Drain, then to discharge to sea, the Sow was now being used to flood the Moor, with the overall effects of which we are now all too familiar.

When, contrary to expectations, the rains of December and January poured down, this large expanse of water-sodden ground blocked the draining to the silted-up Parrett of a much larger area of farmland to the east. An area which could have been used as an emergency overspill was already full.

This was made even worse by the lack of that pumping station at the end of the King's Sedgemoor Drain, vetoed by Morley. As the water levels rose, there was no way of getting rid of the excess water. The Dunball sluice was of insufficient capacity and could only be operated at low tide.

Thus came about the disaster which has filled our television screens for weeks, The hydrology of the entire area had been sabotaged by the Labour Government's deliberate EU-compliant policy, directed by the Environment Agency, in partnership with Natural England and the RSPB, and with the complicity of the Internal Drainage Boards.

⁵¹ <http://www.somersetdrainageboards.gov.uk/media/KSM-WLMP-Parr-approved-Jul-10.pdf>

Only thanks to the intervention of Environment Secretary Owen Paterson were huge Dutch pumps at Dunball belatedly installed, pouring millions of gallons a day into the sea, before dredging the Parrett can begin as soon as is practicable.



Figure 11: the Dutch pumps in action at Dunball sluice. Collectively, by early March, the pumps were moving 7 million tons of water a day.

Interestingly, further north, where the Huntspill River system, discharging separately into the Parrett estuary, had been allowed to function without interference, there had been no local flooding. Thus, not only can we now see just how the flooding further south was deliberately engineered. It was done in blatant disregard for the rights of all those who live and work there.

The evidence is now so strong that some of those affected are considering suing the Government for compensation for damage which could well amount to hundreds of millions of pounds.

Conclusions and recommendations

Although the detail may be complex, what comes over with the utmost clarity is that there has been a fundamental, if partially obscured, change in change in flood prevention and management, putting the interests of the environment, and wildlife above those of protecting life and property. Therefore, the fundamental recommendation to draw from this paper is that philosophy of flood prevention and management must change.

As has been the case traditionally, the primary objectives of flood policy should be the protection of human life and property, with the flora and fauna taking an important but secondary position – not forgetting, of course, that these floods have also been an ecological disaster.

Specifics

In terms of specifics, we can offer a number of outline recommendations, some technical in nature, which would address some, if not all of the problems of the Somerset Levels and Moors. These are:

1. Revisit the wetlands "restoration" programme. No inland sites – such as Southlake Moor – are to be deliberately flooded at the start of winter. The areas must be kept available for emergency flood storage in the event of flooding.
2. Upgrade the Dunball Clyce site: installation of a permanent high volume pumping facility to enable continuous water discharge from King's Sedgemoor Drain (KSD).

3. Revisit CAP cross-compliance and Stewardship Schemes: reprioritise ditch clearance/maintenance on drainage/flood prevention. Assess the total drainage capacity of the Levels, estimate the water storage requirement during peak rainfall periods, and bring the two closer into alignment.

4. Revisit the biodiversity priorities for Internal Drainage Boards and ensure that it is focused fully on its primary function of drainage, any other function being secondary. This applies especially to watercourse (rhynes) maintenance. Restructuring of the of the IDBs may be necessary, with duties and priorities redefined explicitly set out in statute.

5. Consider a cross-link between the King's Sedgemoor Drain and the Huntspill River, with a high capacity pumping capability, to increase discharge flexibility. Facilities already exist, built in conjunction with the Bridgewater ROF.

6. Consider the installation of the Parrett Estuary Sluice.⁵² This £24.6 million scheme would end the problem of tidal surges up the Parrett, allowing greater control over tidal flooding.

7. Reinstate main river dredging programme: specifically, sections of the River Tone at the confluence with the Parrett need to be dredged, together with the River Parrett from the Tone confluence at Burrowbridge to the sea. Seek a relaxation/derogation from the WFD and Habitats Directive for the disposal of sediment.

⁵² See: <http://www.sedgemoor.gov.uk/CHttpHandler.ashx?id=4205&p=0> and <http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/flho0312bwdr-e-e.pdf>

8. Tidal sluice designs: at the point of discharge to the sea, as at Dunball Clyce, it has been suggested that a different type of outlet, other than a sluice, might be appropriate. What might be preferable is a "weiring penstock".⁵³

The problem with a clyce (sluice) is that it opens at the bottom to let the water out. Thus, as Dunball, the tide has to drop considerably before discharge can start. The discharge window is also limited, especially as there can be no discharge on a rising tide. However, with a weiring penstock, the water cascades over the top of the structure.

Thus discharging from a higher point, water can be drained earlier in the cycle. As the tide drops, the weir level is then lowered, increasing the rate of flow, until it is fully lowered to get the maximum flow. As the tide advances the weiring penstock can then be raised to prevent ingress of seawater.

These devices are sometimes called adjustable weirs, and tilting weirs can also be used. Such designs might well be used for any Parrett estuary sluice.⁵⁴

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<http://www.kingcombe.com/ourservices/riversstreamsandcanals/weirsslucispensstock.s.aspx>

⁵⁴ <http://www.aquaticcontrol.co.uk/sites/default/files/download-files/n100-f233.pdf>

Appendix 1

Policy drivers: the early days, to the origin of the Birds Directive

Post war farming was dominated by the need for food production, bringing about a drive for intensification on the Somerset Levels and with that arable cropping. This required a drop in the water table from an optimum of 18 inches in the summer for pasture to a foot lower for root crops and another foot for wheat. And lower water tables meant fewer birds.

This triggered an age old conflict between farming and conservation interests and, in the "battle of the birds", the conservationists felt they were losing. However, there were some successes, not least the designation in 1967 of fields in the Catcott district, on the south side of the Brue Valley, as a Nature Reserve. The facility to designate such reserves had come with the National Parks and Access to the Countryside Act 1949, including the power for the Nature Conservancy to acquire land compulsorily.⁵⁵ Although this was a limited power, as the budget was limited and the power to act was constrained, it was a step forward.

Yet to come was the big breakthrough. This arrived from the European Union or, as it was still then, the EEC, in the form of Council Directive 79/409/EEC on the conservation of wild birds, otherwise known as the Birds Directive of 2 April 1979.⁵⁶ This was the granddaddy of them all,

⁵⁵ http://www.legislation.gov.uk/ukpga/1949/97/pdfs/ukpga_19490097_en.pdf

⁵⁶ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31979L0409:en:HTML>

paving the way for a raft of measures, which included the use of a new designation known as the Sites of Special Scientific Interest (SSSIs).

Specifically, the big change it brought about was to convert a permissive power vested in the Nature Conservancy to create nature reserves into a mandatory duty. Having nominated species of birds at risk, it required Member States to "take the requisite measures to preserve, maintain or re-establish a sufficient diversity and area of habitats" for all the species of birds listed. The directive then required Member States to designate sites, known as Special Protection Areas (SPAs), for these species.

How the Birds Directive came about, though, is a story in itself – and provides the graphic illustration of how our modern system of government works. And, from the very beginning, it had an unlikely start. For its justification, the Community offered the tenuous argument that:

... the conservation of the species of wild birds naturally occurring in the European territory of the Member States is necessary to attain, within the operation of the common market, of the Community's objectives regarding the improvement of living conditions, a harmonious development of economic activities throughout the Community and a continuous and balanced expansion.

However, at the time, "environment" was not a competence of the EEC and was not to become so until the Single European Act in 1986 (Art 130). In the preamble to the Directive, therefore, it notes that the necessary specific powers to create the Birds Directive "have not been provided for in the Treaty". The only power available was the "catch-all" provision of Article 235.

Why the then nine Member States, including the UK which had become a full member in 1973, were so keen on breaking their own rules reflected the mood of the time. During the second half of the 20th century there had been an increasing awareness of environmental problems with publication of books such as Rachel Carson's *Silent Spring* in 1962 and *Limits to Growth* in 1972.

"Environment" as an issue, was becoming fashionable and popular. For the EEC, imbued with the idea "pollution knows no boundaries", it presented a perfect opportunity to extol the virtues of international action.

By then a number of environmental campaigning organisations had been formed, such as the Wildfowl & Wetlands Trust, dating from 1946, the International Union for Conservation of Nature (IUCN), established in 1948, and the relative latecomers: WWF in 1961, Friends of the Earth in 1969 and Greenpeace in 1971.

These added to long-established organisations such as the Royal Society of the Protection of Birds (RSPB), which had been formed in 1891. Its first reserves had been created in 1932, the Dungeness and East Wood reserves, with the land obtained at both in 1930.

These organisations, old and new, were able to exploit the widespread recognition that many wild species were in danger of extinction and that many habitat types were disappearing. One of their first international successes addressed global concern for the loss of wetlands with a resulting decline in numbers of waterfowl. This led to

the Ramsar Convention which was signed in 1971, creating the first international network of protected areas.⁵⁷

The history of this Convention forms a major part of the whole story. The initial call for a network of international wetlands came in 1962 during a conference which formed part of Project MAR (from "MARshes), a programme established two years earlier because of concerns at the rapid destruction of European marshes and other wetlands, with a resulting decline in the numbers of waterbirds.

The MAR Conference was organized by Luc Hoffmann, one of the founders of the WWF, and held in November 1962 in Les Saintes Maries-de-la-Mer in the French Camargue, not far from the Tour du Valat wetland research station (which was also founded by Luc Hoffmann).

Some 80 experts from non-governmental environmental organizations, governments mostly from European countries, and hunting associations published their recommendations, in which they called for a list of internationally important wetlands to be protected and for the development of an international treaty to give that list legal force.

Over the next eight years, a wetland convention text was painstakingly negotiated through a series of international technical meetings (St. Andrews, 1963; Noordwijk, 1966; Leningrad, 1968; Morges, 1968; Vienna, 1969; Moscow, 1969; Espoo, 1970), driven largely by NGOs and the Netherlands.

⁵⁷ http://www.ramsar.org/cda/en/ramsar-home/main/ramsar/1_4000_0__

In the same year that the Ramsar Convention was signed, 1971, the then secretary general of the United Nations Conference on the Human Environment, Maurice Strong, commissioned a report on the state of the planet, *Only One Earth: The Care and Maintenance of a Small Planet*, co-authored by Barbara Ward and Rene Dubos.

The report summarized the findings of 152 leading experts from 58 countries in preparation for the first UN meeting on the environment, held in Stockholm in 1972. This was the world's first "state of the environment" report.

The Stockholm Conference established the environment as part of an international development agenda. It led to the establishment by the UN General Assembly in December 1972 of the United Nations Environment Programme (UNEP), with headquarters in Nairobi, Kenya, and the election of Strong to head it. As head of UNEP, Strong was later to convene the first international expert group meeting on climate change.

The conference was highly significant because it marked the beginnings of international co-operation in the field of environment, from which date environmental law has been regarded as a legitimate and important area of international law. And at EEC level, the baton was picked up by the Paris Summit of October 1972. This had the Member States declaring:

Economic expansion is not an end in itself. Its firm aim should be to enable disparities in living conditions to be reduced. It must take place with the participation of all the social partners. It should result in the improvement in the quality of life as well as in standard of

living. As befits the genius of Europe, particular attention will be given to intangible values and to protecting the environment, so that progress may really be put at the service of mankind.

From this came the first action plan on the environment, published on 22 November 1973.⁵⁸ Although the main focus was on pollution, it called for joint action by Member States in the Council of Europe and other international organisations. Amongst other things, it then called for a study "with a view to possible harmonization of national regulations on the protection of animal species and migratory birds in particular".

Of the international organisations, which included the OECD, UNESCO and UNEP, the Council of Europe was quickest off the mark, adopting in 1973 the concept of a European network of Biogenetic reserves to conserve natural or near-natural habitats, although the programme did not start until 1976.⁵⁹

Following the 2nd European Ministerial Conference on the Environment in 1976, Switzerland published a study recommending a European convention on nature conservation which led to the Berne Convention on the Conservation of European Wildlife and Natural Habitats, also hosted by the Council of Europe and opened for signatures in September 1979.⁶⁰ It included annexes of plant and animal species requiring protection but did not refer to networks of protected areas.

⁵⁸ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:41973X1220:EN:HTML>

⁵⁹ <https://wcd.coe.int/com.instranet.InstraServlet?command=com.instranet.CmdBlobGet&InstranetImage=592183&SecMode=1&DocId=653614&Usage=2>

⁶⁰ http://www.coe.int/t/dg4/cultureheritage/nature/bern/default_en.asp

In the same year, after pressure from members of the European Parliament following lobbying from the public and NGOs for measures to protect birds, especially migratory species, a proposal for the Birds Directive was published by the European Commission. Despite the absence of a specific competence, it was agreed unanimously by the then nine Member States, who agreed that conservation of birds was a cross-border responsibility requiring coordinated action.

Back in 1979, when the Directive was agreed, the Conservative government seemed to be more than a little reticent about revealing that it was adopting EEC legislation, so when the Directive was transposed into UK law, to become the Wildlife and Countryside Act 1981, courtesy of Mr Heseltine, it failed to reveal the source.^{61,62}

With the passing into UK law of the Directive, though, NGOs which had so assiduously lobbied for its creation now had a powerful weapon at their command. They used it to force the government's hand, holding up the prospect of the Commission taking infringement proceedings against the UK if it failed to meet its international obligations.

In the Birds Directive, therefore, we have a classic and one of the first examples of the interplay between international, regional, sub-regional and then national action, directed at specific issues.

At the outset, we see campaigning groups and an increasingly powerful network of international NGOs, working through and on the international system lobbying for agreements on their favoured causes.

⁶¹ http://www.legislation.gov.uk/ukpga/1981/69/pdfs/ukpga_19810069_en.pdf

⁶² <http://jncc.defra.gov.uk/page-1373>

We see these agreements forming the basis of regional and sub-regional agreements, bringing forward actionable legislation which is then transmitted to Member States and adopted by them as national law. It is then used by those self-same NGOs at national level to achieve the changes they set out to promote when they first embarked on their lobbying processes, so completing the circle.

That, in so many ways, typifies how our system of government works. In the process, somewhere, democracy got discarded, as we now see NGOs integrated into a system of global governance, where the single issue groups are able to impose their will on societies who have now lost any capacity to shape their own destinies.

By such means, with a chain of decision-making that started over 50 years ago, did the Somerset Levels flood this winter,

Appendix 2

EU funding of the RSPB

Much of the work which led to the deliberate flooding of the Levels has been funded from the EU's LIFE+ programme.⁶³

Since its launch in 1992, a total of 216 projects have been co-financed in the UK. Of these, 155 focus on "environmental innovation", 55 on nature conservation and six on information and communication. These projects, says the Commission, "represent a total investment of €430 million, of which €193 million has been contributed by the European Union".

One of the biggest single beneficiaries of this funding seems to have been the RSPB. Its involvement in EU funded projects can be seen as early as 1994, when it led a €1,000,000 project on the "Preparation of action plans for the recovery of globally threatened bird species in Europe".⁶⁴ Between 2007-2012, it netted over €14 million from Commission-controlled programmes.⁶⁵

Typical of its projects was the €1,692,547 scheme with a grant of - for a total project cost of - to "raise awareness of the Birds Directive and promote positive land management", with an EU contribution of

⁶³ <http://ec.europa.eu/environment/life/funding/lifeplus.htm>

⁶⁴

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.createPage&s_ref=LIFE93%20NAT/UK/011700&area=1&yr=1993&n_proj_id=160&cfid=16603803&cftoken=fcd000dec6ff810a-B1E4D03B-03C3-2148-460C54C1AACBE5D3&mode=print&menu=false

⁶⁵ Financial Transparency Database: http://ec.europa.eu/budget/fts/index_en.htm

€846,273.⁶⁶ The EU support, with no detail of the funding, was acknowledged on an RSPB website.⁶⁷

Currently, the charity is executing the Little Terns project funded at €3,287,140 with an EU contribution of €1,643,570.⁶⁸ The "Saline Lagoons" project had previously yielded €682,419.50 from the EU, in a scheme worth €1,364,840.52.⁶⁹ There was also the Alde-Ore Project where the RSPB along with the National Trust is splitting €533,145 of EU money in a project worth €1,066,290.⁷⁰ Nor was the RSPB confined to UK activities, carrying out the "Life for the Bourgas Lake" project in Bulgaria where it shared €1,775,006, of which the EU contribution was €1,331,254.⁷¹ This was one of several international projects.

Then there was the Scottish Machair Project where the EU funded the RSPB and partners with €1,367,515 in a project budgeted at €2,735,031.⁷² There was also the Salisbury Plain Project where the RSPB was a partner in a scheme worth €3,482,722, with an EU

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http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=3504

⁶⁷ <http://www.rspb.org.uk/ourwork/farming/>

⁶⁸

href="http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=4755

⁶⁹

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=470&docType=pdf

⁷⁰

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=3537

⁷¹

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=3533

⁷²

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=3540

contribution of €1,741,361.⁷³ Between January 2009 and December 2012, there was the TaCTICS project: (Tackling Climate Change-Related Threats to an Important Coastal SPA in Eastern England).⁷⁴ This involved work on the RSPB Titchwell Marsh bird sanctuary in Norfolk, allowing the RSPB to collect €1,004,830 in EU funding, for a project budgeted at €2,009,660.⁷⁵

Then there was the project of reintroducing the Great Bustard to Salisbury Plain which netted the RSPB-led project €1,636,631.00 in EU funding, in a scheme costing €2,182,175.⁷⁶ And there was also the RSPB's Bittern Project, costing €3,756,072 with an EU contribution of €1,878,036.⁷⁷ There was also the New Forest Project, where the RSPB, with other partners, benefited from €3,744,911 of EU money, out of a total budget of €7,488,389 – the balance funded by Hampshire County Council and others.⁷⁸

The RSPB also took part in the "Blanket Bog Project" in Wales, secured €2,824,046 of EU funding, with a total of €3,765,394 being

⁷³

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=1712

⁷⁴

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=3321

⁷⁵ See also: https://www.rspb.org.uk/Images/Annex_N_layman's_report_tcm9-350942.pdf

⁷⁶

http://ec.europa.eu/danmark/documents/alle_emner/miljo/100723_.life+_natur_og_biodiversitet.pdf

⁷⁷

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=119

⁷⁸

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.createPage&s_ref=LIFE97%20NAT/UK/004242&area=1&yr=1997&n_proj_id=249&cfid=95413&cftoken=b327c2d053659616-56009F32-06C6-1458-B9F83A7028F9C95A&mode=print&menu=false

spent.⁷⁹ The RSPB then took secured another €2,728,721 from a project costing €4,547,869 for blanket bogs in Scotland.⁸⁰

All that must be added to the "Wise Use of Wetlands", co-ordinated by the RSPB, at a cost of €2,108,110 with the EU paying €1,052,044.⁸¹ Then there was the Scilly rat removal project, co-organised by the RSPB, with a total budget of €1,107,871.⁸² The EU put in €553,935. With the Broads Authority, the RSPB took part in a €1,047,116.69 scheme, of which the EU's contribution was €491,909. The project was called "New Wetland Harvests".⁸³

⁷⁹

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=LIFE06%20NAT_UK_000134_FTR.pdf

⁸⁰

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.createPage&s_ref=LIFE00%20NAT/UK/007075&area=1&yr=2000&n_proj_id=1715&mode=print&menu=false

⁸¹

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=1432&docType=pdf

⁸²

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=4320

⁸³

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dsPage&n_proj_id=1147&docType=pdf

Appendix 3

Catchment area treatment

One way of limiting local flooding is the use of tree planting and other devices on uplands to delay surface run-off, reducing what are known as flood pulses. However, while these stratagems may control flash floods arising from short bursts of intensive rainfall, such as from summer storms, there is no good evidence that they have any effect on flooding arising from persistent rain experienced during extreme weather events.

Despite that, environmental commentator, George Monbiot, has convinced himself that upland planting is the answer, thereby asserting that subsidy-driven cropping patterns, and in particular the use of forage maize, contributed significantly to last winter's floods. In mid-February, he was thus writing in *The Guardian* in terms of, "How we ended up paying farmers to flood our homes", asserting that the government had "let the farming lobby rip up the rulebook on soil protection", with us "... suffering the consequences".⁸⁴

During a visit to Somerset in mid-February, Monbiot claimed to have seen from the road from High Ham to Burrowbridge - even though most of the road and the surrounding area was flooded – "field after field of harvested maize". In some places, he wrote, "the crop lines run straight down the hill and into the water". When it rained, he asserted, "water

⁸⁴ <http://www.theguardian.com/commentisfree/2014/feb/17/farmers-uk-flood-maize-soil-protection>

and soil flash off" into the flooded area. "Seldom are cause and effect so visible".

Monbiot's particular antagonism to maize seems to rely on his discovery of he claims to be "a specific exemption for maize cultivation from **all** soil conservation measures", those which had been attached as conditions to subsidy payment in a system known as "cross compliance". "It's hard to get your head round this", he writes. The Labour government in 2005 had issued instructions on the control of soil erosion and now this was being kicked into touch.⁸⁵ "The crop which causes most floods and does most damage to soils is the only one which is completely unregulated", he argues.

This is not correct. Maize is not "completely unregulated". Farmers are still required to take steps to prevent soil erosion and run off for all cropping regimes. Specific measures for every crop grown, Monbiot was told by Defra, must be included in their Farm Soil Plans. The definitive 2010 manual of soil management still applied.⁸⁶ Maize was merely exempted from post-harvest management provisions that applied to other arable crops.⁸⁷

The reason for this was explained by Defra-funded research on soil erosion control relating to maize.⁸⁸ Counter-intuitively, it found that the

⁸⁵ <http://archive.defra.gov.uk/environment/quality/land/soil/documents/soilerosion-lowlandmanual.pdf>

⁸⁶ [http://rpa.defra.gov.uk/rpa/index.nsf/0/2ba694d4a8a991478025768e005e67c0/\\$FILE/Cross%20Compliance%20Guide%20to%20Soil%20Management%202010%20edition.pdf](http://rpa.defra.gov.uk/rpa/index.nsf/0/2ba694d4a8a991478025768e005e67c0/$FILE/Cross%20Compliance%20Guide%20to%20Soil%20Management%202010%20edition.pdf)

⁸⁷ [http://rpa.defra.gov.uk/rpa/index.nsf/0/6eb355ea8482ea61802573b1003d2469/\\$FILE/The%20Guide%20to%20Cross%20Compliance%20in%20England%202014%20complete%20edition.pdf](http://rpa.defra.gov.uk/rpa/index.nsf/0/6eb355ea8482ea61802573b1003d2469/$FILE/The%20Guide%20to%20Cross%20Compliance%20in%20England%202014%20complete%20edition.pdf)

⁸⁸ <http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=7868>

effects of different erosion control treatments varied between sites and years and, in some cases, strategies that worked for some types of soil increased erosion on others. It thus made sense not to have standard conditions, instead to relying on farm soil plans devised for specific conditions.

Nevertheless, maize has become Monbiot's villain, and to further condemn the crop he relied on a recent paper in *Soil Use and Management*. This, he asserted, warned that disaster was brewing, with surface water run-off in south-west England, where the Somerset Levels are situated, "reaching a critical point". From 38 percent of the sites the researchers investigated, rainwater, according to Monbiot, was now pouring off the fields instead of percolating into the ground. And nothing of substance was being done to stop it.

From the abstract of this paper, we see:

Field investigations between 2002 and 2011 identified soil structural degradation to be widespread in SW England with 38% of the 3243 surveyed sites having sufficiently degraded soil structure to produce observable features of enhanced surface-water runoff within the landscape. Soil under arable crops often had high or severe levels of structural degradation. Late-harvested crops such as maize had the most damaged soil where 75% of sites were found to have degraded structure generating enhanced surface-water runoff. Soil erosion in these crops was found at over one in five sites.⁸⁹

Relying on the detail of the paper, Monbiot then asserts that farmers have been ploughing land that was previously untilled and switching from spring to winter sowing, leaving the soil bare during the rainy

⁸⁹ <http://onlinelibrary.wiley.com/doi/10.1111/sum.12068/abstract>

season.⁹⁰ Worst of all, he claims, is the shift towards growing maize: cultivated area in this country has risen from 1,400 hectares to 160,000 since 1970.

In fact, in 2011 the total area used for maize cultivation was 164,000 hectares but it increased to 194,000 hectares in 2013.⁹¹ However, this compares with 17,256,000 hectares given to agriculture and 4.5 million hectares in arable use. Maize thus accounts for just over one percent of total farming area (1.12 percent), and four percent of the land under the plough. As to the South-west, about 37 percent of total maize production comes from the counties of Cornwall, Devon, Somerset, Gloucester, Wiltshire and Dorset, of which a mere 8,000 hectares is grown in the whole of Somerset.

Interestingly, most of the water feeding the upper Parrett comes from the Mid-Somerset Hills, which Natural England records have: "generally well-wooded on ridge tops".⁹² The area of maize draining into the levels is unknown, but very much less than 8,000 hectares. However, if the entire 75 percent that was, "generating enhanced levels of surface-water runoff", was taken, that would still only be 6,000 hectares. On the other hand, the flooded area of the levels was 60,000 hectares - ten times the area. In some places, the water was ten feet deep or more. The notion that maize planting was a major contributor to this is absurd.

Nevertheless, Monbiot constantly asserts that surface run-off is the major factor in flooding, not only in his *Guardian* piece but in another

⁹⁰ <http://eureferendum.com/documents/sum12068.pdf>

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https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/267619/structure-jun2013final-UK-19dec13.pdf

⁹² <http://www.naturalengland.org.uk/sitings/areas/143.aspx>

called "Drowning in money" and in another on dredging.^{93,94} However, hydrology primers have some interesting observations on the relative importance of surface run-off and water which percolates into the soil.⁹⁵ In certain circumstances, surface water entering ditches, streams, watercourses and then rivers, discharges harmlessly to the sea, without adversely affecting the locality through which it passes – provided the drainage system is capable of coping with the volume.

On the other hand, water percolating into the soil may then gravitate through the subsoil and horizontally to the flood plain, raising the water table and thereby reducing the absorption capacity of the soil. By this means, it precipitates floods when heavy rain falls. In some instances, therefore, it can be better to take the water away via surface drains, to prevent the soil becoming waterlogged.

As to the precise effect of surface run-off, we see in the "soil structural degradation" paper a reference to O'Connell *et al*, (2004). These researchers ask, "is there a link between agricultural land use management and flooding?"⁹⁶ Answering their own question, they aver that there is "substantial evidence" that changes in land use and land use management practices affect surface water run-off generation **at a local scale**. It causes what are known as "muddy floods", which can be very visible after short bursts of intensive rainfall.

⁹³ <http://www.monbiot.com/2014/01/13/drowning-in-money/>

⁹⁴ <http://www.monbiot.com/2014/01/30/dredged-up/>

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<http://books.google.co.uk/books?id=eDOsAAAAIAAJ&pg=PA305&ots=teSCXOtdeS&dq=percolation%20raising%20water%20table%20contribution%20flooding&pg=PA310#v=onepage&q=percolation%20raising%20water%20table%20contribution%20flooding&f=false>

⁹⁶ <http://www.hydrol-earth-syst-sci.net/11/96/2007/hess-11-96-2007.pdf>

Also called in aid is Archer *et al* (2010). These researchers do suggest that there is a link between land use and floods at catchment scale.⁹⁷ But they make only the most tenuous of connections, which relate to normal rainfall patterns. In extreme events, of the scale experienced recently, the authors suggest that changing land management practices, such as planting, may not "provide significant observable benefits in terms of reducing the peak flows of extreme floods". In extreme weather events, they say, "very rapid rates of change of flow occur ... irrespective of land use".

This observation we find endorsed by an FAO study, which concluded:

Contrary to popular belief, forests have only a limited influence on major downstream flooding, especially large-scale events. It is correct that on a local scale forests and forest soils are capable of reducing runoff, generally as the result of enhanced infiltration and storage capacities. But this holds true only for small-scale rainfall events, which are not responsible for severe flooding in downstream areas. During a major rainfall event (like those that result in massive flooding), especially after prolonged periods of preceding rainfall, the forest soil becomes saturated and water no longer filters into the soil but instead runs off along the soil surface".⁹⁸

Thus, within the paper cited by Mr Monbiot cites, and endorsed elsewhere, is the evidence that his thesis is wrong. In extreme events, the ground becomes saturated even when there is cover. And once that happens, the run-off to the flood plain is the same as from bare ground. In persistent winter rains, the higher the rainfall, the less the observable effect there is from changes in land use.

⁹⁷ <http://www.iwaponline.com/nh/041/0013/0410013.pdf>

⁹⁸ <http://www.fao.org/forestry/11722-0aea9fb9406230267eaf9955570ec42f3.pdf>

In arguing for upper catchment tree planting as a means of reducing floods, Mr Monbiot further relies on a 2013 research paper, entitled: "The impact of rural land management changes on soil hydraulic properties and runoff processes: results from experimental plots in upland UK".^{99,100} Yet the authors of this paper, having replaced grazed pasture with trees, found exactly the same thing. Their results applied only to, "the potential use of upland land management for ameliorating **local-scale** flood generation".

A longer report used by Mr Monbiot is also unhelpful to his cause. It merely called for more time to assess the true impact of catchment-scale effects.¹⁰¹ Even an Environment Agency report cited by Monbiot merely noted that the impacts of working with natural processes at a catchment scale "cannot currently be distinguished (especially during extreme precipitation events)".¹⁰² All it could offer was: "evidence is emerging that land-use change may have an impact in smaller catchments" (i.e. potentially up to 10km²).

Then, in January 2008, there was a report for the Environment Agency by the Halcrow Group.¹⁰³ Specifically addressed to catchment scale land-use management, it flatly contradicted Monbiot. A study of the Parrett catchment was "not able to identify a clear relationship between land use/management changes and flood risk". Instead, in the catchment, "hydraulic structures" – i.e., ditches and rivers - "were

⁹⁹ <http://www.monbiot.com/2014/01/13/drowning-in-money/>

¹⁰⁰ <http://onlinelibrary.wiley.com/doi/10.1002/hyp.9826/abstract>

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http://nora.nerc.ac.uk/5890/1/ur16_impacts_upland_land_management_wp2_2_v1_0.pdf

¹⁰² [http://a0768b4a8a31e106d8b0-](http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geho0811buci-e-e.pdf)

[50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geho0811buci-e-e.pdf](http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geho0811buci-e-e.pdf)

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<http://archive.defra.gov.uk/environment/flooding/documents/manage/landuserole.pdf>

generally shown to be more effective in reducing flood risk than crop management at the catchment scale in a typical flooding season".

On all counts, therefore, the argument that upper catchment tree planting could have prevented last winter's floods, or floods to come, is unfounded. In the Parrett catchment, where most of the flooding has occurred, hydraulic structures – i.e., ditches and rivers - "were generally shown to be more effective in reducing flood risk than crop management at the catchment scale in a typical flooding season".¹⁰⁴

And here, so to speak, is another nail in the coffin. Natural England seeks to turn every ditch and watercourse into a miniature nature reserve, where biodiversity is king, losing sight of the original purposes of these structures.¹⁰⁵ And not only do they move water, they also store it.¹⁰⁶ Properly managed, they provide substantial additional capacity, slowing down the run-off into the rivers and holding it back until the rivers can cope, the very thing that the "wetlands" are supposed to do. Choked up, they simply cannot function.

The ultimate irony though, is that the essential requirement for maintaining biodiversity in permanent pasture is, according to Defra-funded research, to avoid waterlogging the site, "specifying a maximum water level to limit the degree of surface flooding".¹⁰⁷

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<http://archive.defra.gov.uk/environment/flooding/documents/manage/landuserole.pdf>

¹⁰⁵ http://www.wlma.org.uk/uploads/NE121_Drainage_Channel_Biodiversity_Manual.pdf

¹⁰⁶ <http://www.waterpowermagazine.com/features/featurefloods-on-the-somerset-levels-a-sad-tale-of-ignorance-and-neglect-4172602>

¹⁰⁷ <http://www.floodplainmeadows.org.uk/files/floodplain/d96437.pdf>