

Whose River? London and the Thames Estuary, 1960-2014*

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I Introduction

For the novelist A.P. Herbert in 1967 the problem with the Thames was simple. 'London River has so many mothers it doesn't know what to do. ... What is needed is one wise, far-seeing grandmother.'¹ Herbert had been campaigning for a barrage across the river to keep the tide out of the city, with little success. There were other, powerful claims on the river and numerous responsible agencies. And the Thames was not just 'London River': it runs for over 300 miles from Gloucestershire to the North Sea. The capital's interdependent relationship with the Thames estuary highlights an important problem of governance. Rivers are complex, multi-functional entities that cut across land-based boundaries and create interdependencies between distant places. How do you govern a city that is connected by its river to other communities up and downstream? Who should decide what the river is for and how it should be managed?

The River Thames provides a case study for exploring the challenges of governing a river in a context of changing political cultures. Many different stories could be told about the river, as a water source, drain, port, inland waterway, recreational amenity, riverside space, fishery, wildlife habitat or eco-system. Rivers are constituted as resources variably over time, with changing 'competencies and capacities'.² This article takes as its starting point the two functions that dominated the tideway at the start of this period: as the nation's major trading port, and the quickest and cheapest way of removing sewage. It explores the ways in which flows of urban waste on the river have created political conflicts within the capital and connected London to the estuary downstream as an 'ecological hinterland'.³ The river has long provided vital environmental services for London, especially as its water supply and dumping ground. It also provided the means for the capital to reach beyond its boundaries. In contrast to the mid-Victorian river, with its polluted water sources and unregulated sewage discharges in the heart of the city, these had shifted outwards by the late nineteenth century, with water supply abstractions confined to the freshwater river above London and new sewage outfalls below the city.⁴

Though the image of London as a Leviathan swallowing up neighbouring areas has a long pedigree,⁵ histories of London's river have been comparatively self-contained. The Thames itself has been studied especially in relation to nineteenth-century urban utilities and public health. Metropolitan water supply, sewerage and pollution have been shown to be integral to the 'London Government Problem'. How should London's population be provided for and governed? How should power be balanced between pan-London government and local

authorities within and beyond London's borders? Histories of water supply and other public utilities in London have demonstrated how struggles over their ownership and control were bound up with debates over citizenship by the end of the nineteenth century. But the city has remained the central focus.⁶ Recently a regional turn in urban history has begun to explore ways in which cities have been connected to their hinterlands, while geographers and environmental historians have brought flows of water, sewage and energy within and beyond the city more clearly into view.⁷ Drawing on this regional focus, this article explores the problems for urban governance generated by the tidal river – of balancing sectional and public interests – as well as the problems the city itself has created for other communities and interest groups sharing the river.

This account of the shifting governance of the tidal river assesses to what extent its dominant functions have determined both its material condition and the range of players involved in decision-making. The changing forms of river governance over the past fifty years potentially bear out regulation theory's view of the state as enmeshed in the defence of dominant economic interests, its modes of regulation or governance forming, in Karen Bakker's words, a 'dynamic (yet relatively coherent) set of social and political institutions that sustains a particular "regime of [capital] accumulation"'.⁸ It will be argued that although the river's key economic functions have in various ways been accorded primacy and determined the range of actors, there have also been political constraints to this, relating to public confidence and legitimacy, while pressure from outside state institutions has expanded the range of concerns and political interests incorporated into state policy.

Following an outline of the agencies responsible for the Thames in the early 1960s, the article examines three phases during a period of fundamental change, both in the management of the Thames and other UK rivers and in prevailing understandings of the value of rivers within a wider eco-system. The first phase, during the 1960s, was marked by the prioritization of the river's functions as a drain and trading port, by the wretched condition of the river, and by institutional rivalries and technocratic adjustments which significantly improved the river without altering underlying assumptions about what it was for or how it should be governed. A second phase, spanning the late 1960s to mid 1970s, saw metropolitan institutions seeking to expand into the lower estuary, but also resistance from local government and civil society groups downstream, strengthened by the rising currency of environmental concerns. GLC landfill plans for the Kent riverside are the focus for this phase. In the third phase – broadly envisaged from 1973 to the present day – the Thames and other UK rivers were 're-scaled' within new modes of governance and ownership, from the short-lived integrated water, sewerage and river-basin management under nationalization, to water privatization and 'multi-level governance' within a wider European regulatory framework. These developments will be considered in the light of their implications for understanding the long-term challenges of river governance.

II Estuary Governance Agencies

The tidal river within London is often distinguished in popular terms from 'the estuary' below the city, but following geographic usage 'estuary' here refers to the whole tidal river. The estuary flows eastwards from Teddington Weir through the conurbation of London, through the 'reclaimed', industrialised riverside downstream – interrupted by the remaining marshes and mudflats – to the 'outer estuary' in the North Sea.⁹ **Figure 1** shows the river and some of its governance boundaries from just above the tidal limit to the seaward limits of London's port.

FIGURE 1 NEAR HERE

Estuary institutions in 1960 remained much as they had been since the early 1900s. The Port of London Authority (PLA), established in 1909, was the dominant statutory authority on the tidal river, responsible for navigation, the docks, shipping channels, dredging, river works licensing, sea fisheries, river conservancy and pollution control for the tideway.¹⁰ Conservancy operations were financed by port users' dues, supplemented by abstraction and discharge fees on the tidal river.¹¹ Recovering from the war by 1960, it reached its peak tonnage of 61.3 million in 1964.¹² Other agencies included the City of London Corporation's Port Sanitary Authority, and metropolitan government: the London County Council (LCC, established in 1889). The LCC was responsible, within a 'London excluded area', for London's 'main drainage' sewers and sewage treatment works at Beckton and Crossness – exempted from PLA pollution powers – and for land drainage and flood control. Flood defences were a crucial issue in 1960, following the 1953 east coast flood that had killed 350 people, but were still being debated when the LCC was replaced by the larger Greater London Council (GLC) in 1965. The Metropolitan Water Board (MWB) had managed Greater London's water supply since 1904, replacing earlier private companies.¹³ It abstracted water from the freshwater Thames and, increasingly, from groundwater in the Thames catchment (river basin). The Thames Conservancy managed water resources within the Thames catchment, and river conservancy and pollution control for the freshwater river. The Lea river and waterways, flowing south into the Thames in East London, were managed by the Lea Conservancy Catchment Board. Downstream from London, conservancy and water resources were in the hands of the Essex and Kent River Boards from 1948, re-designated as River Authorities in 1965.¹⁴ Their lack of authority over the tidal Thames as it flowed through their patch was a source of tension with the PLA.

The fragmented Thames was, therefore, both a matter of different agencies managing different stretches of the river and Thames catchment, and of overlapping jurisdictions within the same areas. Both created rivalries and problems in establishing legitimate claims to authority. In its early years the LCC's Progressive Liberals had fought hard to establish a claim – on behalf of the capital's citizens – as the rightful managers of London's water supply, river conservancy and the port itself (**Figure 2**). The creation of the PLA and MWB was a rejection of LCC claims and of direct municipal ownership and control.¹⁵ As public corporations, they were run by large boards embodying a 'representative principle'

and answerable to a minister, an arrangement intended to balance (the right kind of) river interests with public accountability. A majority on the PLA was elected by port users, the rest being appointed by port-related organisations and key London authorities (with four LCC appointees). The MWB included representatives from the LCC and local authorities within and around London.¹⁶ River conservancy boards followed a similar pattern.

FIGURE 2 near here

These public corporations represented, as Bill Luckin has pointed out, the 'ubiquitous tension between ... technical competence ... and ... public control' in the provision of metropolitan public services, but they were not "pre-modern" organisations'.¹⁷ Although they were much criticized for inadequate mechanisms of accountability and scrutiny, the expansion of 'arms-length' or 'delegated' government was an important feature of service provision in the modern period. By 1938, a third of British ports were run on this basis.¹⁸

Both the semi-representative PLA and the representative metropolitan government were hampered by an incomplete mandate for their activities on the estuary. The PLA had the advantage of designated governance borders at the intersection of the estuary and the North Sea (**Figure 1**),¹⁹ but was subject to criticism from groups unrepresented on its board. The LCC, and later GLC, had an electoral mandate within their boundaries (though always in tension with London boroughs), but their sewage discharges and refuse services carried them well beyond their borders. The need to secure legitimacy with a wider set of interests and with the public was a recurring challenge for both these river agencies.

III Zero Velocity in Estuary Governance: 1949-1969

'Zero velocity occurs at that point in the water column where the seaward movement of freshwater is balanced by the landward movement of sea-water.'²⁰

The section explores the tensions created by the two dominant functions on the tideway at the start of this period – port and sewerage – and assesses the extent to which these determined the parameters of public policy and prevented wider access to decision-making processes. As the agencies responsible for these functions up to 1973, the voices of the PLA and metropolitan government (LCC and GLC) could be heard above all others on the river, with the port pre-eminent. As PLA Chairman Thomas Wiles put it in 1944 with a swipe at LCC post-war reconstruction plans: 'unless London is re-established in her pre-war eminence as the centre of international trade all schemes for enhancing her beauty will remain disappointing dreams.' A later PLA chairman was similarly confident in 1959 about the river's other function: 'People sometimes say ... that this or that river is like an open drain. In my view, that is exactly what a river ought to be; but it should be a clean and healthy drain ...'.²¹ The port authority's responsibility for pollution control on the estuary linked these two functions up to the 1960s.

The post-war years were marked by tensions within and beyond Greater London over river conservancy at a time of severe river pollution. The period since 1935 had been the worst on record. Long stretches of river were without oxygen – biologically dead – during the summer months up to the mid 1960s. A PLA-commissioned study of 1957 found no evidence of fish since 1920 over the forty miles between Richmond and Tilbury, apart from eels which were capable of taking air from the surface.²² There were questions in Parliament, complaints from the public about a ‘foul smelling gas’ (hydrogen sulphide) and, as the PLA reported in 1950, ‘numerous complaints from shipowners and other river ... interests regarding the obnoxious condition of the Thames ... and ... damage ... caused thereby.’²³ The sources of pollution were myriad and hard to identify. Industrial effluent discharges were a significant source, both official (with consents) and unofficial. Heavy siltation and deep shipping channels created oxygenation problems, as did synthetic detergents now entering the Thames and other European rivers. Cooling water from power stations contributed to rising water temperatures.²⁴ In 1954, the PLA’s River Purification officer reported that the ‘average temperature over the whole of the River (July-September) at High Water was 20.8° C or practically 70° F’, which, he pointed out, put ‘the Thames in the same category as the Amazon or Zambezi River’. There was also, as a PLA board member put it in 1948, ‘of necessity, much sewage and injurious matter falling into the Thames from the immense amount of shipping carried upon its waters’.²⁵ Above all, though, the problem was sewage from Greater London’s expanding population. The 1961 Pippard Report identified five sewage treatment works, in particular, including those of the LCC, with 50% of total sewage in the tideway attributed to Beckton’s discharges into Barking Reach.²⁶ This was a long-standing problem: the decline in this reach had been the subject of complaints in the 1870s and 1880s that central London’s earlier ‘Great Stink’ had simply been moved downstream. The shipping of settled solids (sewage sludge) to the outer estuary from the 1890s had sought to address this, but increasingly overloaded sewerage systems along the Thames in the early twentieth century were returning inadequately treated wastewater to the river.²⁷ This was not just a one-way flow. The ‘retention’ of water and effluents within the estuary system meant that discharges on the ebb tide returned upstream; pollutants released downstream could travel upstream.²⁸

The post-war rehabilitation of the Thames is often characterised as a common sense response to a problem that had gone too far. Leslie Wood, in his excellent 1982 survey of the scientific project, pointed out that things reached a crisis when efforts to improve the Beckton outfall for the Festival of Britain failed in the summer of 1951. He considered that the clean-up ‘resulted from a unique combination of enthusiasm of responsible bodies and devoted scientific investigation’.²⁹ It was not so straightforward. Those same responsible bodies had overseen the degradation of the river. Acceptable and unacceptable levels of pollution have less to do with absolute standards than with cultural norms,³⁰ and the post-war tideway raised damaging questions about the competence and legitimacy of the governing institutions. Problems on the tidal Thames were part of a wider context of policy stagnation in the water sector in the years before and after the war, of a lack of money and government restrictions on capital expenditure, the multitude of vested interests in discharges, sewerage and water resources, and the fragmentation of groups lobbying for

cleaner rivers.³¹ Within this unpromising landscape, however, the responsible agencies on the tidal Thames did spur each other into action.

It was the PLA who initiated the process in 1947, pressing the Ministry of Health on LCC sewerage and other pollutants, and requesting an investigation into siltation, with concerns that this was exacerbated by pollutants in the Mud Reaches (see **Figure 1**). Dredging silt to maintain navigation was a major expense for the port. Government funding was needed for research; expenditure restrictions were blocking both sewerage improvements and the MWB's long-planned reservoirs. Adequate freshwater flows were crucial for navigation in the tideway, but also for dilution of effluents and water aeration.³² The Government responded by setting up the Thames Survey Committee (TSC, 1947-64) to examine siltation – later becoming a detailed pollution investigation – and in 1951 the Ministry of Housing and Local Government (MHLG) established an enquiry into effluent discharges and different agencies' pollution role (Pippard Committee, 1951-61). In 1953, LCC sewerage improvements were authorized.³³ Both the LCC and PLA were found wanting in the Pippard Report, though with their representatives on both committees criticism was muted. Identifying the LCC outlets as the main polluters, exemption from PLA oversight was also seen as a weakness.³⁴ The PLA's role in seeking improvements was applauded, but they were recommended to apply more stringent water quality standards, to improve effluent monitoring and to take river conditions as well as discharges into account.³⁵ PLA reliance on the LCC for some of their water sampling was criticized: it was 'undesirable in principle' for the pollution authority to rely on the polluting authority. The LCC's continuous records of the condition of river water since the 1890s were considered by the TSC as probably the most 'detailed and extensive' of 'any ... estuary in the world'. As a PLA conservancy officer had pointed out a few years earlier: 'the interests of the Port Authority' were 'not necessarily those of the London County Council and the P.L.A. should have its own data if only for a matter of prestige'.³⁶ The PLA continued to use LCC (and later GLC) data but made important changes to their knowledge base, engaging the TSC chair as chemical engineer, commissioning surveys of estuary fish populations, and setting up the Clean Thames Consultation Panel in 1965.³⁷ They took action in the light of the TSC's conclusion that their dredgings dumped in the outer estuary were returning upstream to the 'mud reaches', terminating this operation and developing instead silt lagoons at Rainham Marshes and Cliffe Marshes in Kent.³⁸ The clean-up was both a scientific endeavour and a necessary public relations exercise for central government and the metropolitan river authorities.

Was this function-led governance then, with the estuary sacrificed to the twin gods of shipping and sewage? These functions had undoubtedly been prioritised by central government, but their relations with the PLA and LCC were complicated. Civil servants were privately critical of both institutions, and river conservancy reform in the light of the PLA's track record was a recurring subject within government departments. When during debates over new River Boards in the late 1940s, downstream authorities had called for independent jurisdiction over the lower river, the government had preserved the LCC 'London excluded area', as well as PLA conservancy on account of its 'particular and special powers' on the tidal river, but a clause in the 1948 River Boards Act allowed for a

future separate river authority for London.³⁹ These pressures may have encouraged the PLA's heightened conservancy activity at that time. In the wake of Pippard and the Proudman Committee on water resources (1962), there were again confidential discussions of the PLA's role. A 1962 MHLG memo, noting Kent and Essex River Boards' criticisms of the PLA, considered that it was 'not particularly good', but '[t]hey naturally concentrate on their main job ...'. An upper estuary river authority was considered unfeasible and there was 'no mandate' to restrict the PLA's role. The Water Resources Act 1963 (creating 29 River Authorities, with increased powers) again allowed for a future London river conservancy.⁴⁰ The Government solution instead was to expand PLA conservancy powers in 1964 alongside concessions to other agencies. The new GLC gained control over six non-tidal tributaries. Lower river agencies were incorporated into formal estuary consultation for the first time, sitting on a new Pollution Control Committee that the PLA were obliged to establish.⁴¹ PLA competence was scrutinized again during the Labour Government's 1969 deliberations over ports nationalization, alongside discussions over the Thames Conservancy taking over the tidal river, but these ended with Labour's 1970 electoral defeat.⁴² The estuary governance structure was eventually settled by the 1973 Water Act (see Section V).

From the 1940s to the late 1960s, debates over the tidal river show estuary governance pulled in different directions but essentially staying at a point of zero velocity. Pressure to improve the river came from metropolitan agencies, central government and from downstream river authorities. Amidst tensions between agencies, the government tentatively incorporated new interests within the governance process in 1964. Rivalries between the PLA and LCC (and later GLC) over technocratic status were a spur to action during these years. Sewerage investment, pioneering research into effluent impacts, and improvements in water quality monitoring left underlying assumptions about the river's functions unchanged, but resulted in a much cleaner and better understood river. The PLA reported 73 species of fish in 1973.⁴³

While river governance structures remained in place, however, changes within the port sector and the PLA's governing board during this time suggest a shift in perceptions of legitimate governance away from the 'representative principle' towards expertise as the basis of good management. Lord Rochdale's ports inquiry (1961) recommended that public ports should be run by small managerial teams, leading to power struggles in the Thames and other ports.⁴⁴ When in 1966 the PLA sought to reduce the number of representatives on its board (retaining one GLC member), it was strongly opposed by several of the represented organizations. At a public inquiry the PLA insisted that consultation was as good as statutory representation; the GLC claimed that its river responsibilities required a strong board role. The GLC was backed as the guardian of the recreational Thames by the London Tourist Board and River Thames Society (RTS, formed in 1962), who argued that port was being allowed to dominate the river.⁴⁵ Labour's Transport Minister, Barbara Castle, was reported confidentially to consider the views of the RTS, Tourist Board and Thames Passenger Transport Federation to 'contain the least substance' of all objections: the PLA was 'essentially concerned with the operation of a great trading port'. The river as a multi-functional amenity was still a long way off. Following a meeting with the PLA

chairman, it was noted that 'the minister ... seemed to go out of her way to urge the analogy of a Board in the private sector'.⁴⁶ Before the water industry's managerial revolution of 1973,⁴⁷ then, the late 1960s saw a shift towards managerialism on the Thames and other ports, and a new focus on expertise as the source of authority. This process was completed when the PLA board was successfully halved in 1975, with representatives replaced by ministerial appointment of

"persons [who] have a wide experience of, and ... capacity in, one or more of the following: business management, financial matters, sea transport, inland transport, international commerce, the organisation of workers, riverside activities, environmental matters affecting the area of the port of London and navigation."⁴⁸

Though, significantly, members of the disenfranchised organizations continued to sit on the board, this was by invitation. The space for 'environmental matters' was new.

If access to decision-making on the tidal river was partially opening up during these years, it also contracted through a new managerialism. From the late 1960s, however, there was an important development outside the confines of institutional closed shops. New players emerged who were to expand the field of expertise and raise fundamental questions about what the estuary was for and who should decide its future.

IV 'Wetlands are Not Wastelands': 1968-86

The late 1960s saw attempts by metropolitan authorities to expand along the estuary, met by increasing resistance to London-based plans. This section examines the implications of one of these border conflicts, over GLC refuse and sewage disposal. The GLC was meant to be a regional solution to the London problem; part of a wider, brief rise of 'big local government' in the UK and other Western European cities.⁴⁹ Five and a half times the size of the LCC, it was similarly responsible for main drainage, sewage treatment and sludge boats, trade effluent control on the river, land drainage and flood defence within the 'London excluded area'. It had a new role in refuse disposal for Greater London, taking over borough waste transfer and the barges used for conveying refuse to landfill sites downstream. It had strategic planning powers for Greater London, including the riverside, alongside the planning role of the 32 London boroughs. London had already outgrown its new boundaries by 1965,⁵⁰ however, and the GLC encountered problems of territorial resistance and lack of democratic mandate whenever it strayed across its boundary.

[Insert Figure 3 near here]

The new GLC had to dispose of three million tons of refuse a year (**Figure 3**).⁵¹ Metropolitan refuse had been barged to low-lying marshland in Essex and Kent since at least the late nineteenth century. While this trade had created opportunities downstream, with estuary communities sending bricks and hay back upstream, it had also created

grievances – from residents living beside refuse pits to fishermen complaining about rubbish dumped straight into the river.⁵² Finding landfill sites was an ongoing challenge. By the 1960s, waste disposal authorities across South East England were competing for abandoned pits, quarries and 'reclaimable' marshland.⁵³ London's sewage sludge too had been shipped downriver and dumped in the outer estuary since early LCC days. By 1971, the GLC was depositing around five million gallons annually in Barrow Deep (see **Figure 1**), but there were increasing concerns over its effects on the estuary.⁵⁴ A scheme for piping sludge direct to the sea was abandoned as too vulnerable to changing international regulations: Oslo Convention (1972) restrictions on the dumping of waste at sea by shipping and aircraft suggested tighter regulation of marine sewage disposal in the future.⁵⁵

Aiming to address both refuse and sewerage, the GLC began in 1972 to pursue a scheme to buy 1,600 acres in Kent: Stoke Ooze on the Hoo Peninsula, on the north bank of the Medway. This was an area of saltmarsh and mudflats covered twice a day by the high tide, formerly reclaimed land that had been dug for clay then partially claimed back by the river (see **Figure 1**). Situated between Kingsnorth Power Station and the industrialised Isle of Grain, it was way beyond the GLC boundary (**Figure 4**). The initial plan was to use part of the site for re-processing sewage sludge into soil, while the landfill area could eventually be sold for commercial development. Early estimates suggested it could take 12 year's worth of river-borne refuse and all of London's sewage sludge. Notably, this ambitious scheme coincided with the GLC's fight to retain control of sewerage in the run-up to the 1973 Water Act.⁵⁶ In 1974, when the GLC had lost that battle to the new Thames Water Authority (see Section V), they focused on the refuse element of the scheme.

[insert Fig 4 around here:]

Following a leak to the press in 1973, there was strong local protest at becoming 'London's dustbin'. There were complaints of a lack of consultation from parishes to the county council. Territorial politics played an important part. '[T]here is a strong fear of the GLC as 'the "Big Brother"', a GLC official noted after meeting Medway Borough Councillors. The GLC had been viewed with suspicion by its neighbours from the start, Kent County Councillors condemning the proposed authority in 1961 as "'a gigantic, remote, ... machine ... far removed from ... genuine local government'". And it was a beacon for complaints about consultation in the wake of its unpopular 'motorway box' plans.⁵⁷ There was a gap too between GLC confidence in its own expertise and electoral mandate, and the democratic ideals of ad hoc community and pressure groups.⁵⁸ There were protests from local civil society groups, such as the Hoo Peninsula Action Group, Dickens Country Protection Society, and Medway River Users Association, who objected to 'the despoilation of one of the characteristics that make the Medway different from the London river'.⁵⁹ After a local public meeting in 1973, GLC's Labour Public Services chairman informed colleagues that '[a]lmost everyone' he had 'met was speaking from self interest', including those 'flogging the environmental issue to death'. He nevertheless considered the scheme politically unfeasible.⁶⁰

It was these oppositional civil society groups who were to shift the balance of power in the estuary. Protests over refuse tips were nothing new but opposition to Stoke Ooze became linked to a high-profile, wide-ranging revaluation of estuaries that went beyond concerns

over pollution. This challenged the view of GLC engineers that the estuary marshes were 'desolate' space that could only benefit from 'reclamation', providing space for industry and reducing flood defence costs. The PLA had encountered similar conflicts of values over their plans for a sea and airport at Maplin Sands, Foulness (from 1968), which had set the pattern for subsequent protests.⁶¹ These conflicts were characterised by the presence of national and international conservation groups alongside local community campaigns. The rising influence of environmental concerns in the late 1960s and early 1970s saw the emergence of new organisations – such as Friends of the Earth (1971) and also older organisations such as the Royal Society for the Protection of Birds (RSPB, formed 1889) enjoying expanding membership and spheres of activity.⁶² The GLC plan was also opposed by the influential Thames Estuary Wildlife Conservation Group (TEWCG), launched in 1976 to oppose a range of estuary developments. The group was part of a new RSPB strategy on estuaries across the country, including the Dee and Severn. Stressing the importance of estuaries as wintering and breeding grounds for birds, they brought together local ornithology, wildlife conservation and amenity groups, and the Nature Conservancy Council (NCC).⁶³

Such national and international wildlife organisations established alternative sources of expert knowledge beyond the statutory river agencies.⁶⁴ Research on all sides was spurred on by development proposals.⁶⁵ Ornithologists Jeffery Harrison and Peter Grant stated that when the Thames was raised at the Ramsar Convention on Wetlands in Iran in 1971, 'at last one saw the real value of all the wildfowl counts ... over the years', with the Wildfowlers Association of Great Britain and Ireland making 'the most authoritative conservation case'. Ramsar itself was a milestone in the transnational re-invention of estuaries, with its message that 'wetlands are not wastelands'.⁶⁶ Identifying specific areas as valuable for wildlife based on measurable characteristics challenged official representations of the function of estuaries. Rooted in early twentieth-century agitation for national parks and coastal preservation, this approach had taken statutory form with the creation of Nature Conservancy (1949-65) and the NCC in 1973, responsible for designating Sites of Special Scientific Interest (SSSIs). Such designations could be used as a 'warrant' by NGOs and others.⁶⁷ Harrison and Grant's own publication, *Thames Transformed* (1976), was part of this process, characterising stretches of the Thames and Medway estuaries and highlighting their vulnerability to contradictory government policies.⁶⁸ Like Maplin (abandoned in 1974), Stoke Ooze became mired in opposition and rising estimated costs, and was dropped in 1978 as too expensive.⁶⁹

The revaluation of the Thames estuary took place in a wider context of increasingly influential environmental pressure groups, and expanded public expectations for participation in planning debates.⁷⁰ This was not about de-industrialization, a waning of 'vested interests' or rise of 'non-material values' on the estuary.⁷¹ Estuarial industry and transport pressures had been intensifying. The PLA's turn to container shipping and mechanised cargo-handling at Tilbury, Essex, in the late 1960s led to further port expansion plans. Under increased scrutiny, however, its 'Operation Trumpet' (1968) – to 'improve' and straighten 'irregularities' in the estuary banks, creating three hundred square miles of new land and a trumpet-shaped estuary – was quietly dropped.⁷² Learning from

Maplin opposition, the PLA began to expand its own knowledge base and incorporate ecological expertise. Though rejecting an NCC bid for PLA board representation in 1973, they commissioned a series of NCC studies during this period, including a survey of possible nature reserves. The Advisory Panel to their 'Steering Committee on Conservation and Ecology', formed in 1974, included leading estuary wildlife campaigners and aimed to 'support the development of areas important to wild life on the river in a way compatible with development for economic growth'.⁷³

The GLC's own approach to environmental management changed radically with the victory of the 'new urban left' in 1981, influenced by the urban nature conservation movement. Their Ecology Unit (established in 1982) and collaborations with groups such as London Wildlife Trust (founded 1981) provided a channel for expert-led community engagement.⁷⁴ This also informed changing GLC views of the lower estuary. While the Greater London Development Plan (GLDP, 1969) had made no reference to ecology or wildlife, its sections on the river were among those revised in 1984. Rainham and Wennington Marshes (just inside the eastern GLC border), where the GLDP had planned 'increasing commercial and industrial uses', were re-designated as sites 'where there should be a presumption against development', though given the GLC's continuing commitment to landfill in Rainham further years in power might have uncovered more tensions.⁷⁵

[FIGURE 5 near here]

At the same time, the upper estuary was being re-shaped by London's dock closures between 1968 and 1980, and the departure of international shipping from the capital. Intense political conflict over the future of the riverside during the 1970s and 1980s, involved trades unions, local action groups, the GLC, and the PLA, now seen as having turned its back on the 'working river'.⁷⁶ The creation of the London Docklands Development Corporation (LDDC, 1981-98) by the 'New Right' Conservative Government, by-passing the planning powers of dockland boroughs, showed no appetite for compromise, and GLC abolition in 1986 has been rightly identified with the loss of metropolitan autonomy and a new democratic deficit on the Thames.⁷⁷

There was, then, no linear development towards widening public participation on the river between the 1960s and 1980s. Civil society groups gained an increasing ability to shape public views on acceptable policy for the lower estuary from the late 1960s; London saw strong community engagement in riverside debates and a brief flourishing of ecological politics, but this was followed by a narrowing of the political circle with the creation of the LDDC and GLC abolition. In the context of overall river management, moreover, it is also important to remember that by the 1980s all London-based institutions had already lost control of key functions: water resources, sewerage and river conservancy were being governed at a different scale.

V Regionalization, Privatization and Multi-level Governance: 1974 – 2014

The Conservative 1973 Water Act created ten public Regional Water Authorities (RWAs) across England and Wales, replacing 1,580 local agencies. Thames Water Authority (TWA) took over the whole 5,000 square mile Thames catchment, with the estuary below TWA's boundary divided between Anglian Water Authority on the north shore and Southern Water Authority to the south (giving a statutory role for the first time to lower river agencies). The TWA absorbed the MWB, Thames Conservancy, GLC sewerage and PLA pollution control, alongside other bodies and powers.⁷⁸ Fierce political opposition nationally to the plan to erase the long-standing connection between ratepayers and their elected municipal representatives in water and sewerage services resulted in a concession; the proposed RWA management teams being replaced by large boards with a majority of local authority representatives.⁷⁹ A GLC bid to take over the whole Thames catchment in place of the TWA failed, though they retained land drainage and flood management (opening the Thames Barrier in 1984) and gained river recreation responsibilities.⁸⁰

The creation of regional authorities reflected a recognition of the limitations of urban governance for managing water cycles. The river basin had emerged by the late 1960s as the 'natural' scale at which to govern a river. In theory, river-basin management meant centralised, integrated planning for the whole catchment, with associated economies of scale. Over time, regionalisation allowed water resources to be abstracted more intensively for London and other cities, despite the fears of London's governors. But the shift from localized to centralised decision-making was slow and uneven: managing competing river functions, river and water users, wildlife groups, and territorial conflicts across the Thames region involved numerous local struggles.⁸¹

Achieving the right scale for estuary governance, moreover, has proved a constantly moving target. With international efforts to regulate the marine disposal of sewage during the 1970s and 1980s, sewage ceased to be a domestic affair. By 1987, the UK was one of the last remaining states still discharging sewage sludge into the North Sea; TWA was contributing 80 per cent of all such North Sea discharges.⁸² International regulation was a crucial constraint on Conservative water privatization policy in the late 1980s. The RWA's ambiguous status as both "'poachers and gamekeepers'" (sewerage and pollution control authority), and the risks for potential investors of non-compliance with an expanding range of European water directives, have been identified as central to the decision to keep river authorities in the public sector while privatizing water and sewerage utilities, as well as to the government u-turn on marine sewage in 1990.⁸³ Privatization was accompanied by a greatly expanded regulatory framework and new forms of 'delegated accountability', with the creation of the National Rivers Authority (Environment Agency from 1996) and Drinking Water Inspectorate, alongside an economic regulator, OFWAT.⁸⁴ The Thames and other estuaries emerged in the 1990s into a new landscape of 'multi-level governance', containing regional private companies (including Thames Water Utilities Ltd), national regulators, and EU directives providing supra-national mechanisms for statutory and civil society organisations concerned with a range of public issues, from drinking water quality to estuary habitats.⁸⁵

VI Conclusion: Whose River?

Herbert's vision of 'one ... wise grandmother' has not been realised on the Thames. Its multi-faceted character – now encompassing a range of market-oriented 'eco-system services' – has made it impossible to delegate to a single body. Diverse estuary interests remain, from riverside industry to waste disposal and sewerage authorities, alongside newer arrivals such as the 'Thames Gateway' strategy, EU protected sites and marine planning.⁸⁶

'Whose river?' remains an open question, but some patterns have emerged from this study of the changing governance of the estuary as a contested space. The prioritization of sewerage and the port on the tideway had significant impacts on the post-war river, both on its condition and its governance, with highly restricted access to decision-making on the river and limitations on its use. Under pressure, initially from outside statutory agencies, alternative ways of understanding the estuary and a more pluralist arena have emerged. The need for central government and river agencies to maintain public trust as effective agencies has led over time to various forms of accommodation with a diverse range of critics, including interest groups, riverside communities and the wider public. Alongside international regulation, this has been an important driver both in the changing material condition of the river and in expanding the range of players within decision-making processes.⁸⁷

This has not been a linear or universal process. In some areas, changes in political culture took place amidst continuing functional pressures, as with the lower estuary in the 1970s. In others, they have been bound up with changing functions on the river. In the early 1990s, following upstream dock closures, the tidal river in London began to emerge as a de-industrialized space with opportunities for a wider range of amenity river uses than at any earlier stage, amidst continuing debate over its future as a working river.⁸⁸ Riverside property development now represents the dominant economic force on London's river and an ongoing site of struggle. Nor have expanding views on the value of rivers been accompanied by widening formal mechanisms for democratic governance of the river in any straightforward way. In the case of water and sewerage, they have coincided with the move towards managerialism and privatization. But the emergence of multi-level environmental regulation, enshrining obligations for public and stakeholder engagement, has secured wider access to decision-making than earlier ratepayer democracies and semi-representative modes of governance alone could offer.⁸⁹ Privatization has required greater regulation in order to maintain public confidence as well as centralized control than the closed circles of public sector professionals under nationalisation,⁹⁰ though there has always been a need to achieve a wider consensus than that implied by formal governance structures. Recent critiques of new forms of environmental governance as 'neoliberal conservation' or 'market environmentalism' have revealed much about the technocratic and market-oriented assumptions underlying the economic mechanisms and political structures of current UK environmental and water regulation. But characterizations of these

structures as 'post-political' underestimate past difficulties: both the difficulties of groups outside fragmented statutory agencies seeking to promote alternative views, and the inadequacies of those agencies' past management of competing river functions and their leaky externalities, including pollution and other forms of environmental degradation.⁹¹ Even the most 'representative' political bodies in the past rarely favoured widening participation in river governance or prioritised the intrinsic qualities of nature over its instrumental values. The GLC's 1980s experiments with urban nature conservation were a notable exception. Recent approaches to river management are part of an ongoing political struggle between different actors and interests to determine the meanings and fate of the Thames.

The estuary continues to generate interdependencies and power relations within and beyond London. Development pressures in the Thames and other UK estuaries have remained a fertile source of conflict, though some forms of compromise have emerged that would have been unthinkable in the 1960s. 'London Gateway' port, opened in 2013, occupies three square miles of the Essex coast. Overcoming early opposition, its environmental 'mitigation' package was eventually endorsed by both Natural England and the RSPB, now a major landowner and power broker on the Thames.⁹² The Thames Tideway Tunnel currently under construction by Thames Water, while prompted by EU Urban Waste Water Directive (1991) requirements, faced opposition from riverside residential communities within London objecting to plans for their neighbourhoods and from those advocating (unsuccessfully) 'sustainable urban drainage systems'.⁹³ Promoting London's economy remains a key driver for development, as demonstrated by various current schemes for a 'London airport' in the outer estuary. These are opposed by numerous local action and environmental groups, but prominently backed by the current Mayor of London and Greater London Authority (GLA). Established in 2000, the GLA has brought a new 'London First' message to the estuary.⁹⁴

Estuary policy is made within a complex arena and the culture of stakeholder engagement that emerged in the 1990s obscures continuing unequal access to decision-making.⁹⁵ Economic growth remains the spine of UK government policy and a government-backed scheme remains difficult to withstand,⁹⁶ but the presence today of numerous civil society organisations with high levels of expertise has changed the balance of power over the past five decades. Political activity at local, national and international levels continues to generate new ways of perceiving rivers and other eco-systems that challenge technocratic claims about how the river should be run and shift the terrain of acceptable policy.

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ENDNOTES

¹ Letter from A.P. Herbert, *The Times*, 15 March 1967, 13.

² K. Bakker and G. Bridge, 'Material Worlds? Resource Geographies and the "Matter of Nature"', *Progress in Human Geography*, 30:1 (2006), 16-17; A. Armstrong and H.A. Bulkeley, 'Micro-hydro Politics: Producing and Contesting Community Energy in the North of England', *Geoforum*, 56 (2014), 68. Equally, the river can be situated in relation to multiple governance scales and structures, including its river basin and land-based regional and sub-regional planning (e.g. the evolving 'South East' or 'Thames Gateway'). For shifting regions, see: A. Cochrane, 'Making up a Region: The Rise and Fall of the "South East of England" as a Political Territory', *Environment and Planning C: Government and Policy*, 30 (2012), 95–108.

³ For 'ecological hinterland', see: G. Haughton, I. Rowe and C. Hunter, 'The Thames Gateway and the Re-Emergence of Regional Strategic Planning: The Implications for Water Resource Management', *Town Planning Review*, 68 (1997), 407-22.

⁴ Abstractions for water supply in the tidal river were ended by Metropolis Water Act 1852, 15 & 16 Vict. c. 84. Beckton and Crossness Sewage Treatment Works were built by the Metropolitan Board of Works in the 1860s. S. Halliday, *The Great Stink: Sir Joseph Bazalgette and the Cleansing of the Victorian Metropolis* (Thrupp, Stroud, 1999).

⁵ F. Sheppard, *London: A History* (1998; Oxford, 2000), 357; P. Ackroyd, *London: The Biography* (2000; 2001), 1-3.

⁶ For public health: W.J. Luckin, *Pollution and Control: A Social History of the Thames in the Nineteenth Century* (Bristol, 1986); C. Hamlin, *A Science of Impurity: Water Analysis in Nineteenth Century Britain* (Bristol, 1990); A. Hardy, 'Parish Pump to Private Pipes: London's Water Supply in the Nineteenth Century', in W.F. Bynum and R. Porter (eds.), *Living and Dying in London* (1991.) For metropolitan government: J. Davis, *Reforming London: The London Government Problem, 1855–1900* (Oxford, 1988); J. Davis, 'London Government 1850-1920: The Metropolitan Board of Works and the London County Council', *London Journal*, 26 (2001), 47-56. For utilities and politics: M. Daunton, 'The Material Politics of Natural Monopoly: Consuming Gas in Victorian Britain', in M. Daunton and M. Hilton (eds.), *The Politics of Consumption* (Oxford, 2001), 69-88; V. Taylor and F. Trentmann, 'Liquid Politics: Water and the Politics of Everyday Life in the Modern City', *Past and Present*, 211 (2011), 199-241. For the 'Metropolis and Beyond',

see K. Young and P.L. Garside, *Metropolitan London: Politics and Urban Change 1837-1981* (1982), 331-339.

⁷ W. Cronon, *Nature's Metropolis: Chicago and the Great West* (New York, 1991); S. Castonguay and M. Evenden, 'Introduction', in S. Castonguay and M. Evenden (eds.), *Urban Rivers: Remaking Rivers, Cities, and Space in Europe and North America* (Pittsburgh, Pa., 2012), 3-4; S. Barles, 'The Seine and Parisian Metabolism: Growth of Capital Dependencies in the Nineteenth and Twentieth Centuries', in Castonguay and Evenden (eds.), *Urban Rivers*, 95-112; B.M. Doyle, 'Introduction', in B.M. Doyle (ed.), *Urban Politics and Space in the Nineteenth and Twentieth Centuries: Regional Perspectives* (Newcastle, 2007), 15.

⁸ K. Bakker, *An Uncooperative Commodity: Privatizing Water in England and Wales*. (Oxford, 2003), 36. See also: Y. Rydin, *Urban and Environmental Planning in the UK*, 2nd edn. (Basingstoke, 2003), 87-88.

⁹ For estuary definitions, see C.C. Inglis and F.H. Allen, 'The Regimen of the Thames Estuary as Affected by Currents, Salinities, and River Flow', *Maritime Paper No. 38*, *Proceedings of the Institution of Civil Engineering*, 7 (1 Aug 1957), 827-78; I. Shand, *The Biogeochemical Origins and Plant-Availability of Potentially Toxic Elements in Sediment from the Thames Estuary* (Unpublished Ph.D Thesis, Cranfield University, Institute of Water and Environment, 2005), 1, <<https://dspace.lib.cranfield.ac.uk/bitstream/1826/998/1/I.Shand%20PhD%20Thesis.pdf>> [accessed 26 November 2014].

¹⁰ The PLA's 'former seaward limit' was a line between Havengore Creek (Essex) and Warden Point (Kent), shifting 22 miles seawards in 1964 to a line between Gunfleet Old Light House (Essex) and North Foreland, west of Margate Sands, Kent. Pollution control remained at the pre-1964 limit. Port of London (Extension of Seaward Limit) Act 1964. Museum of London Docklands [MOLD]: Port of London Authority [PLA] Annual Report and Accounts – Year ended 31st March 1964. For a map of the 92 mile tideway and post-1964 seaward limits, see PLA, *The Cleaner Thames 1966* (1967).

¹¹ MOLD: PLA Board Minutes, 9 November 1970, Item 226; The National Archives (TNA): HLG127/1212: Letter from A.G. Rayner (MHLG) to K.T. Barnett (Ministry of Transport (MOT)), 9 June 1969. The LCC were exempt from such charges, after legal action: HLG127/1212: Memo from B.J. Livermore to A.G. Rayner (MHLG), undated [1969]. The lack of funding contributions from local authorities and other river agencies was to be a permanent source of frustration for the PLA.

¹² 'Port of London Authority Historical Timeline', < <http://www.pla.co.uk/Did-you-know>> [accessed 23 June 2015].

¹³ A.K. Mukhopadhyay, 'The Politics of London Water', *London Journal*, 1:2 (1975), 207-24.

¹⁴ For a map showing the boundaries of Greater London and neighbouring river authorities in 1964, see the PLA's 'Port of London Act 1964' map at: 'Researching the River Thames'

website

<<http://www2.gre.ac.uk/about/faculty/ach/research/centres/maritime/research/case-studies/runningriverthames/timeline/maps/map-of-port,-river-and-greater-london>> [accessed 1 June 2015].

¹⁵ C. Harrison, MP, LCC, *The River Thames: Its Port and Conservancy (Being the Substance of a Lecture Delivered at a Meeting of the London Reform Union, November 13th, 1895)* (1895); J. Davis, 'The Progressive Council, 1889-1907', in A. Saint (ed.), *Politics and the People of London: The London County Council 1889-1965* (1989), 27-48. By 1914, 820 water undertakings out of 2,100 were in public hands; two hundred were statutory private companies, the rest being small, non-statutory private companies. J. Hassan, 'The Water Industry 1900–1951: A Failure of Public Policy?', in R. Millward and J. Singleton (eds.), *The Political Economy of Nationalisation in Britain 1920–1950* (Cambridge, 1995), Table 9.1.

¹⁶ L. Gordon, 'The Port of London Authority', in W.A. Robson (ed.), *Public Enterprise: Developments in Social Ownership and Control in Great Britain* (1937), 22-28; W.A. Robson, *The Government and Misgovernment of London* (1939), 115, 131-38.

¹⁷ For co-existence and contradictions between 'modern' and 'pre-modern' institutions, see: B. Luckin, 'The Metropolitan and the Municipal: The Politics of Health and Environment in London, 1860-1920', in R. Colls and R. Rodger (eds.), *Cities of Ideas: Governance and Citizenship in Urban Britain* (Aldershot, 2004), 66. On a "'modern" combination of order and diversity' in governance approaches during this period, see R. Dennis, 'Modern London', in M. Daunton (ed.), *The Cambridge Urban History of Britain: Vol. III, 1840-1950* (Cambridge, 2000), 104.

¹⁸ For ports and wider debates, see e.g.: L. Gordon, *The Public Corporation in Great Britain* (1938), 7; Robson, *Government and Misgovernment*, 100-138; E. Davies, *National Enterprise: The Development of the Public Corporation* (1946). The PLA was often cited as a model for later public corporations. See also: M. Flinders, 'MPs and Icebergs: Parliament and Delegated Governance', *Parliamentary Affairs*, 57:4 (2004), 768-72.

¹⁹ For PLA limits relating to different functions after 1964, see: PLA, *Cleaner Thames*, 4; n. 10, above.

²⁰ Shand, *Biogeochemical Origins*, 16.

²¹ T. Wiles, "'The Future Shape of London": Criticism of the L.C.C Proposals for Riverside and Market Areas', *The Dock and Harbour Authority* (May 1944), 7; Viscount Simon, 'Pollution of Rivers and Estuaries', House of Lords [HL] Debate, Hansard, c. 1189, 3 December 1959. Available at <<http://hansard.millbanksystems.com/lords/1959/dec/03/pollution-of-rivers-and-estuaries>> [accessed 1 June 2015].

²² L.B. Wood, *The Restoration of the Tidal Thames* (Bristol, 1982), 55; London Metropolitan Archives (LMA): GLC/HE/R/01/076: *Preservation of Fish Life 1965-1984*: A. Wheeler (Department of Zoology, British Museum, Natural History), 'Progress Report

on the Survey of the Fishes of the Lower Thames 1967-1968', 1. J. Harrison and P. Grant, *Thames Transformed: London's River and its Wildfowl* (1976), 37. Pollutants accelerated the consumption of dissolved oxygen in the water faster than it could be replenished from the air. These problems were exacerbated by wartime damage to riverside structures: R.D. Brown, *The Port of London* (1978), 111, 118.

²³ MOLD: Forty-first Annual Report with Accounts of the Port of London Authority – Year Ended 31 March 1950., 9; Condition of the River Thames Water: Joint Statement by the London County Council and the Port of London Authority (March 1936), Section P. See also: e.g. Minister of Health, Written Answer, 'River Thames (Pollution)', House of Commons Debate, 19 May 1950, vol 475, c. 197W, <http://hansard.millbanksystems.com/written_answers/1950/may/19/river-thames-pollution#S5CV0475P0_19500519_CWA_23> [accessed 15 May 2015]; Wood, *Restoration of the Tidal Thames*, 88.

²⁴ Water Pollution Research Laboratory (WPRL) [Department of Scientific and Industrial Research], *Effects of Polluting Discharges on the Thames Estuary: The Reports of the Thames Survey Committee and of the Water Pollution Research Laboratory* (1964), xv, xxi, xxv; 'Causes of Thames Pollution', *The Times*, 11 July 1963, 6. See also: MOLD: W.A. Flere Archive, Box 6: Pollution. Notes of Proceedings at a Conference on the Condition of Tidal Thames Water Held at Head Office of the PLA, London, Friday 25th February 1955. D. Tinsley, 'The Thames Estuary: A History of the Impact of Humans on the Environment and a Description of the Current Approach to Environmental Management', in M.J Attrill (ed.), *A Rehabilitated Estuarine Ecosystem: The Environment and Ecology of the Thames Estuary* (Dordrecht, 1998), 13.

²⁵ MOLD: W.A. Flere Archive, Box 6: Note by L.C. Betts on 'LCC Annual Report 1953', 26 February 1954; Lord Rochester, 'Pollution of Rivers', HL Debate, 5 March 1947, vol 146, c 124, <<http://hansard.millbanksystems.com/lords/1947/mar/05/pollution-of-rivers>> [accessed 4 December 2014].

²⁶ Ministry of Housing and Local Government (MHLG), *Pollution of the Tidal Thames: Report of the Departmental Committee on the Effects of Heated and other Effluents and Discharges on the Condition of the Tidal Reaches of the River Thames [Pippard]* (1961). Also cited were: Mogden, Acton and West Kent. Wood, *Restoration of the Tidal Thames*, 64, 92. For post-Pippard identification of problems at Mogden, see PLA, *Cleaner Thames*, 12-14.

²⁷ Wood, *Restoration of the Tidal Thames*, 38-50; Halliday, *Great Stink of London*, 102-6.

²⁸ The Thames Survey Committee (1964) concluded that water and materials could remain in the estuary for up to two to three months at times of low freshwater flows. WRPL, *Effects of Polluting Discharges*, xxv; Shand, *Biogeochemical Origins*, 20-21.

²⁹ Wood, *Restoration of the Tidal Thames*, 86-87. See also: PLA, *Cleaner Thames 1966* (1967); A. Wheeler, *The Tidal Thames: A History of a River and its Fishes* (1979), 44-45. The Festival of Britain took place on a newly constructed site on the river's 'South Bank'.

³⁰ Luckin, *Pollution and Control*, 3; T.C. Smout, 'Urbanization, Industrialization, and the Firth of Forth', in Castonguay and Evenden (eds.), *Urban Rivers*, 176.

³¹ Clean river lobbies included e.g. fisheries and conservationist groups. J. Hassan, *History of Water in Modern England and Wales* (Manchester/New York, 1998), 81-84. For policy stagnation, see also: Hassan, 'Water Industry 1900-1951'; J. Sheail, 'Pollution and the Protection of Inland Fisheries in Inter-War Britain', in M. Shortland (ed.), *Science and Nature: Essays in the History of the Environmental Sciences* (Oxford, 1993), 41-57; J. Sheail, 'Public Interest and Self-Interest: The Disposal of Trade Effluent in Inter-War England', *Twentieth Century British History*, 4 (1993), 149-70.

³² MOLD: *Thirty-Eighth Annual Report with Accounts of the Port of London Authority - Year Ended 31st March 1947*, 6; *Thirty-Ninth Annual Report with Accounts of the Port of London Authority - Year Ended 31st March 1948*, 7-8; *Fortieth Annual Report with Accounts of the Port of London Authority - Year Ended 31 March 1949*, 7; *Forty-First Annual Report with Accounts of the Port of London Authority - Year Ended 31st March 1950*, 9; *Forty-Third Annual Report with Accounts of the Port of London Authority - Year Ended 31 March 1952*, 8. See also: WRPL, *Effects of Polluting Discharges*, xxiii; Wood, *Restoration of the Tidal Thames*, 88-89.

³³ TSC was established by the Department of Scientific and Industrial Research; the pollution work was carried out by the Water Pollution Research Laboratory (WPRL) and the siltation work by the Hydraulics Research Station. The MHLG had replaced the Ministry of Health. Wood, *Restoration of the Tidal Thames*, 88-92. For LCC works, see: *Forty-Fifth Annual Report with Accounts of the Port of London Authority - Year Ended 31 March 1954*, 7. For the years after 1951 as a new period of vigour in the water sector, see Hassan, *History of Water*, Chap 4.

³⁴ MHLG, *Pollution of the Tidal Thames*, 56-8; WPRL, *Effects of Polluting Discharges*, 1.

³⁵ The TSC report produced, as Leslie Wood has pointed out, the first 'environmental quality objective' for rivers at a time when 'fixed emission' standards for discharges were still being used in EEC directives. The PLA was now to aim for 'a minimum concentration of 10% saturation of dissolved oxygen in every part of the river throughout the ... (summer) quarter'. This approach was confirmed by the Royal Commission on Environmental Pollution in *Third Report: Pollution in some British Estuaries and Coastal Waters* (1972). PLA, *Cleaner Thames*, 4; Wood, *Restoration of the Tidal Thames*, 89-90, 94.

³⁶ MHLG, *Pollution of the Tidal Thames*, 55; WPRL, *Effects of Polluting Discharges*, xxvii-xxviii. MOLD: W.A. Flere Archive: Box 6: File: 1909-1955, 'Bundle of Papers on Pollution': Note signed by L.C. Betts: 'Heated Effluents Committee, 20 April 1954'. Regular LCC monitoring began in 1893: Wood, *Restoration of the Tidal Thames*, 49-50.

³⁷ The consultants were Cremer and Warner. The Committee included the river authorities and Nature Conservancy among others. PLA, *Cleaner Thames* 1966, 9, 11, 31. LMA: GLC/HE/R/01/076: *Preservation of Fish Life 1965-1984*: A. Wheeler, 'Progress Report on the Survey of the Fishes of the Lower Thames 1967-1968', 1. Ecological Survey by Prof.

D.R. Arthur, Kings College, London) in MOLD: PLA Board Minutes: Pollution Control Committee, 19 September 1968, Minute No. 211(3).

³⁸ The Mud Reaches are Gallions Reach, Barking Reach and Halfway Reach. MOLD: Thirty-Fifth Annual Report with Accounts of the Port of London Authority – Year Ended 31st March 1944, 6; Forty-Eighth Annual Report with Accounts of the Port of London Authority – Year Ended 31st March 1957, 7; Forty-Ninth Annual Report with Accounts of the Port of London Authority – Year Ended 31st March 1958, 5; Port of London Authority Report and Accounts – Year Ended 31 December 1969, 8. Inglis and Allen, 'Regimen of the Thames'. For a recent critical analysis of the TSC's conclusions, see Shand, Biogeochemical Origins.

³⁹ Earl of Huntingdon, River Boards Bill, HL Debate, 9 December 1947 vol. 153, c. 14 <<http://hansard.millbanksystems.com/lords/1947/dec/09/river-boards-bill-hl>>; Huntingdon, River Boards Bill, HL Debate, 16 December 1947, vol. 153, cc. 267-68 <<http://hansard.millbanksystems.com/lords/1947/dec/16/river-boards-bill-hl>> [accessed 4 December 2014].

⁴⁰ TNA: HLG 127/1212: Memo by JHS [J.H. Street, MHLG], 'Water Conservation in London' (10 August 1962), Nos. 10, 11(b); 'Report of the MHLG on the Port of London Bill: Preamble' (7 April 1964), Nos. 4, 7. For Proudman and the Water Resources Act, see also: Sub-Committee on the Growing Demand For Water: Final Report (Central Advisory Water Committee) (Chair: J. Proudman) (1962); Water Resources Act 1963, Ch. 38, Sections 10, 125, <http://www.legislation.gov.uk/ukpga/1963/38/pdfs/ukpga_19630038_en.pdf> [accessed 24 June 2015]; Hassan, History of Water, 103-05. A whole river solution was considered unthinkable because of conflicting interests between freshwater and tidal sections.

⁴¹ The Port of London Act 1964 brought PLA powers in line with the Rivers (Prevention of Pollution) Acts of 1951 and 1961. Chaired by the PLA, the Committee sat from 1966 until the Water Act 1973, co-opting members from the GLC, Essex and Kent river authorities, Lee Conservancy Catchment Board and Federation of British Industry (FBI). TNA: HLG127/1212: Memo by JHS (MHLG), 'Water Conservation in London' (10 August 1962), No. 14; Report of the MHLG on the Port of London Bill, Preamble (7 April 1964), No. 1; Memo from B.J. Livermore to A.G. Rayner (MHLG) [undated, 1969]. For powers over non-tidal tributaries, see: PLA, Cleaner Thames, 23, 32.

⁴² At this point, the Thames Conservancy rapidly expanded their technical capacity and staff. MHLG officials were concerned about a 'branch of nationalised industry exercising pollution control'. TNA: HLG127/1212: Letter from A.G. Rayner (MHLG) to K.T. Barnett (MOT), 9 June 1969. See also: TNA HLG 127/1212: Memo from D.H.A. Price to Mrs Ash (MHLG), 8 April 1969; Handwritten Note by Mr James to A.G. Rayner (MHLG) on 'Port Re-organisation' (2 April 1969); Letter from A.G. Rayner (MHLG) to K.T. Barnett (MOT), 7 May 1969; Memo from A.G. Rayner to Minister's Office (MHLG), 9 June 1969; MOT, The Reorganisation of the Ports, Cmnd. 3903 (1969); Ports Reorganisation Bill, 1969.

⁴³ As the PLA pointed out in 1967, no part of the river had been ‘wholly deficient of oxygen’ for the past three summers. PLA, *Cleaner Thames*, 4. Port of London Authority Report and Accounts – Year Ended 31 December 1973, 8. See also: Shand, *Biogeochemical Origins*, 36-7.

⁴⁴ MOT, Report of the Committee of Inquiry into the Major Ports of Great Britain. Cmnd. 1824 (1961-62). On an emerging divide between port policy and pollution control policy in relation to representation and consultation at this point, see: TNA: HLG 127/1212: Memo by JHS (MHLG), ‘Water Conservation in London’ (10 August 1962), No. 14.

⁴⁵ MOLD: British Ports Association [BPA] Archive: BPA 95: ‘PLA Inquiry, 7, 8, 9 November 1966 (Proposed Revision Order), Verbatim Report, Inspector’s Report, Letter of 4 January 1967’: First Day, Lord Simon's evidence; Second Day, GLC's evidence; Third Day, evidence of Tourist Board and RTS, 8-14.

⁴⁶ MOLD: BPA Archive: BPA 95: ‘PLA Inquiry 7, 8, 9 November 1966 (Proposed Revision Order)’; ‘Amendment of PLA Constitution, Legal Working Papers’: Letter with Annexes from MOT Secretary to National Port Council (NPC) Secretary, (4 January 1967), 12-13; Confidential Note by NPC Chairman, ‘Amendment of PLA Constitution, Legal Working Papers’ (undated).

⁴⁷ For managerialism and the 1973 Water Act, see: Mukhopadhyay, ‘Politics of London Water’, 224; A.G. Jordan, J. J. Richardson and R.H. Kimber, ‘The Origins of the Water Act 1973’, *Public Administration*, 55:3 (1977), 317-34; G. Taylor, *State Regulation and the Politics of Public Service: The Case of the Water Industry* (1999), 78-80; Bakker, *Uncooperative Commodity*, 60.

⁴⁸ MOLD: ‘PLA Board Reconstituted’, *Port of London*, Vol. 51 (Spring 1976), 22. This quoted the Revision Order. The completion of this process may have resulted from the termination of GLC sewerage management following the establishment of the Thames Water Authority in 1974.

⁴⁹ J. Davis, ‘“Simple Solutions to Complex Problems”: The Greater London Council and the Greater London Development Plan, 1965-1973’, in J. Harris (ed.), *Civil Society in British History: Ideas, Identities, Institutions* (Oxford, 2003), 249.

⁵⁰ Sheppard, *London*, 348-49. There were 32 metropolitan boroughs and the City of London Corporation.

⁵¹ Advertisement, GLC Public Health Engineering, *The Times*, 16 March 1965, 2.

⁵² Report to the Board of Trade by ... Inspector of Fisheries. *On the Injury Alleged to be caused to the Fisheries by the Deposit of Rubbish in the Estuary of the River Thames*, Cmnd. 5394 (1888); Ministry of Health, *Public Cleansing – A Report of an Investigation into the Public Cleansing Service in the Administrative County of London* (1929). For refuse debates, see: A. Tanner, ‘Dust-O! Rubbish in Victorian London, 1860-1900’, *London Journal*, 31(2) (2006), 157-78; T. Cooper, ‘Burying the “Refuse Revolution”: The Rise of Controlled Tipping in Britain, 1920-1960’, *Environment and Planning A*, 42:5 (2010), 1033-48. The GLC's Greater London Development Plan committed them to river

transport where practical; 23 per cent of London's waste was being sent by barge to Essex in 1976. LMA: GLC/DG/PSFB/01/476: Refuse Disposal - Stoke Ooze, 1974-1979: GLC 'Stoke Ooze Feasibility Study' (29 April 1976), No. 3.

⁵³ LMA: GLC/HE/SW/DD/01/054/R: Landfill Sites, A-Z.

⁵⁴ R.G.J. Shelton, 'Sludge Dumping in the Thames Estuary', *Marine Pollution Bulletin*, 2:1 (Feb 1971), 24-27. The GLC abandoned Black Deep in 1967 for similar reasons to the PLA. MOLD: PLA Board Minutes: PLA Pollution Control Committee, 12 March 1970, Item 81. Sludge disposal had started at Beckton in 1889 and Crossness in 1891. M.K. Green and M.J. Hanbury, 'Sewage Sludge to Sea - The Thames Water Approach', in *Institution of Civil Engineers (ICE), Marine Treatment of Sewage and Sludge: Proceedings of Institution of Civil Engineers Conference held in Brighton, 29-30 April 1987* (1998), 204.

⁵⁵ MOLD: PLA Board Minutes: PLA Pollution Control Committee: 19 September 1968, Item 209; 4 December 1969, Item 23; 12 March 1970, Item 81. LMA: GLC/DG/PSFB/01/475-1: Refuse Disposal - Stoke Ooze, 1972-1974: Report by Director, Public Health Engineering, for Public Services Committee: 'Land Reclamation and Sludge Transfer Works – Site investigation', 12 October 1972. For Oslo Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (1972; UK signatory, 1975), see also: C. Rose, *The Dirty Man of Europe: The Great British Pollution Scandal* (1991), 22, 26, 32; OSPAR Website <http://www.ospar.org/content/content.asp?menu=00350108080000_000000_000000> [accessed 7 December 2014].

⁵⁶ LMA: GLC/DG/PSFB/01/475-1: Refuse Disposal - Stoke Ooze, 1972-1974: Report by Director, Public Health Engineering, for Public Services Committee: 'Land Reclamation and Sludge Transfer Works – Site Investigation', 12 October 1972. This area is now designated part of the 'Greater Thames Estuary': J. Williams and N. Brown (eds.), *An Archaeological Research Framework for the Greater Thames Estuary* (Chelmsford, 1999), 1, <http://www.thamesweb.com/component/docman/doc_download/27-archaeological-research-framework?Itemid=61> [accessed 26 November 2014]. For GLC battle, see: V. Taylor, 'Watershed Democracy or Ecological Hinterland? London and the Thames River Basin, 1857-1986', in D. Schott, M. Knoll and U. Lübken (eds), *Rivers Lost – Rivers Regained* (forthcoming 2016).

⁵⁷ LMA: GLC/DG/PSFB/01/476: 'Poaching Row over Plan for London's Dustbin', *Evening Post* (Chatham Rochester, Gillingham & Gravesend), 17 March 1976; Note from Controller Operational Services to Chair, Public Services Committee, 22 April 1976; GLC/DG/PSFB/01/475-1: 'Thank you, Mr. Button', *Evening Post* (Chatham Rochester, Gillingham & Gravesend), 18 October 1973. 'Kent Opposes Plan', *The Times*, 2 March 1961, 6. For wider debates on public participation, see: Davis, "'Simple Solutions to Complex Problems'", 249-74; A. Skeffington, *People and Planning: Report of the Committee on Public Participation in Planning* (1969); N. Boaden, et al, *Public Participation in Local Services* (1982), 30-31.

⁵⁸ Davis, "Simple Solutions to Complex Problems", 263.

⁵⁹ There were also concerns about insects, smells and the loss of countryside air. LMA: GLC/DG/PSFB/01/475-1: Refuse Disposal - Stoke Ooze, 1972-1974: Letter from Hoo Peninsula Action Group to Councillor, 2 November 1973; 'Three Point Plan to Beat the Rubbish', Evening Post [undated, 1973]; Letter from The Medway River Users Association to Director-General and Chief Clerk, GLC, 28 February 1974.

⁶⁰ LMA: GLC/DG/PSFB/01/475-1: A. Edwards, Memorandum to the Director-General, GLC. 23 November 1973.

⁶¹ GLC, London's River Thames (1973), 63. MOLD: BPA Archive: BPA 95: 'PLA Inquiry, 7, 8, 9 November 1966 (Proposed Revision Order), Verbatim Report, Inspector's Report, Letter of 4 January 1967': Second Day, GLC's evidence, 52. On the interaction of economic hurdles and environmental objections at Maplin, see: D. Needham, 'Maplin: The Treasury and London's Third Airport in the 1970s', History & Policy website (Oct 2014), <<http://www.historyandpolicy.org/policy-papers/papers/maplin-the-treasury-and-londons-third-airport-in-the-1970s>> [accessed 12 May 2015]. For widening pollution concerns and a more systematic approach to environmental planning for estuaries, see: RCEP, Third Report: Pollution in some British Estuaries and Coastal Waters (1972); Rydin, Urban and Environmental Planning, 40.

⁶² Between 1967 and 1977, RSPB membership rose from 35,917 to 238,371. In 1974, the RSPB described itself as 'the most powerful voluntary wildlife body in Europe'. RSPB Archive, Sandy, Beds: RSPB Report & Accounts 1967, 4; RSPB Report & Accounts 1973-74, 1; RSPB Report & Accounts 1976/77, II. On expanding NGO roles, see also M. Hilton et al, The Politics of Expertise: How NGOs Shaped Modern Britain (Oxford, 2013).

⁶³ 'Conservationists unite to save Thames Estuary', The Times, 10 August 1976, 12; TEWCG, The Thames Estuary (undated, 1983?). See also: RSPB Archive: Dee Estuary Conservation Group, The Dee Estuary: A Surviving Wilderness (Neston, 1976); Severn Estuary Conservation Group, The Severn Estuary: A Heritage of Wildlife (1976).

⁶⁴ For the relationship between power and scientific study of the late nineteenth-century Thames, see Luckin, Pollution and Control, 180-181.

⁶⁵ e.g. B.H. Green (ed.) [Nature Conservancy Council (NCC)], Working Party on Wildlife Conservation in the North Kent Marshes (1971); NCC, Nature Conservation in Essex and the Maplin Project: A Statement by the Nature Conservation Council (Norwich, 1974); Institute of Terrestrial Ecology (ITE), Aspects of the Ecology of the Coastal Area in the Outer Thames Estuary and the Impact of the Proposed Maplin Airport: Report to the Department of the Environment, Natural Environmental Research Council [NERC] (1974); L.A. Boorman and D.S. Ranwell [NERC/ITE], Ecology of Maplin Sands, and the Coastal Zones of Suffolk, Essex and North Kent (Cambridge, 1977); J. Harrison and P. Grant, *Thames Transformed: London's River and its Wildfowl* (1976), 129-30, 224.

⁶⁶ Harrison and Grant, *Thames Transformed*, 130. See also 19, 136, 152, 221.

⁶⁷ National Parks and Access to the Countryside Act 1949, Ch. 97 <<http://www.legislation.gov.uk/ukpga/Geo6/12-13-14/97> > [accessed 25 June 2015]. C.M. Harrison and J. Burgess, 'Social Constructions of Nature: A Case Study of Conflicts over The Development of Rainham Marshes', *Transactions of the Institute of British Geographers*, NS, 19:3 (1994), 302.

⁶⁸ Harrison and Grant, *Thames Transformed*, 130. They cited regional and coastal plans: Countryside Commission, *Coastal Preservation and Development: A Study of the Coastline of England and Wales* (1970); W. Burns, *Strategic Plan for the South East* (1970). See also: Countryside Commission, *Coastal Preservation and Development: A Study of the Coastline of England and Wales: The Coasts of Kent and Sussex: Report of the Regional Coastal Conference held in London on May 27th, 1966* (1967).

⁶⁹ LMA: GLC/DG/PSFB/01/476: Refuse Disposal - Stoke Ooze, 1974-1979: Report by the Controller of Planning and Transportation, 'Solid Waste Disposal at Stoke Ooze', 2 March 1978. The GLC instead expanded landfill activities at Rainham Marshes. See also: Needham, 'Maplin'. For the role of agricultural land drainage in the loss of estuary marshland in North Kent, increasing after the construction of new Thames flood defences in the 1970s, see J. Purseglove, *Taming the Flood: History and Natural History of Rivers and Wetlands* (Oxford, 1988), 233-38.

⁷⁰ For the role of state and local government planning powers and development schemes in generating environmental group activity, see P. Lowe and J. Goyder, *Environmental Groups in Politics* (1983), 23-24.

⁷¹ cf. Smout, 'Urbanization, Industrialization', 177-78, on post-industrial developments on the Firth of Forth, citing R. Ingelhart, *Silent Revolution: Changing Values and Political Styles* (Princeton, 1977).

⁷² MOLD: PLA Annual Report and Accounts – Year Ended 31st December 1971, 7; PLA Annual Report and Accounts – Year Ended 31st December 1972, 6.

⁷³ MOLD: PLA Annual Report and Accounts – Year Ended 31st December 1977, 13. See also: J. Nall, *Thames Estuary Survey*. Unpublished Internal Report, NCC South-East England Region (1976); letter from P. Condor (RSPB), *The Times*, 16 June 1972, 22; letter from F. Warner (Cremer and Warner), *The Times*, 21 June 1972, 15; Harrison and Grant, *Thames Transformed*, 52, 60; MOLD: PLA Board Minutes: Director-General's Oral Report, 10 February 1975, 18; J. Elkington, 'Breathing Life into the Thames', *New Scientist*, 24 March 1977, 708. For NCC and PLA public inquiry, see: MOLD: Proposed Reconstitution of the PLA: Public Inquiries and Working Papers (1966-1974) (Box 1.1): Port of London Revision Order Public Inquiry, 22-25 July 1974, Third Day, 12: Letter from Nature Conservancy to the Department of the Environment, 30 October 1973. The Thames Estuary, TEWCG's 1980s publication, also built bridges, with funding assistance from riverside industries and the PLA.

⁷⁴ C. Tudge, 'Ecology's Infiltrator in London Town', *New Scientist*, 20 May 1982, 520-21; L. Cole, 'Urban Nature Conservation', in A. Warren and F.B. Goldsmith, *Conservation in*

Perspective (Chichester, 1983), 267-85; P. Simons, 'A City Fit for Wildlife', *New Scientist*, 28 March 1985, 30; D. Goode, *Wild in London* (1986).

⁷⁵ See GLC Department of Transportation and Development, *Thames-Side Guidelines: An Environmental Design Handbook for London's River* (1986): Sections 1.11, 1.12; 6(iii)(c); 6.8.4 ('Category I' sites); Appendix I, GLDP (1976) 'Section 10: The Thames: Its Tributaries and Canals' [re-printed], 10.6(a); Appendix II, 'The Proposed Alterations to the Greater London Development Plan 1984' (approved by the GLC but not signed off by the Government). See also: GLC, *Greater London Development Plan, Vol. 1 Statement; Vol. 2 Report of Studies* (1969/1976). Rainham Marshes were identified as vital for wading birds in J. Chandler, D. Clenet and D. Dawson, *A Nature Conservation Strategy for London: Woodland, Wasteland, the Tidal Thames and the Two London Boroughs*, *Greater London Ecology Handbook No. 4* (1987), 62-63. For GLC refuse and Rainham in the 1980s, see S. Copeman, 'Putting London's Rubbish to Good Use: On the Use of London's Domestic Refuse for Landscaping at Rainham, Essex', *Port of London*, 59:629 (1984), 57-59.

⁷⁶ See P. Pinch, 'Waterspace Planning and the River Thames in London', *London Journal*, 40(3) (2015). London Docklands Development Corporation (1981-1998), a unitary development corporation, managed the sale and commercial re-development of the former dock areas, taking over the suspended planning powers of the dockland boroughs of Newham, Southwark and Tower Hamlets.

⁷⁷ Luckin, *Pollution and Control*, 182. GLC, *Thames-Side Guidelines*, 'Chair's Foreword'. For the GLC Planning Committee Chair George Nicholson, who went on to form the London River Authority/London Rivers Association (LRA), see Pinch, 'Waterspace Planning'. The GLC and other metropolitan county councils were abolished under the Local Government Act 1985, Ch. 51.

⁷⁸ E. Porter, *Water Management in England and Wales* (Cambridge, 1978), 28. The Anglian and Southern authorities absorbed the Essex and Kent River Authorities. The PLA retained some conservancy powers, including control of oil pollution, flotsam and jetsam.

⁷⁹ Jordan, Richardson and Kimber, 'Origins of the Water Act 1973'; J.E. Castro, M. Kaïka and E. Swyngedouw, 'London: Structural Continuities and Institutional Change in Water Management', *European Planning Studies*, 11:3 (2003), 286-87. The RWA boards were replaced with smaller non-elected boards under the Water Act 1983, Ch. 23. 1983 also saw the Government's White Paper on abolition of the GLC and other metropolitan counties: Department of the Environment, *Streamlining the Cities: Government Proposals for Reorganising Local Government in Greater London and the Metropolitan Counties*. Cmnd 9063 (1983).

⁸⁰ Taylor, 'Watershed democracy' (forthcoming). For the symbolism of the Thames Barrier in the conflict between the GLC and central government, see: J. Schneer, *The Thames: England's River* (2005), 254-60.

⁸¹ As of 1994, 55% of effective rainfall (excluding evaporation, etc.) within the Thames catchment was used for water supply. NRA figure cited in Bakker, *Uncooperative Commodity*, 19. For localised struggles, see e.g. V. Taylor, 'Watershed Democracy'

(forthcoming). For ongoing tensions between water agencies, farmers and wildlife pressure groups in areas such as land drainage and flood protection, in the context of the Wildlife and Countryside Act 1981, see e.g. Purseglove, *Taming the Flood*, Chapter 8, 'The Last Ditch Stand: The Wetlands Debates 1974-1988'.

⁸² M.M. Parker and A.D. McIntyre, 'Sewage Sludge Disposal at Sea – Options and Management', in ICE, *Marine Treatment of Sewage and Sludge*, 125; Green and Hanbury, 'Sewage Sludge to Sea', 208. For pressure from the North Sea Conferences (1984 onwards), see OSPAR website:

<http://www.ospar.org/content/content.asp?menu=00590624000000_000000_000000> [accessed 7 December 2014].

⁸³ Quotation from Conservative Party Press Release, 22 May 1987, cited in D. Kinnersley, *Coming Clean: The Politics of Water and the Environment* (Harmondsworth, 1994), 53; see also 51-54, 70-71; A. Jordan and J. Greenaway, 'Paradigm Shift or Muddling Through? British Coastal Water Policy, 1955-1995', CSERGE Working Paper WM-1997-02 (1997), <<http://www.cserge.ac.uk/publications/cserge-working-paper/wm-1997-02-paradigm-shift-or-muddling-through-british-coastal-wate>> [accessed 14 November 2014]. The u-turn involved adopting the EU's 'precautionary principle' over an evidence-based approach. For differing UK and EU approaches, see: Parker and McIntyre, 'Sewage Sludge Disposal at Sea', 125; V. Mandl, 'European Community Activities towards the Protection of the Marine Environment', in ICE, *Marine Treatment of Sewage and Sludge*, 12. See also: Rose, *Dirty Man of Europe*, 24-40, 43-45; J. Hassan, *The Seaside, Health and the Environment in England and Wales since 1800* (Aldershot, 2003).

⁸⁴ Bakker, *Uncooperative Commodity*, 70. Bakker distinguishes between a pre-privatization context, where 'the inevitable contradictions between the politico-economic and politico-normative settlements were once addressed within a few government departments' and post privatization : 'the creation of quango regulators, and the multiplication of regulatory bodies has diffused responsibility and delegated accountability'. For the NRA, see also: S. Seymour, et al, 'Moralising Nature?: The National Rivers Authority and New Moral Imperatives for the Rural Environment', in N. Walford, J.C. Everitt and D.E. Napton (eds), *Reshaping the Countryside: Perceptions and Processes of Rural Change* (Wallingford, 1999), 39-56.

⁸⁵ For 'multi-level governance', see e.g.: M. Goldsmith and J. Garrard, "Urban Governance: Some Reflections," in R.J. Morris and R.H. Trainor, *Urban Governance: Britain and Beyond Since 1750* (Aldershot, 2000), 16; Bakker, *Uncooperative Commodity*, 69-70; M.G. Reed and S. Bruyneel, 'Rescaling Environmental Governance, Rethinking the State: A Three-Dimensional Review', *Progress in Human Geography*, 34:5 (2010), 646-53. See also: F. Craig and P. Craig, *Britain's Poisoned Water* (Harmondsworth, 1989), 188. EU Directives include: Fish Directive 1978; Birds Directive 1979; Shellfish Directive 1979; Drinking Water Abstraction Directive 1979; Urban Waste Water Treatment Directive 1991; Habitats Directive 1992; Environmental Impact Assessment Directive (1986/1997/2003/2011); Directive on the Quality of Water intended for Human

Consumption 1998; Water Framework Directive 2000; New Groundwater Directive 2006; Floods Directive 2007; Marine Strategy Framework Directive 2008.

⁸⁶ For current London waste arrangements: Mayor of London, *London's Wasted Resource: The Mayor's Municipal Waste Management Strategy* (Nov 2011), <https://www.london.gov.uk/sites/default/files/Municipal%20Waste_FINAL.pdf> [accessed 1 June 2015]. For early 'Thames Corridor' ideas, see MOLD: Port of London Authority Report and Accounts, 1978, 18. For assessments of the Gateway, see: T. Hunt, 'Sold Down the River', *The Guardian*, 18 June 2007, <<http://www.theguardian.com/environment/2007/jun/18/britishidentityandsociety.communities>> [accessed 6 July 2015]; P. Cohen and M.J. Rustin (eds.), *London's Turning: Thames Gateway: Prospects and Legacy* (Aldershot, 2008). The Marine and Coastal Access Act 2009, Ch. 23 established the Marine Management Organisation and allowed for the creation of Marine Conservation Zones, <<https://www.gov.uk/government/publications/marine-conservation-zones-mczs-and-marine-licensing>> [accessed 28 May 2015].

⁸⁷ For differences in perception between environmentalist and public perceptions, see e.g.: Harrison and Burgess, 'Social Constructions of Nature'; S. Tunstall, 'Public Perceptions of the Environmental Changes to the Thames Estuary in London, U.K', *Journal of Coastal Research*, 16:2 (2000), 269-77; (for a range of viewpoints in the context of the River Tyne) Armstrong and Bulkeley, 'Micro-Hydro Politics'.

⁸⁸ For debates around property development and the working river, see P. Pinch, 'Waterspace Planning'. See also: D. Clark and D. Hayter [GLC], *The Use of the River Thames in London* (1986); LRA, *The Working Thames: An Agenda for Action* (1992). The PLA's sale of the Port of Tilbury in 1992 ended its role as a port operator.

⁸⁹ e.g. the EU's Water Framework Directive (WFD) 2000 (Article 14) obliges water resource managers to engage with 'all interested parties' in the creation of river-basin management plans, <http://ec.europa.eu/environment/water/water-framework/index_en.html> [accessed 2 June 2015]. See also earlier participatory approaches: Agenda 21 (and Local Action 21) and the United Nations Conference on Environment and Development, 1992 ('Rio Earth Summit'), <<https://sustainabledevelopment.un.org/index.php?page=view&nr=23&type=400>> [accessed 6 July 2015]; Aarhus Convention 1998 (Articles 6-8) <<http://ec.europa.eu/environment/aarhus/>> [accessed 6 July 2015]. For a critical assessment of the WFD, see e.g.: M. Kaïka and B. Page, 'The EU Water Framework Directive: Part 1. European Policy-Making and the Changing Topography of Lobbying' and 'The EU Water Framework Directive: Part 2. Policy Innovation and the Shifting Choreography of Governance', *European Environment*, 13:6 (2003), 314-327, 328-343.

⁹⁰ See also Jordan and Greenaway, 'Paradigm Shift or Muddling Through?', 10, who cite W. Maloney, and J. Richardson, *Managing Policy Change* (Edinburgh, 1995).

⁹¹ See e.g. Karen Bakker for water industry 'market environmentalism'. For 'post-political' governance, see e.g.: F. Ginn and R.A. Francis, 'Urban Greening and Sustaining Urban

Natures in London', in R. Imrie and L. Lees (eds.), *Sustainable London?: The Future of a Global City* (Bristol, 2014), 283-302; J. Wilson and E. Swyngedouw (eds.), [The Post-Political and its Discontents: Spaces of Depoliticization, Spectres of Radical Politics](#) (Edinburgh, 2014).

⁹² 'Now Open: Britain's New Gateway to Global Trade: DP World London Gateway Port' (2013), http://www.londongateway.com/media/press/7_11_%20LG%20First%20Vessel_English.pdf [accessed 17 May 2015]; RSPB website: 'London Gateway – a very modern port', <http://www.rspb.org.uk/community/getinvolved/b/specialplaces/archive/2013/11/07/london-gateway-a-very-modern-port.aspx> [accessed 17 May 2015]. For London Gateway's background, see A. Grant, 'Environmental Impacts of the Proposed London Gateway Port Development, Thurrock, Essex' <http://www.uea.ac.uk/~e130/London%20Gateway.htm> [accessed 2 June 2015]. Natural England is the current incarnation of the former Nature Conservancy. For an earlier RSPB approach, see RSPB, *Port Development and Nature Conservation: Supply and Demand in the GB Ports Industry* (Sandy, Beds, 1997). DP (Dubai Ports) World demonstrates the new transnational nature of UK ports.

⁹³ See the Thames Tideway Tunnels website at <http://www.thamestidewaytunnel.co.uk/>. For opposition see e.g.: Report of the Thames Tunnel Commission (2011), chaired by Lord Selborne, commissioned by the London Boroughs of Hammersmith and Fulham, Kensington and Chelsea, Richmond, Southwark, Tower Hamlets, https://www.lbhf.gov.uk/Images/BkACE%20Thames%20Tunnel%20Commission%202011%20WEB_tcm21-165704.pdf; the pressure group Thamesbank, <http://www.appropedia.org/Thamesbank> [all accessed 6 July 2015]

⁹⁴ GLA, 'New figures reveal an Estuary airport would provide thousands more jobs than any other option as local businesses confirm their support', 26 August 2014, <https://www.london.gov.uk/media/mayor-press-releases/2014/08/new-figures-reveal-an-estuary-airport-would-provide-thousands>; G. Hayes [Let Britain Fly], 'Airport Expansion is Vital for London's Prosperity – But Politicians Still Do Nothing', 1 September 2014, <http://www.cityam.com/1409597651/new-runways-are-vital-london-s-prosperity-politicians-still-do-nothing>. For London First, see <http://londonfirst.co.uk/>. For local resistance to estuary schemes, backed by the RSPB, see e.g. 'No Airport at Cliffe Campaign Liaison Group'/ 'Friends of the North Kent Marshes', <http://www.coastalkent.net/member.php?id=87>; 'Saving Special Places – North Kent Marshes' (RSPB Film, 2012), <http://www.rspb.org.uk/discoverandenjoynature/discoverandlearn/videosandwebcams/film/42825311.aspx> [all accessed 29 May 2015].

⁹⁵ For discussions of stakeholders from Environment Agency and Thames Water perspectives, see: P. Orr, J. Colvin and D. King, 'Involving Stakeholders on Integrated River Basin Planning in England and Wales', *Water Resources Management*, 21 (2007), 331-49; Y. de Garis, N. Lutt and A. Tagg, 'Stakeholder Involvement In Water-Resources Planning', *Water and Environment Journal*, 17 (2003), 54-58. For a wider context, see also: R.E. Freeman, *Strategic Management: A Stakeholder Approach* (Boston, Mass,

1984); B. Page, 'Has Widening Stakeholder Participation in Decision-Making Produced Sustainable and Innovative Water Policy in the UK?', *Water Policy*, 5 (2003), 313-29; K. Collins, et al, 'A Systematic Approach to Managing Multiple Perspectives and Stakeholding in Water Catchments: Some Findings from Three UK Case Studies', *Environmental Science And Policy*, 10 (2007), 564-74; M.S. Reed, et al, 'Who's In and Why? A Typology of Stakeholder Analysis Methods for Natural Resource Management', *Journal of Environmental Management*, 90 (2009), 1933-49.

⁹⁶ For the changing powers of central government in the planning process see, e.g., the 2010 Conservative Government's new Planning Inspectorate, responsible for 'fast track' reviewing of National Infrastructure Planning applications for 'nationally significant infrastructure projects' (such as the Thames Tideway Tunnels) <<http://infrastructure.planningportal.gov.uk/>> [accessed 2 June 2015].