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"ALL THAT FUSS, JUST FOR SOME BLOODY BADGERS?" THE POLITICS OF WILDLIFE IN INFRASTRUCTURE CONSTRUCTION

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Across many construction projects, and especially infrastructure projects, efforts to mitigate the potential loss of biodiversity and habitat are significant, and at times controversial. In our paper we do not propose to gauge the success or failure of this effort; rather we are interested in fleshing out some conceptual approaches via Actor-Network Theory through which infrastructure projects can start to address a series of overlooked questions. Some of these questions are firmly located within the realm of construction project management: are animals considered project risks or stakeholders; is wildlife always simply a retrospective cost to a project or can it proactively benefit a project, can we ever manage wildlife, and if so how? These questions in turn lead us to engage with wider debates found in the margins between the social and biological sciences on the distinction between Nature and Politics: to what extent should we seek a place for animals in politics and how can we live with them ethically. Thus far, very little research has addressed the interplay of humans and animals within construction projects. Instead those interested in the politics and ethics of human-animal relations, or Animal Studies, have focussed far more on stable and contained sites, whether organisations like zoos, farms or laboratories, or other places like homes and parks. These largely ethnographic studies inevitably perhaps downplay the unplanned, unexpected and highly politically and ethically charged collision of hitherto rather separate human and animal geographies. Yet, as we argue here, it is often along such colliding spaces, where animal geographies are unexpectedly found at the heart of human projects, that we ask and answer many of the above questions around our respect and response to both animals, and indeed other humans. In this paper we will examine such encounters conceptually, with reference to two infrastructure projects, and discuss their relevance to both construction project management and broader work on the politics of animals.

Keywords: human-animal interaction, actor-network theory, infrastructure, environment impact assessment

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INTRODUCTION

Construction activity can be extremely disruptive or damaging to animal habitats and wildlife itself. This is particularly the case for infrastructure projects, where anthropogenic effects can often be amplified by the scale and nature of the activity, as well as the long-lived legacies of the assets that they create. Whether this damage relates to the disruption of natural environments, or to the displacement of animals within their natural settings, the consideration of environmental impacts now ranks amongst the most important decision criteria governing infrastructure development, and efforts to mitigate damage to natural habitats are increasingly central to investment decisions in such projects. It is surprising, therefore, that the agency of animals and their habitats have not been studied more extensively within the construction project management field. Indeed, with a few recent exceptions (Sage et al. 2011; Tryggestad et al. 2013) there is a paucity of work which has examined the interaction between human and non-human animals in construction projects. This is despite the burgeoning interest in other nonhumans in construction projects (see Bresnen and Harty, 2010), especially as influenced by Actor-Network Theory (ANT). The need for such research is further underscored by the tendency within the interdisciplinary animal studies field to largely ignore surprising encounters with animals around the construction process, choosing instead to examine sites where animals are more or less deliberately (ab)used, such as farms (Evans and Miele, 2012), zoos (Davies, 2000), laboratories (Greenhough and Roe, 2011) and homes (Wolch et al., 2000).

Extending the scope of this strand of work to the field of construction, we mobilize an ANT derived perspective to examine how non-human animal spaces and places are often, and unexpectedly, found at the heart of human infrastructure projects. By focussing here on such encounters, we shed light on the extent to which humans can anticipate the agencies of other animals, as well as practical concerns about how wildlife habitats and infrastructure might exist alongside each other before, during and after the development process. In doing so we critically examine the extent to which wildlife can (and perhaps should) be seen as stakeholders to infrastructure projects, and the consequences of both failing to, and of accommodating, their habitats through the development process. Singer (1975: xiii) suggested the linguistic boundary between humans and all other animals is based simply on cultural arguments. Biologically, humans are a species of animal. Thus, we will occasionally seek to remind the reader of this point, to problematize such cultural categories. But first, we address how the presence of animals is systematically (mis)framed within infrastructure projects: the Environment Impact Assessment (EIA) process.

ANIMALS AS RECEPTORS IN ENVIRONMENTAL IMPACT ASSESSMENT

The infrastructure sector has a long history of accounting for the environmental impact of its activities. The legal enforcement and effectiveness of the field of Environmental Impact Assessment (EIA) to encourage a detailed consideration of the impact of all manner of human activity on both natural and human environments, is increasing throughout the world (Tullos 2009). Originally developed in the United States in response to the National Environmental Policy Act 1969, there are now over 100 different legally-supported applications of EIA in operation globally (Wood 2003: 1). The EIA process was legal mandated across Europe in 1985, through the

implementation of Directive 85/337/EEC (amended in 1997, 2003 and 2009 - now all codified in 2011 under Directive 2011/92/EU). The importance of EIA has been provided with additional impetus in recent years under the Corporate Social Responsibility agenda (CSR), not least given the reputational damage incurred by contractors who failed to account for wildlife habitats in road construction projects (see Murray and Dainty, 2009). With the growth in major infrastructure investment the importance of such assessments is set to grow in the foreseeable future.

Although the prevalence of EIAs can be seen as a positive development in many respects, there are some key concerns with regards to the extent to which the needs and agencies of animals and their habitats are accounted for by such processes. While the emergence of the EIA can be seen as generally positive to the mitigation of environmental damage, there has been a tendency to see wildlife, and their habitats, as passive 'receptors' of development, rather than an influence on, or a stakeholder to, construction and development. Indeed, in UK the term 'receptor' is now in popular use across professional bodies (RICS, 2013), charities (FOE, 2008), industry (BP, 2002) government (SNH, 2013) and academia (Morris and Therivel, 2009). The term 'receptor', rather than that of 'stakeholder', is more or less exclusively used to refer to wildlife and their habitats. No doubt part of the explanation for this erasure of non-human agency is the recognition that any EIA is always deeply rooted in a specific political context, and that political or economic factors will often outweigh environmental concerns (Wood 2003: 3). Indeed, the act of developing an EIA is never politically neutral, and can yield actions which fully acknowledge negative environmental effects of infrastructure development. Recent examples of this range from the high-profile third-order effects of the Three Gorges Dam project on the Yangtze River, China to the rare Yangtze River dolphin (Tulloch 2009), to the more prosaic anthropogenic effects of reservoir building on parasite fauna (Morley 2007). What unites these cases is that the broader societal and environmental benefits of these developments were deemed to outweigh concerns for the wildlife which inhabit them; nature appears passive to and separate from Politics (Latour, 2004).

Although the politicisation of the EIA process is clear (see Cashmore and Richardson, 2013), wildlife, their habitats, and their advocates, often themselves play a political role in transforming the outcomes of such analyses. In the UK, environmental groups, such as Friends of the Earth, have criticized EIA processes as often being overly-reliant on desk-based surveys, designed to achieve planning permission at minimal cost, while lacking involvement with local environments and communities (FOE, 2008). Hence unsurprisingly, insights gleaned from EIAs can and are often challenged by emergent encounters during the construction process with wildlife and their advocates. The impact on the local Eurasian Otter population by the Skye Bridge project show how failings in the initial EIA required costly post-hoc analysis and mitigation strategies (Sage et al., 2011). Yet, even long after construction techniques, such as population sampling, deployed within EIA, can successfully improve habitats. For example, Dodd et al (2004) show how the sampling of wildlife road deaths influenced the construction of a barrier culvert system designed to enable animals to cross a long-established Florida highway safely. It is important to note that the act of rendering the road safe to cross also afforded an opportunity for the local population to appreciate wildlife and their habitat that would have been difficult to achieve without the initial infrastructure development. By contrast on Skye, the Otter population have refused to use the expensive mitigation systems (Sage et al., 2011), thus the project displaced the Otter's former habitat.

Infrastructure projects, and effective EIA and other managerial techniques, can be transformed by, as well as productively or adversely impact, habitats and wildlife. This point challenges the notion of wildlife as a passive 'receptor' to the construction project. Thus, the two key overarching questions we pose here are: (i) to what extent can and should wildlife be managed in advance as a passive receptor; (ii) is wildlife always a cost or risk or can it benefit infrastructure development, perhaps in unexpected ways, and if so how? Before addressing the case studies in more detail to engage with these questions, we develop these two questions further with reference to ANT-derived studies of non-human animals. In so doing we seek to address the potential for construction to politicize wildlife, and in the process challenge the long-standing assumption that Nature is separate to Politics, and by extension Society (Latour, 2004).

THE POLITICS OF WILDLIFE IN ACTOR-NETWORK THEORIES

While some work in EIA has recognized its political context (e.g. Cashmore and Richardson, 2013), the *modus operandi* of EIA dictates that 'the environment', or Nature, itself is little more than a complex mosaic of receptors passive to the social interactions of the construction process (and thus Society): "At the simplest level, a whole aspect of the environment could be considered a sensitive receptor, for example, the flora and fauna of a site. As interactions between different aspects of the environment are complex, it is however usually too simplistic to take such an approach, and it is recommended that some attempt be made to break down the receiving environment into receptors" (RICS, 2013).

Set against EIA, there has been a growing interest in the active involvement of various non-human actors in construction management processes (Bresnen and Harty, 2010). Much of the work around non-humans within construction management has been influenced by ANT (Latour, 2005), its derivatives and relations. This body of work opens up an opportunity to consider the complex agency of animals and their habitats in construction projects, as they interact with, and transform, managerial modes of order and control such as EIA. ANT's insistence on the agency of nonhumans offers a useful starting point to this end; while, they appears a tendency within ANT research to focus on objects rather than animals (perhaps influenced by Bruno Latour's noticeable focus on technological projects) a number of ANT studies have explored the interaction of human and non-human animals. This animal-related work includes: Callon's (1986) seminal work on the domestication of scallops; Whatmore's (2002) hybrid geographies; Hinchcliffe et al's (2005) analysis of urban conservation and Law and Mol's (2008) exploration of the politics of boiling pigswill. What unites such work is that animals are afforded the possibility of being more than simply passive intermediaries of human intentions and actions. That is, they could, if empirically evidenced, become, in ANT parlance, actors that "transform, translate, distort, and modify the meaning or the elements they are supposed to carry" (Latour, 2005: 39). And thus: "an animal may become an actor if it make visible a difference to the construction project, for example, by affecting the time schedule, the budget, the design specification, or more generally, other actors' interests and goals" (see Tryggestad et al. 2013: 74)

When an animal becomes an actor it moves the project in new directions, requiring new interests and stakes to be taken into account: thus, an animal, or collective of animals, objects and humans, can, if it makes a difference to the project, be

understood as a stakeholder. In this paper, instead of simply documenting the unexpected influence that animals and their habitats may have on a construction project (as in Sage et al., 2011; Tryggestad et al. 2013), we seek to question how animals are being understood and managed on projects, in relation to EIA and other project practices, and the limitations and opportunities therein of such practices for all involved. By comparing two rather different infrastructure projects we want to say more about the complex interaction of governance systems, cultures, political environments, as well habitats and wildlife. Thus, this paper has a more normative, arguably political, orientation than our earlier work in this area. But, following Hinchcliffe et al., (2005), by 'political', we do not mean to represent the interests of animals more accurately, to provide a more faithful, body of knowledge to identify and evaluate their natural interests and behaviours, alongside those of our own (see Cashmore and Richardson, 2013). After all, following ANT, demands we view interests as open-ended as they are produced through our dynamic relations with others rather than held internally (Callon, 1986; Latour, 2005). In what follows we flesh out a politics of wildlife for construction which allows animals to "object to the stories we tell about them, to intervene in our processes as much as we intervene in theirs" (Hinchcliffe et al. 2005:56-6). ANT proponents have conceptualized this version of politics as 'Cosmopolitics', where: "Cosmos protects against the premature closure of politics [around human actors], and politics against the premature closure of the cosmos [around natural facts]" (Latour, 2004b). This version of politics is set against a representational politics of ecology which only admits the political interests of (naturally) given entities (Latour, 2004). We ask here what unique role construction might have in both inhibiting and realizing such a (cosmo) politics. We will now turn towards the two case studies to address this question, as well as those two posed earlier in relation to EIA.

CASE STUDIES

The Hallandsås tunnels project

In October 1997 a large public infrastructure project, the construction of two parallel 8.6 kilometre long railway-tunnels through the Hallandsås ridge in the south of Sweden, was brought to a halt. Farmers living in the neighbourhood of the construction site found paralyzed cattle on the fields and dead fish in the ponds. Three paralyzed cattle were slaughtered 1st October. The farmers went public with their concerns and claimed that the project had caused the sickness and death of the animals. They contacted the media, organized public meetings and demonstrations and demanded the project stop. Investigations confirmed the farmers' claims. The constructor and key contractor Skanska held a meeting with Båstad municipality on the 3rd October which revealed toxic water was leaking from the tunnel and prompted the municipality's to use the media to warn the public about the danger. Båstad municipality filed criminal charges against the client, the National Railway Authority, (NRA) and the contractor, Skanska, for environmental damage. The project was halted on the 7th October. Construction workers had previously expressed concerns to their managers about their own health and safety when working with the composite Rhoca Gil to water seal the tunnels. Workers had expressed feelings of numbness in limbs and itching on the skin. A governmental investigation began on 20th October 1997. It revealed: 27 contaminated wells near the construction site; 333.000 kg milk needed to be destroyed; 370 cattle had to be slaughtered; the value of farm land and property declined and local crop sells suffered; and the crew had not been appropriately equipped and educated to work with Rhoca Gil. Medical examinations revealed that

about 20 construction workers had documented neural effects related to their work with the toxic composite material (Tunnelkommissionen 1998).

The Hallandsås project was carried out by the NRA. The tunnels would reduce rail journeys, increase train and cargo capacity. NRA considered environmental impacts during construction. Due to local geology, construction would cause a temporary lowering of groundwater, requiring NRA to obtain approval from the Water-Rights Court (WRT). For this application to be approved an Environmental Impact Assessment (EIA) had to be conducted. The EIA revealed that some sections of the ridge had high water transport capacity (due to small rocks and clay). This in turn could result in high losses of groundwater with environmental impacts on vegetation, animals, farmers and other inhabitants living on the ridge. The WRT permitted the NRA to release groundwater, but did express concerns regarding the degree of impact, suggesting that additional investigation should be conducted. The WRT also required a chemical control programme to ensure the water-quality (Päiviö, J. & Wallentinus, HG. 2001, 66). The local municipality, the Swedish environmental protection agency and the Ministry of Environment called for further investigation of the environmental impacts (as per 85/337/EEC on railway projects over 2.1km). The Government decided to start the project in February 1992.

The first contractor to work on the task was Kraftbyggarna who was awarded the 690 million SEK key contract in spring 1992 with an estimated completion time in 1996. The contractor used a tunnel boring machine (TBM) that turned out to be unable to handle the variable geological conditions. Small rocks and clay jammed the boring head. Only a few meters were accomplished during the first years. The contractor ended up in a dispute with its client and left the project in 1995. After a new tender process Skanska took over the project with a contract worth 900 million SEK. The company used the well proven method of blasting and excavation. Progress was lagging behind the time schedule as the amount of groundwater that seeped through the cracks was much larger than anticipated and created more difficult working conditions for the construction crew. Moreover, the client and contractor developed new concerns about an eventual violation of the permission issued by the WRT. Growing concerns among local farmers about the water supply were reported by the press. Combined with the growing media-attention, the government took no chances and did not grant the NRA permission to proceed with the plans of lowering the groundwater level. The NRA was thus forced to come up with new solutions to the groundwater problem. Together with Skanska, the NRA initiated investigated ways to seal and contain the water flows. Tests with ordinary lining methods that used concrete showed them to be insufficient. Lining had to be complemented with other methods. The client and contractor decided to do a test on a limited area of the tunnel with the chemical composite material Rhoca Gil, which was a quite well established sealing method for underground construction work internationally. The test results obtained in spring 1997 were encouraging and project management then decided to scale up for production. Large quantities of Rhoca Gil were used during the summer and fall. The environmental scandal emerged shortly after.

The investigations conducted in the aftermath of the scandal revealed some of the subtleties of Rhoca Gil in use. When used under conditions of moderate water pressures, the toxic agent in Rhoca Gil would harden quite swiftly and be contained with relatively little discharges into the waterways. However, when used under high water pressure, the toxic agent would reveal a different behaviour and take much longer time to harden while discharging the toxic chemical acrylamide into the water

flow (Frisk, 2008). The project resumed in 2003 and is estimated to be completed in 2015 at a cost of 10.5 billion SEK, over 17 times over budget, and 19 years late.

Ashwood to Oakhampton pipeline project

The Ashwood to Oakhampton pipeline (AOP) project (fictitious name, but based on a real project) involved the construction of a c.£45m 1200mm high pressure gas pipeline over 18.5km from protected Green Belt land into outlying suburbs of a large conurbation in the United Kingdom. Construction took place between 2007 and 2009. The project sponsor was an international, privately-owned, utility provider (hereafter named 'Gasgen'). The project did deviate from original time and cost estimates (of a spring 2007 start and 2008 end) partly due to its environmental impact. However, it was also regarded as highly successful for its environmental practice, winning an award for waste management. Under the Public Gas Transporter Pipe-line Works (1999), adopted in response to European Directive 97/11/EC, the pipeline required a full EIA as it was over 800mm in diameter. While this act exempts pipelines from the requirement to gain planning consent from local authorities, all pipelines requiring an EIA require approval from the relevant Secretary of State. The EIA was captured in the Environmental Statement (ES) by a team of independent consultants on behalf of Gasgen, in conjunction with statutory and non-statutory bodies, from regulatory bodies to local authorities and environmental charities (the 'consultees'), in addition to landowners. The ES categorized the impact of the project on animal and habitat receptors as temporary minor to moderate adverse, and thus capable of being mitigated. Thus, the ES enacts the split between Nature and Society: on one side there are a set natural entities whose responses can be easily mapped out, and on the other side there is Society, whose capricious political and economic interests are to be evaluated as they act upon Nature.

While the ES was largely viewed positively, and ultimately accepted by the Secretary of State, the local authority expressed concern that the surveys of animals undertaken in some areas were insufficient, and thus biodiversity and habitat could be adversely affected. In effect, animals were said to not being represented well-enough: this is the politics of representation. Yet, we can also detect moves beyond this politics.

One small river crossing above the pipeline was engulfed with Himalayan Balsam and biodiversity was extremely low. The project team identified this site as an opportunity to enhance local biodiversity. A river restoration company was then employed to; clear the river, introduce new riffles to oxygenate the water, plant a range of native aquatic and riverbank species, construct a backwater wetland feature to connect with the original flood plain and grade the banks with biodegradable matting to improve the habitat. While such work helped enrol the local authority in the project, it failed to enrol sufficient flora and fauna: the project team since report that the local authority did not prevent this promising habitat being re-engulfed with Himalayan Balsam, and the river returned to more or less its former low-biodiversity state. Similar examples of non-human animals acting as matters of political concern, rather than fact, appear elsewhere. For example, during open and cut tunnelling near a major road on the AOP project, a badger set was found; under the advice of the Environment Agency (the badger's legal spokesperson) an artificial set was created to entice the badgers away; however, the badgers refused to use it and so the Agency stipulated that the pipeline must be tunnelled under the original set at a cost of £0.5m. One member of the project was so dismayed at the cost of this work, which is ultimately passed onto consumers' energy bills, that he suggested it would have been far easier, and perhaps more

popular (especially in the light of UK badger culls and high energy costs) simply to move the badgers by force.

CONCLUDING COMMENTS

The two case studies suggest that emphasis in EIA, on seeing wildlife and habitats as mere 'receptors' of development, is flawed. The Hallandsås case reveals how failing to consider the unique agency of local wildlife, and their hydrological and geological environments, can have catastrophic implications not just for local wildlife and agriculture, but, given EIA law, the construction project itself. The AOP project example, on the other hand, reveals that going beyond EIA law and proactively accommodating wildlife and their habitats as part of the development process can positively benefit infrastructure projects and the organisations involved in their development. If you can shelter animals in your project, then they can help you enrol various publics (Callon, 1986). However, if emphasis is solely placed upon the politics of representation, prefigured on the split between Nature and Society, then animals and their habitats will often be as quickly forgotten, as Himalayan Balsam reinstates itself or acrylamide seeps upwards through small rocks. Skanska and the NRA assumed Rhoca Gil was safe based on experience elsewhere; hence they relied upon on assumptions that Nature can be faithfully represented as a set of facts through Science and transported elsewhere, without modification. Yet equally problematic was the assumption by the local authority in the AOP case that the representation of animals in a biodiversity survey, of a recently enhanced habitat, indicated the animals' destinies. After all, we would not assume we could gauge our own fate from a population census.

Cosmopolitics demands we think about interactions between human and non-human animals as an on-going relationship, where we respect their right to behave as actors like us, to surprise us, just as we surprise them (in their sets, ponds and elsewhere). As Latour (2005) puts it we seek to ignite a "burning desire to have the new entities detected, welcomed and given a shelter" (p224). Building sites are surely part of the political front-line in this process. Construction operatives and managers are constantly faced with the spectre of Latour's Cosmopolitics; they cannot simply represent animals in containers of natural facts and social interests as EIA suggests; rather they readily turn animals into matters of concern, even, and especially, as they ask whether it is really worth "all that fuss, just for some bloody badgers!"

REFERENCES

- BP, 2002. BTC Pipeline - Construction Impacts and Mitigation, BP. Available at:
http://www.bp.com/liveassets/bp_internet/bp_caspian/bp_caspian_en/STAGING/local_assets/downloads_pdfs/xyz/BTC_English_ESIAs_Amended_Turkey_EIA_Final_incorporating_comments_Content_BTC_EIA_Volume_2_Section_6.pdf
- Bresnen, M. and Harty, C. (Eds.) (2010) Special Issue: objects, knowledge sharing and knowledge transformation in projects, *Construction Management and Economics*, Vol. 28, pp. 549-555.
- Callon, M. (1986). Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of Saint Brieuc Bay. In: J. Law (Ed.) *Power, Action and Belief: a new Sociology of Knowledge?* Sociological Review Monograph, Routledge: London, 32, pp.196-233.
- Cashmore, M. and Richardson, T. (2013) Power and Environmental Assessment: Introduction to the Special Issue, *Environmental Impact Assessment Review*, Vol. 39, pp.1-4

- Davies, G. (2000) Virtual animals in electronic zoos: the changing geographies of animal capture and display. In: C. Philo and C. Wilbert (Eds.) *animal space, beastly places: new geographies of human-animal relations*, Routledge: London. pp.243-267
- Dodd, C.K., Barichivich, W.J. and Smith, L.L. (2004) Effectiveness of a barrier wall and culverts in reducing wildlife mortality on a heavily traveled highway in Florida. *Biological Conservation*, Vol. 118, pp.619–631.
- Evans, A. and Miele, M. (2012) Between food and flesh: how animals are made to matter (and not matter) within food consumption practices. *Environment and Planning D: Society and Space*, Vol. 30, pp. 298-314.
- Frisk, M. (2008) Sju miljarder för sju minuter? - Planering, politik och hybrida geografier I tunnelbygger genom Hallandsås, Doktorsavhandling, Fakulteten för samhälls- och livsvetenskaper - Kulturgeografi, Karlstad University Studies
- FOE (2008) Environmental Impact Assessment, Friends of the Earth. Available at: http://www.foe.co.uk/resource/guides/42_environmental_impact_as.pdf
- Greenhough, B. and Roe, E. (2011) Ethics, space and somatic sensibilities: comparing relationships between scientific researchers and their human and animal experimental subjects. *Environment and Planning D: Society and Space*, Vol. 29, pp. 47-66.
- Hinchcliffe, S. Kearns, M. Degen, M. and Whatmore, S. (2005) *Urban Wild Things: A Cosmopolitical Experience*, *Environment and Planning D: Society and Space*, Vol. 23, pp. 643-658.
- Latour, B. (2004a) *Politics of Nature: How to Bring the Sciences into Democracy*, Harvard University Press: Cambridge, Mass.
- Latour, B. (2004b) 'Whose Cosmos, Which Cosmopolitics?: Comments on the Peace Terms of Ulrich Beck', *Common Knowledge*, Vol.10, pp.450–62.
- Latour, B. (2005) *Re-assembling the Social: An Introduction to Actor-Network Theory*, Oxford University Press: Oxford.
- Law, J. and Mol, A. (2008) Globalisation in Practice: On the Politics of Boiling Pigswell, *Geoforum*, Vol. 39, pp.133-143.
- Morley, N. J. (2007) Anthropogenic Effects of Reservoir Construction on the Parasite Fauna of Aquatic Wildlife. *Ecohealth*, Vol. 4, 374–383.
- Morris, P. and Therivel, R. (2009) *Methods of Environmental Impact Assessment (3rd Edition)*, Routledge: London.
- Murray, M.D. and Dainty, A.R.J. (2009) *Corporate Social Responsibility in the Construction Industry*. Taylor and Francis, Oxford.
- Päiviö, J. and WallenHans-Geog, W. (2001) *The Hallandsås railway tunnel project*, Swedish University of Agricultural Science, Uppsala.
- RICS, 2013. RICS draft guidance note - Environmental impact assessment, Royal Institute of Chartered Surveyors. Available at: https://consultations.rics.org/consult.ti/enviro_impact/viewCompoundDoc?docid=881908&partid=883220&sessionid=&voteid=
- Sage, D., Dainty, A. and Brookes, N. (2011) How Actor-Network Theories Can Help in Understanding Project Complexities. *Journal of Managing Projects in Business*, Vol. 4 Iss: 2, pp.274 – 293.
- Singer, P. (1975) *Animal Liberation*, Thorsons: Wellingborough, Northampton.

- SNH (2013) Environmental Assessment Handbook - Appendix 1: Landscape and Visual Impact Assessment, Scottish Natural Heritage. Available at:
<http://www.snh.org.uk/publications/on-line/heritagemanagement/eia/appendix1.shtml>
- Tryggestad, K., Justesen, L. and Mouritsen, J. (2013) Project temporalities: how frogs can become stakeholders, *International Journal of Managing Projects in Business*, Vol 6, 69-87.
- Tullos, D. (2009) Assessing the influence of environmental impact assessments on science and policy: An analysis of the Three Gorges Project, *Journal of Environmental Management*, Vol.90, Sup.3, pp208-223.
- Tunnelkommissionen (1998) Miljö I grund och botten - erfarenheter frå Hallandsåsen - Slutrapport av Tunnelkommissionen, SOU 1998: 137, Stockholm, No1, 69-87.
- Whatmore, S. (2002) *Hybrid Geographies: Natures, Cultures Spaces*, Sage: London.
- Wolch, J. Brownlow, A. and Lassiter, U. (2000) Constructing the animal worlds of inner-city Los Angeles. In: C. Philo and C. Wilbert (Eds.) *animal space, beastly places: new geographies of human-animal relations*, Routledge: London. pp.71-97
- Wood, C. (2003) *Environmental Impact Assessment: A Comparative Review (2nd Ed.)*, Pearson, Harlow.