Bear, C. 2016. Tracing bacterial legalities: the fluid ecologies of the European Union's bathing water directive. In: Braverman, I. ed. *Animals, Biopolitics, Law: Lively Legalities*. London: Routledge, pp. 79-98.

Author's post-print manuscript

Tracing Bacterial Legalities: The Fluid Ecologies of the European Union's Bathing Water Directive

Christopher Bear

Introduction

In 2006, the European Union (European Union) introduced a revised Bathing Water Directive[1] (2006/7/EC). Aiming to "preserve, protect and improve the quality of the environment and to protect human health" (Chapter 1, Article 1.2), the Directive will be implemented fully by the start of 2016. Replacing the 1976 Bathing Water Directive [76/160/EEC]), the new Directive requires European Union Member States to monitor their bathing waters for the presence and concentration of faecal bacteria, and to produce "profiles" of each designated site to inform potential bathers and future management strategies. The revisions have been celebrated by many environmentalists and bathing groups for setting considerably tougher standards than the previous version, with the intention of producing safer water for humans to swim in, and for standardizing the communication of water quality assessments to members of the public. At the same time, the revisions have been contested by local politicians, who were concerned about the economic impacts of failing to meet the new requirements (e.g., Pilmoor 2013), and by specialist recreational groups (e.g., Surfers Against Sewage 2014) which felt that the legislation did not go far enough. Although the Directive's focus is on the control of faecal bacteria, its implications for nonhuman life have rarely been at the center of public debate.

In exploring the Directive's implementation, my chapter responds to David Delaney's concerns over how "entities . . . are made meaningful in distinctively legal ways and practically situated with respect to distinctively legal manifestations of relations of power" (2015, 98). The first focus of the chapter, therefore, is on how the Directive co-produces new representations of nonhuman animal life around legally designated bathing waters. Although the Directive itself makes no mention of animals, authorities responsible for its implementation have increasingly framed them as "polluters" in their search for ways to reduce levels of water-borne faecal bacteria. This distinction between "animals" and "bacteria" is somewhat arbitrary, given that all animal bodies are composed of bacteria (Margulis and Sagan 1986). Nonetheless, for the purposes of this chapter, I maintain the distinction, exploring particularly the framing of animals as producers, carriers and distributors of bacteria.

However, the making-meaningful of animals extends beyond representation and does not lie solely in the hands of humans. Second, therefore, the chapter responds to Irus Braverman's (2015, 308) invitation to make visible "the largely invisible roles that animals have long performed in regulatory frameworks." In this particular instance, animals are far from visible in the regulatory framework, leaving considerable scope for managers and policy-makers to decide whether and how to include them. When they are made visible in the implementation, it is rarely through a need to offer them protection—the legislation's focus is on the protection of humans—but more often through a desire to control them. In this way, the chapter is about the becoming-law of animals: how the Directive makes animals visible, legible, and governable. Doing so involves not only animals and associated bacteria in and around the designated bathing water sites themselves, but also those that are topographically distant.

Third, the chapter explores the application of new technologies and approaches in making distant animal bodies and their "incriminating" traces visible. For instance, farm slurry or bird excrement from urban centres have often been categorized rather vaguely as "diffuse source pollution" (e.g., SEPA 2014). In implementing the Directive, environmental management agencies are increasingly turning to techniques such as microbial source tracking (MST) to identify more accurately the sources—both spatial and species—of faeces. Such approaches attempt to render the unruly lives of animals manageable and carry an air of objectivity and certainty. However, additional actants and forces, such as water and sun, complicate such certainty, affecting the life, death, dispersal, and impact of bacteria.

The underlying theme of movement highlights the flow of law itself—the becoming-animal of law, in other words—as the Directive extends beyond the designated bathing water sites, following the flow of bacteria-infused animals and that of bacteria that emanate from them. Law here is not "a thing," but "a dynamic, shifting, often contradictory, multi-point process" (Delaney 2015, 97). Acknowledging the vital materialities of "bathing waters" thus complicates the notion and stability of water quality and highlights the potential of advocating a "less fixedly human and more risky approach to boundaries, to political actors and to political outcomes" (Buller 2014, 314). This chapter's analysis shows along these lines that while the Directive is "pointillist" (Doel 1999) in tone—namely, it focuses on bounded spaces and measurements taken at fixed spatial and temporal points—such pointillist undertones are destabilized by the vital materialities and deterritorializing movements of animals, bacteria, and water. Although the revised Directive is open to engaging with such "liveliness," management strategies and policies tend to do so very selectively, showing their willingness to control, or even eradicate, certain animals in an effort to improve the quality (as enacted through approved scientific measurement techniques) of waters, but tending to ignore other forces, such as the sun and wind. This results in "politics of blame" around water

quality, which sit uneasily between "a strategic understatement of material agency" and an acknowledgement of "the distributive quality of agency" (Bennett 2005, 464). Although issues of blame and responsibility are not expressed explicitly in the Directive, they nonetheless emerge implicitly through law in action , which forms the chapter's focus.

Drawing on a review of documentary sources on the Directive's implementation in the United Kingdom, I provide an overview of the legislation, examining the specific form of water quality it enacts. Subsequently, I examine how the legislative revisions have affected the treatment of animals in and around designated bathing waters, before extending the chapter's focus on animals to those that are topographically distant and made visible through the detection of their bacterial traces. Finally, I expand the chapter's analysis of "lively legalities" to nonhumans other than animals and bacteria, exploring how the movement of water, along with the influence of sun and weather, disrupts the assessment of its quality.

Enacting Water Quality

The Bathing Water Directive is one of a number of reference points for bathing water quality in Europe—other formalized enactments include the "Blue Flags," which have appeared on beaches across Europe since 1987 (and globally since 2001), and the annual *Good Beach Guide* (Marine Conservation Society 2014). These overlapping formalizations enact bathing water quality in multiple ways. There is also a temporal dimension to bathing water quality's multiple enactments, as the formalizations draw on embodied knowledge (such as surfers' bodily responses to the presence of faecal bacteria, subsequently communicated through campaigns) and on changing scientific understandings. This section provides a brief overview of the revised legislation, highlighting the emergent concept of water quality.

The original Bathing Water Directive was introduced in 1976 in response to concerns over "severe water pollution problems" around Europe (Benson and Jordan 2014, 48). This

earlier legislation monitored ten parameters: total coliforms, faecal coliforms, salmonella, enteroviruses, pH, colour, mineral oils, surface active substances [detergents], phenols, and transparency. Mandatory standards were established for each parameter, alongside more stringent "guideline" values (which Member States should "endeavour . . . to observe" [Council Directive 76/160/EEC], but which were not mandatory). In practice, some of these parameters were more significant than others. As England's Department for the Environment, Food and Rural Affairs (DEFRA 2008) notes: "[c]ases of non-compliance with the physico-chemical parameters are extremely rare so compliance in the United Kingdom each year is normally determined by the extent of pollution by total and faecal coliform bacteria." The focus, in other words, has tended to be on the presence of faeces, rather than on any other form of pollution. Figure 1 shows the changing levels of compliance with the Directive across the European Union since 1990, with the percentage of coastal waters meeting the mandatory standards rising from around 80 percent in 1990 to almost 97 percent by 2013 (European Environment Agency 2014a, 13).

Place Figure 1 here: Percentage of coastal bathing waters in the European Union per compliance category. Redrawn using data courtesy of European Environment Agency (2014b). Used with permission.

Viewed through illustrations such as Figure 1, the original Directive could be celebrated as a considerable success (e.g., DEFRA 2008). Alongside other legislation, such as the Urban Waste Water Treatment Directive (91/271/EEC), the Bathing Water Directive has directly led to changing approaches to the management of sewage, and of agricultural runoff in particular (Jones 2008). These changes have been celebrated widely, especially by authorities wanting to promote the quality of their beaches to potential tourists. Simultaneously, the original Bathing Water Directive was subjected to criticism, especially from campaign groups such as Surfers Against Sewage, which argued that they continued to be affected (and, indeed, infected) by contaminated waters (Surfers Against Sewage 2014).

By the mid-1990s, broader concerns were raised that, in spite of growing compliance, there had "been less additional improvement of coastal bathing water quality" as time had progressed, and that the original Directive no longer reflected current scientific understanding or technical and management capabilities (Commission of the European Communities 2000, 16). Although Figure 1 is suggestive of a scientifically measurable quality, visceral demonstrations of bodily impacts highlighted shortcomings. Through the 1990s, scientific arguments were used increasingly to argue that the standards were somewhat arbitrary and were not suitably focused on their goal of protecting human health (Commission of the European Communities 2000, 16). Within the original Directive, therefore, the quality of water was a far from stable concept.

The revision of the Directive was prompted by four concerns in particular: that certain parameters had become either outdated or irrelevant; that monitoring of waters was being carried out purely to check compliance, rather than to develop understanding; that methods of analysis had not been standardized, leading to results that were not comparable; and that "[m]icrobiological analysis requires considerable time which means that, in case the water sample is confirmed to be non-compliant, any (re)action to address that non-compliance will be too late and people might have been exposed to pollution" (Commission of the European Communities 2000, 16). These concerns formed the focus of the revision process.

A revised Bathing Water Directive came into force in 2006. According to the European Environment Agency (2014a, 7), the new Directive "simplifies management and surveillance methods" by requiring the monitoring of only two types of bacteria, intestinal enterococci and *Escherichia coli*, thereby replacing the previous spectrum of ten parameters (United Kingdom Parliament 2008, 4). Alongside this simplified monitoring, the revisions replaced the former mandatory and guideline standards with a four-stage classification system: poor, sufficient, good, and excellent. Starting in 2016, any bathing waters classified

as “poor” “must display a sign advising against bathing during the bathing season . . . giving a reason based on water quality” (DEFRA 2010, 7). These new classifications relate to the Directive’s emphasis on the importance of communicating the data to the general public in a clear way so as to inform their decisions about whether or not to bathe. Management authorities must, therefore, produce “profiles” for each designated Bathing Water, which will:

(a) contain a description of the physical, geographical and hydrological characteristics of –

I. the bathing water;

II. any other surface water in the catchment area of the bathing water where the surface water could be a source of pollution for the bathing water;

(b) identify and assess the causes of pollution that might affect bathing water quality and pose a risk to bathers’ health;

(c) assess the potential for cyanobacterial proliferation;

(d) assess the potential for the proliferation of macro-algae or phytoplankton;

(e) if assessment under point (b) shows that there is a risk of short-term pollution, supply the following information:

– the anticipated nature, frequency and duration of short-term pollution;

– details of any remaining causes of pollution, including management measures taken and the time schedule for their elimination;

– management measures taken during short-term pollution and the identity and contact details of bodies responsible for taking such a decision;

(f) identify the location of the monitoring point (DEFRA 2010, 11).

The profiles will be established on the basis of data collected over four consecutive years: “to assess a quality of bathing water for 2013, for instance, data from 2010 to 2013 are used” (European Environment Agency 2014a, 9). The profiles must be based on a minimum

of one sample per month during the bathing season (Annex IV, 1), with additional samples to be taken during any short-term pollution events (Environment Agency [no date], 2). In addition to these longer-term profiles, the relevant authority should also alert potential bathers to any short-term pollution risks, with advice "made available . . . in an easily accessible place in the near vicinity of each bathing water" (Article 12).

Beyond simplifying the communication of information about water quality, the revised Directive also introduces more stringent standards: whereas 97.6 percent of bathing waters met the mandatory standards in 2010, if the same samples were subjected to the standards set by the revised Directive, only 88 percent of those waters would meet the new "sufficient" classification (DEFRA 2012. According to DEFRA (2010, 7), this new sufficient classification is approximately twice as stringent as the former mandatory pass, whereas the new "excellent" classification is approximately twice as stringent as the former "guideline" standard. The new Directive is aimed at creating direct comparability across Europe through dictating the methods of data collection and analysis.

Two central points emerge from this section. First, that water quality is enacted in multiple ways, whether through bodily encounters, or dialogue and contestation between scientific knowledge, political and legal discourse. Second, and related to this, is that the mandatory assessment of quality has changed over time. Discussion of these regulatory shifts is often centred on a trajectory towards greater stringency (e.g. Kinver 2013; Natural Resources Wales 2014). By contrast, in the next two sections I show that this is not a simple linear path; rather, it has highly variable impacts on who (or what) is to be blamed for the changing quality of bath water.

Siting Water quality

The legislation designates specific sites as bathing waters; it applies, in other words, not simply to all coastal waters, nor to where people swim occasionally, but to an ever-

changing and contested list of legally designated sites. Specifically, Article 1.3 defines the scope of the Directive as applying to "any element of surface water where the competent authority expects a large number of people to bathe and has not imposed a permanent bathing prohibition, or issued permanent advice against bathing." It In this section, I focus on how the revision of the Directive has affected, if indirectly, the treatment of animals in these sites.

As noted previously, the revised Directive has brought about considerable interest in the activities of nonhuman animals around bathing waters—interest that was virtually entirely absent prior to the revisions. This shift is illustrated by Nick Smart, a technical specialist at the Environment Agency, who stated that seagulls are:

> a big, big problem under the new directive… Before, they were more or less background noise. But with these new testing criteria they're going to become a real issue. . . . A seagull eats his fill of chips or sandwich or whatever, and goes and perches on the roof of the pier buildings. . . . He does what he has to do, it rains, and that guano-infested water just runs straight into the sea (Henley 2013).

Whereas in the earlier legislation, water managers generally focused their attention on addressing the most significant sources of faecal contamination, the more stringent standards have encouraged them to explore what might be viewed as more incremental sources. The five most significant sources of intestinal bacteria in bathing waters are widely listed as pollution from sewage; animals and birds on or near beaches; domestic sewage; water draining from farms and farmland; and water draining from populated areas (LOVEmyBEACH [no date]). The contribution of each category can vary considerably between bathing waters, but the classification of coastal animals as "sources of pollution" (Dunphy 2013, 5) is significant. Whereas birds such as seagulls have regularly been portrayed as a "nuisance" (e.g., Aberdeenshire Council 2015), this has been because of noise, removing litter from bins, or attacking people and their food; their faecal bacteria have rarely

been a significant concern. Attempts to quantify the impact of such animals, however, have highlighted the potential contribution of animal activities to poor water quality. A study of two beaches in northwest England, for instance, found that animals on or near the beaches accounted for 10 percent of faecal bacteria, in comparison to 20 percent for domestic sewage (Dunphy 2013, 5).

Through the attempts at quantification that result from the implementation of the new Directive, nonhuman animals have newly been framed by environmental management agencies as threats to human health. Such representations circulate through a variety of contexts. In some cases, the threat is viewed mechanistically and manifests in terms such as "pass" or "fail" under the Directive. An extract from a populist coastal magazine illustrates: "A note to pigeon feeders—go easy on the breadcrumbs this summer. It's worth bearing in mind that in an Olympic-size swimming pool of seawater, just one single dropping from a Canadian Goose will result in a fail by the Environment Agency" (Johnson 2014, 101). While putting this less starkly, similar framings have adopted by government bodies and politicians. For instance, England's DEFRA noted: "We are concerned about flocks of birds roosting near the beach, for example breakwaters or piers, which then impact on bathing water quality. We ask that people do not feed these birds" (DEFRA 2014). During United Kingdom parliamentary debate, seagulls were similarly labelled as "indiscriminate defecators, with the ability to expel significant quantities of runny faeces on the wing" (Peter Aldous MP in United Kingdom Parliament 2011).

So while the Directive makes no explicit mention of animals, it unwittingly affects the perception and potential treatment of birds such as seagulls and starlings. Although the Directive's implementation is at an early stage, these representations of animals as threats are slowly translating directly into physical management measures. In Blackpool, for instance, which is the United Kingdom's most popular seaside holiday resort, it was "proposed that

there needed to be improved management of birds as they could have a great impact on water samples. It was advised that netting on piers and discouraging people from feeding seagulls would be considered in the management of this issue" (Blackpool Council 2012, 13).

Such concerns extend beyond birds. It is increasingly common, for instance, for dog walking to be either discouraged or banned on designated bathing waters. Such bans on walking dogs highlight not only the spatiality of the Directive's implementation, where boundaries are drawn around areas within which certain animal activities are permitted, but also its temporality. Dogs are banned from Blackpool Central Beach, for instance, between May 1 and September 30 each year (the beach's legally designated bathing season), because of their potentially polluting behaviour. Because waters are not tested outside of the season, dogs and their human companions may essentially do as they please from October to April, even though their bacteria are likely to survive longer at that time of year (an issue I return to in the final section) and have a greater impact on anyone willing to brave the cold English winter sea. Animals' enrolment in the assessment of water quality, in other words, varies not only spatially but also temporally and between different species.

In this section, I have shown some of the ways in which the revisions to the Bathing Water Directive have led to changing representations of, and interactions with, particular animals around coasts. In many ways, these reflect Delaney's (2015, 99) characterisation of law as producing "territorializations," carving "life-worlds into innumerable boxes and assembl[ing] and reassembl[ing] them in ways that structure experiences." Not only are lines drawn around areas of water, but animals (and their actions) are labelled and categorized in new ways in relation to, and by, various laws. Yet these representations and interactions are uneven spatially and temporally, and vary between species. Whereas some species (such as dogs) are represented as "polluters" only during the summer, others (such as seagulls) might be increasingly discouraged year-round. Animals of the same species, meanwhile, can be

treated very differently in close proximity to one another—for instance, where only one of two adjacent bays has been designated as bathing water.

The implications of the Directive extend beyond actors and events within the spatial boundaries of designated bathing waters. Accordingly, the next two sections explore how "traces" of animals come to matter in the Directive's implementation, as they destabilize the Directive's territorializing tendencies and implicate animals in a politics of blame. The next section, therefore, moves away from a focus on physically present animal bodies toward the Directive's concern over the bacteria that are carried and dispersed by these bodies.

Animal Flows and Traces

A number of authors have recently highlighted how animals become present in more-than-human relationships not only through their embodied materiality but also through the "traces" they (and their relationships) leave. These traces have included imprints on the physical environment (such as the otter footprints discussed by Hinchliffe et al. 2005), the physical transformation of bodies by viruses (Greenhough 2012, 292), the contemporary distribution of a species (the "traces of human-elephant companionship" discussed by Lorimer 2010, 497), or the signs of human-animal conflict, such as the "companion planting . . . protective containers [and] pellets" that respond to slug presence in gardens (Ginn 2014, 534). Studying traces offers a route through which animal practices that take place away from direct observation by, or contact with, humans might be acknowledged. The study of traces encourages an exploration of the remnants of embodied relationships, as they continue to be affective and co-constitutive of a place long after the human or animal body has moved on.

The traces I am interested in here often spread across considerable distances, reaching places that the animals themselves may never have encountered. Although environmental managers and politicians are taking an increased interest in certain animals that inhabit, or are in close proximity to, bathing waters, the revised Directive's focus on faecal bacteria has

concurrently stimulated heightened interest in what is often labelled “diffuse pollution.” The earlier Directive, in relation to animals at least, was most concerned with diffuse pollution in the form of runoff from livestock farming. This makes a highly variable contribution at different bathing waters, but can be significant. For instance, the previously alluded to study of two beaches in northwest England found that water draining from farms and farmland accounted for 55 percent of “pollution” at one beach [Walney] and 25 percent at the other [Morecambe] (Dunphy 2013, 5). In many ways, this pollution can be seen as an issue of farm management—a full discussion of which extends beyond the purposes of this chapter (but see, for instance, Winter et al. 2011). Instead, my interest is more in how animals have come to be made present in bathing waters in spite of their physical (or topographical) distance.

While the Bathing Water Directive itself does not require differentiation between human and animal sources, doing so is increasingly viewed as desirable for two reasons. The first reason such differentiation is considered desirable is that it is perceived as assisting managers in addressing the most serious threats to their “sufficient” water quality classification. The Scottish Environmental Protection Agency notes accordingly that “the recent implementation of the Revised Bathing Water Directive highlights the need for more accurate apportionment of the sources of faecal contamination. If we can identify the sources of potentially harmful bacteria then we can better target investment and remedial work” (2011, 6). Similarly, the Environment Agency notes that, “In order to manage faecal pollution in our bathing waters we need more information on the sources of pollution” (2008, iv). The second reason that the differentiation between sources of faecal bacteria is considered desirable is that management authorities can then highlight the potentially more significant impacts on human health from animal faeces, which “often contain high levels of bacteria (much higher than treated human waste)” (Natural Resources Wales 2014). However, as a

report from Scotland suggests, “It is very difficult to distinguish between human and animal sources of contamination” in marine waters (Baxter et al. 2011, 57).

A variety of approaches has been tested with the aim of identifying sources of faecal contamination, including assessment on the basis of known ratios of faecal coliform bacteria to faecal streptococci for different species, “chemical analysis for products related to human activity (i.e. caffeine and detergents etc.) or for compounds found in faeces such as stanols, sterols and immunoglobins” (Scottish Environmental Protection Agency 2011, 6). However, the approach currently favoured in the United Kingdom is microbial source tracking (MST). This form of tracking “uses DNA markers to identify sources of bacterial pollution to determine whether it is derived from sewage, agricultural diffuse pollution (including livestock) or other sources, such as birds or dogs” (DEFRA, quoted in Scarborough Borough Council 2012, 25).

The MST technique can highlight significant variability in the source of bacteria. One study in Scotland, for instance, found that whereas in one July day in 2008, 40 percent of faecal bacteria were derived from humans, with the remainder deriving from ruminant animals, on a day in the following month, 87 percent of faecal bacteria came from humans and only 13 percent from ruminants (Scottish Environmental Protection Agency 2011, 6). The report also comments that prohibitive costs had prevented the collection of a suitable number of samples, making it inappropriate to classify the water “with such a small amount of data” (Scottish Environmental Protection Agency 2011, 7). Nonetheless, the Environment Agency increasingly uses MST “to investigate sources of pollution at bathing waters which have failed to meet mandatory water quality standards” (quoted in Scarborough Borough Council 2012, 25).

While this technique remains in its infancy—at least in its practical application to bathing waters—its implications for the treatment of animals in relation to the revised

Bathing Water Directive are significant for three reasons. First, MST distinguishes between human and nonhuman sources of bacteria. This distinction changes fundamentally the nature of what is being managed, from a broad focus on bacterial concentrations to a system of categorization that enables the construction and targeting of particular groupings of bacteria-dispersers. Second, while too much uncertainty remains in this area at present, the technique is likely to distinguish more clearly in the future between different species of nonhuman animals. While this may be beneficial in targeting key sources of pollution and in moving beyond assumptions, the results may end up demonstrating that animals, once thought to make significant contributions, are insignificant in comparison to other sources. Equally, certain groups could become easy targets: the quick-fix, low-cost route to achieving what the Directive defines as "sufficient" water quality might be to ban dogs on beaches, cull seagulls, or prevent starlings from nesting on piers, although more significant (though potentially harder to eradicate) pollution originates from other sources. Third, animals here are known and managed not through material presence on or near a beach but through DNA and associated bacteria.

The new Directive, therefore, enrols animals as much (if not more) through their bacterial traces as it does through their bodily presence. In one sense, the Directive encourages managers to follow these dispersed animals' trails. In another sense, the actions of animals, embodied in these bacterial traces, themselves disperse the legislation, destabilizing "the territorial rubrics of containment associated with sovereign power" and challenging "regimes of spatial ordering" (Johnson, this volume), thereby extending bathing waters considerably beyond the confines of their legally designated boundaries. While the actions and movements of animals increase the spatial complexity of the Directive's implementation, managers' increasing ability to pinpoint sources of bacteria can lead to the construction of particular animals as polluters.

Fluid Ecologies

Until now I have focused specifically on nonhuman animals. In this final section I attend to the broader lively legalities implied by the Directive. Specifically, I am interested here in how the Directive deals with the fluid materialities it attempts to regulate and how, in turn, water disrupts and confuses the assessment of its own quality. My own work on water has increasingly highlighted its "messiness . . . in terms of both form and flow; it does not neatly conform to abstract models but moves in often unexpected ways with unpredictable consequences" (Bear and Bull 2011, 2262). Jones and Macdonald (2007, 535) similarly describe urban water management as an attempt to "script [the] continued performance" of water as it moves through cities. Elsewhere, I also showed how wind, currents, and the resultant movement of the seabed has led to considerable uncertainty and controversy around the impact of dredging on the sea floor (Bear 2013). In that particular case, the pointillist approach to management referred to earlier struggled to contain or stabilize the nonhuman actants involved—whether fish, water, sand, or dolphins.

Despite its different focus on flows of bacteria into water bodies, the revised Bathing Water Directive raises similar issues. The Directive's approach to monitoring is explicitly pointillist. Article 3.3 states, for example, that:

The monitoring point shall be the location within the bathing water where:

(a) most bathers are expected; or

(b) the greatest risk of pollution is expected, according to the bathing water profile.

In other words, water quality is only assessed at a single defined point within any designated site. In addition, the fact that only four samples (or one sample per month—whichever is greater) are required in any one bathing season means that assessments take little account of spatial and temporal differences within bathing water. The only exceptions are "abnormal

situations" (e.g., when there is a one-off event, such as a slurry spill, at which point additional samples should be taken).

Water, sunlight, and weather more broadly play important active roles here in determining the impact of bacteria. As DEFRA (2013, 2) notes, "during wet weather, combined sewer overflows operate more frequently; diffuse pollution increases from urban and agricultural sources; and, there is less sunlight to kill off bacteria in water." This combination of events intensifies the potential impact of bacteria. DEFRA's stress on the impact of sunlight considerably complicates any attribution of impact that might be apportioned to animals. This can be seen through more localized examples. Blackpool Council (2012, 11), for instance, comments on how "hotter, drier summers may be beneficial for bathing waters as bacteria in the water would be killed quicker due to the increased sunlight." Indeed, sunlight's role can be significant even on a single day. One microbiologist found that:

> during the bathing season all three of Morecambe's bathing waters failed the Bathing Water Quality Directive when sampled at 7am but passed at 7pm. The difference was attributed to the indicator bacteria surviving in the dark prior to the morning sample and being killed by UVB during daylight prior to the evening sampling. We proposed that all bathing waters throughout the European Union should be sampled in the early morning to allow for the worst case scenario (Jones 2008, 25).

While the focus in the previous examples was on sunlight, other commentators highlight an even greater complexity to the emergence of any quality reading. One environmental management agency comments, for instance, that "sources of bacteria . . . and their distribution relative to the beach, soil conditions, river flows, tidal state, wind speed and direction and solar irradiance could all influence bacteriological quality at the beach sampling location" (Scottish Environmental Protection Agency 2001, 1). Despite their importance, the

majority of these factors are rarely discussed in management and policy documents relating to the Directive. Nonetheless, the examples provided in this section demonstrate the contingency of the notion of quality as promoted by the revised Bathing Water Directive.

While animals are constructed as "polluters" on the basis of the bacteria they produce and disperse in their faeces, these bacteria in fact generate highly variable effects that depend not only on their concentrations but also on their subsequent dispersal (in stormy conditions they will disperse in the sea more rapidly, but in the same conditions the bacteria will reach the sea more easily) and their eradication (through sunlight). While approaches such as MST may seem to go some way toward apportioning impact definitively, the occasional nature of the sampling process has the potential to play down the frequent (even diurnal) changes brought about by the materiality of bathing waters. As a result, even employing MST does not work as a significant antidote to some of the more drastic blanket measures introduced in response to the new Directive.

Conclusion: Bacterial Legalities

This chapter has explored ways in which forms of nonhuman life—animals and bacteria—are made visible in the European Union's revised Bathing Water Directive and its implementation. Animals are ostensibly absent from this legislation, which focuses simply on acceptable levels of bacterial pollution and their monitoring and assessment, but the chapter has highlighted two central ways in which animals have nonetheless become visible through the Directive and its implementation.

First, certain animals (such as dogs and seagulls, but potentially encompassing any animal that releases faecal bacteria that reaches a bathing water) have been made visible through their classification as "polluters." This classification sits alongside and overlaps with other representations of the same animals—as species to protect, as nuisances that steal sandwiches, as cherished pets, as significant variables in a healthy ecology, or even as vital

subjectivities. The interplay of these multiple enactments extends beyond the confines of this chapter, but could potentially form the focus of future work around the everyday life of law. Here, the central interest has been in the animals' shift from background noise in the previous Directive to their more visible and even lively role in the implementation of the revisions.

The animals' more central role carries potentially significant implications for the creatures concerned. To return to Jane Bennett's (2005, 464) discussion of the politics of blame, the attribution of pollution to nonhuman life acknowledges "the distributive quality of agency"—as there is no *a priori* assumption that pollution relates to human activity. Indeed, the focus of the Directive on bacteria, and its flattening of distinctions between sources, allows the issue of blame to remain open to question. However, nonhuman life does not exist in abstraction from its environment, and the failure of emerging management strategies to engage holistically with the vital materialities of bathing waters—including the interplay of bacteria, sunlight, wind and currents—results in that the blame for pollution has been thus far directed to specific actants. Put simply, for coastal managers who have responsibilities relating to the tourist economy, it might often be more palatable to attempt to control the activities of birds rather than restricting humans' bathing activity in relation to sun, wind, temperature, and currents. This might be interpreted as "a strategic understatement of material agency" (ibid.), focusing on approaches that might have the economically least detrimental impacts yet which could prove detrimental to the lives of nonhuman others (through culling or restrictions on habitat, for instance).

Second, the chapter has shown how animals become visible in the Directive through their movement and dispersal of bacteria. In many ways, the Directive is pointillist and territorializing—bathing water profiles, for example, are built on water quality sampling at fixed locations and focus on designated bounded locations. However, as managers implement the legislation and attempt to reduce flows of faecal bacteria, they are increasingly drawn

away from the designated waters, following flows of bacteria to their topographically dispersed and distant sources. In this way, nonhuman life plays an active, if hidden, role in the Directive's implementation, as its unruliness enfolds distant sites and actants into regulatory frameworks.

The spatial extension of the law, which takes it away from the sites to which it was centrally directed, may be driven by the movements and actions of certain animals, but in turn relies on new ways of identifying—incriminating even—those animals. The monitoring of faecal bacteria in bathing waters, therefore, increasingly extends beyond mere levels of concentration and is moving towards the attribution of source to particular species. While animals and their bacteria extend the spatial reach of the law, those implementing the Directive, in other words, search for new ways to render the bacteria (and, as a corollary, the actants who carry and disperse those bacteria) manageable and governable.

The chapter has also hinted at the disruptive—perhaps even transgressive—forces of water, wind and sun. Future research could usefully extend this theme to consider, for instance, how management measures that attempt to restrict the activities of birds may be disrupted by the same creatures, or how bacteria might defy definitive assessment of their origin. Doing so might extend the interpretations of nonhuman resistance, as put forward by Gillespie in this volume. In Gillespie's case, resistance involved cows running away or kicking humans who attempted to control them and confine them, forming "an active form of resistance" (Coppin 2003). Because their control often takes place at a distance and through preventative measures, more "passive" forms of resistance might, therefore, be significant, as birds find alternative nesting sites and bacteria travel along unexpected routes.

Law thus extends beyond the written Directive; its everyday, multiple, and, most importantly, lively implementations allow it to emerge differently in different spatial settings. Such lively legalities render animals both visible and meaningful in new ways, while the

animals themselves simultaneously co-author law's implementation through their everyday activities. It is therefore important that the emergent literature on lively legalities does not limit itself to studying explicitly animal-focused legislation. It should instead seek to explore the unintended or unexpected implications and manifestations of regulatory forms for nonhuman others.

Acknowledgements

I am grateful to Irus Braverman for her careful and insightful editing, and to participants at the *More-than-human Legalities* workshop for their helpful comments on an earlier version of this chapter.

Notes

1 There are three forms of binding legal act at the level of the European Union. Regulations are applied "in [their] entirety across the EU," while Decisions are addressed to specific parties (such as a country or a company). In contrast, Directives set binding goals that must be met by all EU Member States, but members have discretion over how to meet these goals (see European Union 2014).

Works Cited

Aberdeenshire Council. 2015. *Survivor's Guide to Living with Urban Gulls*. Aberdeen: Aberdeenshire Council.

Baxter, John M., Ian L. Boyd, Martin Cox, *et al*.. eds. 2011. *Scotland's Marine Atlas: Information for the National Marine Plan*. Edinburgh: Marine Scotland.

Bear, Christopher. 2013. "Assembling the Sea: Materiality, Movement and Regulatory Practices in the Cardigan Bay Scallop Fishery." *Cultural Geographies* 20: 21-41.

Bear, Christopher and Jacob Bull. 2011. "Water Matters: Agency, Flows, and Frictions." *Environment and Planning A* 43: 2261-2266.

Bennett, Jane. 2005. "The Agency of Assemblages and the North American Blackout." *Public Culture* 17: 445-465.

Benson, David and Andrew Jordan. 2014. "3. Subsidiarity as a 'Scaling Device' in Environmental Governance: The Case of the European Union." In *Multilevel Environmental Governance: Managing Water and Climate Change in Europe and North America*. Edited by Inger Weibust and James Meadowcroft, 39-57. Cheltenham, UK: Edward Elgar Publishing Ltd.

Blackpool Council. 2012. *Bathing Water Quality Scrutiny Review Final Report.* Blackpool: Blackpool Council.

Braverman, Irus. 2015. "More-Than-Human Legalities: Advocating an "Animal Turn" in Law and Society." In *The Handbook of Law and Society*, edited by Austin Sarat and Patrcia Ewick, 307-321. West Sussex, UK: John Wiley & Sons.

Buller, Henry. 2014. "Animal Geographies I." *Progress in Human Geography* 38: 308-318.

Commission of the European Communities. 2000. *Communication from the Commission to the European Parliament and the Council: Developing a New Bathing Water Policy.* Brussels: Commission of the European Communities.

Coppin, Dawn. 2003. "Foucauldian Hog Futures." *The Sociological Quarterly* 44: 597-616.

DEFRA. 2008. "Bathing Water Directive: History of the Revision Process." http://archive.defra.gov.uk/environment/quality/water/waterquality/bathing/history.htm.

DEFRA. 2010. *Guidance for Bathing Water Controllers in England: Provision of Information to the Public* London: DEFRA.

DEFRA. 2012. "Bathing Waters and the Bathing Water Directive." http://archive.defra.gov.uk/environment/quality/water/waterquality/bathing/.

DEFRA. 2013. "Statistics on Coastal Bathing Waters—a Five Year Summary of Compliance with Mandatory and UK Guidelines." https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255063/bathing-water-release-2013.pdf.

DEFRA. 2014. "Press Release: Bathing Water Testing Begins in the South West." http://www.government-world.com/press-release-bathing-water-testing-begins-in-the-south-west/.

Delaney, David. 2015. "Legal Geography I: Constitutivities, Complexities, and Contingencies." *Progress in Human Geography* 39 (1): 96-102.

Doel, Marcus. 1999. *Poststructuralist Geographies: The Diabolical Art of Spatial Science*: Lanham, MD: Rowman & Littlefield.

Dunphy, Rob. 2013. *Morecambe Bay Bathing Water Study*. Morecambe: Love My Beach.

Environment Agency. 2008. *Microbial Source-Tracking Project*. Bristol: Environment Agency.

-----. No date. "Fact Sheet: All You Need to Know About the Revised Bathing Water Directive." http://lovemybeach.org/download/1877/.

European Environment Agency. 2014a. *European Bathing Water Quality in 2013*. Luxembourg: European Environment Agency.

-----. 2014b. "Percentage of Coastal Bathing Waters in the European Union Per Compliance Category." http://www.eea.europa.eu/data-and-maps/daviz/percentage-of-coastal-bathing-waters#tab-chart_1.

European Union. 2014. "Regulations, Directives and Other Acts." http://europa.eu/eu-law/decision-making/legal-acts/index_en.htm.

Ginn, Franklin. 2014. "Sticky Lives: Slugs, Detachment and More-Than-Human Ethics in the Garden." *Transactions of the Institute of British Geographers* 39: 532-544.

Greenhough, Beth. 2012. "Where Species Meet and Mingle: Endemic Human-Virus Relations, Embodied Communication and More-Than-Human Agency at the Common Cold Unit 1946-1990." *Cultural Geographies* 19: 281-301.

Henley, Jon. 2013. "England's Polluted Beaches: Stop This Tide of Filth." *Guardian* 7 July 2013.

Hinchliffe, Steve, Matthew Kearnes, Monica Degen, and Sarah Whatmore. 2005. "Urban Wild Things: A Cosmopolitical Experiment." *Environment and Planning D-Society & Space* 23: 643-658.

Johnson, Jessica. 2014. "Love My Beach." *Coast* 98-101.

Jones, Keith. 2008. "Bathing Water Microbiology: Past, Present and Future." *Health Protection Matters* 12: 22-25.

Jones, Phil, and Neil Macdonald. 2007. "Making Space for Unruly Water: Sustainable Drainage Systems and the Disciplining of Surface Runoff." *Geoforum* 38: 534-544.

Kinver, Mark. 2013. "UK Dips Its Toes into Revised Bathing Water Directive." 6 July. http://www.bbc.co.uk/news/science-environment-23183751.

Lorimer, Jamie. 2010. "Elephants as Companion Species: The Lively Biogeographies of Asian Elephant Conservation in Sri Lanka." *Transactions of the Institute of British Geographers* 35: 491-506.

LOVEmyBEACH. No date. "The Challenge." http://lovemybeach.org/the-challenge/.

Margulis, Lynn, and Dorion Sagan. 1986. *Microcosmos: Four Billion Years of Evolution from our Microbial Ancestors*. Los Angeles: University of California.

Marine Conservation Society. 2014. "Good Beach Guide." http://www.goodbeachguide.co.uk/.

Natural Resources Wales. 2014. "Bathing Water Quality." http://naturalresourceswales.gov.uk/marine/bathing-water-quality/?lang=en.

Scarborough Borough Council. 2012. "FOIA2021 Response." http://www.scarborough.gov.uk/pdf/FOIA2021%20redacted%20response.pdf.

Scottish Environmental Protection Agency. 2001. *A Study of Bathing Waters Compliance with EC Directive 76/160/EEC: The Relationship between Exceedence of Standards and Antecedent Rainfall.* Stirling: SEPA.

-----. 2011. *Phase One Characterisation Report for the River Ayr Priority Catchment (Part 7: Faecal Contamination).* Stirling: SEPA.

-----. 2014. "River Basin Planning." http://www.sepa.org.uk/water/river_basin_planning.aspx.

Surfers Against Sewage. 2014. "Water Quality - an Environmental Issue." http://www.sas.org.uk/issues/water-quality/.

UK Parliament. 2008. *Explanatory Memorandum to the Bathing Water Regulations 2008* London: HMSO.

-----. 2011. *Seagulls (Coastal Towns)* London: HMSO.

Winter, Michael, David Oliver, Rob Fish, A. Louise Heathwaite, David Chadwick, and Chris Hodgson. 2011. "Catchments, Sub-Catchments and Private Spaces: Scale and Process in Managing Microbial Pollution from Source to Sea." *Environmental Science & Policy* 14: 315-326.