

Environmental crime prosecutions in Ireland, 2004–2014

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Abstract

Despite increased interest in environmental crime and green criminology, few studies address the use of criminal penalties in response to environmental crimes. A handful of published examples employ data from the United States or the Flanders court system, and little is known about how other nations punish environmental violations. Addressing this issue, the current study examined the use of criminal environmental penalties in Ireland from 2004 to 2014. Few criminal environmental cases (N = 147) and few environmental offenders (N = 154) were represented in these data over time. Consistent with the expectations of green/environmental crime researchers, mean penalties for environmental violations, which in Ireland only include fines and investigative cost recovery penalties, were rather small. Unlike in the US or Flanders, the majority of offenders were corporate offenders as opposed to individuals. Contextual factors related to Ireland's economy, history and use of criminal sanctions should be used to interpret these factors, and prevent generalising from these data.

Key Words

environmental crimes; environmental enforcement; environmental punishment; environmental social control; green criminology; Ireland

Introduction

Little is known about the use of criminal environmental sanctions in general, but in particular with respect to their use across nations and within different national contexts. To address that observation, the current study examines criminal environmental prosecution outcomes in Ireland from 2004 through 2014. We examine the number of convictions over time, the mean number of criminal environmental convictions per year, components of criminal environmental punishments handed out by judges in Ireland's courts, the distribution of types of offences and offenders, and how often multiple offenders appear in these data. These data are employed to assess the scope of environmental punishments, and the kinds of penalties environmental offenders receive in Ireland.

Only a handful of extant studies examine the distribution of environmental crime prosecutions or environmental crime charges over time. Many employ US data (Cohen, 1988, 1992; Brickley 2001; O'Hear, 2004; Pena-Sanchez, 2010; Crow, Shelley, & Stretesky, 2013; Ozymy & Jarrell, 2015; Lynch, 2017; Lynch, Barrett, Stretesky, & Long, 2017), with fewer studies available for European nations (Earnhart, 1997; Rousseau, 2009; Almer & Goeschl, 2010; Billiet, Blondiau, & Rousseau, 2014; Billiet & Rousseau, 2014; Blondiau, Billiet, & Rousseau, 2015). For most nations, little is known about the use of criminal prosecutions and penalties in relation to the enforcement of environmental regulations, and consequently how widespread criminal enforcement efforts are in different national contexts. Generally, social scientists who examine environmental crimes argue that the punishment of environmental offences is lax and/or that criminal punishments for environmental crimes are underutilised (e.g., Bullard & Johnson, 2000), and it is assumed that this observation is true across nations. However, cross-national studies examining the use of criminal prosecutions for environmental offences have not been widely researched, and broad empirical support for these contentions is therefore lacking.

Our examination of criminal prosecutions in Ireland from 2004 to 2014 contributes to the warehouse of knowledge concerning formal social control responses to environmental or green crimes. Despite the expansion of the green criminological literature in recent years, there remains a paucity of studies of environmental social control, particularly those that employ empirical data (Lynch et al., 2017; Lynch & Pires, 2019). Several green criminological studies of environmental social control employ qualitative data (Ruggiero & South, 2010, 2013; van Solinge, 2010; Eliason, 2013; Walters, Westerhuis, & Wyatt, 2013; Opsal & Shelley, 2014). Such studies are important ways of illustrating the varieties of green crimes that occur within and across societies, the harms they produce, and reasons that those behaviours ought to be treated/labelled as crimes and controlled. In that literature, however, broader knowledge of environmental social control has been limited by a paucity of empirical studies.

As noted, researchers suggest that state governments devote “little attention” to the punishment of environmental offenders, but that this proposition lacks strong empirical support. A significant portion of empirical studies on environmental social control address the ability of environmental punishments to control/deter environmental crime (e.g., Harrington, 1988; Thornton, Gunningham, & Kagan, 2005; Stretesky & Lynch, 2009; Gray & Shimshack, 2011; Lynch, Barrett, Stretesky, & Long, 2016), or argue that those forms of punishment acts as a message concerning social disapproval of behaviours that promote ecological destruction (Karpoff, Lott, & Wehrly, 2005). Those studies, however, fail to address the volume of environmental social control within societies.

To place our discussion of environmental prosecutions in Ireland in context, we begin with an overview of the economy of Ireland. Here, we also refer to the ecological footprint of Ireland as a potential rationale for controlling environmental harms, the extent of pollution in

Ireland, and briefly review the scope of environmental crime regulations there as context for interpreting these data.

Background: the economy and environment of Ireland

In order to interpret the data presented below, it is important to consider contextual factors that potentially shape the use of criminal enforcement for environmental offences in Ireland. Some of that context is found in the construction of specific laws, and some of those laws are influenced by Ireland's membership in the Europe Union. Thus, part of the environmental enforcement outcome effect in Ireland is related to the nature of EU environmental laws. While those laws are important to keep in mind, it is beyond the scope of the present study to address how international laws affect the punishment of environmental offenders in Ireland. To be sure, EU directives may cause nations to focus attention on particular environmental issues. However, to know whether that is true with respect to outcomes, time series data would be required to examine the effect of any specific EU environmental policy on enforcement across nations. Such an analysis is beyond the scope of the present study.

Given the above, here, we draw attention to contextual factors associated with the Irish economy and the kinds of environmental and ecosystem problems Irish Environmental Protection Agency (I-EPA) has identified as existing in Ireland as factors that shape environmental enforcement. In doing so, we are drawing on observations in a variety of research literatures which direct attention to the association between economic development and expansion, and conditions of environmental degradation (Daly, 1996; Foster, 1992; Jorgenson, 2006; Jorgenson, Clark, & Kentor, 2010; Jorgenson & Clark, 2011; Meadows, Randers, & Meadows, 2004; O'Connor, 1988; Odum, 1973). Significant quantities of pollution are associated with economic production, and thus the nature of a society's economy can shape the kinds of pollution it experiences and needs to control. The nature of

ecosystems and the kinds of environmental problems experienced within a nation also shapes the nature of environmental law and its enforcement, which will tend to address the most pressing environmental issues within a nation. To address these observations, the section below examines some attributes of the Irish economy.

The Irish economy grew rapidly from 1984 to 2007, and then slowed dramatically during the global recession. In value added terms, the Irish economy is primarily service oriented (72%), with 25% (99.6 billion, US in 2016) from manufacturing (Byrne & McQuinn, 2014). As a comparison, in the US, World Bank data indicates the service sector produced 78% and the manufacturing sector 12.5% (2.2 trillion) of value added. Thus, while in the US, the percentage of value added by manufacturing is much smaller, gross value added is more than 22 times higher in the US than in Ireland.

It is well-known that manufacturing is a significant source of pollution, and the size of firms in the manufacturing sector may also impact the volume of pollution and the likelihood of environmental violations. There are approximately 13,000 manufacturers in Ireland, and most (83%) are small, with 10 or fewer employees (Byrne & McQuinn, 2014). According to the Manufacturing Institute, there are 295,643 firms in the US (22 times higher), with 52% employing less than 10 workers. About 42% of manufacturing in Ireland is in the chemical and pharmaceutical industries (Irish Academy of Engineers, 2013), with an additional 14% in computer/electronic/machinery manufacturing, which constitute economic sectors with high pollution risks. As these data indicate, there is a large-scale difference between the Irish and US economies, with both fewer and smaller firms in Ireland. As a result, it is expected that the extent of pollution would be smaller, and the opportunity for such crime would be diminished, likely producing fewer environmental crimes and perhaps less need for criminal sanctions to control environmental crime in Ireland compared to the US.

Mining can also be a significant source of pollution, and numerous studies detail the extent of environmental harms associated with mining. Ireland has a large mining industry, and is a leading global producer of zinc (1st) and lead (2nd) among EU nations (Minister for Communications, Energy and Natural Resources, 2015b, p. 10). Mining expanded in Ireland from 2005 through 2015, when 1,031 prospecting licences were granted (Minister for Communications, Energy and Natural Resources, 2015a). Ireland also produces gypsum, brick-shale, and crushed rock, sand and gravel, all of which are environmentally destructive activities. There are about 400 of the later kinds of mining sites in Ireland. In addition, Ireland has 65 active petroleum exploration/lease licences (Ministry for Communications, Energy and Natural Resources, 2015a, p. 9), and is exploring creation of unconventional gas exploration and extraction (Ministry for Communications, Energy and Natural Resource, 2015b, p. 29–30).

Pollution has also been related to consumption levels within nations, which can be measured by referring to the ecological footprint (Jorgenson & Clark, 2011). Ecologically, Ireland has a rather substantial footprint (<http://www.footprintnetwork.org/en/index.php/GFN/page/trends/ireland/>). A nation's ecological footprint consists of a ratio between its biocapacity availability and consumption patterns. An ecological footprint is defined as sustainable when it is 1.0 or less, or when consumption is less than national biocapacity. Biocapacity of Ireland has decreased rather continuously since 1961, from about 5.1 ha/per capita in 1961 to about 3.8 ha/capita in 2011. At the same time, the ecological footprint of Ireland has increased from about 3.2 ha per capita in 1961, to 4.6 ha per person in 2011. Until about 1975, Ireland had a biocapacity surplus, and its ecological footprint began to increase around 1986 with rapid growth of the Irish economy. Rapid acceleration in the ecological footprint converged with a decline in biocapacity. Reference to ecological footprints is useful for understanding the extent of

ecological disorganisation within nations, and have been widely employed in empirical studies (Jorgenson, 2006; Jorgenson & Clark, 2011), as well as in discussions of defining green crime (Lynch, Long, Barrett, & Stretesky, 2013; Stretesky, Long and Lynch 2013a). We will return to this issue in the discussion section.

Ireland has specific pollution problems which, over time, have led to the creation of important environmental protection legislation. It is beyond the scope of this article to review the full scope of those laws (see footnote 1 for example).¹ I-EPA has posted several reviews of the state of the environment on its website. It notes that air quality in Ireland compares favourably to air quality in other European nations, but that “about 1,200 deaths in Ireland in 2012 were directly linked to air pollution . . .” (<http://www.epa.ie/irelandsenvironment/air/>). Of particular concern are particle matter, ozone and nitrogen dioxide pollution. On most pollution measures (sulphur dioxide, nitrogen dioxide, carbon monoxide, Ozone, particulate matter [PM₁₀ and PM_{2.5}], heavy metals, benzene and polycyclic aromatic hydrocarbons), levels in Ireland are below “target values as set out in the Clean Air for Europe (CAFE) Directive, and 4th Daughter Directive” (<http://www.epa.ie/irelandsenvironment/air/>). Thus, one can conclude that there are few air pollution problems environmental law enforcement officials must address.

I-EPA notes that two-third of Ireland’s ecosystem consists of agricultural and forestry lands, which is primarily grasslands. The second largest part of the ecosystem (1/5th) is composed of peatland and wetlands. In recent years, there has been an increase in forested land and a decrease in agricultural and peatlands. This has led to increased concern with providing environmental protection for peatlands and for soil protection projects.

Ireland has a large waterway system, consisting of coastal, transitional and inland waters. Ireland has, for example, 37 rivers, which together flow over 3,731 km (2,318 miles), and contains 68,573 km² (24,476 miles²) of river basin. Those river basins comprise 81.2% of

the total land area in Ireland. The country also contains 1,448 km of coastline. Generally, water resources in Ireland are classified as “good” by I-EPA, with only 1.5% of assessed groundwater sources being classified as poor (for I-EPA water quality reports see, <http://www.epa.ie/pubs/reports/water/waterqua/>). There is concern with nitrogen levels in waterways in the south and southeast of Ireland. I-EPA’s ecological assessment of 2,800 river sites found that 53% ranked as “high” or “good” (https://www.epa.ie/media/WQR_rivers_and_canals.pdf), while 43% of lakes are classified as being in “high” or “good” attainment status. There are more significant concerns with coastal and transitional waterways, where only one-third of assessed transitional waterbodies obtaining a high or good rating. In contrast, 93% of coastal waterways were rated as high or good quality. These data indicate a combination of low pollution levels and high compliance with water pollution laws.

As I-EPA notes, industry is the largest producer of hazardous waste, and efforts have been made to constrain the production of hazardous waste. I-EPA notes a decline of 6% in industrial hazardous waste in recent years, but it is unclear whether that reduction is the result of environmental policies and industrial recycling or declines in Ireland’s industrial economic activity.

Ireland’s Environmental Protection Agency and Office of Environmental Enforcement

The data employed in this study relate to the enforcement responsibilities of the I-EPA which are conducted through the Office of Environmental Enforcement (OEE). The following information, drawn from I-EPA materials describe its duties.

The general duties of I-EPA are to issue and enforce licences for waste production and disposal, and enforce environmental regulation that apply to industrial production and “other activities” that affect the environment. In Ireland, environmental regulation is also decentralised, requiring local authorities to surveil compliance with environmental

regulations. I-EPA provides guidance to local authorities to enhance environmental audits, and on the enforcement of environmental regulations.

Of particular concern to I-EPA is enforcement of “high environmental risk activities,” and behaviours that produce a “significant level of environmental complaints.” Beginning in 2007, IEPA responsibilities for enforcing regulations related to protection of the public water were expanded. It is only recently (the past 10 years) that I-EPA has begun to address integration of its licensing and enforcement activities.

With respect to licensing, OEE audits and inspects licenced sites, but this activity does not appear to be extensive. These activities relate to 23 environmental laws enacted since 1996 ([http:// www.epa.ie/pubs/legislation/waste/licpermit/](http://www.epa.ie/pubs/legislation/waste/licpermit/)), which include efforts to address European Union environmental directives. I-EPA notes that in 2007 (the last I-EPA summary), they: (1) conducted 131 environmental audits; (2) completed 900 inspections of licenced facilities; and (3) monitored 1,097 water, air, and noise emission situations. Above, we noted that there are about 13,000 manufacturing facilities in Ireland. These are not the only facilities licenced and regulated by IEPA, and facilities also include some kinds of agricultural facilities, waste disposal sites, waste transfer sites, composting sites, and sea dumping sites, and include locally licenced sites (e.g., IEPA estimates there are 4,500 waste collection and waste site licences, I-EPA, 2015). Relative to the number of facilities, it is clear there are few environmental audits, monitored events/activities and inspections. I-EPA (2015) provides some details on these issues for waste enforcement. For the 159 registered waste sites, there were 275 inspections, 31 prosecutions, but only six (6) fines totalling 86,055 Euros in 2013. According to I-EPA (2015, p. 17), prosecutions of licenced facilities are rare: only 78 (15.6/year) prosecutions of various types (I-EPA does not detail whether the prosecutions were criminal, civil or administrative) were completed during the 5-year period from 2009 to 2013. I-EPA notes that it has numerous enforcement options to prevent and

remedy pollution, and most are non-criminal. For example, in 2007, I-EPA brought a total of 15 cases, and only two of these were submitted for criminal prosecution. Much of the I-EPA's activities occur through less formal means, such as the Environmental Enforcement Network, which primarily engages in facilitating enforcement through national and regional planning, and compliance workshops, seminars, and conferences.

In sum, I-EPA indicates a preference for: (1) preventing pollution; (2) use of training/workshops to enhance environmental compliance; and (3) an emphasis on informal environmental social control. As a result, there tend to be few prosecutions (civil, administrative or criminal), and a very small number of criminal cases.

In the data sections below, this tendency towards the limited use of environmental prosecutions is illustrated by analysing trends in I-EPA enforcement activities for the period 2004–2014. Before turning to those data, some theoretical issues related to environmental/green crime and enforcement are discussed.

Theoretical background

Increased interest in environmental or green crimes within criminology has stimulated the rapid growth of green criminology. Green criminologists have devoted significant attention to defining the concept of green crime and providing examples of these crimes (e.g., South, 1998; Beirne, 1999, 2014; Lynch & Stretesky, 2003; Ruggiero & South, 2010, 2013; Higgins, Short, & South, 2013). Important to the context of green crime in Ireland are green criminological/sociological theories relating political economic theory to ecological disorganisation and destruction (Lynch et al., 2013; Stretesky et al., 2013a). Those approaches argue that green crimes as well as the social control of green crimes are influenced by the political economic organisation of society. Relevant literature, for example, illustrates that processes such as ecological unequal exchanges—or the global structure of unequal economic and ecological exchanges between developed and developing nations in

the global world economy (Jorgenson, 2006)—and the inherent tendency of capitalism to disorganise (destroy) nature (Schnaiberg, 1980; O’Connor, 1988; Foster, 1992, 1999), have significant effects on the production of environmental harms/pollution.

Here, there is also a need to describe how these perspectives relate to the creation and enforcement of environmental regulations. Political economic theory suggests the expectation of a bias in the creation and enforcement of environmental laws and regulations, an argument that has been illustrated in various relevant literatures. That bias limits the extent of environmental law, decreases enforcement and punishment, and produces lax punishment. For example, Yeager’s (1987) analysis of structural biases in the enforcement of water pollution laws by the US EPA demonstrated that enforcement activities tend to favour larger firms over small firms, and, he states “disproportionately burdens” small firms. Other studies suggest that these kinds of effects, which impact both environmental harms and the enforcement of environmental regulations, stems from structural profit-making forces that affect firms and enforcement agencies in more general terms. Stretesky, Lynch, Long, and Barrett (2017) illustrate this outcome, demonstrating that changes in the polluting behaviour of corporations is influenced by the trend in US gross domestic product rather than through the deterrent effects of US Environmental Protection Agency (US EPA) behaviours, including its efforts to enhance the control of corporate pollution through the use of self-policing strategies (see also Stretesky & Lynch, 2009). That outcome is also consistent with Stretesky, Long and Lynch’s (2013b) examination of whether large environmental fines meted out by US EPA slow the generation of pollution by corporations. Employing the political economic approach associated with treadmill of production explanations, they argue that fines are an inefficient mechanism for slowing the growth of pollution or altering its trend because those fines, even when large, do not affect the behaviour of firms, which are guided by larger structural forces such as the pursuit of profit and the technical organisation

(i.e., types of technology, such as chemical and fossil fuel base production techniques) of production. Consistent with that view, they found that large fines had little impact on firm's polluting behaviour. In a related study, Long et al (2012), also drawing on treadmill theory, demonstrate this political economic effect, finding that firms in the coal industry increased political donations just prior to the conclusion of environmental enforcement events. This appears to be an example of corporations using their economic assets to influence the application of environmental law.

These studies have relevance to the current study. Based on observations above concerning the scope of the Irish economy and its composition, and the kinds of environmental laws that exist, one could argue the following. Ireland's economy is largely service-based, and its industrial sector consists of relatively small firms. It also appears to have a relatively minor pollution problem. Thus, one would expect fewer opportunities for environmental crimes, and given minor pollution problems, less reliance on formal enforcement of environmental regulations compared to, for example, the US. We cannot, however, predict how much environmental enforcement might be curtailed in Ireland from these few facts. Some additional issues that may be related to environmental social control in Ireland are examined in the discussion section.

Data

The data for this study were collected from I-EPA, Prosecutions Website (<http://www.epa.ie/enforcement/prosecute/#.Vj0sbL9HOVf>; last accessed December, 2017). The data for the study period included all 11 years of data (2004–2014) available when these data were collected, and included 147 criminal prosecutions. In four of those prosecutions, additional charges were brought against connected individuals and corporate entities, raising the number of criminal punishment meted out during this time period to 154². These data are official data and only represent prosecuted cases where a conviction or guilty plea are also

present. The I-EPA does not make the data on charges independent of convictions/pleas publically available.

According to I-EPA's OEE, its official enforcement policy is as follows (<https://www.epa.ie/pubs/reports/enforcement/OEE%20Policy.pdf>):

The OEE puts the environment first and encourages individuals and businesses to integrate good environmental practices into normal working methods.

We seek to prevent environmental pollution before it has a chance to occur. The OEE provides information and advice via published guidance to those it regulates, to secure environmental improvements while ensuring value for money. The OEE also works with local authorities and other regulators to ensure efficient use of resources and coherent enforcement of environmental law. Where appropriate, it co-operates with local authorities and other public bodies, voluntary groups and non-governmental organisations in order to achieve common goals.

In the above, OEE stresses prevention rather than punishment. OEE suggests, however, that the criminal enforcement of environmental laws should enhance environmental law compliance and ensure that "polluters pay" for their illegal behaviours. As part of its mission, I-EPA also encourage transparency, including, for example, making criminal enforcement prosecution data publically available.

Data overview/summary

To begin, we would like to point out that due to limitations of these data, multivariate analysis of the data is ill-advised. The small number of cases is distributed over an 11-year period, and within that time period, across counties, courts and judges, and by charge type. Charge types are quite diverse in the original data, and we re-coded charges into 27 categories. Thus, given this widedispersion in the data, there are not enough cases to provide sufficient power for multivariate analysis.

Criminal prosecution data were collected from all 147 criminal enforcement cases during the period of study, and as noted, resulted in 154 criminal penalties being meted out during the study period. The number of penalties per year ranged from 8 to 19 with a mean of 14 penalties per year. Above, we noted that there are an estimated 13,000 industrial firms in Ireland. These are not the only entities regulated by Ireland's environmental regulations, so the universe of potential firms/ entities regulated is likely larger and includes waste handlers and transporters, municipalities, and farms. Relative to the number of regulated facilities, the annual number of criminal environmental convictions appears quite small. For example, if we estimate the environmental prosecution rate relative to the minimum, maximum and mean number of prosecutions during this time period, those rates are, respectively, 61.5/100,000 firms, 146.2/100,000, and 107.7/100,000. In contrast, in 2014, the number of known street crimes in Ireland is equivalent to a crime rate of 4,890/100,000 population, or 45.5 times larger than the known rate of environmental offending. There is little reason to believe that corporations are significantly more law abiding than individual citizens, suggesting that differences in these known rates of offending could be a product of how different laws are enforced in Ireland.

The distribution of penalties by year is displayed in Table 1. Charges were brought against three groups of offenders: corporations, government entities (e.g., towns and cities) and individuals. Individuals were not identified by name in the data. There was limited description of individuals in the data, referring to the offences involving a charge against: (1) a "pig farmer" (N = 9); and (2) "a poultry farmer" (N = 3). In five additional cases against corporations, unnamed individuals were also punished, bringing the total of individual punishments to 17 (11% of punishments). City Councils were prosecuted for environmental violations in 19 cases (12.3%). The remaining 118 penalties (76.6%) involved what were, as far as we could determine, incorporated entities.

Given the limited number of studies on the use of criminal environmental penalties in different nations, it is difficult to determine how unique Ireland's use of criminal penalties for environmental violations is in a comparative perspective. Because of the limitations of available studies on this subject, the comparisons made here should be interpreted with caution. Most of the available information comes from studies performed in the US, and as a result, despite differences between Ireland and the US, comparisons to US research results are often the only comparative examples that can be made.

TABLE 1 ABOUT HERE

To begin, the distribution of punishments and offenders in Ireland is quite different than the distribution of criminal cases in the US. US EPA data indicate that individuals are much more likely to be prosecuted than corporations. For example, among 568 criminal convictions/plead cases across 18 federal environmental laws from 2000 to 2013, 413 individuals (72.7%) and 154 corporations were penalised (Lynch, 2017). Moreover and also in contrast with the data from Ireland, Billiet et al. (2014) note that 80% of environmental cases in Flanders were filed against individuals. Thus, the focus of environmental enforcement in Ireland appear to be quite different than in other nations where such information is available.

Charges prosecuted

A wide variety of charges were brought during the period of examination, and charges referred to a wide range of statutes and sub-statutes. To facilitate analysis of charges, we re-coded case charges into 27 categories representative of similar environmental violations³. Across all cases, there were 341 charges brought (see Table 2). The number of charges per case varied from 1 through 12. Number of charges per defendant were distributed as follows: one charge, 29.9% of cases (N = 46); two charges 20.8%; 3 charges in 23.4% (N = 36); and 4 or more charges, 26%. The mean number of charges per penalty case was 2.21 (see Table 2).

In cases where there was only one charge, 12 different kinds of charges were brought. The most frequent were for operating a piggery or poultry farm without a permit (N = 9) and “general permit violations” (N = 16; the nature of general permit violations are not described in the I-EPA data). Across all charges, the most frequent violations involved “a general permit violation” (N = 101), water permit violations (N = 41) and charges for failure to contain pollution to the facility (N = 42).

Punishment of environmental offences

In all cases, the punishment of an environmental offender was limited to the use of fines and/or IEPA cost recovery charges. There was no indication of the use of incarceration of any type in the time period examined. We cross-checked this finding with news-services, and were unable to locate any news stories concerning the imprisonment of an environmental offender in Ireland. Under some environmental statutes in Ireland, it is possible for Higher Courts to punish directors or managers of corporations with prison terms of up to 10 years for significant environmental violations. Thus, the absence of any prison sentences in these data suggest that the responsible courts did not view the violation as sufficient enough for a prison term. In addition, there was no indication of the use of probationary terms or other punishments. These outcomes are quite different from those found using data from the US or comparable data from Flanders (Billiet et al., 2014). Billiet, Blondeau and Rousseau report nearly 10% of cases included a prison sentence; for the US, O’Hear (2004) reports a mean of 36% imprisonment for these cases (1996–2001), while Lynch (2017) reports variation in imprisonment between 22% to 56% from 2003 to 2013 across US EPA regions.

TABLE 2 ABOUT HERE

There was a fine associated with each prosecutorial outcome, and fines ranged from 10 to 350,000 Euros (€). Total fines during the period examined amounted to 989,569 €, with a mean fine of 6,425.77 €. Few fines (N = 19) were in excess of the mean. Two very large

fines skewed the mean, and after excluding those cases, mean fines in the remaining cases was significantly lower, 3,484 €. Excluding the five largest fines, the mean declines further to about 2,883 €. This finding is similar to those for the US, where large fines increase calculation of mean fines dramatically (Lynch, 2017). The total fine amounts from the five largest cases (total = 560,000 €, mean, 112,000 €) comprised a large proportion (56.6%) of all fines meted out during this period. This result is consistent with the general observation that large fines for environmental crime are rare and make up a large percentage of the total punishments meted out to environmental offenders (Lynch, 2017). Table 3 displays the distribution of fines.

For cases involving corporations alone, the mean fine was 6,965.96 € with a maximum fine of 350,000 €. In contrast, the mean fine for individuals was 1,420 €, with a maximum fine of 7,200 €. In a related study using criminal environmental crime data from Flanders, Billiet, Blondiau and Rousseau noted that the mean corporate fine (excluding appealed cases) was 14,569 € or slightly more than twice the mean fine for corporations convicted of environmental crime in Ireland. They note that the mean fine for individuals (excluding cases on appeal) was 3,787 €, which is 2.67 times the mean fine meted out to individuals in Ireland for environmental crime cases. In contrast, in the US, mean fine amounts for individuals and corporations are substantially higher compared to Ireland—about 123 times higher for individuals, and 215 times higher for corporations (Lynch, 2017). In Ireland, however, offenders are also often assessed recovery costs, adding to their financial penalty.

Irish environmental laws allows judges to award the I-EPA cost recovery for investigating a case, and such awards occurred in 147 of the 154 cases. Recovery cost data was missing for three cases. Among the remaining cases, the mean recovery costs were 8,638.77 €. In four cases, EPA recovery costs were quite high totalling 172,000 €, and

excluding those cases lowered the mean recovery costs for the remaining 140 cases to 7,704 €. Recovery cost judgements were significantly different across individuals and corporations. For Individuals, the mean recovery cost was 3,519.53 €, which was nearly 2.5 times greater than the mean fine meted out to individuals. The maximum recovery cost judgement against an individual was 10,283 €. For corporations, the mean recovery cost judgement was 9,203.39 €, which was 1.3 times the mean fine levied against corporations. Mean recovery costs for corporations were 2.6 times larger than for individuals. The largest recovery cost judgement against a corporation was 100,000 €, or 9.7 times the largest recovery cost against an individual. The recovery cost data indicate that a significant portion of the total fine (fine plus recovery costs) meted out by environmental courts in Ireland consist of recovery costs rather than environmental punishment (the fine cost).

TABLE 3 ABOUT HERE

Combined, fines and recovery costs increase the penalty for noncompliance with environmental laws for offenders convicted of an environmental offence. Summing fines and recovery costs yields a mean “total cost” of 15,065.54 € per case, more than doubling the average penalty costs. There is a small positive correlation between fines and I-EPA recovery costs ($r = 0.165$; $\text{Sign } t = 0.043$), indicating that higher fines and recovery costs co-occur. As noted, adjusting for the addition of recovery costs, total I-EPA penalties increase, which also affects the ratio of I-EPA penalties to the examples given for Flanders and the US. Adjusting for the addition of recovery costs, total mean I-EPA fines for individuals (4,940 €) are 30% greater than mean fines for individuals in Flanders, and 36 times lower compared to the US. For corporations, total corporate penalties I-EPA costs are still 93 times smaller than average corporate fines in the US. In the US, however, several large environmental crimes committed by corporations significantly affects the average financial penalty incurred by US corporations found guilty of environmental crimes (Lynch, 2017) and skews this comparison.

As one would expect, there was a correlation between the number of charges in a case and IEPA cost recovery awards ($r = 0.166$; Sign. $t = 0.045$). This outcome makes logical sense as the IEPA must invest more time in the investigation of cases with multiple charges, increasing its investigative costs. There was, however, no correlation between the number of charges and the fine amount ($r = 0.05$; Sign $t = 0.536$). There was also no association in the data between fines or recovery costs related to whether the defendant is an individual or corporation.

Fines, recovery costs and violation distributions

In Table 4, we examine variations in fine across violation types. Table 4 displays the mean fine and recovery costs for the first noted offence in each case to which offenders plead or were found guilty of violating. Offences were grouped into 14 categories described at the end of Table 4.

The largest number of cases ($N = 46$; 29.9%) were identified as “general permit violations”. The second largest violation category ($N = 33$; 21.4%) was failure to contain pollution or a spill to the facility. The third largest category ($N = 22$; 14.3%) included offences listed as general water pollution violations. These three categories made up 65.6% of cases.

The smallest mean fines were meted out for failures to obtain a licence or an expired licence to operate a piggery or poultry facility ($N = 9$; mean = 883.33 €). Three other types of violations are found in the next group of lowest fines: failure to maintain appropriate records or required files and reports ($N = 3$; mean = 1,850 €); failure to maintain waste storage areas, storage tanks, and storage drums ($N = 5$; mean = 1,910 €); and illegal disposal, storage, transfer or waste and illegal sale, storage and disposal of WEEE waste ($N = 16$; mean = 2003.12 €). Violation categories 1 (failure to contain pollution to the facility), 3 (emission

limits exceedances or failure to report illegal emission), and 14 (failure to monitor emissions), all received mean fines in the mid-3,000 € range.

The largest mean fines, for which there were only two cases, were received for violations of the Waste Management Act (mean = 21,904 €), though the two violations in this group received quite disparate penalties that were, perhaps, related to the seriousness of the offence. However, the data do not contain any information that would allow this conclusion to be confirmed. The second largest mean fine categories include those for unspecified or general water pollution permit violations (mean = 11,311.09 €), and this offence category also included the largest number (N = 46) of violations. The third largest mean fines (N = 22; 8,018 €), were issued for general water pollution violations. The remaining offence categories contained few fines, and fines for individual cases in this group were widely dispersed and ranged from 500 to 20,000 €.

Across individual cases, cost recovery penalties ranged from 1,398 to 100,000 €. Mean cost recovery fines were highest for violations of the Waste Management Act (N = 2; mean = 31,236 €). These violations also had the highest mean fine, but represent an average from only two cases, one with very high fine (40,000 €) and recovery costs (50,000 €). With the exception of very low cost, recovery costs in cases involving illegal piggeries and poultry operations (mean = 2,972 €), the vast majority of mean recovery costs (N = 122) were in the mean range of 7,024 to 9,354 €. Thus, recovery cost amounts were less disbursed than fine amounts and may be the result of specific formulas used by I-EPA to determine recovery costs.

TABLE 4 ABOUT HERE

Of the 154 defendant cases, only seven (4.5%) resulted from trials. All seven cases involved corporate entities. Mean fines in trial cases (2,528.57 €) were substantially lower (39.4%) than the mean fine for all cases. From the data, we cannot determine why cases that

went to trial received significantly lower fines. Three of the seven trial cases included only one offence charge, two cases included two charges, one cases included three charges and one case included four charges. Thus, the lower penalty amounts may be the result of the fewer number of charges filed. In six of these seven cases, I-EPA costs were awarded. I-EPA costs in these six cases averaged 22,100 €, or about 2.3 times the cost recovery for non-trial corporate cases, and was substantially influenced by one cost recovery award of 100,000 €. There was no statistically significant correlation between the number of environmental charges, trial, pleas, or recovery costs in these few cases. These findings appear, from many criminological perspectives, to be unusual. One would expect that the number of charges might be related to trial probabilities, or that fine amounts and recovery costs would be affected by whether a case went to trial or a hearing. Further research requiring access to data not posted by the I-EPA would be required to help make more sense of these findings.

Multiple offenders

There were a limited number of multiple offenders convicted of environmental crimes in these data (N = 24). Multiple offending could only be determined for corporate entities and municipalities since the data do not include identifiers for convicted individuals in the data set. The recidivists included four municipalities and 20 corporations. From these data, the recidivism rate for municipalities and corporations combined was 17.5%.

The distribution of multiple convictions was as follows. The four municipal recidivists in the data each pled guilty to offences on two occasions, and the number of charges across these cases varied. In one case, the municipality was charged with three offences on two separate occasions; in a second case, the municipality was charged with two offences on the first occasion and three offences on the second occasion, with one offence across the two occasion overlapping, resulting in a smaller fine when the three offences were

charged. In the remaining two cases, the municipalities were charged with one offence on each occasion, and the offences were of different types.

Among the 20 recidivists corporations, one corporation plead guilty on five different occasions; four corporations plead guilty on four separate occasions; and two corporations plead guilty on three separate occasions. The remaining 13 corporations had two convictions each. Fine amounts were not significantly impacted by recidivism and show no clear relationship between the number of convictions and the fine amount, which may be the result of variation in the offence charged. However, the largest fine in the data (350,000 €) was administered to a corporation on its fourth conviction. The case report does not mention whether the judge in the case took the prior record of offending into account when determining the fine in the fourth case.

Discussion

As noted, little is known about environmental criminal prosecutions and the punishments received by environmental offenders in different national contexts. To address that issue, we examined 11 years of environmental punishment data from Ireland. In Ireland, there are few environmental punishments annually—about 14/year. That result would appear to confirm the assumption in the literature concerning under-enforcement of environmental laws (but see below). It is unlikely that these few punishments represent the scope of environmental crime in Ireland. As noted, there are more than 13,000 manufacturers in Ireland, and thus it would be difficult to believe that these convictions for environmental crime adequately represent the potential rate of offending in Ireland. The conviction likelihood is about 0.1% of manufacturers, which would be a tiny fraction of possible violators even if violations were only the result of random error. One limitation of these findings relates to the use of alternative, informal environmental processes in Ireland. Ireland does not have formal administrative responses to environmental crime, though one document

suggests that informally, Ireland employs 11 types of noncriminal sanctions for environmental offenders (Lynott and Cullinane, n.d.). It is likely that due to the informal nature of these settlements, data on those settlements are unavailable, and we could not locate a relevant document related to these settlements on the IEPA site. Data from those informal processes would, of course, affect the count and description of environmental enforcement in Ireland, and thus is an area of research that criminologists should investigate.

If criminal prosecutions deliver a message about society's attitudes towards environmental crime, then it would appear that the attitudes of the government in Ireland towards environmental crime are not well developed. In a survey relevant to that issues, Hynes, Norton, and Corless (2014) found evidence that the Irish public was sceptical of government and private industry's management of marine resources. In a cross-cultural study of attitudes towards the environment in 27 countries, Marquart-Pyatt (2012) assessed three types of environmental attitudes: environmental threat analysis; environmental efficacy, and willingness to pay for some form of environmental protection. Ireland ranked 22nd in environmental attitudes, 14th in willingness to pay and 13th in environmental efficacy (defined as the importance of addressing environmental problems through collective action). Thus while there is some support for willingness to pay or environmental protection in Ireland, there is less concern with environmental problems, which may help explain the rather low number of environmental crime prosecutions in Ireland.

As noted, Ireland has a significant ecological footprint, and Ireland's national ecological consumptions patterns exceed the availability of Ireland's biocapacity. That measure indicates excessive biocapacity consumption and perhaps, therefore, also a general lack of concern with protecting the environment which may translate into weak environmental protection and lax use of criminal environmental prosecutions. The observation that Irish citizens may be less concerned with environmental issues has been, as

illustrated above, shown in prior cross-national surveys. Given current knowledge concerning the use of criminal environmental sanctions across nations, it is difficult to test this hypothesis due to a lack of relevant data. Such hypotheses, therefore, remain open to future investigation.

Our analysis also discovered that the penalties for criminal environmental offences within Ireland were rather small compared to fines in other nations, even after accounting for the additional fines levied to recovery I-EPA investigation costs. Further, we found no evidence of the use of incarceration as a punishment. These outcomes also seem to us to suggest weak efforts to control environmental crime in Ireland. This is especially true since Ireland, unlike other nations such as the United States, does not have a specific administrative mechanism designed to control and respond to environmental crimes/harms. This finding may also be relevant to political economic analyses of environmental crime and punishment. Any effort to suggest such a connection requires the use of more extensive empirical indicators of environmental crime and political economic processes as indicated by studies conducted in the US. In addition, this leads to the need to consider the fact that, in the US at least, environmental punishments have not been shown to limit the effects of ecological destruction and disorganisation (Long et al., 2012; Stretesky, Long, & Lynch, 2013b; Stretesky et al., 2017). Thus, the relatively lax punishments witnessed in Ireland can be excused to the extent that even stringent environmental penalties have been shown not to affect/change the polluting behaviour of corporate treadmill of production actors.

Nevertheless, these data appear to confirm what many environmental crime researchers and green criminologists suggest about societal and government responses to environmental crime: that criminal sanctions are not widely employed for such purposes, and when employed are relatively minor. Whether or not these few criminal sanctions in Ireland effectively control or deter environmental crime remains an open question, and further

research is needed to assess this issue. But, given differences across nations, it is difficult to generalise these results to suggest that environmental punishment in Ireland is lax, or that these results indicate the more general assertion concerning lax punishment for corporations. Some comparisons are needed to make such an assessment. For example, compared to the US where the imprisonment rate for street crime is around 500/100,000, in Ireland, the imprisonment rate is significantly smaller, about 79/ 100,000, which may indicate a lower level of punitiveness within Ireland that spills over into other enforcement areas. Thus, what looks lax from a US perspective, may not be lax within Ireland.

The criminal environmental punishment data from Ireland are perhaps unusual, and they certainly appear so in contrast to studies that have been performed using data from the US and European nations. However, because there are a paucity of such studies in different national contexts, it is difficult at this time to conclude whether Ireland's response is unique from other nations or simply different compared to results for the limited number of nations that have been studied.

Much work remains to be done concerning the distribution of and use of not only criminal but administrative environmental sanctions across nations. Much of this work is based on data from the United States, and thus much of what is known about environmental crime enforcement is limited to the US. Whether or not the data necessary for such projects is currently available is also an open question in need of further research attention. These are questions that remain to be answered by green criminologists and others interested in the distribution of different types of crimes across nations.

Future research is required to more fully understand environmental crime prosecutions in Ireland. These prosecutions, as noted above, likely reflect the influence of EU environmental law directives. The extent to which those directives affect environmental crime prosecutions in EU member states is an unknown. To address that issue, studies of

specific EU directives and the distribution of environmental crimes and prosecutions across EU nations would be required, and pre-post data would need to be compared. On its website, the EU lists 23 directives related to the environment, and the effects of these directives across EU member nations has not been well studied.

End Notes

[1] Important statutes, however, include the Integrated Pollution Control Licensing Regulations (original, 1992; revised 2013); the European Union and the Ireland EPA Industrial Emissions Licensing Acts (both 2013); the Ireland Environmental Protection Agency Act of 1992; the Protection of the Environment Act of 2003 (which amends the Protection of the Environment Act of 1992); a number of waste licensing, permitting and management acts (<http://www.epa.ie/pubs/legislation/waste/licpermit/#.Vj4vtr9HOVc>); electronic waste regulations (implemented 2012 and 2014); Restrictions on Hazardous Substances Regulations (implemented 2005, amended 2012); Waste Water Discharge Regulations (2007, amended 2010); various air quality regulations (<http://www.epa.ie/pubs/legislation/air/quality/#.Vj4woL9HOVc>) including those related to solvents (<http://www.epa.ie/pubs/legislation/air/solvents/#.Vj4wx79HOVc>), ozone depleting substances (<http://www.epa.ie/pubs/legislation/air/ods/#.Vj4w5r9HOVc>), and volatile organic compounds (in the EPA Act of 1992, amended 1997); and the Dumping at Sea Acts (1996, 2004, 2009, 2010, 2012). Thus, there appears to be a well-developed system of environmental laws in Ireland that apply to a wide range of pollution related issues.

[2] Subsequent to completing this analysis, we returned to the I-EPA webpage, and briefly examined the addition of new environmental prosecutions in 2015 and 2016, or data we had not collected for this study when it was initiated. In 2015, there were an additional 11 cases, and in 2016, 7 cases. The addition of this small number of cases is consistent with the general findings of limited enforcement of environmental regulations in Ireland.

[3] We coded the offence categories as follows: (1) failure to contain pollution to facility; (2) failure to contain a water discharge; (3) ammonia emissions limit exceedance; (4) failure to notify authorities concerning a spill or emission event; (5) failure to submit required reports or maintain required records; (6) failure to notify EPA of an equipment malfunction; (7) failure to properly maintain hazardous waste storage tanks, storage drums, and storage areas; (8) failure to notify EPA of a hydrocarbon emission event; (9) water permit violations; (10) operating a piggery or poultry farm without proper permit; (11) use of inappropriate pollution control equipment; (12) not specifically identified environmental permit violations; (13) illegal waste transfer or disposal; (14) making false or misleading statements to environmental authorities; (15) illegal electronics permits, illegal electronic waste, WEE violations; (16) inappropriate and missing emission permits and related unpermitted emission violations; (17) slurry/manure violations; (18) Waste Management Act violations; (19) failure to appropriately monitor emissions; (20) failure to ensure that dust, vermin, odour, birds, flies, etc., are not a public nuisance; (21) failure to contain significant deterioration of a waterway; (22) violations related to Chemical Oxygen Demand (COD), ammonia, nitrogen or biochemical oxygen discharges; (23) expire permit violations; (24) illegal waste storage; (25) ammonia emission limit exceedances; (26) unpermitted waste hauler; (27) obstruction of justice.

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Table 1. Distribution of penalties by year* (*N* = 154).

2004	16	2010	13
2005	16	2011	16
2006	18	2012	08
2007	12	2013	15
2008	12	2014	09
2009	19		

*There were 147 cases, but 154 defendants. In 2007, one case involved two defendants; in 2011, one case involved four defendants; in 2013, one case involved two defendants, and a second, three defendants.

Table 2. Number of charges across cases.

One charge only	46 (29.9%)	Sum = 46
Two charges only	32 (20.8%)	Sum = 64
Three charges only	36 (23.4%)	Sum = 108
Four or more charges	40 (26.0%)	Sum = 123
Total	154 (100.1%*)	Total = 341 (mean = 2.21)

* Rounding error.

Table 3. Distribution of fines ($N = 154$) by euro categories*.

10–500	13	6500–9000	9
501–999	7	10000	3
1000	23	14000	1
1001–1999	21	18000	1
2000	15	20000	1
2001–2999	16	40000	2
3000	13	110000	1
3001–3499	0	350000	1
3500–3999	7		
4000–4500	9		
4501–4999	0		
5000–6000	11		

*The fine categories listed in this table were our construction of the fine distribution, and do not represent equal fine amount categories. We used unequal amount categories because certain specific fines (e.g., 1,000 or 2,000 or 3,000 €) were used in a sufficient frequency to list those categories separately. Our division of fine categories also represents an attempt to clearly list the largest fines as separate categories.

Table 4. Mean fine and recovery costs by type of violation*.

Type	Fines (N; range; mean)	Recovery costs (N, range, mean)
1	33 100–5,000 3,592.42	33 2,220–27,500 8,365.00
2	0	0
3	8 500–7,200 3,587.50	8 4,918–100,000 18,578.63
4	3 50–3,000 1,850	2 2,516–25,000 13,758.00
5	5 750–2,800 1,910	5 4,900–10,204 7,024.80
6	22 500–110,000 8,018	21 2,000–42,000 9,354.19
7	9 100–1,500 883.33	9 1,398–4,000 2,972.00
8	46 10–350,000 11,311.09	45 2,000–17,133 8,995.47
9	16 250–4,000 2,003.12	16 2,000–17,133 7,218.69
10	4 1,000–20,000 7,750	4 9,000–11,077 10,038.50
11	2 2,500–2,500 2,500	2 4,000–8,094 6,047
12	1 1,000 1,000	1 8,256 8,256
13	2 3,808–40,000 21,904	2 12,472 31,236
14	3 500–5,200 3,233.33	3 5,500–11,100 7,821.57

Violation type codes for Table 4: (1) Failure to contain pollutant to facility (2) Nuisance; pests, vermin, flies, noise (3) Emission limits exceeded; failure to notify of illegal emission (4) Failure to submit require report or maintain required records (5) Failure to maintain storage area, drums tanks or inappropriate pollution control equipment (6) General water permit violations (7) Operating a piggery or poultry facility without a licence (8) Unidentified general permit violations (9) Illegal waste disposal, transfer, storage, including WEEE (waste electronic and electrical equipment) (10) Makes false or misleading statements (11) Expired, inappropriate, missing permits (12) Slurry/manure violations (13) General, Waste Management Act violations (14) Failure to monitor emissions