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Environmental Crime

ABSTRACT

Enhanced protection of the physical environment was the focus of legislative and regulatory initiatives in many nations in the closing decades of the twentieth century. The strength of the environmental movement and the attention paid to environmental crime are belied by the paucity of systematic data on its extent and distribution, its perpetrators, and responses to it. Organizational offenders have received by far the greatest attention from investigators, and case studies compose a substantial part of the research literature. Rational-choice approaches predominate. Most states give regulatory agencies primary responsibility for responding to environmental illegalities and crime. They generally do not operate vigorously, and penalties imposed are not severe. Criminal prosecution of environmental offenders occurs infrequently. Responsive regulation is touted as an effective response to traditional problems of control and regulation, but it remains a promissory note. The increasing globalization of economic relationships makes more difficult and further challenges regulatory oversight of increasingly transnational corporations.

The designation "environmental crime" is applied to behaviors that contravene statutory provisions enacted to protect the ecological and physical environment (Clifford and Edwards 1998). The formal statutory and analytic designation is of recent origin, but efforts to prevent or mitigate harm to the environment are not. In England, Disraeli's Rivers Act of 1876 (Prevention of Pollution Act) and, in the United States, the Refuse Act of 1899 marked the beginning of efforts to control pollution through national legislation (Robinson 1995). In the closing decades of the past century, however, legislative bodies throughout the world defined and provided criminal penalties for a broad range and increased number of acts harmful to the environment (DiMento 1993).

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In the United States, for example, the Clean Air Act (1963), the Resource Conservation and Recovery Act (1976), the Clean Water Act (1972), and other landmark federal legislation provided criminal penalties for an extended list of environmentally harmful behaviors (Blacksberg et al. 2001). A growing number of states also provide criminal penalties for violating environmental laws (Herm 1991).

Research on environmental crime has proceeded on multiple tracks, most informed by rational-choice assumptions about offending. Criminological theory and investigations, particularly those spurred by problems of white-collar crime, make up an important line of inquiry. These efforts, however, are more than matched by the work of political scientists, economists, and law-trained scholars. Social research on environmental harm, environmental management analyses, investigations of regulatory problems and dynamics, public policy studies, and economic research all contribute to what has been learned about environmental crime. Understandably, this corpus of work is published in a wide range of periodicals and books, from criminology journals to law reviews. The bulk of research by economists is based on a normative economic foundation. It proceeds from the assumption that if the economic costs of a regulatory program exceed the putative fiscal benefits it is deemed inefficient. This analytic approach assumes that financial concerns trump all other possible justifications for environmental-protection initiatives.

Despite the widely dispersed relevant literatures and a paucity of official data, much has been learned about environmental crime and efforts to control it. First, there is no doubt that the financial and human costs of environmental crime are enormous, if indeterminable. Second, both aggregate rates of environmental crime and crime commission by individuals and organizations vary substantially. Theory and research point to a number of factors that influence aggregate rates or the likelihood of environmental crime. These risk and protective factors include the state of the economy, the degree of competition in an industry, the prevalence of socially acceptable rhetorical explanations for noncompliance, and the style of oversight. Third, oversight of environmental practices varies internationally, but controls are more intense where well-organized and sustained political movements press for state action. Fourth, the first line of oversight for environmental practices is regulatory agencies; criminal prosecution is rare. Although there is some movement toward more severe sanctions

against environmental criminals, as yet there is little evidence to suggest a significant change has occurred. Fifth, concern for the economic health of a locale, region, or industry is a major constraint on oversight by decision makers at all levels of the oversight process. Sixth, despite what has been said about a limited movement toward heavier criminal sanctions for environmental crimes, it is clear that a significant shift in regulatory paradigms has occurred; deterrence-based approaches generally have given way to programs of responsive regulation that emphasize educative, flexible, and cooperative strategies. The efficacy of this approach remains unclear. Last, the record of research on environmental crime shows the need for increased attention to international environmental crime, enhanced understanding of the contexts and meanings of environmental crime, comparative studies of regulatory control styles, and better statistical information.

This essay reviews and assesses theory and research on environmental crime. Section I notes the behavioral and legal diversity of acts subsumed under this rubric while Section II describes sources of data and methods used in studies of environmental crime. Section III presents what is known about the victims and costs of environmental crime. In Section IV we describe and discuss the distribution of and temporal trends in environmental crime. This is followed in Section V by description of what is known about the characteristics of and decision making by environmental criminals. Section VI reports what has been learned about nonstate responses to environmental crime. Section VII examines regulatory and criminal justice oversight, and Section VIII explores styles of oversight and their effect on environmental crime. The essay concludes in Section IX with a research agenda for further work on environmental crime.

I. Forms of Environmental Crime

Environmental crimes are diverse both in nature and in the harm they cause. They include littering, improper disposal of radioactive materials, taking game out of season, intentional discharge of hazardous substances into storm drains or waterways, and theft of flora, fauna, and natural resources. The victims of some environmental crimes are few and easily identified, as when industrial firms discharge toxic chemicals that subsequently contaminate and render unsafe the water wells of nearby residents. The victims of other environmental crimes

are countless and may be miles or years removed from the offenders who victimize them. This is seen, for example, where toxic substances discharged criminally into the air drift to other regions of the globe and thereby increase respiratory illness and diminish the overall quality of the earth's atmosphere. Other environmental crimes may have disastrous immediate consequences. In 1984, for example, the Union Carbide Corporation negligently released methyl isocyanate and hydrogen cyanide gas into the atmosphere from their plant in Bhopal, India. According to the Indian government's count, the incident killed 3,329 people and seriously injured some 20,000 (Pearce and Tombs 1998).

It is not hyperbole to suggest that environmental crime can victimize entire populations or nations; to the extent that natural resources belong to a nation's people, theft or destruction of them victimizes all. Increasingly, environmental crime crosses international borders. Given its potentially far-reaching harm, nations throughout the world have moved to regulate or prohibit entirely a growing list of activities. These include trade of endangered plant and animal species, whaling and fishing, biopiracy, movement of hazardous waste, and trade in ozone depleting substances (Cho 2001; Brack 2002). A lengthening list of international conventions and treaties prohibit or limit actions potentially harmful to the environment. They include the 1973 Convention on International Trade in Endangered Species, the 1989 Basel Convention on illegal transport of hazardous waste, the International Maritime Organization's Marine Pollution Convention, the 1987 Montreal Protocol on Substances That Deplete the Ozone Layer, the 1998 Rotterdam Convention on Chemicals and Pesticides, and the 2001 Stockholm Convention on Persistent Organic Pollutants (Brack 2002).

A. Crimes and Illegalities

Criminal conviction of environmental "crime" requires prosecutors to demonstrate either that defendants knowingly, intentionally, or recklessly violated the law or were negligent. This can be a high standard to meet in most cases (Cohen 1992). Environmental "illegalities," by contrast, are violations of rules that do not require demonstration of intent to violate. Generally, illegalities are violations of regulatory rules promulgated and enforced by environmental protection agencies. They are regarded by many as substantially less serious than criminal acts, and they generally carry minor civil penalties.

Failure to post adequate notification and warning signs at the site of an environmental cleanup project that otherwise operates in compliance with regulatory requirements is an example.

Despite their different statutory origins, burden-of-proof requirements, and maximum permissible penalties, there are reasons theoretically to expect a positive statistical relationship between the distributions of illegalities and environmental crimes. The logic and propositions of self-control theory, for example, build on the belief that noncompliance is a cross-domain phenomenon that reflects stable internal qualities of offenders (Gottfredson and Hirschi 1990). Studies consistently show that some organizations have lengthy histories of repeated transgression, while others have equally long-standing records of compliance (Sutherland 1949; Clinard and Yeager 1980; Ross 1980). Despite the predicted positive relationship between environmental crime and illegalities, and empirical evidence that they may have similar correlates, there is disagreement on this point (Baucus and Dworkin 1991). Evidence is weak, however, and the issue is unresolved.

Given the diversity of environmental crime, perhaps little can be said about it that applies uniformly to its subtypes. As a way of advancing theoretical understanding and informed policy options, one response to this is to focus on more narrow and behaviorally homogeneous forms of environmental crime. Examples include wildlife crime, industrial pollution, and theft of natural resources. Whether explanations of its diverse subtypes subsequently can be integrated into a more general theory or understanding of environmental crime is unclear.

B. Individual and Organizational Offenders

A distinction generally is drawn between "organizational" and "individual" environmental crime. The former is crime committed in the context and pursuit of the objectives of legitimate formal organizations (Clinard and Quinney 1973). It is committed by individuals or groups when they knowingly violate the criminal law to further objectives thought to be important to their employer or work group. Individual environmental crimes by contrast are committed by individuals or groups in pursuit of personal objectives. Far from committing crime to contribute to organizational objectives, some victimize their organizational employers. Although organizational crime is distinguished by the subsidiary importance of individual reward in favor

of organizational benefit, this does not deny that participants may benefit personally in some ways from their criminal participation. They may gain recognition as "team players" or be awarded economic bonuses or other career-enhancing payoffs denied to peers.

The rationale for distinguishing organizational environmental crime rests on the belief that organizational forces can be significant, causally autonomous constraints on the genesis and development of environmental crime, and on responses to it. Organizational properties and dynamics from differentials of power and authority to goal displacement can be sources of variation in the strength and efficacy of normative constraints. Because organizational arrangements can obscure decision-making processes and dynamics, they increase the difficulties of oversight (Simpson 2002). They can function, for example, to diffuse responsibility for misconduct and thereby facilitate individual willingness to participate. Also, where there are obvious and long-standing patterns of environmental violation, the pathologies of individuals fail as explanation, and the causes instead must be sought in organizational conditions. To talk of organizational environmental crime, however, is neither to reify a collectivity nor endow it with volitional properties (Cressey 1995). Organizations act through individuals and groups.

The corpus of research into environmental crime is tilted conspicuously toward studies of unusually egregious crimes committed by powerful organizations both private and public (e.g., Herm 1991; Anderson and Talley 1995; Beamish 2000; Simon 2000). The crimes of individuals and nonprofit organizations have received remarkably little attention. This in part explains why the theoretical approaches and perspectives employed in analysis of environmental crime share much in common with prevailing approaches to corporate crime. To judge from the number of investigators whose interests and research are in both areas, the overlap is more than theoretical. Without question some of the most destructive and costly environmental crimes are committed by large corporations. Corporate organizations, moreover, may be unusually prone to criminal participation precisely because they are organized and operated to increase private profit (Pearce 2001). It is well to keep in mind, however, that environmental crimes can be committed by individuals of modest fortune as well as large organizations. "Private home owners who improperly dispose of household chemical cleaners and disinfectants every day" are environmental criminals also (Rebovich 1992, p. 2).

II. Data Sources

Historically, what is known about crime and its distribution is anchored in three principal bodies of data. Official data collected and reported by police and governmental agencies make up the lion's share. These include information on the number of crimes known to the police, the numbers and characteristics of offenders arrested for crime, and the outcome of criminal processing. Surveys of citizens and organizations that have been crime victims, their characteristics, and the actions they and officials took following victimization are another important source of information about crime. The third major data stream is self-report surveys, typically administered to samples of known offenders. These surveys of the nature and extensiveness of past criminal participation make clear that many offenders are arrested and sanctioned for a small proportion of the crimes they commit. A high proportion will be caught, however, if not for one crime then for another.

A. Official Crime, Illegalities, and Case-Processing Data

Nations generally do not routinely collect, collate, and publish statistical data on environmental crime, environmental offenders, or actions taken against them. In the United States, for example, the most widely employed source of statistical information about crime are the *Uniform Crimes Reports* (UCR), which are compiled and published annually by the Federal Bureau of Investigation (FBI). The UCR reports detailed information on eight criminal offenses, known as Index offenses, and those arrested for them (Federal Bureau of Investigation 2002). Environmental crime is not among them. Besides data on Index Crimes, the UCR also includes limited statistical data on arrests for other crimes, but environmental offenses are absent from the list. The UCR, therefore, contains little of value for those interested in mapping the distribution of environmental crime and describing its perpetrators. Several nations do better. The Federal Republic of Germany has in place the beginnings of a system of statistics on environmental crime (Umweltbundesamt 2001), but most nations provide quite limited data on the matter. This is the case with Canada (Environment Canada 2003) and the United Kingdom (Environment Agency 2004). The United Nations does not collect or publish statistics on international environmental crime (Brack 2002).

In the United States, the availability, comprehensiveness, and utility of state-level data varies (Burns 2002). Data on illegalities and environmental crimes known to regulatory personnel are available

from many state-level regulatory agencies and are published in their annual reports (e.g., New York State Department of Environmental Conservation 2001; Ohio Environmental Protection Agency 2003; Washington State Department of Ecology 2003). The U.S. Environmental Protection Agency (EPA) (2003*a*) and an increasing number of state-level agencies make available online summary enforcement and penalties data (Burns 2002; U.S. Environmental Protection Agency 2002*b*, 2002*e*). As states assume a greater role enforcing environmental laws and regulations, the correspondence between state- and federal-level environmental crime data becomes important for researchers and policy makers. Currently there are significant discrepancies between state and federal enforcement data and, therefore, obstacles to merging them for research and other purposes. These include nonuniform definitions of enforcement categories, difficulties in adding state data into federal databases, and incomplete information for some states (Markell 2000). In light of these and other problems, it is not easy to put together either elementary information about specific types of environmental crime or a clear picture of offenders.

B. Victim Surveys and Accounts

Surveys of the general population to determine their experiences as victims of crime are commonplace. In the United States, the National Crime Victimization Survey (NCVS) collects data from a representative national sample of households and publishes the results annually (Bureau of Justice Statistics 2002). Similar surveys are conducted in nations around the globe, but questions about experience with environmental crime are conspicuously absent from all. The absence of victimization data is a serious handicap to investigators and policy makers alike. It makes more difficult the challenge of examining trends and mapping the distribution of victimization.

Surveys of victims of environmental crime unquestionably pose significant challenges. To begin, victims may not be aware that they have been victimized. Unlike robbery, burglary, and other ordinary crimes, acts of environmental crime may be obscured from victims and even when noted may not appear unusual. Many can be carried out in solitude and secrecy without leaving trace evidence. The harmful or destructive effects of other environmental crimes are accretional in nature and may not manifest themselves for years or decades (Mueller 1996).

The paucity of data on environmental crime means that studies by private organizations, civic groups, and public interest groups take on added importance for the light they shed on environmental crime and its victims (e.g., Commission for Racial Justice 1987). Descriptions of victims' experiences and case studies by journalists also give impressive if anecdotal evidence of the human and communal consequences of environmental crime (Tallmer 1987; Edelstein 1988; Wolkomir 1994; Mokhiber 1996).

C. Self-Report Surveys and Offender Accounts

First-hand accounts of crime and criminal careers are an important part of the canon on street criminals. There are also outstanding first-hand accounts of some corporate crimes (e.g., Leeson 1996). They include useful information, for example, on organizational pressures and facilitative conditions as well as how offenses are managed individually, interpersonally, and organizationally (Vandivier 1992). Just as important, they reveal something of how controls are understood and constrain decision making in organizational settings (e.g., Blundell 1976). Insider accounts by key participants in environmental crime may be few in number, but what they may reveal about crime potentially is important. Although little use has been made of them, depositions, research reports, and other materials filed as part of court proceedings are other potential sources of insider information (Firestone 2003).

III. Costs and Victims of Environmental Crime

The costs of environmental crime are numerous and varied, and no one seriously disputes that its aggregate financial toll is enormous. As with street crime, the tangible costs of environmental crime include victims' loss of money and property, and physical injuries or death. To this must be added the psychological toll produced by crime; household burglary, for example, can have a pronounced emotional impact on women who reside alone (Shover 1991). Unlike most forms of street crime, environmental crime can cause serious harm not only to individuals and organizations but also to the physical and ecological environment. The U.S. Sentencing Commission (1995, p. 120) notes that many "crimes labeled as 'environmental' may be regarded as white collar crimes, although unlike conventional white collar crimes, the 'victims' are often not only people but also wildlife habitats or endangered species for which there is no easily ascertained economic value." The commission adds that "it is difficult to put a value on

public goods such as clean air or national forests." Among the intangible costs of environmental crime are pain, suffering, and reduced quality of life. Its victims may be few or many. In some cases, entire communities are made uninhabitable by criminal actions. Federal agencies are both offenders and victims (Alexander 1999). Other environmental crimes threaten plant and animal species or the ecosystems that sustain them. Given its diverse harms and victims who can number in the millions, we lack data needed to measure the victim consequences of environmental crime. Not surprisingly, estimates vary substantially.

The balance of research conducted by economists on environmental crime is weighted toward analyses of factors associated theoretically with environmental compliance (e.g., Harrington 1988; Garvie and Keeler 1994; Heyes and Rickman 1999; Heyes 2000). The goal of most studies is to determine an optimally efficient regulatory regime that fosters and maintains an acceptable level of compliance (e.g., Ziegler 1982; Lear and Maxwell 1998; Florens and Foucher 1999). Economists have explored variables that influence compliance, including the nature of the violation and the size of financial penalties (e.g., Kleit, Pierce, and Hill 1998; Oljaca, Keeler, and Dorfman 1998), the comparative effects of deterrence-based enforcement, information disclosure strategies (e.g., Foulon, Lanoie, and Laplante 2002), and variables useful for arbitrating theoretical notions. Despite growing use of economic perspectives on regulatory compliance, it is difficult to estimate the financial costs of environmental crimes.

Environmental scientists and advocates have adopted an approach to the damages caused by environmental crime that is more inclusive and less useful for criminological investigations than traditional ways of thinking about the effects of crime victimization. The concept "environmental harm" is employed as a global measure of the efficacy of public policies developed to mitigate destructive environmental practices. It is conceptualized as the degree to which violations exceed regulatory limits, or the duration of violations (Nadeau 1997). It captures the environmentally harmful consequences of a range of acts and activities, of which crime is one (Mueller 1996; Clifford and Edwards 1998). Other components include permissible and accidental discharges. Since data on environmental harm cannot be disaggregated by the actions that generated it, the part that can be attributed to crime cannot be determined.

A substantial number of investigators, most of whom work in disciplines other than academic criminology, employ measures of environmental harm as the dependent variable in studies that differ little from mainstream criminological research (e.g. Anderson and Talley 1995). This corpus of work is published in a wide expanse of outlets, many far removed from the journals where criminological research traditionally is reported (e.g., the *Review of Economics and Statistics*). Explanatory and predictor variables conceptually indistinguishable from those used in corporate crime research figure prominently in these analyses (e.g., Brehm and Hamilton 1996). More important, investigators frame and conduct their research, and interpret their findings, in theoretical ways that are compatible logically with rational-choice theory (e.g., Viladrich-Grau and Groves 1997). An obvious question raised by this parallel line of inquiry is whether environmental harm and environmental crime have similar or different correlates. The question cannot be answered currently.

In the United States, the federal and some state governments have created information disclosure programs for making data on corporate performance on measures of environmental harm available to the public. Established in 1989, the Toxics Release Inventory (TRI) is a publicly available EPA database that contains estimated data on toxic chemical releases and other waste management activities reported annually by firms in certain designated industry sectors and by federal facilities (U.S. Environmental Protection Agency 2003*d*, 2003*f*). The estimates include specific toxic emissions from manufacturing plants of ten or more employees (U.S. Environmental Protection Agency 2003*d*).

The categories of toxic emissions tracked by the EPA are transfers off-site to disposal, on-site land releases, underground injection, surface water discharges, and total air emissions. On-site releases represent toxic emissions from a specific facility where the toxic substance was generated; off-site releases are discharges of toxic chemicals that occur during transfer elsewhere for disposal. Reporting of land releases is required when toxic substances are placed in landfills, applied or incorporated into the soil, stored in a surface impoundment, or disposed of in waste piles, spills, or leaks. Underground injection is the disposal of toxic substances beneath the surface by pumping it through a designated well. Any discharge to a stream, river, lake, ocean, or other body of water, including storm water runoff, is considered surface water discharge. Air emissions reported in the TRI include the

discharge of toxic chemicals into the atmosphere (U.S. Environmental Protection Agency 2003*e*). The TRI data show that the reported estimates of the total million pounds of toxic substances discharged into the atmosphere, surface water, underground wells, and through on- and off-site disposal methods declined by nearly 50 percent from 1988 to 2001.

Increasingly, TRI data are combined with U.S. Census information and firm-level economic data to explore environmental harm (Hamilton 1995; Brehm and Hamilton 1996; Karkkainen 2001; Grant, Bergesen, and Jones 2002). Government managers, business people, academics, and citizens have found uses for these data (U.S. Environmental Protection Agency 2003*b*). Care must be taken when doing so, however (U.S. Environmental Protection Agency 2002*e*). There are systematic omissions. In addition, nearly one-third of plants failed to report their toxic emissions in the program's early years (Brehm and Hamilton 1996). Reporting, like compliance, varies by industry (U.S. Environmental Protection Agency 2003*e*). Manufacturing facilities in the stone, clay, and glass industry, for example, are less likely to file required reports (Abt Associates 1990). Among firms that do report, there may be significant underreporting of quantities of toxic substances released to the environment (Brehm and Hamilton 1996). The reliability of the TRI may be further reduced by possible changes by the Environmental Protection Agency to increase the minimum criteria for facilities required to report and curtail the information they must provide while permitting them to report an estimated range of toxic discharges (U.S. Environmental Protection Agency 2003*f*).

Another source of publicly available data is the Emergency Response Notification System (ERNS), an online national database of reported chemical accidents and unplanned releases of oil and hazardous substances in the United States and adjoining waters (U.S. Environmental Protection Agency 2002*a*, 2002*b*). Originally created by the Environmental Protection Agency in 1986, it is administered by the U.S. Coast Guard (U.S. Coast Guard 2004*a*).

As with the TRI, there are a variety of reasons for assuming that the ERNS probably underreports spills. Some firms do not report releases, there are multiple records for some, and many records are incomplete (Lynch, Stretesky, and Hammond 2000). In addition, whether to report an accidental hazardous liquid or gas pipeline release is left to the discretion of operators to determine if an incident is significant

(U.S. Coast Guard 2004*b*). Whatever their shortcomings, ERNS data are used to examine how news media coverage influences public opinion about corporate environmental crime (e.g., Lynch, Stretesky, and Hammond 2000).

Environmental harm and its dangers are borne disproportionately by economically disadvantaged communities and citizens, a finding that has attracted attention both from public interest groups and investigators. The environmental justice movement has explored, described, and publicized the inequitable distribution of environmental harm. Research shows, for example, that residents of impoverished and minority areas often have difficulty resisting dangerous and illicit environmental practices (Wenz 1988; Bryant and Mohai 1992; Hofrichter 1993; Anderton et al. 1994; Bullard 1994; Camacho 1998; Hird and Reese 1998; Cole and Foster 2001; Pellow 2002). Media coverage of environmental incidents is both incomplete and misleading. Only nine of 878 chemical spills reported to the EPA for Hillsborough County, Florida, for the period 1987–97 were reported in the area's principal newspaper (Lynch, Stretesky, and Hammond 2000).

IV. Distribution and Trends in Environmental Crime

Notwithstanding data limitations, no one doubts that the prevalence of environmental crime varies temporally and spatially. The nature and extent of this variation cannot be mapped with anything approaching precision. Geographically, rates vary by region of the nation and also by industry. Historically, for example, woods arson in the American South was concentrated in some locales and entirely absent from others (Bertrand and Baird 1975). Increasingly, offenders commit environmental crime with global consequences, but transnational variation in rates of environmental crime and the harm caused by it is largely unexplored territory.

The sources of variation in environmental crime are matters of considerable theoretical agreement and a gradually expanding corpus of research. Rational-choice theory, or theories that are logically compatible with it, predominate (e.g., Shover and Bryant 1993; Adler 1996; Cohen and Simpson 1997; Nadeau 1997; Vandenbergh 2003). When applied to the problem of explaining aggregate-level variation in environmental crime, rational-choice theory highlights twin determinants: the volume of criminal opportunities, and the size of the pool of tempted individuals and predisposed organizations. The key

to explaining regional, industry-level, and temporal variation in the proportion of organizations and individuals that commit acts of environmental crime lies in the exploration of variation in them.

Criminal opportunities are situations or conditions encountered by organizational personnel that offer attractive potential for furthering organizational objectives by criminal means. A major reason for their attractiveness is the absence of effective and credible oversight. In geographic areas, at times, or in industries where there are abundant opportunities for environmental crime, we expect correspondingly high rates of it. Where there is a paucity of opportunities, the rate of environmental crime contracts.

Structural, economic, legal, and technological forces may increase, redistribute, or decrease the supply of opportunities for corporate crime, but the changing nature of commercial relationships and transactions among firms is one source (Vaughan 1983; Szasz 1986; Florens and Foucher 1999). What may be of greater importance is the degree of inequality among firms in specific industries, markets, or geographic regions (e.g., Yeager 1986; Coleman 1987). Industries, for example, where there are a few large firms and numerous smaller, dependent ones may see high rates of crime because the former can impose severe restrictions on the latter that cause them to economize and cut corners. Inequality translates into power, and power can be used to impose restrictive conditions on dependent firms. Some studies demonstrate that environmental pollution rates, illegal or not, are associated with changes in capital markets such as reductions in stock prices (Stephan 2002).

The size of the pool of individuals and organizations predisposed to break the law is a function of three conditions: the level of uncertainty in critical corporate markets; cultures of noncompliance that gain support and legitimacy in specific areas, industries, or historical periods; and the consistency and strength of the context of control. To acquire financing, personnel, raw materials, and other resources needed for production, organizations must participate in a variety of markets. Conditions in any or a combination of these markets may range from financially depressed or unsettled to healthy and optimistic. When the former is the case, market uncertainty increases. For officers and managers of business firms, this complicates planning, escalates anxiety, and pushes an increasing proportion toward desperation and crime. For this reason, fluctuation in the business cycle has been linked

repeatedly to the rate of some types of white-collar crime (e.g., Simpson 1986).

Whenever and wherever a culture of noncompliance gains strength and credibility, it increases the supply of offenders by providing perspectives and justifications to the predisposed that conflict with or call into question ethical behavior. Two dimensions of cultural variation are critical. One is the extent to which the culture provides interactionally tolerated rhetorical constructions of illicit conduct as permissible. These "techniques of neutralization" or "accounts" excuse, justify, or in other ways facilitate crime by blunting the moral force of the law and neutralizing the guilt of criminal participation (Sykes and Matza 1957; Scott and Lyman 1968; Maruna and Copes, in this volume). Like techniques of neutralization, "techniques of restraint" are linguistic constructions of prospective behaviors that shape preferences, perceived options, and the odds of criminal choice. A culture of restraint takes form in publicly spoken admonitions of the like that "virtue is its own reward," "honesty is the best policy," and "protection of the environment is part of our job." It dampens the proportion of firms where environmental crime occurs.

Organizational culture has been conceptualized in a host of ways, but there are no empirical studies that examine techniques of restraint as a component (Shover and Hochstetler 2001). The dominant culture of an industry, region, or period is significantly determined by the proportionate mix of techniques of neutralization and techniques of restraint (e.g., Fineman 1998; Eliason 1999; Fineman and Sturdy 1999; de Prez 2000). This variable and shifting balance is a key source of variation in organizational environmental crime (Braithwaite 1989).

Just as uncertainty rooted in market fluctuations and cultural support for criminal actions increases the supply of predisposed offenders, weak or inconsistent controls do so by presenting organizations with noncredible oversight. Oversight takes a host of forms. It includes professional associations and trade groups, crime control ideologies promoted or endorsed by political leaders, and state-enforced strategies of crime control. This complex of ideologies, organizations, rules, and practices is the "context of control." Where it is inconsistent in focus and weak in application, the supply of potential offenders expands; where controls are consistent and strong, it diminishes (Malik 1993). There is some support for these predictions. Increased regulatory enforcement is associated with higher rates of environmental compliance by plants in the U.S. steel industry (Gray and Deily 1996).

A four-nation study of compliance by fourteen pulp and paper facilities found that more restrictive environmental regulations and grassroots citizen political pressure produced significant improvement in compliance. The investigators suggest that the latter, when coupled with "greener" corporate cultures, explains why compliance by some firms is better than others. Close regulatory oversight can produce large reductions in environmental crime, and its interaction with activist pressure, market forces, and corporate culture is particularly effective in improving environmental compliance (Kagan, Thornton, and Gunningham 2003). State-level rates of reported illegal oil dumping decline as enforcement actions against hazardous waste facilities increase (Sigman 1998). It is possible, however, that compliance will erode as potential offenders become knowledgeable about the low likelihood of detection and ways to circumvent regulations (Rebovich 2002).

V. Environmental Criminals

There are few studies of the distribution of environmental crime in samples representative of theory and policy relevant populations. Clinard and Yeager (1980) analyzed federal administrative, civil, and criminal actions initiated or completed by twenty-five federal agencies against the 477 largest publicly owned manufacturing corporations in the United States during 1975 and 1976. Environmental violations made up 29.4 percent of the total violations by the firms, with an average of 3.9 violations per firm. Some firms were multiple violators, but others recorded no environmental violations during the two-year period (Clinard and Yeager 1980, pp. 334–35). A study of crimes committed by seventy-eight publicly traded U.S. corporations convicted of federal crimes between 1984 and 1990 reported that 21 percent were convicted of environmental offenses (Alexander and Cohen 1999).

Even when surrounded by abundant opportunities for environmental crime and indications perhaps that others are behaving in an unrestrained fashion, not all do so. Whether the aggregate rate of environmental crime is high or low, some individuals and organizations are less likely than others to commit it. Kagan and Scholz (1984, p. 71) point out that even when "there are firms in the same industry in the same city, with ostensibly equal opportunities for gain and equal detection, some violate regulations frequently and some do not." They further note that "there are major petroleum refineries in the same county in California each inspected for air pollution violations virtually every day.

They have sharply different [compliance records] according to enforcement officials" (1984, p. 89). More than one-half of U.S. pulp and paper facilities recorded no violations for the period 1990–93 (Helland 1998). Data from a sample of 175 of these facilities showed that only 13 percent recorded more than three incidents of noncompliance for the period 1979–89 (Nadeau 1997). Of all motor-vehicle transportation facilities in Los Angeles County, California, required to submit documentation, only 14 percent in 1993 and 34 percent in 1994 actually complied with the reporting requirements for storm water discharge regulations (Duke and Beswick 1997).

Fundamental to rational-choice theory is the belief that criminal behavior results from a decision-making process in which actors seek to achieve a satisfactory level of valued objectives. The formal risk of crime presumably figures prominently in their decision making. To conceive of crime in this way requires no assumption that actors' choices are rational a priori. It does assume that the decision to commit a criminal act is based on a calculus, however cursory or crude, of options and their potential outcomes.

The formal risk of criminal participation arguably is the most important variable in rational-choice theories of offending. Individuals or groups who see the law and its agents as remote, illegitimate, or improbable actors presumably are more likely to break the law than those who see state controls as legitimate, credible, and effective. There is evidence that increasing the severity of threatened penalties for violating hazardous waste regulations improves facility compliance (Stafford 2002). Fines are a weak deterrent for environmental harm (Viladrich-Grau and Groves 1997). Compliance is boosted by increasing the frequency of monitoring, by simplifying the sanctioning process, and by increasing the severity of sanctions (Vandenbergh 2003). Discretionary enforcement approaches (Liu [1995] as reported in Cohen 2000), a history of inspection in the previous month (Magat and Viscusi 1990), and increased enforcement actions (Nadeau 1997) are associated with improved regulatory performance.

The inverse relationship between oversight and noncompliance does not mean that it is explained principally by fear of formal punishment. Those who weigh the potential costs of noncompliance also risk the self-reproach of conscience and the disapproval and disappointment of significant others if any crimes they commit should come to light. Fear of these informal sanctions can be a powerful source of compliance, operating both autonomously and as adjuncts to formal threat and

punishment (DiMento 1993). Based on data about the criminal offenses, victim characteristics, and the size of monetary penalties for seventy-eight U.S. public corporations convicted of federal criminal offenses between 1977 and 1990, reputational penalties for crimes that victimize consumers or others directly are greater than comparable penalties for acts that harm the natural environment (Alexander 1999). Other studies by contrast find that state-supported public information programs about toxic releases are more effective than enforcement measures for reducing toxic emissions among states (Yu et al. 1998). For some corporations, high scores on measures of environmental harm are followed by a reduction in stock prices (Stephan 2002).

Risk perceptions are shaped significantly by proximate conditions and controls within business firms. This is true particularly of the stance toward ethical conduct taken by top management. Because they function as moral exemplars for middle management and employees, organizational leaders help mold subordinates' perceptions of the legitimacy and the credibility of controls. Their signaling behavior is critical. To the extent that management establishes internal compliance programs or procedures and compliance performance incentives, compliance should improve (Boyer et al. 1987). When they establish appropriate and effective control measures and communicate unequivocally that compliance is a principal corporate objective, it is not lost on subordinates.

Where organizational leaders support these initiatives only grudgingly, however, awareness of this spreads throughout the firm. Interviews with thirty-seven top and middle managers in six major automotive manufacturing companies based in the United States, Scandinavia, Europe, the United Kingdom, and Japan explored their views on the environment, how these shape their roles, and factors that influence their environmental actions. Investigators found that managers' practices were influenced both by firm performance goals and by market pressures. There was often disparity between a firm's public position on environmental protection and its environmental practices. Inside the firms, active support for green practices diminished substantially with increasing organizational distance from the position of environmental director (Fineman 1997).

Firms that are structurally and procedurally complex may be unusually prone to environmental crime. The rationale is belief that increasing size escalates both the internal complexity of organizations and the difficulty of maintaining effective normative controls and supervision.

The most common proxy for organizational complexity is firm size (Baucus and Near 1991). As firms increase in size and complexity, the odds increase also that cultures of noncompliance can develop and persist in subunits. Organizational complexity is reflected also in the number of production facilities owned or controlled by a parent firm. Thus, several reasons lead to a predicted positive relationship between size and environmental criminal participation. Larger chemical plants, particularly those that are owned by major firms, emit larger quantities of toxins (Grant, Bergesen, and Jones 2002). But while rates of organizational crime increase among larger firms, the relationship at the firm level probably is conditioned by other variables. These include management philosophy, organizational culture, and specific structural arrangements. Environmental harm research, for example, shows that chemical firms that are subsidiaries of larger firms emit toxic substances at higher rates than independent ones (Grant and Jones 2003).

No interpretation of the causes of corporate criminal participation is asserted as often or with as much confidence as the belief that pressures and strain produced by the need to meet acceptable levels of firm performance increase the probability of crime. In market-based economies, the need for firms to maintain profitability is of paramount importance, and falling profits are a source of pressure for improved performance. The locus of performance pressure may be external, perhaps in management's determination to produce success, or it may originate with the individual. Regardless of its source, the line separating lawful and unlawful conduct becomes less salient in the face of increasing performance pressure. Illicit action can be appealing particularly when circumstances make goal attainment by legitimate means unlikely. Firms that have difficulty acquiring the resources needed to produce and market their products, that fail to plan adequately, or that must struggle to compete successfully are those in which officers and managers are more likely to engage in criminal behavior. Whether economic and structural strains conduce to environmental offenses more often than other types of crime is unclear, but water permit noncompliance by plants in the U.S. pulp and paper industry increases as compliance costs increase and, presumably, profits are threatened (Helland 1998).

As compared with firms that do not commit crimes, offenders may be distinguished also by cultures conducive to illicit conduct (Beamish 2000; Hochstetler and Copes 2001). This link between organizational culture and the incidence of criminal behavior has been pointed to repeatedly by corporate crime investigators (e.g., Baucus and Near 1991;

Shover and Hochstetler 2001). Empirical research into the relationship is rare, however, and its presumed strong contribution to variation in firm-level environmental crime remains largely untested (Yeager 1986).

A. Characteristics

Only a start has been made at describing the demographic characteristics, perceptions, motivations, and behaviors of individual environmental criminals (Situ 1998). Evidence from studies of incendiarism in southern forests shows that "latent arsonists," persons who "departed from acceptable views regarding burning of woods" in their rural communities, "consistently held attitudes negative to fire prevention and forest conservation; they did not interact a great deal with persons outside their communities; they were less integrated into their larger communities." Investigators also found latent arsonists to be older. In addition, they were "less educated, and most of them were social isolates" (Bertrand and Baird 1975, p. 18). The U.S. Sentencing Commission publishes annual summary data on the characteristics of persons convicted of environmental and wildlife crimes in U.S. district courts. Comparison of the characteristics of convicted environmental/wildlife offenders with data for federal street criminals shows clear differences. Table 1 shows that convicted environmental offenders are older than offenders sentenced for robbery, burglary, and larceny; they are better educated; they are white more than African American and Hispanic; and they are less likely to be U.S. citizens. Women compose 5.2 percent of convicted environmental offenders but 22 percent of federal offenders convicted of robbery, burglary, and larceny. Inability to determine how the characteristics of convicted offenders compared with environmental criminals who go unapprehended and unprosecuted means that the representativeness of this picture is unknown. As with other types of crime, presumably environmental offenders vary in the seriousness and extensiveness of criminal participation. One investigator distinguishes situational, routine, and entrepreneurial offenders (Rebovich 2002).

The picture of organizational environmental criminals is clear only in outline. Data on organizations prosecuted for federal environmental crimes show them as a group to be larger than firms sentenced for federal economic offenses; 42 percent of organizations sentenced in 1988 were on the Standard and Poor Index as compared to 20 percent of firms sentenced for corporate economic crimes (Cohen 1992). More recent data are not available. Firestone (2003) analyzed data on EPA decisions in 325 cases of criminal, civil, and administrative violations for the

TABLE 1

Characteristics of Individuals Sentenced for Federal Environmental/ Wildlife Crimes and Street Crimes, United States, 1995–2001

Characteristic	Environmental Offenders	Street Offenders*
Average number of cases annually	311.0	4,316.9
Percent of total federal criminal cases	.3	8.7
Race (percent African-American and Hispanic)	22.1	48.7
Gender (percent male)	94.8	78.0
Age (average annual percent):		
Under 21	2.2	9.6
21–30	16.1	37.0
31–40	30.5	29.0
41–50	27.1	16.3
Over 50	24.2	8.2
Average age	41.7	31.5
Education:		
Less than high school	26.8	29.8
High school graduate	35.2	41.1
Some college	24.0	23.8
College graduate	31.2	5.3
Average annual proportion sentenced to jail or prison	28.1	66.1

SOURCE.—U.S. Sentencing Commission, Annual Reports (1995–2001).

*Street offenders include defendants convicted of robbery, burglary, and larceny.

period 1990–97. Fifty-three sentenced defendants (16 percent) were organizations. Corporations were two-thirds more likely to be the target of enforcement efforts, but they were two-thirds less likely to be targets of criminal prosecution. In addition, while smaller organizations are nearly 40 percent of targeted organizational violators, they make up more than 60 percent of firms that were targeted criminally (Firestone 2003). The scarcity and quality of data on organizational offenders and their fates are in contrast to more abundant and reliable data on individual offenders (Alexander, Arlen, and Cohen 1999).

B. Decision Making

Decades of research have laid bare the decision-making dynamics of many types of street criminals. We know, for example, that they routinely make decisions to offend in circumstances populated by young males in which the use of illicit drugs is commonplace.

Individual and collective mood often cause decision makers, if they calculate at all before acting, to assign grossly distorted value to some utilities while entirely ignoring others, which would appear to external observers to be fundamental. This includes the painful consequences of arrest. Remarkably little is known about decision making by environmental criminals. There are studies of accidents and mistakes in the workplace, but the methodologies used to study street-offender criminal decision making have not found use in studies of environmental crime (Vaughan 1996, 1998, 1999).

Rational-choice theory may capture and describe well decision making by environmental criminals, in part, because white-collar individuals are commonly supposed to be more rational in decision making than street offenders. Unlike the latter, they do not routinely do so in hedonistic contexts of competition and display where drug consumption clouds both judgment and the ability to calculate beforehand. Nor do white-collar offenders make decisions in leisure contexts that are populated overwhelmingly by young males. Instead, they live and work in worlds structured to promote, monitor, and reward rational decision making. They and their decisions are meant to be restrained, and most derive self-satisfaction from being restrained. There are reasons then to predict that the crimes of white-collar organizational offenders are more deliberative than the crimes of street criminals.

Little more than a start has been made in examining sources of variation in individual-level environmental crime (e.g., Firestone 2002). The offenses and offenders cluster toward less serious and unsophisticated types of crimes. Studies of deer and lobster poachers (Forsyth and Marckese 1993; McMullan and Perrier 1998; Eliason 1999; McMullan and Perrier 2002), fishermen who violate a net ban on mullet fishing (Kelley 2001), and Malaysian fishermen (Kuperan and Sutinen 1998) confirm that individual environmental criminals have little difficulty justifying their actions through the use of accounts and techniques of neutralization. In some organizations and locales these are widely shared, approvingly used, and justifiably seen, therefore, as cultural phenomena. Historically, woods arson in some areas of the rural American South was seen as a way of getting back either at private enemies or at timber companies for policies considered unfair to landowners and hunters (Bertrand and Baird 1975). Research into corporate decisions to implement environmental management systems suggests that they do so because of high compliance costs, market

pressure, public pressure, and fear of environmental liability (William and Anton 2002).

VI. Nonstate Responses to Environmental Crime

Because a form of conduct is demonstrably and seriously injurious does not ensure it will be the focus of private or public controls. Research (Pendleton 1997) conducted in British Columbia, Canada, examined the factors contributing to the criminalization of behavior affecting rural areas such as logging. The investigator determined that only when harm done to the environment exceeded publicly tolerable thresholds of size, harmfulness, and visibility was the Canadian Forest Code amended to provide severer sanctions for logging-related environmental offenses.

A. Citizens

Concern for the natural environment emerged in the general public during the 1960s and 1970s as a response in part to widely publicized cases of environmental degradation. The resulting social movement over time gained widespread support (Dunlap 1992; Mitchell, Mertig, and Dunlap 1992). Its impact arguably is seen in changing perceptions of crime severity; many citizens now believe that some environmental crimes are as serious as some street crimes. The seriousness of crimes generally is assessed in public opinion polls in which respondents are presented with vignettes that describe specific criminal acts and the harm they caused (e.g., Rossi et al. 1974; Schrager and Short 1980; Wolfgang et al. 1985). A study supported by the U.S. Sentencing Commission and conducted in 1994 asked a national sample of citizens for their opinions of the appropriate penalty for a large number and variety of crimes. The results confirm generally that citizens rank willful crimes in which there is physical harm to victims as more serious. As the investigators note, "evidence of a harmful impact leads to an increase in the median sentences, depending on the kind of impact" (U.S. Sentencing Commission 1995, p. 120). Environmental crimes committed intentionally that result in injury or loss of life are seen by the public as especially serious (Rossi and Berk 1997).

Another response to environmental degradation associated with industrial production in developed countries is the emergence of environmentally focused political parties (Rudig 1991; Marangudakis 2002). Often described as "green" parties, these organized social movements espouse an amalgam of philosophical and political positions.

Typically they promote ecological, grassroots democracy, social justice, and nonviolent values. Many advocate public policies marked by decentralization, community-based economics, respect for diversity, and global responsibility. They share a future-oriented perspective (University of Kentucky 2003).

It is not yet clear to what extent these "green" social movements or organized political parties shape the form and extent of environmental regulation, control, or compliance. Analysis of the emergence of a private regulatory scheme for ameliorating environmental problems in the forest products industry points to social movement campaigns that targeted offending corporations as a key factor (Bartley 2003). There is more evidence that they may directly influence the creation of environmental policy (e.g., Doherty 1999; Barry and Doherty 2001; Kainer et al. 2003). This emphasis on the degree to which domestic social movements influence national-level environmental policy contrasts with the suggestion that increased nation-state environmentalism more likely results from an emerging norm that nations have a responsibility to protect their natural environments (Frank, Hironaka, and Schofer 2000).

Other evidence of the significance of the environmental movement is seen in information disclosure programs adopted by the federal and many state governments. These programs are premised in the belief that they improve corporate environmental compliance. Specifically, when the state provides information about compliance, the costs of collective action and private monitoring efforts are reduced. This enables citizens and "watchdog" groups to pressure polluting firms to improve their performance. Public information programs also motivate firms to reduce pollution voluntarily so as to avoid bad publicity and the problems this can bring. Environmental justice research shows also that organization and action by private citizens is fueled by public information about the inequitable distribution of environmental harm. Information disclosure programs also may reduce pollution levels indirectly by raising the salience of pollution on the agendas of political actors (Stephan 2002).

The U.S. Clean Water Act permits private citizens to bring civil suits against polluters to force compliance with specific provisions of the act (Jalley et al. 2002). Analysis of data from the Toxic Release Inventory suggests that states with substantial funding for citizen right-to-know programs or right-to-sue legislation have significantly lower toxic emission rates over time (Grant 1997). There is evidence also that

information disclosure programs are a significant factor in facilitating successful suits against violators of the Clean Water Act by residents of communities with high cancer rates (Stephan 2002).

The mainstream environmental movement is composed of and represents the interests of predominantly the white, professional middle class. By contrast, grassroots and minority activists began mobilizing in the 1980s to address health concerns raised by the disposal of toxic materials (Szasz 1994). The resulting environmental justice movement is made up noticeably of African Americans, Latinos, and Native Americans. The primary objective of their action is improved health, particularly in minority communities. Some advocate engaging corporations to reduce pollution or to improve compliance with environmental regulations through stakeholder negotiations and agreements (Pellow 2001).

B. Business Organizations

The success of the environmental movement and the growing body of environmental protection legislation met with resistance from business interests. Their efforts are aimed at shaping public policy while avoiding rule-making setbacks (Austin 2002). One response by industry to criminalization movements is adoption of "environmentally friendly" business practices. This "green management" includes eco-labeling, ecoauditing, ecoaccounting, ecomarketing, environmental-quality life-cycle analyses, environmentally oriented management systems, environmental compliance programs, process reforms, and environment-focused research and development. Green firms also work to use fewer natural resources and to do so more efficiently, to reduce the environmental impact of their business practices, and to weigh economic and environmental objectives equally in policy making (DiMento and Forti 2001).

VII. Regulatory and Criminal Justice Responses to Environmental Crime

Like private citizens, the state can turn a blind eye toward harmful behaviors or choose to make them the focus of attention. It can take the lead in identifying and crafting controls, or it can wait until pressed to do so through action by citizens and organized groups. The outcome of campaigns for new or tougher controls on a form of conduct is never assured, however. Many harmful practices and behaviors do not win the kind of popular condemnation and movement strength needed

for successful criminalization, and this may be true particularly of campaigns to impose new or more effective controls on business interests. The consequences can be illogical. Clear-cutting old growth forest is permissible, while cultivating hemp fiber and similar environmentally benign alternatives as timber substitutes is prohibited (Halsey 1997).

Efforts to restrict corporate conduct invariably meet with opposition from trade and professional organizations who charge that the proposed rules either are unnecessary and heavy-handed examples of big government or harm legitimate economic interests. The actions of business interests are moved by the wish to avoid restrictions on their autonomy and, if loss or concession seems unavoidable, to accept the obligation to do only what is "practicable." When it does act, the state can fashion responses and remedies from revocation of professional license to civil penalties and, ultimately, to criminal prosecution. The bulk of the state's effort and output, however, is rules that carry minimal civil penalties for most forms of environmental rule breaking. The body of statute law that organizations and citizens are expected to meet is small when compared with the volume of regulatory rules that confronts them. Corporate interests and their representatives play an active and influential part in crafting the laws and rules that proscribe their conduct (Yeager 1987, 1992).

A. Regulatory Agencies

Regulatory inspectors make up the front ranks of those who oversee compliance with environmental rules, which helps explain why they and their work have received considerable attention (Lynxwiler, Shover, and Clelland 1983; Hawkins 1984; Hutter 1986, 1988; Fineman and Sturdy 1999). Like all street-level bureaucrats, they face the challenge of applying law on the books to the variable specifics and meanings of violation. The resulting body of law in action can depart significantly from the intentions of legislative framers. Some locate the source of these regulatory deviations in resource constraints on enforcement bureaucracies (Helland 1998). Others, however, point to overarching structural conditions, organizational dynamics, and the practical challenges of street-level implementation as reasons why policy reforms generally do not work as planned. Interviews with thirty-one game wardens charged with enforcing wildlife conservation laws show that experienced game poachers have substantial advantages over enforcement personnel. One is their detailed knowledge of the

areas where they poach. They are advantaged also by secrecy; because game wardens are heavily dependent on informants, poachers who do not talk to others about their activities are more successful at evading arrest than are occasional poachers (Forsyth 1993). Where they find evidence of serious, willful violations or a pattern of violations, inspectors in most jurisdictions may elect to refer the matter for criminal investigation and prosecution. In the United States, and in other nations as well, criminal referrals and prosecution are used sparingly by environmental protection agencies (e.g., Grabosky and Braithwaite 1986).

The nature and intensity of regulatory enforcement varies spatially and temporally. Criminal referral rates by the U.S. Environmental Protection Agency, for example, differ for the agency's ten regions (U.S. Environmental Protection Agency 2002*d*). The reasons for variation in enforcement are several, but the size and complexity of regulated entities is an important one (Shover, Clelland, and Lynxwiler 1984). Regions where production is characterized by large, capital-intensive operations may see oversight quite different than regions where there are large numbers of small and potentially mobile operations. The intensity of regulatory oversight is constrained also by limited resources and by concern for local economic interests, particularly the need to maintain acceptable levels of employment (Dion, Lanoie, and Laplante 1998; Helland 1998). The same is true of local prosecutors; on occasion they do not aggressively pursue crimes committed by local businesses for fear of harming the local economy and employment (Benson and Cullen 1998). Plant inspections decline in frequency as area unemployment rises (Dion, Lanoie, and Laplante 1998). The likelihood of self-reporting and the severity of penalties, however, are reduced by depressed economic conditions at targeted plants and in surrounding communities (Helland 1998).

State and federal regulatory officials routinely carry out regulatory inspections, issue notices of violations, and make referrals for possible administrative, civil, or criminal sanctions. The rate of regulatory inspections fluctuates substantially from year to year. From a nine-year high of 23,000 EPA inspections in 1998, the number declined to 17,668 in 2002 (U.S. Environmental Protection Agency 2003*c*, 2003*d*). The greatest number of violations normally involve violations of the Clean Water Act, the National Pollution Discharge Elimination System (NPDES) permit restrictions, or the Safe Water Drinking

Act (U.S. Environmental Protection Agency 2002*a*, 2002*c*). A small percentage of detected violations are referred to the Department of Justice for prosecution. The EPA normally has a higher rate each year of referrals for possible civil action by U.S. attorneys than those referred for criminal prosecution. In 2002, 342 civil referrals were made compared to 250 criminal referrals (U.S. Environmental Protection Agency 2002*e*, 2003*c*).

Studies of the impact of regulation generally support theoretically based predictions of an inverse relationship between the intensity of regulation and compliance (Magat and Viscusi 1990; Gray and Deily 1996; Laplante and Rilstone 1996; Nadeau 1997). Research on the oil transport industry and North American pulp and paper mills suggests that reductions in pollution levels and greater compliance are associated with increased regulatory oversight (Cohen 2000). A study of state enforcement of NPDES permits for pulp and paper plants in thirty U.S. states shows that targeted enforcement by regulatory agencies increases self-reporting overall. Also, environmental harm, as measured by the volume and frequency of oil spills, is inversely related to the number of port enforcement hours (Epple and Visscher 1984), type of port monitoring activity (Cohen 1987), and the perceived probability and targeted enforcement approach (Viladrich-Grau and Groves 1997). For facilities in the pulp and paper industry, a study by Laplante and Rilstone (1996) demonstrated that reductions in emissions were associated with the frequency of inspections. Their study of water pollution control of pulp and paper plant discharges in Quebec reveals that inspections and other monitoring actions are more likely for plants whose emissions pose a greater threat to the environment and are visible to constituents in the surrounding community.

Limited research examines the relationship between regulatory enforcement and individual offenders. One example found the EPA more likely to employ criminal sanctions for employees versus administrative or civil sanctions for individual offenders with ownership interests. In addition, offenders with small firms are seven times more likely than those with large firms to receive administrative or civil penalties (Firestone 2002).

Both organizations and corporate officers or employees may be held liable under federal environmental statutes (Page et al. 1999). In 1991, 80 percent of federal environmental defendants were organizations. In 1995, organizational defendants were 20 percent of all federal criminal defendants (Page et al. 1999). Research into factors that shape

regulatory enforcement decision making shows that violators' political importance and violation characteristics both play a part (Deily and Gray 1991; Dion, Lanoie, and Laplante 1998; Helland 1998). The severity of EPA penalties for small firms varies with regulatory estimates of offenders' real or potential gain from noncompliance and the level of harm caused by it (Lear-Nordby 1998). The mixed findings from studies of regulatory monitoring suggest that political considerations may exert stronger force on regulators who are more proximate to violators, suggesting perhaps the value and need for a federal enforcement presence (Firestone 2002).

B. Investigative Agencies

In the United States and many other nations, responsibility for enforcing environmental protection statutes is shared by national and subnational agencies. Local police and prosecutors generally do not have the expertise or budgetary resources to take on and investigate any but the most straightforward cases of environmental crime. More complex and sophisticated crimes require state or national-level personnel and expertise (U.S. Department of Justice 1994). The complexity of many environmental crimes necessitates a task force approach, which draws from the expertise of a host of regulatory and law enforcement agencies (Hammet and Epstein 1993).

In the United States, the federal Environmental Protection Agency and federal, state, and local law enforcement agencies cooperate to investigate and prosecute violations of environmental law. The Federal Bureau of Investigation is the principal federal-level agency that targets environmental crime. Its investigations frequently involve but are not limited to the illegal disposal of hazardous waste, illegal discharge of pollutants into waterways, illegal importation of certain restricted or regulated chemicals into the United States, tampering with drinking water supplies, and mail fraud, wire fraud, conspiracy, and money laundering relating to environmental criminal activities.

Besides referrals from police officials and regulatory personnel, investigators receive allegations or reports of environmental crime from citizens who may be aware of or have grown concerned about circumstances that appear improper. Whistle-blowers employed by business firms that violate environmental protection requirements are another source. In 2002, for example, crew members aboard a Danish oil tanker secretly notified the U.S. Coast Guard of a hazardous leak. Coast Guard officers subsequently found both the leak and directions from shipping

company officials that the leak not be reported. As provided for in federal statutes, the two crew members who notified the Coast Guard were awarded one-half of the criminal fine ($250,000) assessed in the case (U.S. Department of Justice 2002). In January 2003, the U.S. Sentencing Commission issued new sentencing guidelines meant to enhance protection of whistle-blowers (Solow 2003).

When they investigate complaints, officials routinely encounter behaviors that can range from straightforward and easily understood acts to the complex behaviors of many individuals that are difficult to comprehend and reconstruct. The organizational veil can obscure and make virtually impossible the task of determining who was responsible, who participated, and how the crimes occurred. These are among the reasons why reactive enforcement may be dispensed with in favor of techniques commonly employed against syndicated crime. Surreptitious surveillance, informants, and sting operations all find use. Threats and inducements also can be used to obtain information from knowledgeable participants about how crimes occurred and those who participated. For this reason, culpable key participants in environmental crimes may avoid harsh penalties; their centrality and the information they provide give them bargaining power with regulators and prosecutors.

C. Prosecutors

Criminal prosecution of environmental offenders occurs infrequently. Under provisions of the 1899 Refuse Act, which prohibits discharge of refuse in navigable waters, U.S. attorneys prosecuted twenty-five cases during the 1970s (Cohen 1992). In 1981, environmental crime units were established in the EPA and in the U.S. Department of Justice (Cohen 1992). Criminal prosecutions increased modestly in the ensuing thirty years. The total number of cases stood at 484 for 2002, and it has never exceeded 636 for any year (Adler and Lord 1991; DiMento and Forti 2001; U.S. Environmental Protection Agency 2003*c*, 2003*d*).

When prosecutors screen cases of corporate crime, they pay particular attention to the presence and extent of physical harm to victims, whether there was evidence of multiple offenses, the extent of economic harm caused by the conduct, evidence of continuing noncompliance after regulatory notification, and the strength of evidence (Cohen 1992; U.S. Department of Justice 1994; Benson and Cullen 1998). The U.S. Department of Justice considers several additional factors in deciding

whether to file criminal charges. They include whether the offender voluntarily disclosed violations and the timeliness and degree of cooperation. Also considered is whether there are existing preventive measures and compliance programs, whether there is a pattern of noncompliance, and whether sanctions were imposed earlier for noncompliance (Page et al. 1999). There is a recent trend toward indicting corporate officers instead of or in addition to their organizational employers (Jalley et al. 2002). Of 703 offenses of environmental crime prosecuted by federal authorities during 1983–90, 70 percent involved indictments against individuals within a firm, with 52 percent of individual indictments against presidents, owners, vice presidents, directors, or corporate officers (Cohen 1992).

There were 571 convictions of organizational offenders for environmental crimes from 1983 to 1991, although most occurred in the final two years (Thornburgh 1991). For reasons that are unclear, the distribution of organizational and individual defendants has fluctuated dramatically; organizations were 80 percent of defendants in 1991 but only 20 percent in 1995 (Page et al. 1999). In the United Kingdom from 1984 to 1990 criminal prosecutions of environmental offenses were 10–15 percent of corporate prosecutions. Eighty-eight percent were settled by guilty pleas (Cohen 1992).

D. Courts and Judicial

Relatively few environmental crimes that become known to enforcement agencies are resolved in criminal proceedings. Under U.S. sentencing guidelines, environmental violations are divided into four categories of seriousness: knowing endangerment of human life, violations involving hazardous or toxic substances, those involving other pollutants, and conservation and wildlife offenses (Adler and Lord 1991). Frequently, environmental criminals, particularly organizational defendants, are permitted to plead guilty to a small number of charges as representative of many more.

Data on public corporations sentenced for federal crimes from 1988 through 1996 show that environmental offenses composed approximately 20 percent of all cases. The severity of penalties imposed on convicted defendants increased following implementation of revised federal sentencing guidelines in 1991 (e.g., Alexander, Arlen, and Cohen 1999). Data are available currently only for the period 1995–2001, and they are summarized in table 2. As can be seen, from 1998 to 2001 approximately 25 percent of all organizations sentenced for a list

TABLE 2

Organizations Sentenced for Environmental/Wildlife Crimes, United States, 1995–2001

Characteristic	1995	1996	1997	1998	1999	2000	2001
Total number of organizations sentenced annually	108	155	222	213	255	304	238
Number of organizations sentenced for environmental crimes	22	25	49	54	70	74	61
Number of organizations with fine imposed	19	20	46	51	61	65	56
Mean fine imposed ($ million)	.11	4.76	.31	.17	1.30	1.31	1.47
Median fine imposed ($ million)	.050	.198	.060	.060	.153	.442	.210
Number of organizations with restitution imposed	5	6	16	15	22	22	16
Mean restitution imposed ($ million)	.13	.78	.73	.12	.70	2.22	5.33
Median restitution imposed ($ million)	.30	.77	.43	.48	.76	.99	.846

SOURCE.—U.S. Sentencing Commission, Annual Reports (1995–2001).

of designated offenses were environmental offenders. The majority received only a fine or were ordered to pay some amount of restitution. The size of monetary penalties imposed on convicted organizational offenders is small when compared with penalties imposed on economic white-collar criminals. This is the lesson of table 3, which presents the comparison.

While there is evidence of a modest increase in punishment severity in recent years, research into the calculus of deterrence consistently shows that estimates of the certainty of punishment are a more important damper on crime than estimates of the penalty (Simpson 2002). There are no measures of the certainty of being caught and punished for environmental crimes. It is unclear whether the increased focus on environmental crime in recent years can be sustained in the wake of events of September 11, 2001. Federal efforts directed at terrorism have pulled away significant resources that formerly were invested in control of environmental crime.

Individual offenders are more likely to receive criminal than administrative or civil sanctions for violating environmental laws. Administrative and civil penalties are seven times more likely to be assessed on small firms than on large ones (Firestone 2002). These offenders also tend to be midlevel managers rather than top corporate officers (Adler and Lord 1991). Individuals convicted of federal environmental offenses may receive penalties in the form of fines, probation, or prison terms. The average fine imposed for individual offenders of various federal environmental statutes never exceeded $5,000 from 1983 to 1989. The average prison sentence imposed during the same period ranged from five days to almost eleven months (Adler and Lord 1991).

VIII. Changing Control Styles and Environmental Compliance

Investigators have distinguished alternative "control styles" on the bases of the underlying crime control ideology and the apparatus and strategies typically employed to control corporate conduct (Reiss 1984; Kagan 1989). Control ideologies are beliefs about the general nature of corporate officers and managers, the causes of corporate environmental crime, and appropriate strategies for minimizing its occurrence.

A study of the enforcement of water protection laws in the Czech Republic from 1988 to 1992 examines penalties assessed on businesses following water-damaging accidents. Few sanctions were imposed on military and foreign entities, but heavy industry received harsh

TABLE 3
Monetary Penalties Imposed on Organizations Sentenced for Environmental/Wildlife and Economic Crimes, United States, 1995–2001

Characteristic	Environmental Crimes	Economic Crimes*
Average number of organizations sentenced with monetary penalties	50.7	102.3
Average number of organizations sentenced with fines	45.4	74.4
Mean fine imposed ($ million)	1.35	18.3
Median fine imposed ($ million)	1.68	1.59
Average number of organizations sentenced with restitution	14.6	38.6
Mean restitution imposed ($ million)	.65	2.25
Median restitution imposed ($ million)	1.63	1.31

SOURCE.—U.S. Sentencing Commission, Annual Reports (1995–2001).
NOTE.—Monetary penalties include fines and restitutions.
* Economic crimes include antitrust, fraud, and tax offenses.

sanctions. Penalty size also varied according to the type of water source affected; accidents that affected groundwater supplies drew larger penalties (Earnhart 1997).

A. Deterrence-Based Approaches

The "deterrence style" embodies an ideological conception of corporate actors as self-serving and calculating actors who are selectively indifferent to public welfare. Because they are believed to respond primarily to profit considerations and power, countervailing force, usually in the form of state coercion, is needed to restrain them. Strict and closely administered external controls are mandatory if corporations are to act responsibly. Known as command-and-control regulation, this approach incorporates legal threats, inspections, and the mechanical imposition of penalties for noncompliance.

Case study research designs have been put to good advantage in studies of regulatory bureaucracies and processes. In several countries, a large number of regulatory bureaucracies and practices were examined including some studies of multiple agencies and locales. There are

excellent studies of the organizational and practical consequences of new statutes and policies meant to enhance environmental protection (e.g., Barnett 1994). Evidence from this and other research suggests, however, that the adversarial nature of command-and-control regulation fosters resentment and mistrust, at least in some industries or industry sectors. It fuels resistance to enforcement, which escalates the costs of oversight and diminishes its effectiveness. The 1970s saw support for and the hegemony of the deterrence style as the U.S. Congress created new federal regulatory programs with enhanced enforcement powers (Shover, Clelland, and Lynxwiler 1986; Yeager 1992; Barnett 1994).

B. Flexible Enforcement and Responsive Regulation

The official favor enjoyed by the deterrence style waned rapidly in the 1980s. The Reagan administration rejected the deterrence ideology and sharply reduced the number of enforcement personnel in many regulatory programs. The diminished federal role was coupled with an abrupt shift of regulatory responsibility to state-level agencies and by increasing reliance on corporate self-regulation (Braithwaite 1983).

"Responsive regulation" is regulation that is both "attuned to the differing motivations of regulated actors" and flexible in efforts to enhance compliance (Ayres and Braithwaite 1992, p. 4). Regimes of responsive regulation are counseled to be knowledgeable about and to take into account the problems, motivations, and conditions behind noncompliance. Evidence suggests that a high proportion of noncompliance is explained by ignorance of requirements rather than willfulness (Brehm and Hamilton 1996). The fundamental assumption is that a substantial proportion of firms will self regulate with minimal external monitoring so long as they are treated fairly by regulatory officials and are met with understanding or assistance should they encounter problems doing so (Tyler 1990; Makkai and Braithwaite 1996).

Emphasis, therefore, is placed on educating firms about rules and assisting them in efforts to comply, and programs that rely principally on threats and the mechanical imposition of penalties are de-emphasized. For firms that fail to comply despite educative and cooperative efforts, officials may escalate their responses and sanctions accordingly. While ordinarily kept in the background, the availability of severe sanctions coupled with officials' clear willingness to employ them if necessary pushes firms of a more resistant bent toward compliance or to punish those who commit serious or repeated

violations. Consequently, programs of responsive regulation legitimize and make available to officials a range of options, from voluntary assistance programs to sanctions (Gunningham and Grabosky 1998; Grabosky 2001; Firestone 2002).

Many regulatory initiatives are compatible programmatically with responsive regulation—targeting, inspection targets, and the use of fines—and focus exclusively on action taken against private corporations (Firestone 2002). Anderson and Talley (1995) determined that Coast Guard patrols to detect oil spills are more effective than random vessel compliance inspections in reducing the size of some accidental oil spills. Also, smaller spill size is associated with closer oversight of vessels, particularly those owned by domestic shippers (Anderson and Talley 1995).

Other suitable targets presumably include the syndicated criminal organizations that are quick to exploit the opportunities presented by environmental protection legislation (Block and Scarpitti 1985; Szasz 1986; Rebovich 1992; Hyatt and Trexler 1996). Distinguished chiefly by their hierarchical nature, these organizations are a marked contrast in operational style and longevity to the entrepreneurial organizations established and operated by offenders who operate more democratically (Shover and Bryant 1993). It has been suggested that environmental crimes committed by syndicated criminals in the New York construction and medical waste disposal industries respond not only to changing market forces but also to the intensity of oversight (Carter 1997).

Critics of cooperative approaches to environmental regulation fear it opens the door to increasing corporate influence on the nature and intensity of the oversight they must endure (Rechtschaffen 1998; Snider 2001). As to the comparative effectiveness of deterrence and cooperative approaches, compliance rates of Canadian and U.S. pulp and paper mills suggests that the latter's deterrence-based enforcement approach results in higher rates of environmental compliance than the former's cooperative approach (Harrison 1995).

IX. Research Agenda

Technological change and the growing importance of transnational corporations (TNCs) have widened in unprecedented fashion the population at risk of victimization by environmental crime. The same changes have increased the challenges faced by all who study and struggle to control it. The difficulties of controlling environmental

crime were enormous in a world of national economies and domestic corporate actors, but the ability of corporations to shield their operations behind the laws of friendly nations complicates substantially the challenge of controlling them. The most attractive resources for use in industrial recruitment for many nations is cheap labor and weak regulation, and TNCs are in an increasingly powerful position to influence crafting of the statutory and regulatory standards they are expected to meet.

Global trade and development throws into sharp relief the problem of determining which rules will be used as standards for individual and organizational behavior. Should environmental crime be defined to include violations of international agreements that perhaps do not violate criminal statutes of all states or nations? When firms do business in countries with inconsistent laws and rules, which are the standards for determining criminal conduct?

Although the signatories to international trade agreements typically pledge to adopt and enforce elementary regulatory standards for environmental protection in their home countries, nations are not uniformly and adequately prepared to monitor these conditions. Third World countries may be incapable of resisting or effectively controlling industries' self-interested interpretation of rules and their environmentally destructive actions. Corporate owners and managers can threaten to relocate to jurisdictions with less restrictive regulatory approaches, with the resulting loss of jobs and tax revenues. Police and prosecutors in most local jurisdictions and many nations do not have the budget, expertise, or other resources needed to pursue cases of environmental crime aggressively. Issues of national sovereignty also complicate development of a coherent international environmental law and credible enforcement (Cho 2001). The willingness of states to confront environmental crime flags under the exigencies of competition and business claims that oversight is unnecessary and costly.

The most significant change in the context of control of environmental crime is the move away from deterrence-based strategies. Command-and-control regulation has given way to cooperative and flexible enforcement, and it has pushed to the background theoretical and research interest in state regulation. This is a stark contrast to the harsh and intrusive measures taken to curb street criminals in the past three decades. The move increasingly is to identify nonstate sources of environmental constraint on organizations and compliance. Interest in

"corporate governance" is testimony to the strength of this movement; organizations increasingly are pushed to establish and provide evidence of successful internal control mechanisms.

There continues to be vigorous debate over the efficacy of deterrence-based and flexible enforcement regimes. Advocates for responsive regulation point to the need to maintain a credible enforcement "big gun" if compliance is to be managed efficiently and effectively. There is need for empirically based assessments of the strengths and shortcomings of these regulatory approaches (Ayres and Braithwaite 1992). This is not to devalue the considerable legacy of research on environmental compliance and crime. Given substantial variations in the samples employed in these studies, the scope of the data, industry technology, the nature and intensity of external enforcement, and overall levels of compliance in different industries, it is unclear to what extent findings can be generalized to other industries, locales, and firms (Cohen 2000). It may be useful to consider whether a tightened theoretical and policy circle can be drawn around environmental crime by research that draws it closer to investigations of environmental harm. Do rates covary spatially and temporally? Does the distribution of environmental crime vary directly with environmental harm? If so, can one serve as proxy for the other?

The tendency to focus attention on organizational offenders and away from individual ones has created a striking imbalance in what is known about these two forms of environmental crime. There is remarkably limited understanding of the perspectives of offenders convicted of environmental crime either as individual offenders or as organizational ones. Ethnographic research on decision making has given policy makers a nuanced and rich understanding of street criminals over recent years. All decision making makes up a single field of study, and investigations of environmental crime can learn and borrow from this body of work. The potential value of doing so lies in the fact that regimes of responsive regulation place a premium on knowing about the industries, entities, and individuals they are charged to regulate. In addition, there is little data describing the accounts and experiences of victims of environmental crimes. Greater attention to the characteristics of offenders and collection of self-report data could help illuminate theoretical questions about crime specialization and environmental criminal careers. In this direction might be found answers to whether environmental crime and illegalities covary in patterned ways.

The absence of systematically collected, collated, and routinely disseminated data on environmental crimes makes it difficult to meet the challenges posed by environmental crime. Better data and data systems must be made available in forms and ways useful to investigators and control agencies. As Rebovich (1998, p. 349) notes, "a major barrier to the effective control of environmental crime is the absence of an effective, centralized information-sharing mechanism" for environmental crime data.

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