

Criminal sanctions for agricultural violations of the Clean Water Act[☆]

Dennis C. Cory^{a,*}, Anna Rita Germani^b

^aDepartment of Agricultural and Resource Economics, University of Arizona, Tucson AZ 85721, USA

^bIstituto di Economia e Finanza, Facolta' di Giurisprudenza, University of Rome, La Sapienza,
Piazzale Aldo Moro, 5, 00185 Rome, Italy

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Abstract

Public enforcement of the Clean Water Act (CWA) has been characterized by the increased use of criminal sanctions over the past decade. This sanctioning trend has developed in direct response to the passage of the Sentencing Reform Act (SRA) as part of the Comprehensive Crime Control Act of 1984. New sentencing guidelines were established in 1987 under which courts were required to impose sentences which reflect the seriousness of the offense, provide just punishment for the offense, and afford adequate deterrence to criminal conduct. Legal trends are documented for both industrial and agricultural violations as a result of applying the new federal sentencing guidelines to CWA cases. The efficiency implications of the SRA are evaluated in the context of a model of the public enforcement of environmental law. It is concluded that fault-based standards of liability and the use of mixed fine/incarceration sanctions are appropriate for agricultural violations of the CWA.

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1. Introduction

Criminal sanctions for significant violations of the Clean Water Act (CWA) have varied dramatically over the past decade. In *United States vs. Wells Metal Finishing* (1991),¹ John Wells and his metal finishing company were convicted of knowingly discharging hazardous pollutants in

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*Corresponding author. Tel.: +1-520-621-4670; fax: +1-520-626-3070.

E-mail addresses: dcory@ag.arizona.edu (D.C. Cory), anna.germani@uniroma1.it (A.R. Germani).

¹922 F.2d 54 (1st Circuit 1991).

violation of CWA provisions. The discharge contained levels of zinc and cyanide vastly in excess of federal pretreatment limits that inhibited the sludge process of the treatment plant of the City of Lowell (Massachusetts) that flows in the Merrimack River, a drinking supply for numerous downstream communities. Wells was found guilty of systematically discharging wastewater into the municipal sewer system, and sentenced to 15 months of imprisonment and 1 year of supervised release. No monetary fine was imposed. In contrast, in *United States vs. Gienger Farms* (1995),² farm managers discharged approximately 1.3 million gallons of manure-laden wastewater into drainage ditches into Tillamook Bay, in Oregon, without a permit. In response to an Environmental Protection Agency (EPA) administrative complaint, the farm was assessed a \$20,000 penalty. No period of incarceration or probation was imposed. More recently, in *United States vs. Johnson* (2000),³ the defendant, Glenn Kelly Johnson, general manager and president of Johnson Properties, was convicted of failing to maintain wastewater treatment plants and knowing discharge of pollutants in violation of the CWA. Failing to maintain wastewater treatment plants according to CWA requirements can lead to the release of harmful levels of *Escherichia coli* bacteria and other microscopic organisms that can produce intestinal illness in humans and harm aquatic organisms and wildlife. At sentencing, the district court sentenced Johnson to 36 months of imprisonment with 3 years of probation, and a fine of \$500,000. Again, by way of contrast, in *United States vs. Rockview Farms* (1999),⁴ a California corporation which owned and operated a dairy farm in Nevada illegally discharged 1.7 million gallons of dairy wastewater contaminated with urine and feces. As in *United States vs. Johnson*, exposure to fecal coliform and other pathogens in animal wastes can cause intestinal and other infections in humans and can also be harmful to aquatic life. At sentence, Rockview Farms was fined \$250,000 and was ordered to upgrade the dairy to prevent future discharges; the manager was fined \$5000 with only 3 years of probation.

A review of these and other similarly situated cases raises a variety of questions concerning the structuring of criminal sanctions for CWA violations: (1) why does the severity of sanctions vary significantly over time? (2) why does the severity of sanctions vary between agricultural and industrial cases? (3) why is incarceration/probation imposed in some cases, monetary fines in others, and a combination of the two in still other cases?, (4) what are the implications of current sanctioning practices for efficient enforcement of CWA provisions, and (5) is tort reform justified on economic grounds to complement and reinforce the Environmental Protection Agency's current regulatory efforts?

The principal purpose of this paper is to evaluate the use of criminal sanctions for CWA violations, particularly as they apply to agriculture. The paper is organized as follows. First, CWA requirements which affect agriculture are reviewed. Next, the federal sentencing guidelines governing CWA sanctioning are described, followed by a review of their application in selected legal cases in recent years. The paper then concludes with the presentation of a model of the public enforcement of environmental law and a discussion of the model's implications when compared to current judicial practice.

²Administrative Action, EPA Region 10, FY 1996 Enforcement and Compliance Assurance Accomplishments Report.

³US District Court of Eastern Louisiana in New Orleans, June 21, 2000.

⁴US District Court for the Eastern District of California in Fresno on 26 April 1999.

2. The CWA and agriculture

In 1972,⁵ in response to growing public concern over serious and widespread water pollution, Congress enacted the first comprehensive revision of national clean water legislation that, with some modifications, is still in place today. The result was the Federal Water Pollution Control Act Amendments⁶ now commonly referred to as the Clean Water Act (CWA).⁷ The CWA's primary objective is to "restore and maintain the chemical, physical and biological integrity of the nation's water" by minimizing the effects of water pollution.⁸ The Act focuses on improving the quality of the nation's surface waters and provides a comprehensive framework of standards, technical tools and financial assistance to address the many causes of pollution and poor water quality, including municipal and industrial wastewater discharges, polluted runoff from urban and rural areas, and habitat destruction.

Pursuit of CWA objectives presents a formidable challenge. Nearly 40% of the Nation's surveyed waters are too polluted for fishing or swimming, and agriculture is a major contributor to the problem. According to the 1998 *National Water Quality Inventory*, approximately 60% of pollution in rivers and streams and 45% in lakes come from agricultural sources. Livestock operations are particularly important in this regard. An estimated 376,000 livestock operations confine animals in the United States, generating approximately 128 billion pounds of manure each year (US Environmental Protection Agency, 2000a). Concentrated animal feeding operations (CAFOs) are the largest of these livestock operations and are regulated under the Clean Water Act.⁹

Livestock waste is a major water quality concern. Runoff from livestock operations enters water bodies when poor maintenance of waste lagoons, improper design of storage structures, improper storage of animal waste, and excessive rainfall result in spills and leaks of manure-laden water. Over application of manure to cropland is another source of animal waste runoff. When livestock manure and other animal waste spills or leaks into surface or ground water it can create an immediate threat to public health and water resources. This runoff has nutrients such as nitrogen and phosphorus that in excess cause algae and other microorganisms to reproduce in waterways, creating unsightly and possibly harmful algae blooms. Explosive algae populations can lower the level of dissolved oxygen, which can cause fish and other aquatic organisms to die. Spills from ruptured waste lagoons and other faulty storage facilities have killed tens of thousands of fish. Animal waste runoff can also be a threat to the health of people who come into contact with affected waters because some of the microbes (bacteria, protozoa, and viruses) in animal waste can cause disease.

In response to public concern about contamination of rivers, lakes, streams, coastal waters, and ground water from livestock manure and other animal wastes from livestock operations, the EPA

⁵This discussion is taken from the Environmental Protection Agency's publication EPA 833-F-00-016, an excellent introductory survey of this topic. For an in-depth discussion of the CWA and CAFO regulation, see Evans (1994) and Letson and Gollehon (1996) respectively.

⁶Pub. Law 92-500.

⁷33 U.S.C. Sections 1251–1387.

⁸Section 101 of the 1972 Act (33 U.S.C. Section 1251).

⁹The CWA also has regulatory impacts on aquatic feeding operations and on agricultural discharge of dredged or fill materials in US waters. Normal agricultural practices are exempted from regulation under CWA wetlands protocols.

and the US Department of Agriculture developed the *Unified National Strategy for Animal Feeding Operations* in March 1999, as part of the *Clean Water Action Plan* (US Department of Agriculture & US Environmental Protection Agency, 1998). The strategy includes a national goal that all Animal Feeding Operations (AFOs) should develop and implement technically sound, economically feasible, and site-specific comprehensive nutrient management plans (CNMPs) to minimize impact on water quality and public health (US Environmental Protection Agency, 2000b).

2.1. Current CAFO regulatory programs

Under¹⁰ the Clean Water Act, CAFOs are defined as point sources of pollution and are therefore subject to National Pollutant Discharge Elimination System (NPDES) permit regulations. Under these regulations, CAFOs are defined as facilities with 1000 or more animal units (AU). An animal feeding operation (AFO) that confines 300 to 1000 AU is defined as a CAFO if it discharges pollutants through a man-made structure or if pollutants are discharged to waterways that run through the facility or come into contact with the confined animals. The authority that issues NPDES permits may also designate any AFO, including those with fewer than 300 AU, as a CAFO if it meets the definitions above and is a significant source of water pollution.

Although the NPDES regulation identifies who needs a permit, the effluent guidelines establish national requirements regarding the types and amount of pollutants a permitted CAFO with 1000 AU or more is allowed to discharge. EPA established the effluent guidelines for feedlots in 1974 based on the best technology available that was economically feasible for the industry. The current effluent guidelines do not allow discharges of pollutants into the Nation's waters except when a chronic or catastrophic storm causes an overflow from a facility that has been designed to contain manure and runoff during a 25-year, 24-hour storm. Discharge limits for permitted facilities with fewer than 1000 AU are established using the permit writer's best professional judgment. Regardless of the size of a permitted facility, violation of effluent guidelines, discharge limits, or NPDES requirements can trigger a variety of enforcement actions and related sanctions (McGaffey, Hayes, Nicoll, Prezuya, & Fox, 1994).

3. Agriculture and CWA enforcement

The permitting system established under CWA statutory authority attempts to control environmental risks through the direct regulation of safety. Permittees must adhere to regulatory standards if they are to legally engage in their activities. This approach to pollution control is *ex ante* in nature in that requirements are imposed before, or at least independently of, the occurrence of harm.

In spite of substantive regulatory efforts, violations of NPDES requirements and other CWA protocols frequently occur, violations that range from routine recordkeeping irregularities to tampering with monitoring equipment to negligent disposal of hazardous materials (see Table 1).

¹⁰For a cogent evaluation of regulating animal waste from an economic perspective, see Innes (1999).

Table 1
Clean water act violations

Violation	Section	A	C
Violation of specific limits of particular pollutants in the discharge	1311	✓	✓
Violation of effluent limitations for the maintenance of water quality	1312	✓	✓
Violation of standards for the control of the discharge of pollutants for the reduction considered achievable through application of the best available technology	1316	✓	✓
Violation of pretreatment standards	1317	✓	✓
Violation of the duty to have and maintain records, make reports, install, use and maintain monitoring equipment	1318	✓	✓
Violation of the duty to notify the appropriate federal official as soon as there is knowledge of the discharge of a considerable quantity of oil or hazardous materials	1321 (b)(3)		✓
Violation of aquaculture programs	1328	✓	✓
Violation of any condition or limitation included in an NPDES permit	1342	✓	✓
Violation of any condition or limitation included in a “dredge and fill” permit	1344	✓	✓
Violation of any provision for disposal or use of sewage sludge	1345	✓	✓
Violation of any requirement imposed in pretreatment program approved under section 1342(a)(3)	1342 (a)(3)		✓
Knowing false statement in any application, record or report			✓
Knowing tampering of any monitoring device or method			✓
Introduction into a sewer system or a publicly owned treatment work of any pollutant or hazardous substance that could cause personal injury or property damage			✓

A = enforceable through administrative or civil action, C = enforceable through criminal prosecution.

Source: Authors' compilation.

Under CWA section 309, the US Environmental Protection Agency is given a choice of three enforcement mechanisms after it discovers a violation.¹¹ First, EPA can issue an administrative order requiring compliance.¹² Second, as an alternative or in addition to an administrative order, EPA can bring a civil action.¹³ And third, where a state has been delegated authority to administer an NPDES program, EPA may notify the state of the violation and give the state 30 days to bring an enforcement action.¹⁴ If the state does not take action within 30 days, EPA can issue an administrative order or bring a civil action itself. For egregious violations, section 309(c) of the CWA also authorizes criminal sanctions for persons who negligently or knowingly violate the CWA, knowingly endanger another person while violating the CWA, make false statements in reports required by the CWA, or tamper with monitoring equipment required by the CWA.¹⁵

This composite enforcement system can be viewed as a pyramid formed by a base level where a large number of relatively minor violations is handled through administrative actions, followed by

¹¹ 33 U.S.C. Section 1319.

¹² See 33 U.S.C. Section 1319(a)(3).

¹³ 33 U.S.C. Section 1319(a)(3).

¹⁴ 33 U.S.C. Section 1319(a).

¹⁵ 33 U.S.C. Section 1319(c).

Fiscal Year 1997 Enforcement Activities

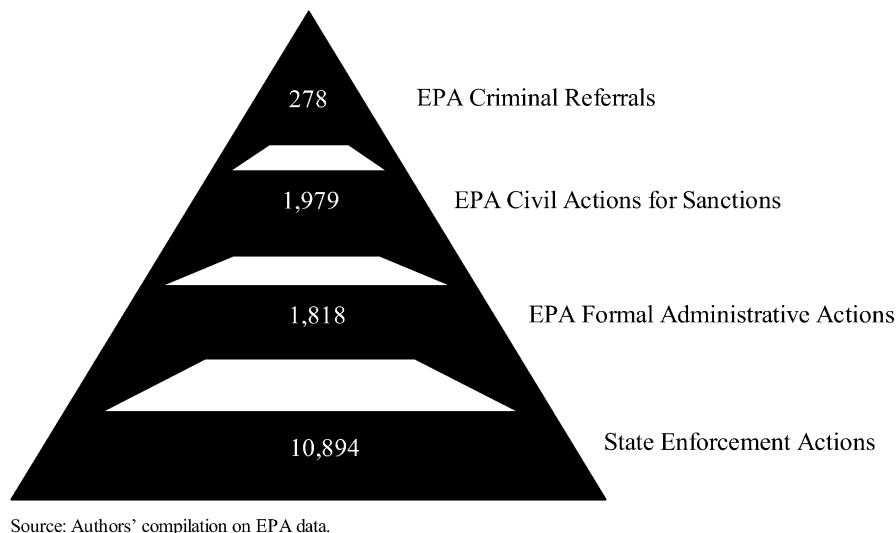


Fig. 1. Fiscal year 1997 enforcement activities.

an intermediate level where a small number of more serious violations is handled through civil (government and citizen) actions,¹⁶ and finally a superior and last level where a smaller number of very serious violations is handled through criminal prosecution (Mandiberg & Smith, 1997). Fig. 1 illustrates the distribution of enforcement actions for the year 1997.

For administrative enforcement actions, the violator is ordered to stop the activity. If the violator complies, then the case is ended, otherwise informal negotiations will begin in order to reach a settlement. If the negotiations do not achieve a resolution, an administrative enforcement action will be pursued. During 1998, EPA issued 849 CWA administrative compliance orders (out of a total of 1721 for all environmental statutes), 389 CWA administrative penalty orders (out of a total of 1400), and 324 administrative penalty settlements (out of a total of 1245). If the case cannot be resolved in the administrative process, the EPA will refer it to the Department of Justice for civil or criminal prosecution. In 1998 EPA referred 81 CWA civil cases to DOJ (out of a total of 411).^{17,18}

¹⁶The Act provides also that civil actions seeking for injunctions and civil penalties can be pursued by individual citizens or organizations through citizen suits (33 U.S.C. Section 1365).

¹⁷US EPA (1998, 1999) US EPA, Office of Enforcement and Compliance Assurance, *Enforcement and Compliance Assurance FY 1998 Accomplishments Report*, June 1999.

¹⁸While the discussion in this analysis is centered on criminal sanctions, it is worth noting that administrative and civil penalties can be substantial. Administrative penalties are subdivided into two classes. After consultation with the State in which the violation occurred, it can be assessed a Class I civil penalty or a Class II civil penalty. The amount of a Class I civil penalty may not exceed \$10,000 per violation, within a maximum amount of \$25,000. The amount of Class II civil penalty may not exceed \$10,000 per day of violation within a maximum amount of \$125,000 (33 U.S.C. Section 1319(g)). The total of administrative penalties assessed during 1998 was \$28 million, of which almost \$5 million

Table 2
Clean water act criminal provisions

Penalties	Fine (per day)	Imprisonment	Both	After 1st viol.
Negligence	\$2500–\$25,000	<1 year	Yes	Double
Knowing violation	\$5000–\$50,000	<3 years	Yes	Double
Knowing endangerment by individuals	<\$250,000	<15 years	Yes	Double
Knowing endangerment by organizations	<\$1,000,000			Double
Knowing false statement	<\$10,000	<2 years	Yes	Double

Source: Authors' compilation.

The DOJ, analyzing all the facts, makes a determination about how to proceed. If the case is not egregious, it will be handled through the civil enforcement process. If the case is more serious, a criminal enforcement can be pursued: the violator will be prosecuted in criminal court (Cohen, 2001).

In the context of agricultural activities, CAFO's are NPDES regulated activities. Thus, the CWA provides for the imposition of criminal sanctions when concentrated animal feedlot operations are negligently operated. As shown in Table 2, sanctions can be severe, ranging up to \$2 million and 30 years of imprisonment. In structuring actual sanctions on a case-by-case basis, however, judges enjoy wide discretion, discretion that is constrained by the recently enacted Federal Sentencing Guidelines.

4. The Federal sentencing guidelines

In 1984, after several years of political debate and research, the US Congress passed the Sentencing Reform Act (SRA),¹⁹ as part of the Comprehensive Crime Control Act,²⁰ which completely transformed the traditional sentencing process in an attempt to reduce unwarranted disparity in sentencing.

The main objectives of the Sentencing Reform Act²¹ were to reduce unwarranted disparity in sentencing, to ensure certainty, proportionality and uniformity of punishment, and to establish more serious penalties for specific categories of offenses. These objectives apply with particular

(footnote continued)

only for violations to the Clean Water Act. The amount of the average CWA administrative penalty was more than \$12,000. On the other hand, civil action can result in judicial injunctions and civil judicial penalties that may not exceed \$25,000 per day without a maximum limit. The total of civil judicial penalties assessed in 1998 for environmental violations was more than \$63 million, of which \$18.5 million of violations to the Clean Water Act, while the value for CWA injunctive relieves was equal to \$860 million (US EPA, Office of Enforcement and Compliance Assurance, *Enforcement and Compliance Assurance FY 1998 Accomplishments Report*, June 1999).

¹⁹Sentencing Reform Act of 1984, Pub. L. 989–473, Title II, Ch. II, Oct 12, 1984, 98 Stat. 1987, codified at 28 U.S.C. Sections 991–998. See United States Sentencing Commission, *The Sentencing Reform Act*, 1996.

²⁰Comprehensive Crime Control Act of 1984, Pub. L. 998–473, Title II, Oct. 12, 1984, 98 Stat. 1976, codified at 18 U.S.C. Sections 3551–3742.

²¹See note 23.

relevance to structuring sanctions for environmental crimes. In the 1980s a dramatic increase in the overall number of environmental criminal prosecutions occurred. However, the sentences imposed in the majority of these cases reflected the reluctance of judges to impose significant incarceration for violations of environmental laws. The practice of lenient sentencing of environmental criminals was not uncommon in several districts (Barrett, 1992). More generally, some analysts have argued that the EPA uses regular court action as a means of reinforcing current values which condemn environmentally threatening activities. Provided the courts respond by imposing substantial penalties in cases of serious failure, the view that environmental offences are “wrongs” and ought to be treated seriously is likely to gather strength (De Pres, 2000).

In order to achieve sanctioning goals, Congress created the United States Sentencing Commission²² as an independent, permanent agency in the judicial branch with the main purpose of developing an unprecedented body of laws to regulate federal sentencing: the federal sentencing guidelines.²³

4.1. *The sentencing guidelines*

The sentencing guidelines went into effect November 1987, and apply to all federal crimes committed on or after that date. Before guidelines were developed, federal judges were not required to use the same sentencing standards and could impose a sentence that ranged anywhere from straight probation to the maximum imprisonment established in applicable statutes (Lincenberg & Krakoff, 1999). Under the Comprehensive Crime Control Act,²⁴ courts are now required to impose sentences “which reflect the seriousness of the offenses,” “promote respect for the law,” “provide just punishment for the offense,” “afford adequate deterrence to criminal conduct,” “protect the public from further crimes of the defendant” and “provide the defendant with correctional treatment in the most effective manner.” The sentencing guidelines consider these entire factors through the evaluation of the gravity of the criminal offense and the defendant’s criminal history.

Each crime²⁵ is assigned a base offense level corresponding to the seriousness of the offense, from level 1 (least serious) to level 43 (most serious). The base level can then be increased or decreased depending upon “specific offense characteristics” and “general adjustments.” Each offender is assigned a category based upon the criminal history of the defendant, from category I (first conviction offender) to VI (career criminal). Combined, the offense levels and the criminal

²²On the Commission activities see United States Sentencing Commission, *Annual Report*, 1986–present, and United States Sentencing Commission, *Sourcebook of Sentencing Statistics*, 1996–present.

²³United States Sentencing Commission, *1998 Guidelines Manual* (Amendments effective 11/01/1998). For a summary of the Commission’s guidelines development process, see *Supplementary Report on the Initial Sentencing Guidelines and Policy Statements*, 1987.

²⁴18 U.S.C. Sections 3551–3742.

²⁵The sentencing guidelines do not apply to any count of conviction that is a Class B or C misdemeanor or an infraction. A “Class B” misdemeanor is any offense for which the maximum authorized term of imprisonment is more than 30 days but not more than 6 months. A “Class C” misdemeanor is any offense for which the maximum authorized term of imprisonment is more than 5 days but not more than 30 days. An “infraction” is any offense for which the maximum authorized term of imprisonment is not more than 5 days. See U.S.S.G. Section 1B1.9 and 18 U.S.C. Section 3559(a).

Table 3
Sentencing table (in months of imprisonment)

Zone	Offense level	Criminal history category (points)					
		I (0 or 1)	II (2 or 3)	III (4, 5, 6)	IV (7, 8, 9)	V (10, 11, 12)	VI (13 or more)
	1	0–6	0–6	0–6	0–6	0–6	0–6
	2	0–6	0–6	0–6	0–6	0–6	1–7
	3	0–6	0–6	0–6	0–6	2–8	3–9
A	4	0–6	0–6	0–6	2–8	4–10	6–12
	5	0–6	0–6	1–7	4–10	6–12	9–15
	6	0–6	1–7	2–8	6–12	9–15	12–18
	7	0–6	2–8	4–10	8–14	12–18	15–21
	8	0–6	4–10	6–12	10–16	15–21	18–24
B	9	4–10	6–12	8–14	12–18	18–24	21–27
	10	6–12	8–14	10–16	15–21	21–27	24–30
C	11	8–14	10–16	12–18	18–24	24–30	27–33
	12	10–16	12–18	15–21	21–27	27–33	30–37
D	13	12–18	15–21	18–24	24–30	30–37	33–41
	14	15–21	18–24	21–27	27–33	33–41	37–46
	15	18–24	21–27	24–30	30–37	37–46	41–51
	16	21–27	24–30	27–33	33–41	41–51	46–57
	17	24–30	27–33	30–37	37–46	46–57	51–63
	18	27–33	30–37	33–41	41–51	51–63	57–71
	19	30–37	33–41	37–46	46–57	57–71	63–78
	20	33–41	37–46	41–51	51–63	63–78	70–87
	21	37–46	41–51	46–57	57–71	70–87	77–96
	22	41–51	46–57	51–63	63–78	77–96	84–105
	23	46–57	51–63	57–71	70–87	84–105	92–115
	24	51–63	57–71	63–78	77–96	92–115	100–125
	25	57–71	63–78	70–87	84–105	100–125	110–137
	26	63–78	70–87	78–97	92–115	110–137	120–150
	27	70–87	78–97	87–108	100–125	120–150	130–162
	28	78–97	87–108	97–121	110–137	130–162	140–175
	29	87–108	97–121	108–135	121–151	140–175	151–188
	30	97–121	108–135	121–151	135–168	151–188	168–210
	31	108–135	121–151	135–168	151–188	168–210	188–235
	32	121–151	135–168	151–188	168–210	188–235	210–262
	33	135–168	151–188	168–210	188–235	210–262	235–293
	34	151–188	168–210	188–235	210–262	235–293	262–327
	35	168–210	188–235	210–262	235–293	262–327	292–365
	36	188–235	210–262	235–293	262–327	292–365	324–405
	37	210–262	235–293	262–327	292–365	324–405	360-life
	38	235–293	262–327	292–365	324–405	360-life	360-life
	39	262–327	292–365	324–405	360-life	360-life	360-life
	40	292–365	324–405	360-life	360-life	360-life	360-life
	41	324–405	360-life	360-life	360-life	360-life	360-life
	42	360-life	360-life	360-life	360-life	360-life	360-life
	43	Life	Life	Life	Life	Life	Life

Source: U.S.S.G. Chapter Five, Part. A

history categories create the grid of the sentencing table,²⁶ and the point at which the offense level and the criminal history category of a specific case intersect on the sentencing table determines the offender's guideline range (see Table 3).

The sentencing judge must impose a sentence within the guideline range, unless the court finds that there exists “an aggravating or mitigating circumstance of a kind, or to a degree, not adequately taken into consideration by the Sentencing Commission in formulating the guidelines that should result in a sentence different from that described.”²⁷ In this case, with appropriate written motivations, the judge can adopt a departure upward or downward from the guideline range.²⁸

In the vast majority of cases, the court has to apply the range resulting from the sentencing table by matching the pertinent offense level and criminal history category.²⁹ In determining the type of sentence to impose, the sentencing judge should consider the nature and seriousness of the conduct, the statutory purpose of sentencing, and the pertinent offender characteristics. Within the applicable range, the judge has full discretion to pick the sentence from any point and to choose different sentencing options that combine fines,³⁰ probation,³¹ supervised release,³² imprisonment and imprisonment substitutes (home detention, community confinement and intermittent confinement).³³

The guidelines require that specific criteria be met for each possible combination of sentencing options, and divide the sentencing table into four zones (from Zone A to Zone D) based on the maximum term of imprisonment. Within each zone, the judge can combine the different options according to the instructions (see Table 4). Thus, if the applicable range is in Zone A (levels 1–8) of the sentencing table, the judge can impose (1) a fine, (2) straight probation, (3) imprisonment, or (4) a combination of these sanctions.

4.2. *The application of the sentencing guidelines to environmental crimes and the CWA*

The sentencing guidelines provide offense levels for 19 groups³⁴ of criminal conduct that account for approximately 90% of the statutory criminal provision of US Code. The introduction of specific provisions for environmental violations in the Federal Sentencing Guidelines—resulting in considerable increases in both fines and terms of imprisonment (Bennett et al., 1995)—is an important indicator of the augmented concern of the US Congress and of the public opinion about the enforcement and the prosecution of the environmental crimes.

²⁶ U.S.S.G. Section 5A.

²⁷ 18 U.S.C. Section 3553(b) and U.S.S.G. Section 5K2.0.

²⁸ For a summary of departures approved and disapproved by appellate courts, see United States Sentencing Commission, *Guideline Departures* 1989–1999.

²⁹ It is important to note that if a specific statute prescribes different minimum or maximum term of imprisonment, the guideline range is consequently adjusted to fit the statutory provisions. See U.S.S.G. Section 5G1.1.

³⁰ U.S.S.G. Section 5E.

³¹ U.S.S.G. Section 5B.

³² U.S.S.G. Section 5D.

³³ U.S.S.G. Section 5C.

³⁴ U.S.S.G. Chapter 2, from Part A to Part X.

Table 4
Individuals sentencing options

Zone (levels)	Straight probation ^a		Probation with imprisonment substitutes ^b		Imprisonment with substitutes ^c		Straight imprisonment		Fine ^d
A (1–8)	Yes	Or	Yes	Or	Yes	Or	Yes	Or/and	Yes
B (9–10)	No		Yes with at least the minimum term in substitutes	Or	At least one month in prison, plus substitutes	Or	At least the minimum term	and	Yes
C (11–12)	No		No		At least half minimum in prison, plus substitutes	Or	At least the minimum term	and	Yes
D (13–43)	No		No		No		At least the minimum term	and	Yes

Source: Authors' elaboration from U.S.S.G. Chapter Four.

^aThe term of probation is 1–5 years for base offense level of 6 or greater, and no more than 3 years in any other case. According to the Comprehensive Crime Control Act of 1984, probation is a sentence in and of itself and may be used as an alternative to incarceration. See 18 U.S.C. Section 3561 and U.S.S.G. Chapter Five, Part B, Introductory Commentary.

^bIn this case, the judge should impose a term of probation up to 5 years (see previous note) with a “special condition” that replaces the minimum term of imprisonment with home detention, community confinement or intermittent confinement. See U.S.S.G. Section 5B1.1(a)(2).

^cIn this case, the court should impose a term of supervised release from 1 to 5 years, depending on the class of the committed crime, with a “special condition” that substitutes home detention or community confinement for imprisonment. See U.S.S.G. Section 5C1.1 and U.S.S.G. Section 5D.

^dA fine may be imposed in addition to a term of imprisonment, or may be the sole sanction if the guidelines do not require a term of imprisonment. See U.S.S.G. Section 5E1.2, Application Note 1.

The violations against the Clean Water Act³⁵ and the other environmental statutes are grouped in the part Q of Chapter 2 of the Guidelines entitled “Offenses involving the Environment.”³⁶ In turn, part Q is divided in two sub-parts: (1) “Environment” and (2) “Conservation and Wildlife.” The “Environment” sub-part of the Guidelines is further broken down into six sections covering various environmental statutes.³⁷ Only the first three sections are applicable to the Clean Water Act:³⁸

³⁵33 U.S.C. Sections 1251–1387.

³⁶U.S.S.G. Section 2Q.

³⁷Including, among the others, Rivers and Harbors Act (RHA) of 1899; Clean Air Act (CAA) of 1970; Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) of 1972; Safe Drinking Water Act (SDWA) of 1974; Resource Conservation Recovery Act (RCRA) of 1976; Toxic Substances Control Act (TSCA) of 1976; Clean Water Act (CWA) of 1977.

³⁸33 U.S.C. Sections 1251–1387.

- (1) “knowing endangerment resulting from mishandling hazardous or toxic substances, pesticides or other pollutants”, with a base offense level of 24,³⁹ corresponding to a range of 51–63 months of imprisonment for a first conviction offender;
- (2) “mishandling of hazardous or toxic substances, pesticides; recordkeeping, tampering, and falsification; [...]”, with a base offense level of 8,⁴⁰ corresponding to a range of 0–6 months of imprisonment for a first conviction offender;
- (3) “mishandling of other environmental pollutants; recordkeeping, tampering, and falsification”, with a base offense level of 6,⁴¹ corresponding to a range of 0–6 months of imprisonment for a first conviction offender.

As with the other eighteen groups of criminal conduct, the specific provisions for environmental violations in the Federal Sentencing Guidelines were designed to provide certainty and fairness in meeting the purposes of sentencing, avoiding unwarranted sentencing disparities among defendants with similar records who have been found guilty of similar criminal conduct. The extent to which the intent of the law has been realized in practice can best be described as mixed, as the discussion of recent CWA cases in the following section illustrates.

5. Criminal sanctions and CWA enforcement: legal considerations

Early application of the Federal Sentencing Guidelines to environmental crimes reflected the reluctance of judges to impose significant incarceration for violations of environmental law. That is, the uniform and determinant sentencing goals of the SRA were not being met in the environmental area (Barrett, 1992). Despite clear Congressional intent that environmental crimes should be treated as serious crimes and not mere regulatory annoyances, environmental criminals continued to receive sentences of straight probation and incarceration of less than 1 year, even for the commission of substantive environmental crimes. Prosecution of CWA violations in the early 1990s was not immune to the critique of lenient enforcement and lax discretion, as the following cases illustrate.

5.1. *Industrial cases and judicial discretion*

Recall that in *United States vs. Wells Metal Finishing*,⁴² John Wells and his metal finishing company were convicted of knowingly discharging hazardous pollutants in violation of Clean Water Act provisions.⁴³ Wells was found guilty of systematically discharging wastewater into the

³⁹ See U.S.S.G. Section 2Q1.1.

⁴⁰ See U.S.S.G. Section 2Q1.2.

⁴¹ See U.S.S.G. Section 2Q1.3.

⁴² 922 F.2d 54 (1st Circuit 1991).

⁴³ 33 U.S.C. Sections 1317(b), 1317(d), and 1319(c)(2). 33 U.S.C. Section 1317(b) “The Administrator shall, [...] publish proposed regulations establishing pretreatment standards for introduction of pollutants into treatment works [...] which are publicly owned for those pollutants which are determined not to be susceptible to treatment by such treatment works or which would interfere with the operation of such treatment works. [...]”

33 U.S.C. Section 1317 (d) “After the effective date of any effluent standard or prohibition or pretreatment standard promulgated under this section, it shall be unlawful for any owner or operator of any source to operate any source in violation of any such effluent standard or prohibition or pretreatment standard.”

municipal sewer system. To determine the appropriate sentence under the Sentencing Guidelines, the district court assigned a base offense level of 8 for mishandling of hazardous or toxic substances.⁴⁴ Then the court made a 6-level upward adjustment, as required by the specific offense characteristics for crimes involving an ongoing, continuous, or repetitive discharge, release, or emission of a hazardous or toxic substance into the environment,⁴⁵ and a 2-level upward adjustment for disruption of a public utility.⁴⁶ Subsequently, the district court adjusted the offense level by a 2-level decrement because the defendant accepted his responsibility.⁴⁷ In the end, the base offense level of 8 was enhanced by a total of 6 levels and the resulting adjusted offense level adopted was 14, corresponding to an imprisonment range of 15–21 months. The final sentence, as affirmed later by the Court of Appeals,⁴⁸ condemned Wells to 15 months of imprisonment and 1 year of supervised release.⁴⁹

If compared to other sentences imposed in similar cases before the advent of the sentencing guidelines, Wells' sentence could be considered severe, but under the guidelines as presently structured, the sentence could have been much more severe. In fact, a straightforward application of the sentencing guidelines would consider a base offense level of 8,⁵⁰ plus an enhancement of 6 levels for ongoing, continuous, or repetitive discharge of a hazardous or toxic substance into the environment,⁵¹ an increase of 4 levels for disruption of a public utility,⁵² an additional 4-level enhancement because the discharge was in violation of a permit,⁵³ and a downward adjustment of

(footnote continued)

33 U.S.C. Section, 1319(c)(2)(B) “Any person who [...] knowingly introduces into a sewer system or into a publicly owned treatment works any pollutant or hazardous substance which such person knew or reasonably should have known could cause personal injury or property damage or, other than in compliance with all applicable Federal, State, or local requirements or permits, which causes such treatment works to violate any effluent limitation or condition in a permit issued to the treatment works under section 1342 of this title by the Administrator or a State; shall be punished by a fine of not less than \$5000 nor more than \$50,000 per day of violation, or by imprisonment for not more than 3 years, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment shall be by a fine of not more than \$100,000 per day of violation, or by imprisonment of not more than 6 years, or by both.”

⁴⁴ U.S.S.G. Section 2Q1.2(a): “Mishandling of Hazardous or Toxic Substances or Pesticides; Recordkeeping, Tampering, and Falsification; Unlawfully Transporting Hazardous Materials in Commerce. Base Offense Level: 8.”

⁴⁵ U.S.S.G. Section 2Q1.2(b)(1)(A): “If the offense resulted in an ongoing, continuous, or repetitive discharge, release, or emission of a hazardous or toxic substance or pesticide into the environment, increase by 6 levels.”

⁴⁶ U.S.S.G. Section 2Q1.2(b)(3): “If the offense resulted in disruption of public utilities or evacuation of a community, or if cleanup required a substantial expenditure, increase by 4 levels.” In this case, the district court assigned 2-level upward adjustment to the base offense level rather than the 4-level required by the Sentencing Guidelines for disruption of a public utility.

⁴⁷ U.S.S.G. Section 3E1.1(a): “Acceptance of Responsibility. If the defendant clearly demonstrates acceptance of responsibility for his offense, decrease the offense level by 2 levels.”

⁴⁸ 922 F.2d 54 (1st Circuit 1991).

⁴⁹ Aware of Wells' enormous personal debt, the court declined to impose its own fine, although the law authorizes fines of “not less than \$5000 nor more than \$50,000 per day” for knowing violations of 33 U.S.C. Section 1317. See 33 U.S.C. Section 1319(c)(2)(A).

⁵⁰ U.S.S.G. Section 2Q1.2(a).

⁵¹ U.S.S.G. Section 2Q1.2(b)(1)(A).

⁵² U.S.S.G. Section 2Q1.2(b)(3).

⁵³ U.S.S.G. Section 2Q1.2(b)(4): “If the offense involved transportation, treatment, storage, or disposal without a permit or in violation of a permit, increase by 4 levels.”

2 levels for acceptance of responsibility.⁵⁴ The resulting adjusted offense level would be 20, corresponding to an imprisonment range of 33–41 months. Even without taking into consideration the 4-level increase for violation without a permit, the final offense level would be 16, corresponding to an imprisonment range of 21–27 months. In either case the sanction would be significantly harsher than the one court actually imposed. In this respect, the sentence is clearly lenient since the amount of jail imposed is less than half the time that could have been sentenced under the federal guidelines.⁵⁵

In a similar case, *United States vs. Boldt*,⁵⁶ adjudicated just 3 months later before the same court, the final sentence was strikingly different. David Boldt, a chemical engineering manager for a corporation that manufactured printed circuits, was convicted of knowingly discharging hazardous pollutants in violation of Clean Water Act provisions.⁵⁷ Boldt was found guilty of authorizing discharge of industrial wastewater containing excessively high concentration of toxic metals from electroplating process, at the rate of approximately 58,000 gallons a day, directly into sewer system of Lowell.

Using its discretion under the sentencing guidelines, the district court found an applicable range of imprisonment between zero and 6 months and sentenced Boldt to \$1000 fine and a mere 2 days of imprisonment with 1 year of probation. A straightforward application of the guidelines, however, would have given a widely divergent outcome, resulting in an estimated adjusted offense level of 14, equivalent to an imprisonment range of 15–21 months (Barrett, 1992).

The dramatic divergence between the 2 days of imprisonment imposed in the sentence and the minimum of 15 months hypothetically applicable given a straightforward application of the guidelines is evident. Moreover, comparing this sentence to the 15 months of imprisonment imposed on Wells illustrates in an equally dramatic fashion the impact of judicial discretion on sentencing disparity.

More recent industrial cases have evidenced a clear trend toward holding violators more fully liable under the Federal Sentencing Guidelines. That is, both the imprisonment rate and the average length of incarceration have increased substantially in recent years for criminal violations of the CWA. For example, in *United States vs. Weitzenhoff*,⁵⁸ Michael H. Weitzenhoff and Thomas W. Mariani, managers of a sewage treatment plant in Oahu (Hawaii), were convicted of knowing violations of Clean Water Act by permitting discharge of untreated sludge directly into ocean.⁵⁹ Weitzenhoff and Mariani were found guilty of instructing two employees at the plant to dispose on a regular basis excess sludge generated by the plant by pumping it from the storage tanks directly into the ocean, rather than have it hauled away to another treatment plant, resulting in some 436,000 pounds of pollutant solids being discharged into the ocean. At sentencing, Weitzenhoff was sentenced to 21 months and Mariani to 33 months in prison. By historical standards, this sanction is severe, reflecting the judicial trend of taking environmental violations seriously. However, it should be noted that more rigorous sanctions were potentially applicable to both defendants, amounting to a maximum imprisonment term of 41 months.⁶⁰

⁵⁴ U.S.S.G. Section 3E1.1(a).

⁵⁵ The sentencing analysis of the Wells case is developed and discussed in detail in Barrett (1992).

⁵⁶ 929 F.2d 35 (1st Circuit 1991).

⁵⁷ 33 U.S.C. 1319(c).

⁵⁸ 35 F.3d 1275 (9th Circuit 1994).

⁵⁹ 33 U.S.C. Sections 1311(a) and 1319(c)(2) 33 U.S.C. Section 1319(c)(4).

⁶⁰ See Germani (2000) for detailed analysis and documentation.

Similarly, in *United States vs. Johnson*,⁶¹ the defendant Glenn Kelly Johnson, general manager and president of Johnson Properties, was convicted for failing to maintain wastewater treatment plants and knowing discharge of pollutants in violation of the Clean Water Act. As a result of the violations, hundreds of customers did not receive basic sewage treatment for years, and raw sewage and other untreated waste backed up into customers' homes with large quantities of potentially harmful pollutants entering into local waters, streams and bays connected to the Louisiana's intercostal waterway. At sentencing, the district court sentenced Johnson to 36 months of imprisonment with 3 years of probation, and a fine of \$500,000. A retrospective evaluation of the sanction results in a maximal adjusted offense level of 24, corresponding for a first conviction offender to a range of 51–63 months, equal to about a 42–75 percentage increase of the imprisonment term (Germani, 2000).

As these recent industrial cases illustrate, the guidelines seem to have imposed a binding constraint on the exercise of judicial discretion with more severe sentences having been recently imposed. A recent study conducted by Alexander, Arlen, and Cohen (1999), confirms the general, recent legal trend of the continuous increase in criminal penalties; that is, the trend toward fines and total penalties for corporations or organizations, convicted of federal crimes, being higher under the sentencing guidelines than they were previously is fully documented.

5.2. *Agricultural cases and prosecutorial discretion*

Critics have argued that sanctions for industrial violations of environmental law continued to be too lenient in the early years following the implementation of the federal sentencing guidelines (Barrett, 1992). That is, judicial discretion continued to be exercised in a way that tended to trivialize even substantive violations. This criticism applies with particular force to early agricultural cases involving violations of the CWA.

In the early application of the sentencing guidelines, the EPA sanctioned *Misty Meadow Dairy* for unlawfully discharging CAFO manure at the rate of 685,000 pounds per year, without a permit into navigable waters. The company, which operated a beef cattle farm in Oregon, disposed of manure directly into Tillamok Bay, without an NPDES permit and was sentenced to pay a civil fine of \$6000. In this case a criminal indictment imposed in full compliance with the sentencing guidelines would have resulted in prison or, at least, years of probation. In fact, following a straightforward computation of the sentencing guidelines, the final sanction would be over 4 months of imprisonment (Germani, 2000).

Similarly, the reluctance to fully implement the sanctions detailed in the guidelines, particularly those involving incarceration, is documented in a case involving *Gienger Farms*. Operators of the farm discharged approximately 1.3 million gallons of manure-laden wastewater into drainage ditches into Tillamook Bay, in Oregon, without a permit. In response to an EPA administrative complaint, the farm paid a \$20,000 penalty and modified its operations to separate clean water from contaminated material, extending the holding capacity of its wastewater storage lagoon from 2 to 57 days. Clearly in this case, a criminal indictment imposed according to the sentencing guidelines would have resulted in imprisonment or, at least, years of probation. In fact, following

⁶¹ US District Court of Eastern Louisiana in New Orleans, June 21 2000.

the application of the sentencing guidelines, the final sanction would again be more than 4 months of incarceration.

As with industrial cases, recent sanctions for substantive agricultural violations have evidenced a trend toward holding violators more fully liable. While the agricultural trend mirrors the trend in industrial cases, the similarity is one of kind, not magnitude. That is, agricultural sanctions are increasing but continue to lag behind those imposed in other sectors. Consider the case of *United States vs. Rockview Farms*. In this instance, a California corporation, which owns and operates a dairy farm in Nevada with 5000 cows and milk production of 30,000 gallons a day, was sentenced for violating the Clean Water Act.⁶² Rockview illegally discharged 1.7 million gallons of dairy wastewater contaminated with urine and feces in February 1998 when a manager at the dairy, left a wastewater lagoon valve open for 2 days. At sentence, Rockview Farms was fined \$250,000 and was ordered to upgrade the dairy to prevent future discharges, and the manager was fined \$5000 with 3 years of probation. While this sanction is significantly harsher than those discussed in early agricultural cases, full liability under the guidelines did not occur. Full liability would include a base offense level of 6, an enhancement of 6 levels for ongoing discharge, a 4-level upward adjustment for discharge without a CAFO permit, a 2-level enhancement for obstruction of justice for giving false information to EPA investigators about how the spill occurred and who was responsible. The final offense level would be 18, corresponding to a range of 27–33 months of imprisonment (Germani, 2000).

The Rockview Farms case is not an isolated example of how agricultural sanctions for some CWA violations have been adjudicated more severely in recent years while not fully complying with the federal sentencing guidelines. In another recent case, the EPA sanctioned a cattle ranch, Heckman Ranches, for unlawful discharge of pollutants into navigable waters in violation of the Clean Water Act. EPA commenced an administrative action under section 309 of the Clean Water Act,⁶³ and issued a \$40,000 civil penalty⁶⁴ against the CAFO farm and a compliance order⁶⁵ to cease immediately all discharges of pollutants and develop a monitoring and reporting system of the facility. EPA determined the penalty amount in consideration of the significance of the nature, circumstances, extent, and gravity of violations. However, in exercising its discretion, EPA chooses an administrative action which can only lead to monetary sanctions. In the Heckman case, a criminal indictment would likely have led to months of imprisonment or, at least, years of probation. In fact, following the computation of the sentencing guidelines adopted in the Rockview manager example, the final offense level would be at least over 8 points and the final sanction would be over 4 months of imprisonment.

To sum up, the impact of the Federal Sentencing Guidelines has been to move prosecution of significant CWA violations toward full liability. While this trend toward constraining judicial discretion is highly evident and well documented for industrial violations, a similar, albeit less dramatic, trend seems to be occurring in agriculture as well.

Five additional observations emerge from this legal analysis of sanctioning under CWA. First, liability under the CWA is inchoate, that is, defendants can be held liable for actual spills and for

⁶² US District Court for the Eastern District of California in Fresno on 26 April 1999.

⁶³ Docket no. CWA-10-2000-0128.

⁶⁴ 33 U.S.C. Section 1319(g)(2)(B).

⁶⁵ Docket no. CWA-10-2000-0127.

behavior that increases the likelihood of spills. Second, judges and the EPA have wide discretion in imposing sanctions and frequently impose less than full liability. Third, liability is defined in terms of the Federal Sentencing Guidelines and is unrelated in any systematic way to damages. Fourth, the CWA liability threshold is fault-based; defendants are held liable only if discharges occur without a permit or operators/managers are negligent. Fifth, and finally, sanctions have frequently involved a combination of monetary fines and incarceration as allowed under federal sentencing guidelines protocols. Each of these practices has significant economic efficiency implications.

6. Criminal sanctions and CWA enforcement: economic considerations

The efficiency of CWA enforcement can be evaluated using an analysis recently developed by Polinsky and Shavell (PS). The basic framework of the PS model involves evaluating the public enforcement of environmental law by the extent to which policies adopted by the enforcement authority create individual incentives that are compatible with the promotion of social welfare. The analysis addresses a variety of enforcement issues from an economic efficiency perspective, including the choice between strict and fault-based liability, structuring criminal sanctions, and optimal deterrence.⁶⁶

6.1. Individual behavior

If an individual commits a harmful act, he will be caught with some probability and then possibly have to pay a fine or go to jail, or both. In general, he will commit the act if and only if his expected utility from doing so, taking into account his gain and the chance of his being caught and sanctioned, exceeds his utility if he does not commit the act. Whether an injurer who has been caught will be sanctioned depends on the rule for imposing liability. Under strict liability, a sanction is imposed on the injurer regardless of his behavior. Under fault-based liability, a sanction is imposed only if the injurer's act is determined to be socially undesirable.⁶⁷

Under strict liability, a risk-neutral individual will commit the harmful act if and only if his gain from doing so exceeds the sum of the expected fine and the expected disutility of the imprisonment term.^{68,69} Under fault-based liability, the individual would be held liable if he committed the harmful act when his gain was relatively low, below a critical level of gain known as the fault

⁶⁶ For purposes of evaluating CWA enforcement, the Polinsky and Shavell framework is directly excerpted and summarized, with pertinent conclusions enumerated. See Polinsky and Shavell (2000a, b) for their comprehensive presentation, as well as their forthcoming book-length treatment of the public enforcement of law.

⁶⁷ Formally, let g = gain a party obtains from engaging in the harm-creating activity; p = probability of detection; f = fine; t = length of the imprisonment term; and λ = disutility borne by a prisoner per unit of the imprisonment term.

⁶⁸ Polinsky and Shavell also consider the case of risk averse and risk preferring individuals. If the individual is risk averse in fines and/or imprisonment, his gain would have to be higher before he would commit the harmful act; and if he is risk preferring in imprisonment, the requisite gain would tend to be lower.

⁶⁹ $g > p(f + \lambda t)$.

standard (\hat{g}). Thus, if an individual commits the harmful act when his gain is less than \hat{g} , he will be said to be at fault and will be found liable; otherwise he will not be liable.⁷⁰

6.2. Social welfare

If individuals are risk neutral, social welfare can be expressed simply as the gains individuals obtain from committing their acts, less the harms caused, and less the costs of law enforcement. Since individuals differ in the gain they obtain from committing the harmful act, there will be a critical gain above which individuals will commit the harmful act and below which they will be deterred. The critical gain is determined by the probability of detection, the level of sanctions, and the standard for imposing liability.⁷¹

Under strict liability, if individuals are risk neutral, social welfare can be expressed as the aggregate gain obtained by those who commit the harmful act, plus the aggregate harm caused by such individuals, plus the disutility suffered by the subset of them who are caught and put in jail, plus the cost to the public of keeping them in jail. The last impact is the public's enforcement costs.⁷² Similarly, social welfare under fault-based liability when individuals are risk neutral reflects the costs and benefits accounted for under strict liability adjusted for the private and public costs associated with imprisonment only for individuals who are caught and found to be at fault.⁷³

6.3. The enforcement authority's problem

The enforcement authority's problem is to maximize social welfare by choosing enforcement expenditures, e (or, equivalently, the probability of detection p), the level of the fine, f , the length of the imprisonment term, t , and the standard for imposing liability. If the authority chooses fault-based liability, it also must choose the fault standard, \hat{g} .

6.4. Characteristics of efficient public enforcement of law

By comparing individual incentives created by a variety of enforcement activities with incentives necessary to promote social welfare, PS derive a set of results applicable to evaluating recent CWA enforcement. In particular, efficient CWA enforcement would likely be characterized by the following:

1. Fines should be employed to the maximum extent feasible before resort is made to imprisonment. Fines are socially costless to impose, whereas imprisonment is socially costly, so deterrence should be achieved through the cheaper form of sanction first.

⁷⁰ In practice, fault is often found if an individual did not take reasonable precautions to prevent harm, where a reasonable precaution is one whose cost is less than the harm that it prevents. The fault-standard characterization of fault-based liability is consistent with this practice if gain is interpreted as the savings an individual obtains from not taking a precaution.

⁷¹ Formally, let $z(g)$ = density of gains among individuals; $Z(g)$ = cumulative distribution of $z(\cdot)$; \tilde{g} = critical gain; h = harm caused by an individual if he commits the harmful act; α = cost to the public per unit of the imprisonment term; e = enforcement expenditures by the government; and $p(e)$ = probability of detection given e ($p' > 0, p'' < 0$). The population is normalized to equal unity and the harm is assumed to be monetary.

⁷² $\int_{\tilde{g}}^{\infty} gz(g)dg - [1 - Z(\tilde{g})](h + pt(\lambda + \alpha)) - e$, where $\tilde{g} = p(e)(f + \lambda t)$.

⁷³ $\int_{\hat{g}}^{\infty} gz(g)dg - [1 - Z(\hat{g})]h - [Z(\hat{g}) - Z(\tilde{g})]pt(\lambda + \alpha) - e$, where $\tilde{g} = \min[\hat{g}, f(e)(f + \lambda t)]$.

2. Sanctions can be imposed either on the basis of the commission of a dangerous act that increases the chance of harm or on the basis of the actual occurrence of harm. In principle, either approach can achieve optimal deterrence.
3. Costs of imposing fines should be added to the fine that would otherwise be desirable. The optimal fine equals the costs incurred by society as a result of the harmful act divided by the probability that the injurer will have to pay the fine.
4. Parties tend to choose an excessive level of activity under fault-based liability, but not under strict liability. Making parties strictly liable for harm would be superior to safety regulations with respect to inducing socially correct activity levels.
5. Enforcement is said to be general when several different types of violations may be detected by an enforcement agent's activity. When enforcement is general, the optimal sanction rises with the severity of the harm and is maximal only for relatively high harms.
6. In many circumstances, an individual may consider which of several harmful acts to commit, for example, whether to release only a small amount of a pollutant into a river or a large amount. Such individuals will have a reason to commit less harmful rather than more harmful acts if expected sanctions rise with harm. Deterrence of a more harmful act because its expected sanction exceeds that for a less harmful act is referred to as marginal deterrence.
7. Corporate officers who engage in harmful acts should face optimal sanctions. By holding corporate officers accountable, they have incentives to behave socially optimally in controlling their agents, and in particular will contract with them and monitor them in ways that will give the agents socially appropriate incentives to reduce harm.
8. Only if deterrence is inadequate it is possibly desirable to condition sanctions on offense history to increase deterrence. Given that there is underdeterrence, making sanctions depend on offense history may be beneficial since society can take advantage of information about the dangerousness of individuals and the need to deter them while incapacitating repeat offenders with higher propensities to commit future violations through imprisonment.
9. Optimal enforcement tends to be characterized by some degree of underdeterrence because allowing some underdeterrence conserves enforcement resources.
10. In principle, both fault-based and strict liability can promote economic efficiency. In practice, important differences in application arise.
11. Imprisonment sanctions usually will be required to maintain a tolerable level of deterrence of acts classified as criminal.
12. The standard of liability when imprisonment sanctions are imposed is typically fault-based. This is socially desirable because fault-based liability reduces the use of socially costly sanctions.

7. Theory versus practice

Much of current enforcement practice under the CWA is accordant with prescriptions based upon economic efficiency considerations. For example, CWA criminal provisions (Table 2) have several efficiency characteristics. Liability is inchoate; that is, sanctions can be imposed either on the basis of the commission of the dangerous act that increases the chance of harm or on the basis of the actual occurrence of harm. Additionally, the range of permissible fines under CWA

provisions is wide, allowing for the incorporation of imposition costs at judicial discretion. Corporations and their officers are held potentially liable, creating incentives for optimally controlling corporate agents with respect to reducing harm, and imprisonment sanctions are available for maintaining a tolerable level of deterrence of criminal acts.

Similar points of congruence emerge from the sanctioning structure created under the Federal Sentencing Guidelines (Tables 3 and 4). Deterrence is marginal in that sanctions for more harmful acts exceed sanctions for less harmful acts. In the context of the CWA, structuring sanctions in this fashion can reasonably be expected to promote efficiency since individuals generally have the choice of several harmful acts to commit and EPA enforcement is general, not specific. Additionally, optimal CWA enforcement is characterized by some degree of underdeterrence since enforcement costs are substantial.⁷⁴ Given underdeterrence, the FSG allow for sanctions to be contingent upon offense history, a practice that may be beneficial since society can take advantage of information about the dangerousness of individuals and the need to deter/incapacitate them.

A significant point of ambiguity arises when comparing theory and practice under the CWA in determining the appropriate threshold of conduct for the imposition of liability. Notionally, the CWA is a strict liability statute: a defendant's intent, good faith, and state of mind are irrelevant in establishing liability for violations of the act.⁷⁵ In practice, CWA litigation tends to be concerned with issues of fault, addressing a variety of affirmative defenses. For agricultural violations, enforcement of CAFO regulations under the CWA is clearly fault-based.⁷⁶ Sanctions are imposed only when operators are not in compliance with NPDES regulations and effluent guidelines for CAFOs. That is, if operators have adopted the best technology available that is economically feasible and follow best management practices as outlined in CWA guidelines, no liability is incurred even when a discharge occurs since the firm is not at fault.

The choice of negligence over strict liability in triggering fault under the CWA is suspect in that CAFOs may tend to choose an excessive level of activity under fault-based liability. On the other hand, when imprisonment sanctions are imposed, fault-based liability is socially desirable because it reduces the use of socially costly sanctions. More generally, the choice between strict liability and negligence liability is quite complex in practice, involving questions of the information available to the regulatory agency, incentives for abatement research and development, and regulatory, administrative, monitoring and enforcement costs.

⁷⁴In fact, sizeable resources are committed to CWA enforcement activities every year, across a myriad of activities. See the "Annual Report on Enforcement and Compliance Assurance Accomplishments in 1999" Environmental Protection Agency publication EPA 300-R-00-005, July 2000, for a summary of enforcement programs and efforts.

⁷⁵See, e.g., *Stoddard vs. Western Carolina Reg'l Sewer Auth.*, 784 F.2d 1200, 1208 (4th Cir. 1986); *United States vs. Earth Sciences, Inc.*, 599 F.2d 368, 374 (10th Cir. 1979); *International Union, UAW vs. Amerace, Corp., Inc.*, 1072, 1083 (D.N.J. 1990) (citing cases).

⁷⁶For example, in the context of CAFOs, some, but not all, NPDES permits include an upset defense. EPA regulations define an "upset" as "an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventive maintenance, or careless or improper operation (40 C.F.R. Section 122.41 (N)(1))." By definition, the upset defense can be used only to excuse violations of technology-based effluent limitations, not water quality-based effluent limitations. Because an upset is an "exceptional" incident, the upset defense will not excuse a "consistent pattern" of violations.

Many arguments favoring negligence over strict liability or vice versa are generic in that they would apply with equal force to any potentially polluting sector of the economy. Focusing on agricultural liability per se, it is often the case that only the defendant has the information upon which an adequate assessment of culpability can be made, and therefore national environmental liability systems have, in practice, tended to impose notionally strict liability, but then to establish defenses which, if a defendant can satisfy the burden of proof, will allow him to avoid liability. In fact, it is rare in practice for liability to be truly strict. The natural reluctance to hold agricultural defendants liable when the cause of the environmental damage was not their fault is evidenced in a variety of environmental statutes including exemption legislation for groundwater contamination enacted in several midwestern states,⁷⁷ and federal CERCLA or superfund legislation.⁷⁸ Current environmental policy in the US is consciously designed to hold agriculturalists liable for damages only when fault can be established while simultaneously encouraging entry and discouraging exit from the industry over the long run.

Finally, three important points of incongruity emerge from comparing current CWA enforcement practice with economic efficiency prescriptions. First, sanctions frequently involve a combination of monetary fines and incarceration as allowed under the federal sentencing guidelines. Efficiency considerations would normally dictate that fines should be employed to the maximum extent possible before resort is made to imprisonment since fines are less costly to impose.

Polinsky and Shavell note two important exceptions to the general directive of maximal fines: (1) when violators have limited assets and as a result are judgment proof, incarceration in the absence of maximal fines will be required to ensure deterrence,⁷⁹ and (2) repeat offenders are more likely to have higher propensities to commit violations in the future and more likely to be worth incapacitating by imprisonment.

More generally, economic analysis of criminal law is concerned with the efficacy and the social costs of enforcement and the imposition of sanctions, and does not view punishment as a means of achieving retributive justice. Once various conceptions of fairness and other non-deterrence objectives are incorporated into models of public enforcement, a variety of justifications emerge for the use of incarceration in the absence of non-maximal fines (Posner, 1985; Polinsky & Shavell, 2000a,b). Thus, in an extended, more descriptively realistic evaluation of enforcement, optimal sanctioning will typically involve the use of both fines and incarceration. In the context of the CWA, federal sentencing guidelines provide needed flexibility in the use of judicial discretion so that judges can account for ameliorating and aggravating circumstances in selecting an appropriate sanction.

A second point of inconsistency involves the specification of fines. In the Polinsky and Shavell analysis, harm is assumed to be monetized and the optimal fine equals the costs incurred by society as a result of the harmful act divided by the probability that the injurer will have to pay the fine. Under the federal sentencing guidelines, the applicable range of fines is not determined in any systematic way by considerations of monetized costs of harms or probabilities of detection.

⁷⁷ Exemption legislation shields farm operations for groundwater contamination when best management practices are followed. See Segerson (1990) for a discussion.

⁷⁸ CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) legislation explicitly exempts agricultural activities completely. (CERCLA Sections 9607i).

⁷⁹ An example of addressing the judgment-proof problem by imposing imprisonment in the absence of fines is the case of *United States vs. Wells Metal Finishing*, 922 F.2d54 (1st Circuit 1991).

Instead a damage schedule is employed (Table 3), based on a categorical assessment of the severity of the offense and the violator's criminal history.

The use of a predetermined fixed schedule for sanctioning guidelines can be justified in a variety of ways (Chuenpagdee et al., 2001). First, current methods of estimating monetary values are limited and there is little widespread agreement that they provide dependable and consistent valuations (Binger, Copple, & Hoffman (1995) and Kahneman et al., 1999), particularly in the case of environmental losses, or reductions in losses, for which the compensation measure of value rather than the willingness to pay measure is appropriate (Knetsch, 1990, 1997). Second, and perhaps more importantly, the use of damage schedules can be more universally and less expensively employed than case-by-case monetized estimates of harm, while providing more consistent deterrence incentives, restitution for harms, resource allocation guidance, and greater fairness of similar treatment of similar losses (Kahneman, Schkade, & Sunstein, 1998; Rutherford et al., 1998).

Perhaps the greatest strength of setting sanctions through the use of a damage schedule instead of through case-specific damage assessments is that violators will know with greater certainty the general magnitude of sanctions for various violations. Clearly individual behavior is not affected by the actual probability and magnitude of sanctions, but by the perceived levels of these variables. Erratic sanctioning based on controversial monetized assessment of damage may well exacerbate perception problems, resulting in private assessments of the magnitude of sanctions greatly at odds with expected outcomes. The well-advertised use of the federal sentencing guidelines and CWA enforcement provisions can alleviate problems of gross misperception.

The third and final point of divergence between CWA enforcement practice and efficiency prescriptions also involves knowledge about the probability and magnitude of sanctions. To achieve deterrence objectives, operators must face full liability for CWA violations. Operators are made aware of the consequences of CWA violations once information on the CWA sanctions and the FSG is provided. Given the probability of detection, the CWA regulated community then base compliance decisions on sanctioning information and on the likelihood that violations will be prosecuted appropriately by the EPA and adjudicated rigorously by judges. Prosecutorial or judicial laxity concerning the appropriate imposition of criminal sanctions undermines marginal deterrence and compliance objectives. Recent legal trends suggest that judicial discretion is steadily moving toward imposing full liability. If EPA Agency discretion in pursuing administrative, civil and criminal prosecutions is equally rigorous, CWA enforcement is well positioned to pursue deterrence objectives efficiently.

8. Looking to the future

The Environmental Protection Agency is advancing new regulations to address water pollution from concentrated animal feeding operations. If these projected changes are adopted, the number of animal feeding operations (AFOs) subject to point-source pollution regulations could double or triple (Centner, 2000).⁸⁰

⁸⁰These proposed regulations are the culmination of efforts previously set forth by the EPA and USDA including "Compliance Assurance Implementation Plan for Concentrated Animal Feeding Operations," "Unified National Strategy for Animal Feeding Operations" and "Draft Guidance Manual and Example NPDES Permit for Concentrated Animal Feeding Operations, Final Internal Draft."

Under one proposed regulatory structure, the EPA estimates that more than 39,000 operations would be affected by this proposed structure, with 12,660 operations needing permits because of their size of more than 1000 animal units. Operations with 300–1000 animal units would have to apply for a National Pollutant Discharge Elimination System (NPDES) permit or certify to the permit authority that they are not a CAFO based on existing practices. Operations with less than 300 animal units could be designated CAFOs on a case-by-case basis. The EPA proposal also seeks to require some processors and integrators to secure NPDES permits under federal co-permitting provisions. The proposed regulation would allow the EPA to regulate nonfarming entities that exercise “substantial operational control” over a CAFO through co-permitting requirements.

In light of this expansive and controversial effort at regulatory reform,⁸¹ it is natural to ask if complementary or synergistic tort reform for sanctioning violators is also desirable. The results of this evaluation suggests not.

Much of the CWA sanctioning provisions, as well as their potential application under the Federal Sentencing Guidelines, is wholly consistent with efficiency prescriptions for enforcing public law. Additionally, the use of incarceration in the absence of maximal fines, and the use of sanctioning table in lieu of a case-by-case assessment of the monetized value of harm are cogently defensible on second-best, fairness and deterrence grounds. Moreover, the practice of CWA enforcement being grounded in considerations of fault instead of strict liability promotes the twin objective of treating criminal violators fairly while encouraging the long-run viability and growth of the agricultural sector.

The “Achilles heel” of the existing CWA enforcement structure may well be the use of discretion, both prosecutorial and judicial. To achieve a tolerable level of deterrence of criminal acts, to promote marginal deterrence, and to incapacitate repeat offenders, it is necessary that criminal violations of the CWA face consistent, predictable criminal sanctions. This requires that the EPA systematically pursues criminal indictments when appropriate, and that sanctions reflecting full liability be imposed when justified.

Critics may well label such an enforcement policy as anti-agriculture, but the charge is unsustainable. Pursuing criminal prosecutions on the basis of negligence or fault treats agricultural violators fairly and promotes the long-run viability of the sector. Vigorous application of criminal sanctions for significant agricultural violations of the CWA, on the other hand, addresses irresponsible or reckless decision making on the part of a distinct minority of agriculturalists.

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⁸¹In addition to dramatically increasing the number of regulated AFOs, the EPA estimated that the proposed regulations may cost \$831–\$935 million annually and may reduce aggregate national economic output by nearly \$2 billion per year. See Centner (2000) for a discussion of potential impacts.

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