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A DIRTY RIVER RUNS THROUGH IT (THE FAILURE OF ENFORCEMENT IN THE CLEAN WATER ACT)

Victor B. Flatt*

On March 15, 1996, the Atlanta Bar Association’s Section on Environmental Law hosted a presentation concerning the City of Atlanta’s continuing non-compliance with the terms of its NPDES1 permit related to municipal sewage treatment discharges. This ongoing problem recently had come to the forefront of local news stories,2 and the meeting was heavily attended.

The story made for good press and hit a responsive chord as resentment against the big city of Atlanta found play in its continuing “unauthorized” pollution of the Chattahoochee River and the effect of that pollution on downstream, more rural, neighbors. Surprising to most of the public was the information that the state Environmental Protection Division (EPD), the Georgia state agency charged with administering the NPDES program in Georgia, had not levied the most extensive fines that it could on Atlanta for the city’s violations. The EPD also had not required immediate compliance with the permit, even though the problems (in this case phosphorous load and combined sewer overflow) had

* Associate Professor, Georgia State University College of Law. The author wishes to thank Owen Anderson, Fred Cheever, Bradford Mank, Charles Marvin, Joel Mintz, David Moore, Zygmunt Plater, Cliff Rechtschaffer, Jack Williams, and all of those who offered helpful comments at the presentation of an earlier draft of this paper at the 1997 AALS conference, Natural Resources Panel. The author particularly would like to thank Marjorie Girth and Paul Milich for their intensive review of the Article. I owe an enormous debt to my research assistants, Karen Armsby and Stan Case, without whose precise attention to detail this data could not have been analyzed nor could this article have been written. A special thanks to the Editor in Chief of the BOSTON COLLEGE ENVIRONMENTAL AFFAIRS LAW REVIEW, Christopher J. Hunter, and to the Executive Editor, Siobhan Mee. Your enthusiasm for the Article made this collaboration a joy.


existed for several years.³

At the time of the presentation, the issue of whether the enforce-
ment actions taken were effective had become quite politicized.
The Georgia legislature that very week was considering various
proposals overriding the Georgia EPD's enforcement decision
and tightening requirements and punishment of Atlanta for its
perceived lack of zeal in addressing the NPDES violations.⁴ At
the March 15, 1996, meeting, Senator Langford of the Georgia
state legislature rose to his feet and declared that "this time" the
legislature was serious about stepping in and "doing something"
because the Georgia EPD was "in the pocket" of the city of At-
lanta.⁵

Two years earlier, in 1994, the Georgia EPD released its public
which summarized the actions of the EPD with respect to water
quality in Georgia during those years.⁶ In the section on NPDES
permitting, the report stated: "In 1992–93, a significant amount
of personnel time was allocated to the reissuance of NPDES
permits. Permits were reissued for 374 municipal and private
discharges and for 210 industrial discharges. In contrast to many
other areas of the nation, Georgia has no backlog of permits to be
issued."⁷

I. Introduction

Some call it the "Mississippi syndrome." Others call it the "race to
the bottom." Whatever the exact term, the concept posits that, if left
to their own devices, the states invariably will not provide the proper
regulation needed for their citizens' well-being.⁸ Specifically, because
of differential economic development, some states, notably the poor-
est (e.g., Mississippi), will bargain away the long-term health and
well-being of their citizens for current economic gain.⁹ Without a
federally mandated floor, poor states' bargaining power with industry

³ See Charles Seabrook, Suit Filed to Halt Pollution: Plaintiffs Claim State Agency Can't
⁴ See id.
⁵ Author's notes of Mar. 15, 1996, Atlanta Bar Association meeting (on file with the author).
⁷ Id. at 19.
⁸ See Thomas W. Merrill, Panel III: International Law, Global Environmentalism, and the
⁹ See Jeffrey Geiger, Canary in a Coal Mine? Federalism and the Failure of the Clean Air
may be very limited. As such bargaining becomes commonplace, less impoverished states are forced to match some of the incentives offered by the poorer states in order to maintain their comparative economic benefits, raising the ante of health giveaways. This leads to a downward spiral at the end of which the economic well-being of most states remains unimproved—all states provide a lower standard of long-term health and well-being for their citizens, while giving away the higher standards in a competitive frenzy to enrich the coffers of private interests. Today, the discussion often is about either development giveaways, or the lowering of taxes used to fund education in order to attract business. But in the past, the "race to the bottom" conjured up images of polluted water, air, and land.

It was the "race to the bottom" that supposedly explained the inability of state legislatures to take steps that would protect their own citizens from environmental degradation; the "race to the bottom" also was one of the factors that prompted the major reform in United States environmental policy—the federalization of environmental laws and standards. In a stunningly quick series of developments in the late 1960s and early 1970s, federal primacy in the control of air, water, and toxic waste pollution replaced state pri-
macy. New standards provided a maximum level of pollution for all states. The federal model had triumphed.

According to this new environmental protection paradigm, no citizen of any state would have to suffer environmental degradation because of unhealthy competition for environmentally bad business. In order to preserve efficiency and flexibility, the states in many instances would be given the opportunity to run their own programs as long as pollution curtailment met federal standards. Ongoing supervision by the federal government was supposed to ensure that the states enforced these minimum standards adequately. If a state's enforcement was inadequate, the federal government could step back in and run the program directly. In order to preserve flexibility, states were supposed to tow the line in enforcement to avoid possible draconian enforcement at the hands of the federal government. Federal supervision of state enforcement seemed like a great idea, foolproof in every way. The flexibility of state enforcement would be coupled with federal standards and oversight to ensure the adequate protection of all citizens.

But all was not as rosy as it seemed. For a strange thing happened in the subsequent years. As the responsibility of the federal oversight agency, the Environmental Protection Agency (EPA), grew, its funds did not. This hampered EPA's ability to monitor programs adequately. Moreover, without money, the threat of a true federal takeover largely disappeared, as the federal government could no longer afford the direct control of pollution compliance within most states. Some results of this oversight breakdown were obvious, such as the failure of states to promulgate water quality standards and the failure of EPA to require promulgation of such standards. These

17 See Geiger, supra note 9, at 85.
18 See id. at 84-85.
19 See id.
visible failures provoked the use of citizen suits and commensurate relief.23 Other results, such as ineffective "enforcement" actions that states took under the National Pollutant Elimination Discharge System (NPDES), were and are less visible.

Federal supervision of state enforcement was not as fail-safe a scheme as its proponents initially believed. The laws and standards were still there and they might be enforced with much energy from citizens.24 But all the laws on earth do not amount to much if they are not enforced, or if the enforcement lacks teeth. With the credible threat of a federal takeover removed, the states could go back to, or continue, their race to the bottom.25 Yet this time, they did not race with the laxity of laws, but with the lack of zeal of enforcement of laws—a competition that is much more hidden and insidious, and one in which some states may not want to compete.26

Although lack of zeal of enforcement has been commented upon anecdotally for a long time,27 differing enforcement patterns never have been proven to exist numerically, and the implications never have been analyzed. One of the downsides of the failure to study this problem until now has been the proliferation of commentary declaring the environmental "race to the bottom" problem dead and claiming that states can handle environmental problems.28 The "success" of the federal-state partnership in environmental cleanup is supposed to substantiate these claims.29 Moreover, the states' "proven" ability to withstand the temptation of negative competition leading to environmental degradation is supposed to suggest the conclusion, featured prominently in the Republican majority congressional agenda, that more responsibility for environmental health should be given to the states.30

23 See id.
24 See id.
25 Indeed, consistent enforcement at the federal level also may be problematic due to funding cuts. This Article does not address this issue.
26 Although he does not rely on empirical evidence, Professor David R. Hodas analyzes the "competition" of weakened regulatory enforcement in *Enforcement of Environmental Law in a Triangular Federal System: Can Three Not Be a Crowd When Enforcement Authority Is Shared by the United States, the States, and Their Citizens?*, 54 Md. L. Rev. 1552, 1574-75 (1995).
28 See Revesz, *supra* note 13, at 1233-34.
29 See generally Geiger, *supra* note 9, at 113.
This Article challenges that conclusion and gives support to the anecdotal evidence of enforcement failure by looking at enforcement patterns in a consistent manner for one major federal environmental law, the CWA.\(^{31}\) This Article reviews the requirements and the implications for uniform pollution control of the CWA, and then empirically analyzes the enforcement patterns of two medium-sized states, Georgia and Washington, which both have permission to administer programs and permitting under the CWA's NPDES program.\(^{32}\) The statistical analysis proves that even when source differences are taken into account, the stringency of enforcement between the states is different, leading to the conclusion that neither uniform national standards, nor effective enforcement of at least one major environmental law exists.\(^{33}\) As this Article makes clear, the states have not changed in their ability to enforce environmental standards rigorously on their own; any assertion to the contrary is at best wishful thinking, and at worst deliberate propaganda. Sadly, state flexibility represents not only the promise of efficiency in environmental protection, but the reality of health giveaways in the name of comparative advantage.

The perception of the Georgia state legislator at the Bar Association meeting that the Georgia EPD was too cozy and flexible with Atlanta concerning its NPDES violations is not just an interesting anecdote; it represents a true picture of what is happening in our nation. Federal laws are not protecting the environment or human health because states do not enforce the laws uniformly. A dirty river runs through the clean promise of our environmental laws, and that river is inadequate state enforcement. True environmental protection awaits the ability to address this problem effectively. More federal enforcement is needed, not less. Evidence indicates that further devolution of power to the states merely will intensify the lack of environmental protection, whereas increased federal enforcement may provide the hammer that is needed to get the states back on track.\(^{34}\)

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\(^{31}\) After the 1972 amendments, the national scheme to control water pollution was called the Federal Water Pollution Control Act. At the time of the 1977 amendments, the name was changed to the current Clean Water Act, the term used throughout this Article.


\(^{33}\) See infra Parts III and IV.

\(^{34}\) See infra Part IV.
II. The Clean Water Act and Its Intentions for Uniform, Stringent Enforcement

A. Clean Water Act: Background and History

When Congress enacted the Federal Water Pollution Control Act Amendments of 1972 (Clean Water Act, CWA, or 1972 Amendments), the stated objective was "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The ever-mounting pollution resulting from the industrial revolution and the increasing urban population largely had gone unchecked, despite repeated efforts to address the problem. Among the early congressional schemes dealing with water pollution were the Refuse Act of 1899 and the Water Quality Act of 1948. Ambient water quality standards were created in 1965, with the understanding that the states would implement the necessary steps to meet the standards. Nevertheless, the Senate Public Works Committee in 1971 determined that "the national effort to abate and control water pollution has been inadequate in every vital aspect." Previous congressional initiatives were intended to encourage pollution control while reflecting (pre-New Deal) deference to local authority. The comprehensive provisions of the 1972 Amendments represented a marked departure from this approach. For the first time, lawmakers embarked on a major federalization of the cleanup effort.

When Congress approved the modern CWA, it originally mandated that all discharge of pollutants into the nation's navigable waters cease by 1985, that fish and other wildlife be protected, and that water quality be adequate for recreation by 1983. Further, Congress imposed a flat ban on the discharge of toxic pollutants in toxic amounts. By 1987, the various deadlines in the CWA had passed. Congress was

41 See id. at 3669.
44 See id.
forced to extend the timetable for compliance with various technology standards to 1989. This deadline also has elapsed and achievement of the specified goals remains elusive.

B. Effluent Limitations: BPT, BAT, and NSPS

The CWA directs and empowers the EPA Administrator to establish water quality standards and promulgate regulations necessary to achieve the CWA's objectives. Perhaps the Administrator's most important duty is the promulgation of effluent guidelines limiting the discharge of pollutants. When considering these guidelines, the Administrator must make three essential determinations: (1) whether the pollutant results from a non-point source or a point source; (2) whether the pollutant is classified as conventional, non-conventional, or toxic; and (3) whether the discharger is a new or existing source of pollution.

Non-point sources include pollution resulting from runoff attributable to agriculture, silviculture, mining activities, and construction. Here, the federal role is essentially one of advice and encouragement. The EPA Administrator's authority over non-point sources is limited to the identification of areas in need of control and the evaluation of state plans designed to control them. The CWA requires each state to develop and implement an area-wide waste treatment management plan for each area having substantial water quality control problems relating to non-point source pollution.

The primary thrust of the CWA is to limit and ultimately to eliminate point source discharges into U.S. waterways. Point sources may be classified as conventional, non-conventional, and toxic.  

\[50\] See 33 U.S.C. § 1288(a).
\[51\] See 33 U.S.C. § 1288(a)-(b).
\[52\] See 33 U.S.C. § 1288(b).
\[53\] "For simplicity, the universe of the causes of water pollution should be considered as covered fully by the categories of point and nonpoint sources. . . . Consignment to the point source category brings attentive regulation. . . . [R]egulation to the nonpoint source group brings loose oversight." WILLIAM H. RODGERS, JR., ENVIRONMENTAL LAW § 4.5 at 303 (2d ed. 1994). A point source is "any discernible, confined and discrete conveyance" such as a "pipe, ditch, channel, or tunnel." 33 U.S.C. § 1362(14) (1994); 40 C.F.R. § 401.11(d) (1994).
tional pollutants are those classified as biological oxygen demanding, suspended solids, fecal coliform, and pH.56 The most common sources for conventional pollutants are confined discharges from industrial plants and municipal wastewater treatment plants.56 Toxic pollutants are listed based on their toxicity, persistence, and degradability.57 The CWA classifies non-conventional pollutants as those that are neither conventional nor toxic.58

Using the latest scientific knowledge, the Administrator is to set effluent limitations for categories or classes of point sources.59 When the CWA initially took effect in 1972, existing dischargers of conventional pollutants were given a 1977 deadline to reduce pollutants through use of the “best practicable control technology currently available” (BPT).60 By 1984, dischargers were required to use the more stringent “best available technology economically achievable” (BAT).61 Toxic pollutants also are subject to the BAT standard,62 as are non-conventional pollutants.63 The CWA specifies factors the Administrator must consider when assessing the applicable technology standard.64 In each instance, the cost of compliance is part of the calculus.65 Where EPA has not set specific guidelines for a particular pollutant or industry, the CWA empowers the Administrator to exer-

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59 Prior to the 1972 amendments, the primary measure of pollution control was the quality of the water receiving the effluent, rather than specific limits on the various pollutants. The water quality standards were set by the states based on their judgment of how the water could be used best. The Senate Public Works Committee found the water quality standards program “limited in its success.” 1972 U.S.C.C.A.N. at 3675 (1972). The 1972 Act relegates water quality standards to “a measure of program effectiveness and performance, not a means of elimination and enforcement.” Id.
63 See id.
65 To determine the best practicable control technology, the Administrator must do a cost-benefit analysis and consider the age of equipment and facilities involved, and any other appropriate factors. See id. The Administrator also must consider “the cost of achieving such effluent reduction” when determining the BAT, and the cost of achieving effluent reductions when promulgating New Source Performance Standards. See 33 U.S.C. §§ 1314(b)(2)(B), 1316(b)(1)(B) (1994).
cise discretion to set conditions “necessary to carry out the provisions of this chapter.”

Standards for new point source dischargers are more exacting than those for existing sources. The CWA directs the Administrator to establish New Source Performance Standards (NSPS) for a variety of operations that qualify as point source dischargers. They must meet effluent limitations through use of the “best available demonstrated control technology.”

The CWA also authorizes EPA to regulate the quality of the wastewater flowing out of publicly owned treatment works (POTWs). The Administrator is empowered to define secondary treatment processes necessary to attain a minimum level of effluent quality for conventional pollutants.

Most POTWs are designed primarily to treat domestic wastewater. Therefore, industrial users and others making discharges into POTWs must pre-treat their effluent. Rather than control these discharges directly, the CWA requires POTWs themselves to develop and enforce pre-treatment programs based on standards developed by EPA. Then these programs are incorporated into the plant’s permit under the NPDES. The central feature of the pre-treatment requirement is elimination of so-called “pass-through” or “interference.” As with other discharges, this effluent is subject to standards established by the Administrator. Ultimately, wastewater discharged to a POTW from a new source must meet the same standards applicable to effluent discharged directly into a waterway.

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68 See id.
71 See id.; see also 40 C.F.R. § 133.102 (1994) (EPA standards).
73 See 40 C.F.R. § 403.8(c) (1996); see also NPDES discussion infra Part II.
74 A “pass-through” is a discharge from a POTW that results in violation of the plant’s NPDES permit. It can occur either alone or in combination with other discharges. See 40 C.F.R. § 403.3(n).
75 “Interference” occurs when an indirect discharge disrupts the treatment processes of the POTW or otherwise results in a permit violation. See 40 C.F.R. § 403.3(i).
76 See 33 U.S.C. § 1317(b).
77 See 33 U.S.C. § 1317(c).
C. Water Quality Standards

In addition to technological requirements, point sources also are expected to comply with receiving water quality standards. The water quality based controls that dominated pre-1972 efforts at pollution control remain a feature of the CWA. Each state is required to establish water quality standards for all bodies of water within its borders, subject to review by EPA. Whereas technology-based and process-based controls are concerned with the reduction of pollution at the source, the water quality standards focus on the receiving waters and their designated uses. These standards create a baseline for the level of a particular pollutant that a body of water may tolerate. If the discharger is able to demonstrate that the water quality will be protected adequately by reducing point source pollutants through use of the appropriate technology-based standard alone, no additional controls are required. Otherwise, the discharger is subject to additional controls to safeguard receiving water quality.

D. The Federal-State Partnership: NPDES Permitting

A central tenet of the 1972 Amendments was the absolute prohibition of pollutant discharge into the nation’s waterways. For general industrial discharges into water, this prohibition only could be waived by the pollutant source receiving a permit specifying the manner and amount of pollution allowed. The NPDES permitting system is the central enforcement mechanism of the CWA. The permits are to incorporate all technology and receiving water quality standards with limits on the specific sources. In order to determine the effect of

78 Receiving water is the water body into which point sources are discharged.
80 See 33 U.S.C. § 1313(a).
81 “Designated uses pretty well exhaust the possibilities from recreation to waste disposal.” RODGERS, supra note 53, at 345.
84 See § 1311(b)(1).
discharges and type of control technology required, applicants must test their effluent for various constituents, including toxics and other materials listed in the Code of Federal Regulations.\(^{89}\) The permits specify the control technology applicable to each pollutant, the effluent limitations a discharger must meet, and the deadline for compliance.\(^{90}\) Each pollutant then must be monitored, and the results submitted to EPA or to another governing entity in periodic discharge monitoring reports (DMRs).\(^{91}\) Permits under NPDES may be granted for no more than five years, but are renewable thereafter.\(^{92}\) A discharger may continue to operate under a prior permit when it submits a timely application for renewal.\(^{93}\)

EPA has statutory authority to administer the NPDES program.\(^{94}\) However, the CWA recognizes "the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution."\(^{95}\) Thus, Congress has provided that states wishing to oversee their own water pollution control efforts may do so under NPDES, subject to EPA approval and oversight.\(^{96}\) The states must demonstrate both the ability and the legal authority to carry out such a permit program.\(^{97}\) If the EPA Administrator determines that the necessary requirements have been met, the federal permit program is suspended.\(^{98}\) However, authorization for state permitting may be withdrawn if the state fails to comply with the provisions of the CWA and corrective action is not taken after notice and a public hearing.\(^{99}\) Each state also is required to submit an annual report to EPA describing the quality of the water within its borders and the progress made toward meeting the CWA objectives.\(^{100}\)


\(^{90}\) See 40 C.F.R. § 122.2133 (f)–(g).

\(^{91}\) See id.; 40 C.F.R. § 122.41(i)–(j).

\(^{92}\) See 40 C.F.R. § 122.46(a)–(b).

\(^{93}\) See 40 C.F.R. § 122.6(a)(1).

\(^{94}\) See 33 U.S.C. §§ 1251(d), 1342(a) (1994).

\(^{95}\) See 33 U.S.C. § 1251(b).

\(^{96}\) See 33 U.S.C. § 1342(b).

\(^{97}\) See id.

\(^{98}\) See 33 U.S.C. § 1342(c)(1).


E. Clean Water Act Enforcement: Non-compliance Orders, Civil and Criminal Sanctions

Enforcement of the NPDES program lies largely with the EPA Administrator or similar state agent.\textsuperscript{101} If a discharger fails to comply with the requirements of a permit issued by EPA or an appropriate state agency, the Administrator is authorized to issue a compliance order or bring a civil action in federal court for appropriate relief.\textsuperscript{102} Violators are subject to civil penalties of up to twenty-five thousand dollars per day.\textsuperscript{103} The CWA further provides for criminal penalties of up to fifty thousand dollars per day for knowing violations\textsuperscript{104} and up to twenty-five thousand dollars per day for negligent violations.\textsuperscript{105}

The CWA also provides for citizen suits against polluters, or against the EPA Administrator or equivalent state administrator for alleged dereliction of non-discretionary duties.\textsuperscript{106} In appropriate circumstances, state governors may commence civil actions against the Administrator for alleged failure to enforce effluent standards which are detrimental to the health or welfare of their citizens or to the water quality within their own states.\textsuperscript{107}

F. Why the Clean Water Program Was Federalized: Strengthening Enforcement

The impetus for the massive changes in the CWA was similar to the reasons for the federalization of environmental programs in other areas—the overriding perception that water quality was not improving, and that the states could not be depended on to improve the situation.\textsuperscript{108} The possibility that some states would not implement clean water goals also supports the argument in favor of federal regulation of the environment: Uniform federal standards would prevent the creation of economic incentives for states to further relax

\textsuperscript{103} See 33 U.S.C. § 1319(d).
\textsuperscript{104} See 33 U.S.C. § 1319(c)(2).
\textsuperscript{105} See 33 U.S.C. § 1319(c)(1).
\textsuperscript{106} See 33 U.S.C. § 1365(a) (1994).
\textsuperscript{107} See 33 U.S.C. § 1365(h).
their standards in the typical "race to the bottom." Moreover, even if some states did improve their water quality, despite other states' economic incentives to lower standards, the states that did not improve their water quality would harm other states' efforts due to cross-boundary pollution. State control of water pollution became subject to federal law in 1972 when Congress first created the ambient standards. However, overall enforcement by the states against polluters and the record of enforcement against the states by the federal government were poor. The problem stemmed from a lack of enthusiasm to enforce state and industry compliance and from a lack of enforceable standards. According to one commentator: "In practice, the [pre-1972] enforcement procedures were subject to excessive negotiations and delay. Municipal and industrial polluters and state and federal agencies spent considerable amounts of time bargaining with no apparent cleanup results. There were few enforceable agreements and timetables were not met." This was not an uncommon problem with the initial attempts to develop strong environmental laws. As bluntly stated by Professors Menell and Stewart: "No program of environmental regulation is better than its enforcement system. The best standards in the world would accomplish nothing unless they were complied with, and purely voluntary compliance cannot be expected within our social and economic institutions."

Therefore, when debating changes to the Federal Water Pollution Control Act in 1972, both the United States House of Representatives and Senate believed that a key to changing water quality through the law was stronger enforcement. Thus, Congress considered vigorous federal enforcement of the new stricter technology standards to be critical to the success of the CWA.

110 See *Harvey Lieber, Federalism and Clean Waters: The 1972 Water Pollution Control Act* 197 (1975).
112 See Andreen, supra note 20, at 226–27.
114 LIEBER, supra note 110, at 20.
115 See *Anderson et al., supra note 108, at 354–55.
116 Menell & Stewart, supra note 42, at 531.
117 See Andreen, supra note 20, at 223.
118 See id. at 226–29.
Nevertheless, political realities, as well as the hope for some local tailoring, demanded that the states maintain some role in the new scheme. As stated in the CWA, the states were given the power under certain circumstances to administer the NPDES program “to recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution.”

Unique circumstances of a state, such as a particularly pernicious pollutant, might require specifically tailored enforcement action best handled at the state level. However, overall control provisions in the statute indicate that Congress expected strict adherence to the goal of clean water and to a limitation on bargaining with polluters. Unfortunately, this meant that one of the hoped for goals for some Congress members—to eliminate the state-level administration of the Act completely—was not going to occur, and that there would be a reintroduction of the uncertainty of state zeal and ability to enforce the new laws.

In theory, the 1972 amendments to the CWA still achieved the goal of strict enforcement in the face of continued state involvement by having strict federal control over state administration. The fact that states had to meet certain requirements in order to administer the NPDES program, the fact that individual compliance data was to be monitored by EPA, and the fact that EPA could revoke the authority of a state to run a program if the state were not running the program effectively and in compliance with the statute, were supposed to insure that the use of state enforcement would not weaken the clean water program. Citizen suit provisions also were to spur both federal and state enforcement.

G. The Problems with the State-Federal Partnership

Despite the elaborate scheme for enforcement of strong standards, enforcement has been highly criticized and government studies show

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119 See RODGERS, supra note 53, at 363.
121 See GEN. ACCT. OFF. REP., Water Pollution: Differences Among the States in Issuing Permits Limiting the Discharge of Pollutants, 6-7 (Jan. 1996).
122 See RODGERS, supra note 53, at 364-65.
123 See id. at 363-64.
125 See § 1342(c)-(d); California State Water Resources Control Bd., 426 U.S. at 206-08.
that enforcement continues to be poor.\textsuperscript{127} Whether the responsibility lies primarily with the federal or state side of the partnership, there are many structural reasons to suspect that strict, uniform state enforcement is not occurring. A review of the factors that could contribute to this enforcement decline are set out below.

1. The Threat of Program Revocation Is Ineffective

Although there is some evidence that initially EPA zealously used its power of program revocation to hold the states to a high standard,\textsuperscript{128} the possibility of program revocation is now almost non-existent.\textsuperscript{129} There are several reasons why the threat of program revocation is no longer credible. First, in an era of the need for state cooperation, it is seen as a blunt and too harsh instrument for simply altering state behavior as to enforcement; negotiation seems the preferred route.\textsuperscript{130} Second, the statutory and regulatory requirements for withdrawing the program are very complex. As stated by Professor Rodgers: "[T]he procedures for withdrawal of state programs would be suitable for the Nuremberg trials, and will be invoked only upon epochal occasions."\textsuperscript{131} But probably the most important reason for the curtailment of the federal ability to take back state administration of an NPDES program is the reality of limited federal resources to administer all the programs.\textsuperscript{132}

Enforcement and compliance work represented approximately twenty-five percent of EPA's budget in 1990.\textsuperscript{133} With recent budget cuts and disputes over funding, it is clear that EPA's direct enforcement and secondary enforcement of state programs is damaged.\textsuperscript{134}

2. Data to Monitor the States' Programs Is Incomplete

Even if EPA were to retain credible power to take back enforcement of a state's NPDES program, the structure of EPA's monitoring of the states' programs may not give an accurate picture of the effec-

\textsuperscript{127} See Kuehn, supra note 30, at 2388.
\textsuperscript{128} See Lieber, supra note 110, at 121.
\textsuperscript{129} See Rodgers, supra note 53, at 367.
\textsuperscript{130} See Percival, supra note 109, at 1175.
\textsuperscript{131} Rodgers, supra note 53, at 368.
\textsuperscript{132} See generally Order, supra note 22 (finding EPA's oversight of Georgia's compliance "totally inadequate").
\textsuperscript{133} Joel A. Mintz, Enforcement at the EPA: High Stakes and Hard Choices 2 (1995).
\textsuperscript{134} See id. at 115.
tiveness of the NPDES program in controlling water pollution or meeting the general goal of clean water. EPA primarily receives raw data concerning the self-reported effluent levels of all major NPDES permitted parties.\textsuperscript{135} These are then compared to the terms of the permits.\textsuperscript{136} This method of oversight may distort the true picture of the health of a state’s water quality regulation in several ways.\textsuperscript{137}

First, EPA’s received NPDES information only allows a comparison of a permitted party’s individual pollutant monitoring results with the terms of that party’s NPDES permit.\textsuperscript{138} It requires no formalized analysis of the terms of the permits themselves. Although there are standards governing the requirements of an NPDES permit and EPA retains the right to disapprove permit terms, there appears to be great flexibility in how a state sets terms in the granting of a permit.\textsuperscript{139} States are not required to have formal administrative hearings on the granting or termination of an NPDES permit, and only recently have been required to provide judicial review of final permit decisions.\textsuperscript{140}

In a new report prepared for Senator Baucus on this issue of divergent standards in the permits, the General Accounting Office (GAO) noted that there is no real consistency in how pollutant levels are set in NPDES permits.\textsuperscript{141} Although the report noted that these differences can be due to many legitimate factors meant to preserve state flexibility, such as the receiving water quality and proposed uses...
of the receiving waters, other factors may include how each state assesses cancer risks or makes assumptions about the overall cleanliness of a water body.\textsuperscript{142} And in at least one instance, a state specifically did not apply new standards because the state, in its own view, thought that the standards were too strict.\textsuperscript{143} In that case, the report noted that EPA did not withdraw the program because it was "an unrealistic option."\textsuperscript{144} Whether this is a major problem or not is unclear because EPA has no consistent oversight or review of the NPDES limits within new or revised permits.\textsuperscript{145}

Furthermore, without specific requirements, discretion can come under enormous pressure to accommodate the permittees. A 1980 study revealed that dischargers initiated nearly all challenges to an NPDES permit, and over half received relief from requirements.\textsuperscript{146} Thus, it is clearly possible that the ability of the state to set the terms of the initial NPDES permits may cause wide inconsistency in pollution control.

Moreover, when a polluter is out of compliance, EPA is supposed to receive information which tells what state action was taken.\textsuperscript{147} However, there is no standard by which to judge this action. Although EPA may receive a report saying that the state agency has entered into an administrative agreement to correct the violation, the agreement might be pursued vigorously in a short amount of time in one state, while the violator might dally freely in another state with a new permit reflecting newly relaxed standards.\textsuperscript{148} The empty threat of EPA taking back the program merely underscores the fact that a hard look at these differences in enforcement actions between the states will not occur. In one recently publicized case, Georgia's Environmental Protection Division (EPD) suspended enforcement of water pollution standards for more than two dozen sewage treatment plants on the same day they were imposed, all without public review or input.\textsuperscript{149}

In addition to the problems of analysis of the initial consistency of permit requirements of each state as noted above, EPA's system of

\textsuperscript{142} See id. at 11–13.
\textsuperscript{143} See id. at 6.
\textsuperscript{144} Id.
\textsuperscript{145} See id. at 11, 13–14.
\textsuperscript{146} See Zemansky & Zerbe, supra note 140, at 4.
\textsuperscript{147} 40 C.F.R. § 123.45(a)(1) (1996).
\textsuperscript{148} See Percival, supra note 109, at 1175.
\textsuperscript{149} See Charles Seabrook, Water Pollution Standards Waived, ATLANTA J.-CONST., Sept. 13, 1995, at C8. In December 1996, Judge Alice Bonner of the Fulton County Superior Court ruled
oversight (and indeed the oversight system of most of the states) only analyzes the performance of major sources. Additionally, the CWA does not even require certain point sources to obtain individual NPDES permits. It may be impossible to track all sources, some of which might go unnoticed and avoid permitting altogether. But there is no way to know this. By the very act of not requiring information about certain polluters, EPA has given many states license not to have an effective permit history of smaller sources. Thus, such information would be largely unavailable even if EPA wanted it.

Such a lack of information could be excused if small point sources were tiny contributors to water pollution. Assuming, however, that non-major sources are not de minimis contributors to overall water pollution, the failure to examine them when trying to get a complete picture of pollution sources can be justified only by an assumption that data from compliance of major NPDES permitted sources is sufficient to give a true and accurate picture of overall compliance of all sources. Among permitted sources, there has been some indication that the frequency of violation is related to the size of the source with per capita violations increasing as sources get smaller. Unless the major sources are truly representative of all violators, the inability to track pollution systematically from all sources prohibits an effective analysis of state NPDES permit programs, and thus the NPDES program generally. If the major source data received by EPA is unable to reflect the entire picture, it undercuts even further any pretense EPA has of adequately enforcing the NPDES program and achieving its goal of clean water through the current federal-state system.

3. Citizen Suit Litigation Gives Too Much Credence to State “Enforcement”

Even though the possibility of citizen suits may pressure state action, case law has weakened this enforcement provision. In 1987, that waivers of such permit terms must be made public. See Charles Seabrook, Judge: EPD Waivers Must Be in Public, ATLANTA J.-CONST., Dec. 4, 1996, at C1.

100 See 40 C.F.R. § 123.45(a).
101 See 40 C.F.R. §§ 122.21(g)(7)-(8), 122.28 (1996).
Congress shielded state enforcement of NPDES violations from citizens' suits if the alleged permit breaches were being "diligently prosecuted." Most courts have interpreted this "diligent prosecution" bar broadly to preclude any citizen's suit based upon the same CWA violations alleged in an administrative action, not allowing such challenges "merely because [the citizens] do not agree with the type or extent of punishment imposed." This problem is exacerbated when many consent orders are not made public or could appear to be "sweetheart" deals. Thus, judicial relief in a citizen's suit challenge to an NPDES permit enforcement is an "odd duck" indeed, and generally occurs only when the state specifically does not impose any penalty for the NPDES permit violation. This allows the states to lower standards strategically by taking minimal actions to prevent citizens' suits.

4. Effective Enforcement of the Clean Water Act Program Is Left Entirely to the States

As of 1993, thirty-seven states had approved NPDES permit programs—a number too large for EPA to monitor and police effectively. Thus, the states that failed to improve the cleanliness of the nation's waters in the past are now the critical link in enforcing the 1972 Amendments. Although there are more articulable standards for individual water polluters through the NPDES program than there were before 1972, it is obvious that adequate enforcement is a critical part of the CWA.

The simplistic belief that having clean water standards on the books will ensure uniformly clean water nationwide is not true. Adequate enforcement is needed to reach this goal. Since enforcement will occur effectively only through state action, the original goals of the strengthened CWA—to have uniform regulations and clean water

156 Russo, supra note 154, at 281; but see Citizens for a Better Env't v. Union Oil Co., 83 F.3d 1111, 1119–20 (9th Cir. 1996) (noting that shield of administrative enforcement does not protect polluter from suits compelling compliance when NPDES permit itself has not been altered to reflect temporary lessening of standards).
159 See Hodas, supra note 26, at 1622.
160 See RODGERS, supra note 53, at 363 n.15.
161 See Geiger, supra note 9.
throughout the country—now depend on whether adequate enforce­ment is occurring at the state level.\textsuperscript{162}

As noted in the Introduction, there is a notion that because states have programs and bureaucracies in place to enforce environmental laws, state recalcitrance in enforcement is a problem of the past.\textsuperscript{163} Indeed, the 1994 Republican congressional majority indicated a will­ingness to reduce federal environmental regulation, ostensibly based on the fact that the states now have both a will and a way to protect the health and well-being of their citizens and their environment.\textsuperscript{164} But simply giving the fox some rules on guarding hen houses does not make the hen house any safer. Many people who work in the field claim that there has been state resistance to environmental laws, including to the CWA.\textsuperscript{165} Cases show problems of compliance in areas that are visible such as promulgation of water quality standards.\textsuperscript{166} Early anecdotal observations suggested great resistance to meeting federal goals.\textsuperscript{167} However, whether this is only an occasional problem or a measurably systemic one never has been empirically tested.

**III. What Can We Learn About State Enforcement?**

This Article examines empirically some indicia of state enforcement of the CWA, primarily by statistical comparisons of enforcement ac-

\textsuperscript{162} Of course, one might argue that whether one of the goals of the 1972 amendments was uniform state enforcement is unimportant to whether the administration of the Act should reflect that goal today. “Dynamic Statutory Interpretation,” which is one method of legislative intent, “track[s] current political trends in order to achieve an interpretation of a statute that best fits the values and goals animating current legislators, administrative agencies, and other interested actors.” John C. Nagle, Newt Gingrich, Dynamic Statutory Interpreter (reviewing William N. Eskridge, Jr., Dynamic Statutory Interpretation (1994)), 143 U. PA. L. REV. 2209, 2212 (1995).

However, even acknowledging this as the valid method of statutory interpretation does not let one ignore uniform state standards and enforcement in the Clean Water Act. For although such enforcement may not be apparent from an administrative standpoint, there appears to be no lessening at all of the desires and expectations of Congress and citizens that such a result is expected from the Clean Water Act. See Adler, supra note 113, at 228 (recognizing that widely varying standards are still a problem motivating a federal response).

\textsuperscript{163} See Geiger, supra note 9, at 113.


\textsuperscript{165} David Pope, Remarks at the Atlanta Bar Association, Environmental and Toxic Tort Section Presentation, Past, Present, and Future of Toxic Tort Litigation, (Dec. 7, 1995) (from contemporaneous notes of the author).

\textsuperscript{166} See Order, supra note 22.

tions between two representative states. This will allow an analysis of comparative stringency of enforcement and the ability of these states, in the absence of adequate federal oversight, to achieve the goal of uniform, stringent, national standards for pollution.

A. Discovering Indicia of Compliance Consistency

As noted above, actual data concerning enforcement of the NPDES program by the states may be incomplete. Statutes and regulations governing state administration of the NPDES program require only periodic reports of effluent concentrations from already permitted major sources in each state, and a summary of actions taken against noncompliant sources. EPA, or the state agency administering the program, compiles this information into Quarterly Non-compliance Reports (QNCRs), which summarize all sources in violation of their permits within an NPDES program jurisdiction and what broad actions the administrator of that NPDES program took in response to these violations. These QNCRs merely show that violations are occurring and that these administrators supposedly are addressing them. Violations may be due to an exceedance of actual pollutant levels in an NPDES program, to reporting, or to other administrative violations. However, just because these reports show that, almost without exception, actions are taken when a violation appears, does not mean that enforcement is effective, or that ultimately the purposes of the CWA are being served.

According to the Supreme Court in Gwaltney v. Chesapeake Bay Foundation, there is an assumption that any administrative enforcement action of the state or federal government against an NPDES permit violator is taken with the purpose of securing compliance with the CWA. However, no one has tested this proposition. An "action taken" may vary enormously from strict fines and/or shutdown of the offending source, to negligible fines and an agreement which only requires remote compliance with the terms of the initial permit. Although examining where a state's enforcement actions fall on this spectrum may give some picture regarding how extensive

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168 See supra Part II(G)(2).
170 See id.
171 See 40 C.F.R. § 123.45(a)(1)(iii).
172 See 40 C.F.R. § 123.45(a)(2)(ii)-(iii).
174 See id. at 59-60.
175 See generally 33 U.S.C. § 1319(c)-(d), (g) (1994).
enforcement is in one state, it does not tell if the state is enforcing the NPDES laws in the best way to ensure the ultimate protection of the state's waters or compliance with the CWA. In isolation, enforcement patterns reveal little about the effectiveness of overall enforcement, since it is possible that "mild" enforcement actions may be bad for the environment or, conversely, may be most appropriate to meet the ultimate goal of clean water in certain cases. However, a comparison of enforcement patterns between states does shed some light on whether NPDES permit limits actually are being enforced in the best way to ensure compliance with the CWA.

Uniform severity of enforcement actions generally should be expected when comparing the administration of NPDES programs in different states, particularly when controlling for differences due to types of sources. Indeed, two of the goals of the 1972 amendments to the CWA were to ensure uniformity of minimum standards governing clean water and to force strict compliance with these clean water standards subject to the individual source pollution circumstances of the states. Failure to find such similarity between two states (unexplainable by random variation) would indicate that enforcement actions are inconsistent in the NPDES program and that the quality of cleanup efforts varies from state to state. This disparity supports the idea that effective enforcement may not be occurring in some of the state-administered NPDES programs.

Although complete data regarding all source violations and responding actions in each of the NPDES programs does not exist, the QNCR data compiled by EPA does allow a comparison of certain indicia of the consistency and strength of enforcement action taken against major source violators in various states. Thus, this study uses contemporaneous QNCR data of one and one-half years re-

176 This may be especially true in situations of municipal sewage treatment systems where public health constraints may prevent a "shutdown" of the offending source.


178 The period covered for the State of Georgia is January of 1994 to June of 1995, while the period covered for Washington is April of 1994 to June of 1995. Although the data from Washington was supposed to run contemporaneously with the Georgia data from January of 1994 to June of 1995, EPA's Region X was unable to supply the first quarter data. Since there are no significant winter spikes in non-compliance and since Georgia sources are fewer in number, all of the Georgia data was used for more accurate analysis. Because we are examining average times of consecutive non-compliance for any source in any given month, and are not doing a total measurement, the number of data "instances" from each state should not bias the result.

Although 15 or 18 months may capture an unusual time statistically, there is no reason to assume that is the case. When faced with analysis constraints, limits on the amount of data had
garding major source violators in two states, Georgia and Washing­
ton, to examine this strength of enforcement. 179

The most important measurable indication of enforcement consist­
tency and strength is the average length of time that violators are out
of compliance with their NPDES permit criteria before they come
back into compliance or before they are shut down. The QNCRs show
whether permit criteria were exceeded for a particular pollutant at
any time in the monthly reporting periods. 180 Moreover, even sources
subject to enforcement action must file reports showing monthly per­
mit violations if they have not corrected permit limit violations. 181
Other things being equal, the same permit violations over periods of
consecutive months show that whatever “enforcement action” was
taken by the state to correct the initial violation has not been effective
in meeting that goal. Therefore, the average length of time out of com­
pliance for similar sources in consecutive months can serve as an
accurate surrogate for measuring the effectiveness of enforcement.
More stringent penalties for violations or stringent demands in com­
pliance schedules presumably would produce an incentive for more
immediate compliance. 182 Of course, “non-compliance” statistics in
QNCRs will not reflect changes of permit terms in compliance agree­
ments. This problem is noted earlier as a general problem in NPDES
effectiveness and accountability. However, given this and other limi­
tations, such as the absence of minor source data, the average length
of time similarly situated NPDES permittees continue to be out of
compliance remains the best way of measuring and comparing state
enforcement zeal and ability.

In order to make an accurate comparison between Washington's
and Georgia's compliance, the study uses multivariate regression
analysis which accounts for differences in enforcement patterns due
to other distinctions between the states which may cause differing
to be imposed. As for questions of which 18 or 15 months to use, these last available reports
should most reflect the current situation with respect to these two states.

The reporting of violations in the QNCR data from both states is methodologically consistent
for purposes of this comparison.

179 A description of the data and how it was received can be found in Appendix A.
182 See ENVIRONMENTAL COMMUNITY ACTION, INC. (ECO-Action) WITH THE GRASSROOTS
tiated fines paid by the companies [in Georgia] were well below the maximum penalties allowed
by law. Hence, settlement penalties are woefully inadequate to serve as incentives to companies
to comply with the law." Id.
enforcement. Although Georgia and Washington are of roughly similar size with similar urban/suburban/rural population distribution, the possible effects due to qualitative differences in sources must be considered in order to measure the effects of enforcement due to different state policies. The only obvious differences not attributable to different state approaches to enforcement are related to the type of sources involved. For instance, it may be true that compliance with ammonia limitations is always more difficult than compliance with limitations on other kinds of pollutants. Thus, this study controls for the effects of type of pollution by regressing out the statistical effects on differing state enforcement corresponding to the type of pollutant.

Cursory analysis of NPDES quarterly non-compliance reports indicates that municipal sources are far more likely to be out of compliance with NPDES permits for longer periods of time than are industrial sources. To the extent that this is true, it may be because municipalities have limits on resources to help with compliance, and because a shutdown of these sources usually is not feasible since that would cause more pollution or human health problems. Therefore, a dummy variable was created identifying each source as a municipal or a non-municipal source. Effects due to differences based on the relative proportion of municipal systems are screened out so that effects in enforcement rates are not attributable to differences in proportions of municipal sources. Finally, to recognize the cumulative effects and the severity of multiple source violators, this study treats violations for multiple pollutants as separate violations with separate non-compliance times.

There could be other differences between the states which impact non-compliance times. If the effects due to different types of pollution sources and the special problems associated with municipal enforcement are controlled, however, any remaining statistical differences

183 Multivariate Regression or Multiple Regression Analysis is an "interval level statistical technique that uses several independent variables to predict or explain one dependent variable based on minimizing squared error." Kenneth J. Meier & Jeffrey L. Brudney, Applied Statistics for Public Administration 446 (3d ed. 1993). This method holds confounding factors (variables) as constant as possible when measuring the relational effects between variables. See Thomas H. Wonnacott & Ronald J. Wonnacott, Introductory Statistics for Business and Economics 16 (4th ed. 1990).


185 Anderson et al., supra note 108, at 481.
can be attributed to enforcement differences not contemplated by the CWA.\textsuperscript{186}

B. \textit{Results of the Comparison}

Over the reporting period, Georgia had 133 non-compliant sources and Washington had 1,243 non-compliant sources.\textsuperscript{187} Although the states are of similar geographic and population size and distribution, one would expect Washington to have more licensed sources for direct pollutant discharge into water due to its much larger coastline.\textsuperscript{188}

A statistical analysis of the average lengths of time in which NPDES permitted major sources were not in compliance with their permits showed that Georgia's non-compliant sources were out of compliance an average of 5.5 months.\textsuperscript{189} Washington's non-compliant sources were out of compliance an average of 3.6 months.\textsuperscript{190} These differences in non-compliance times between sources in the State of Georgia and sources within the State of Washington are not the result of random variations which one would expect if length of NPDES violations in each state were drawn simply from a larger set of national average non-compliance times which are normally distributed around a single mean. The probability that the differences are the result of random variations is exceedingly small, at one in one billion.\textsuperscript{191}

Non-compliance times were significantly higher in Georgia for both municipal and non-municipal sources separately and for all sources

\textsuperscript{186} Even though this analysis controlled for these distinctions, ultimately it is important to note that even if one state did have a disproportionate number of municipal sources or permitted sources with a particularly troublesome pollutant to control, the distinction would be immaterial to the overall goal of the Clean Water Act to protect human health and the nation's waters. High amounts of overall pollution load can cause associated health and environmental effects, regardless of the reasons for their existence.

\textsuperscript{187} See Appendix A-2.


\textsuperscript{189} See Appendix A-2.

\textsuperscript{190} See id.

\textsuperscript{191} See Appendix A-3.
together.\textsuperscript{192} Even when accounting for effects due to whether a source is municipal or non-municipal and for effects due to the type of violations, the probability that random variation accounts for the difference in the average length of non-compliance time for non-compliant sources is still approximately one in one billion.\textsuperscript{193} When one discards violations due to reporting and only counts average time of non-compliance for actual pollutant sources, a comparison between much smaller subsets, the average period of non-compliance time is still significantly higher for pollutant sources in the State of Georgia.\textsuperscript{194}

Thus, differences in non-compliance periods between NPDES facilities in the State of Georgia and the State of Washington are related statistically to the state in which the source is located, irrespective of the type of pollution source in each state. Since the statistical differences exist in the absence of effects related to the sources themselves, one may infer other factors at work—differences in enforcement patterns, attitudes, or zeal exist between the two sample states.\textsuperscript{195}

\textbf{IV. Implications of This Analysis}

\textbf{A. State Enforcement of the Clean Water Act Is Not Uniform}

The most direct implication of the study is apparent. For reasons unconnected to the need to tailor enforcement to particular circumstances of a state, state enforcement is not uniform. Since enforcement compliance is intended to correct excess pollution not allowed by the statutory scheme, this indicates that overall environmental quality is inconsistent among the states, and substandard for at least one state.\textsuperscript{196} The study also indicates that the differing enforcement patterns are probably linked directly to differences in state resolve

\textsuperscript{192} See Appendix A-4.
\textsuperscript{193} See Appendix A-5.
\textsuperscript{194} See Appendix A-7.
\textsuperscript{195} I do not attempt to claim that this disparate enforcement is related necessarily to any inherent “wrong” on the part of the enforcement authority of Georgia or any other state. There can be various benign reasons why some states take longer to enforce against known pollution sources, including cultural differences regarding the value of negotiation. It has been hard for any state to measure the effectiveness of such patterns in any empirical way to determine even what is “good” or “bad.” This is one very important reason why such a study is needed. The data in this study show that the differences in enforcement are not related to source differences, which the Clean Water Act anticipates, but instead result from something that lies outside the ambit of the Act.
\textsuperscript{196} See discussion, infra, Part III B.
and zeal to enforce the law. It also may be hypothesized that the states could be lax in other areas where EPA supervision and authority is weak, such as the licensing of major sources and the determination of the permit limits themselves.

This lack of uniform enforcement certainly challenges the assumption that state participation in the CWA is adequate or effective. Whether this is "bad" in the pejorative sense, is another question entirely, which cannot be answered within the scope of this Article. Certainly the citizens with the weaker enforcement may suffer more environmental damage. But it is of course possible that we as a society are willing to pay this price in order to facilitate some agreement on program goals, even if the goals are not always met. Nevertheless, on its face the CWA does not countenance this as a credible reason for disparity. If it is to be the reason for the disparate results apparent in this survey, it should be considered directly, rather than imposed indirectly through administrative action, where the policy decision essentially is insulated from public participation and review.

Although the statistics only show non-uniformity and do not indicate whether states necessarily are getting better or worse, the study provides the empirical evidence needed to support the anecdotal assertions that state enforcement is weakening and that a new race to the bottom is occurring.

B. Provisions to Help Ensure State Compliance Are Currently Ineffective

As anticipated, even though there are problems with state enforcement, the federal oversight system in the CWA is not dealing effectively with this issue. Without the legitimate threat of an EPA takeover, state program management and enforcement can remain weak, and hundreds of millions of American citizens may not be receiving effective, legally mandated clean water.

Since much of this may be traced to EPA's inability to afford adequate oversight or direct regulation in place of the states, this would indicate that funding cuts to EPA indeed have diminished environmental quality. Quality is affected not just by EPA's ability to take direct enforcement or to direct and create new policy initiatives, but also by EPA's loss of credibility as a stringent overseer of state enforcement and compliance. Until EPA displays a willingness to step

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197 Similarly, citizen suits have not ensured environmental compliance. Data, however, suggest that not all Clean Water Act suits have been prosecuted diligently.
in and fund enforcement in any state that is incapable of doing the enforcement itself, the states will have no hammer to require strict, legal enforcement. If the threat of a takeover is credible, it does not mean that federalism will disappear or that EPA will take over all CWA enforcement. If real, the threat of losing local control should be enough of an incentive to prod most states into effective enforcement programs.

Necessarily, these results also indicate that further budget reductions and a turnover of greater administrative power to the states would be inconsistent with the goals of the current CWA. Reduction in EPA's budget and oversight functions only can be taken for what it is, a weakening of the strength of United States environmental laws.

As stated by Joel Mintz:

[O]nce can hope that the Congress will take account of the true dimensions of the agency's expanded workload, the urgency of its budgetary needs, and the larger cost to society if federal environmental legislation is not implemented effectively. If the Congress fails to do this, it seems certain that many of our environmental laws, so proudly heralded at the time of their enactment, will be administered haltingly—and only partially enforced.\footnote{MINTZ, supra note 133, at 118.}

In another ominous sign, one potentially strong method of state enforcement oversight, citizen suit enforcement, also has been weakened over time by congressional action and judicial interpretation. Much of the "policing" of state enforcement of federal environmental laws was to occur through citizen pressure on state and federal agencies.\footnote{Russo, supra note 154, at 211.} Congress has "authorized citizen enforcement for nearly every major piece of federal environmental legislation."\footnote{Charles S. Abell, Ignoring the Trees for the Forests: How the Citizen Suit Provision of the Clean Water Act Violates the Constitution's Separation of Powers Principle, 81 VA. L. REV. 1957, 1959 (1995).} Although some commentators have argued that this gives citizens enormous power to require immediate enforcement, successful citizen prosecution at most prompts authorities to take minimal enforcement action.\footnote{See id. at 1960 n.12.} As noted earlier, the citizen suit provisions in the CWA, as well as in other environmental laws, bar the prosecution of an action if a state is "diligently prosecuting" a violation.\footnote{See 33 U.S.C. § 1365(b)(1)(B) (1994) (describing "diligent prosecution" bar in the Clean Water Act).}
The study in this Article suggests that many of the "diligent prosecution" findings, at least for the CWA, may be factually incorrect. If the lack of enforcement can be linked not to individual circumstances of each state's pollution sources but instead simply to a lack of zeal in enforcing strict laws, the law would require that citizens' suits challenging the lack of enforcement be given more attention.203 But in other environmental arenas with even fewer indicia of state enforcement, when a state has indicated that a source is out of compliance, and a corrective action is taken or a fine imposed, it is difficult to prove that there has not been "diligent prosecution," even where enforcement actions in fact may be routinely less stringent than they might be in another state or location.204 Thus, citizen suit pressure is not an effective mechanism to ensure uniform state enforcement of environmental laws.

C. Enforcement Problems Are Likely to Exist with Other Environmental Laws

Since the federal supervision of other state environmental programs is similar to the supervisory structure established in the CWA, this study may indicate a wider problem with environmental protection than merely that which exists in the CWA. Although this Article only looked at state enforcement with respect to one part of the CWA, the causes of inconsistent enforcement suggest that the problem is widespread across much of the environmental spectrum where federalism plays a significant role.

Among the many federal-state dual enforcement schemes, only the NPDES program has summary reporting requirements such as the QNCRs.205 The other major environmental statutes do not even have reliable indicators to measure.206 It is not a stretch to hypothesize that even worse accountability in state enforcement would produce similar or even less effective state enforcement.


203 Cf. Gwaltney of Smithfield v. Chesapeake Bay Found., 484 U.S. 49, 60-61 (1987) ("The bar on citizen suits when governmental enforcement is under way suggests that the citizen suit is meant to supplement rather than to supplant governmental action.").

204 Cf. Russo, supra note 154, at 231–32.


206 The Clean Air Act requires permit information under Title V (1990 amendments), but this requirement has yet to be fully implemented. See 42 U.S.C. §§ 7661(a)–(f) (1994). The Resource Conservation and Recovery Information System (RCRIS) also has been criticized for poor information tracking in the hazardous waste context. See GEN. ACCT. OFF. REP., Hazardous Waste: Benefits of EPA's Information System Are Limited, 6 (Aug. 1995).
In analyzing federalism in environmental laws since the 1970s, Hubert H. Humphrey III and LeRoy C. Paddock noted that the threat of the EPA withdrawing approval for any state enforcement programs and having the federal government assume primary responsibility was hollow due to a lack of federal resources and an expanding number of regulated entities.\(^{207}\) In order for federalism to be truly effective for any environmental program, the threat of EPA's ability to withdraw authority from a state must be strengthened across the board.\(^{208}\) In a recent case that analyzed a constitutional equal protection claim for selective enforcement of the CWA, the Sixth Circuit recognized that limited funding forces state regulators "to make difficult, and often completely arbitrary decisions" in the effort to enforce federal laws and mandates.\(^ {209}\)

A recent study of California's regulation of underground fuel tanks revealed that the lack of funds to enforce the law adequately had created a situation where enforcement was lax and inconsistent, further weakening any attempts at voluntary compliance.\(^{210}\) The failure of such an approach is severe indeed. As described by the author:

> Because responsible parties often refuse to remediate their releases, [Leaking Underground Fuel Tank (LUFT)] regulators believe it is "more efficient to move on to cases with cooperative tank owners rather than spend time with belligerent ones." This enforcement practice is facilitated by discretionary cleanup standards which can be applied by the field-level regulators on a case-by-case basis without regard for the impact of such "front-line" decisions on overall enforcement success. It is precisely because of this disparate treatment that many UFT [or Underground Fuel Tank] owners and operators cite [San Francisco Regional Water Quality Control Board (SFRWQCB)] regulatory inconsistencies as one reason for their unwillingness to cooperate with the SFRWQCB.\(^{211}\)

There are other ominous signs that EPA's oversight of state enforcement is structurally ineffective across a wide range of programs. A GAO study indicates that the Resource Conservation and Recovery


\(^{208}\) Cf. id. ("[A] clear set of principles for allocating enforcement responsibilities ... should include ... EPA maintain[ing] a credible threat to withdraw authority from states whose implementation of federal programs is consistently inadequate.").

\(^{209}\) See Futernick v. Sumpter Township, 78 F.3d 1051, 1058 (6th Cir. 1996).


\(^{211}\) Id. at 137.
Information System (RCRIS), which was developed to assist the states and the federal government in tracking hazardous waste and managing the hazardous waste program, does not "provide[e] a mechanism for maintaining highly reliable data." Similarly, a GAO report has indicated that data quality in the Superfund program is also insufficient to implement the CWA effectively and efficiently. In the case of RCRIS, EPA took no steps to ensure that there was consistent data, or that conversion to the new system did not create many errors in terms of monitoring overall enforcement and state compliance.

With respect to the CWA implementation in Washington by the State Department of Ecology, People for Puget Sound indicated in 1993 that lack of regular data made it impossible to quantify or even estimate total water quality violations. Overall, as stated by Joel Mintz, "[EPA's] enforcement information support systems were established ... with little attention to data quality."

This pattern of having flawed or incomplete data systems or incomplete methods of tracking is a severe problem that calls into question EPA's ability and desire to really monitor whether pollution compliance is occurring at the state level. In general, program evaluation is critical to studying the effectiveness of any policy implementation. Without adequate program evaluation, it is impossible to tell if a program is working or not. Moreover, without effective or consistent enforcement, there is little incentive for compliance. Therefore, tracking and enforcing compliance is necessary to bring about changes required by the law.

Perhaps most discouraging for environmental protection, there has been increasing anecdotal evidence that many states may want to weaken their environmental laws deliberately. EPA has been alarmed by the rapid growth of so-called state audit shield laws which protect a polluter from prosecution when information indicating violations is gained from internal environmental auditing. Without the critical

215 See People for Puget Sound, supra note 153.
216 Mintz, supra note 133, at 76.
218 See id.
step of state support for strong enforcement, and with the myriad other problems faced by states in enforcement, the weakness of federal oversight most certainly will doom the true and effective control of pollution in all of our jointly administered environmental laws.

V. CONCLUSION

On April 25, 1996, the Governor of Georgia signed new legislation imposing fines of $25,000 to $100,000 per day on Atlanta if the city failed to meet the construction deadlines designed to contain phosphorous pollution at the limit established in its NPDES permit. More importantly for a fast-growing, pro-development city such as Atlanta, the new legislation established a very strict sewer hook-up ban for any new development if Atlanta's combined sewer overflow facilities were not completed on schedule, or if Atlanta were not in compliance with its NPDES permitted phosphorous limit. The people of Georgia had spoken. At least with respect to Atlanta, the state was willing to require strong agency enforcement, and was trying to make progress in actual cleanup of the polluted Chattahoochee River. Paradoxically, the passage of this legislation does not represent the effectiveness of state intervention to restore stringent state enforcement. Instead, it shows how difficult it is to uniformly change state enforcement of CWA standards.

The legislation in this case was controversial and difficult to pass, and it only applied to one NPDES permit—that of Atlanta's municipal sewage treatment system. Although one general provision required a reduction of capacity for all non-compliance sewage treatment facilities, the state made no attempt to change how the Georgia EPD would enforce monetary or other penalties under the delegated CWA. Other Georgia cities still remain out of compliance with their NPDES permits with no threats likely to compel changes. Thus, despite a great hue and cry, very little actually has changed in Georgia with respect to strong enforcement of CWA standards.

As previously recognized:

The success of the complex regulatory scheme created by the Clean Water Act depends ultimately upon the effective enforce-

221 See id.
222 See id.
223 See id.
ment of its various requirements. In recognition of this critical relationship and keenly aware that previous federal enforcement efforts had languished, Congress gave the EPA substantial power to exact compliance with the Act.\textsuperscript{225}

This study indicates that without the requirement of compliance from EPA, the states have not been uniformly complying with the CWA. Absent a change of priorities at the state level, a true change in state enforcement and thus control of pollution requires effective EPA intervention, in the form of a genuine threat of a federal take-over. Without this threat, the nationwide goal of strong, uniform standards of environmental protection is a myth. Some states may do well; others will not. The presence of strong environmental standards in statutes alone will not compel consistent and effective environmental protection. Georgia and many other states will be doomed to inferior enforcement of the CWA and possibly other environmental laws in a new race to the bottom. Without nationally enforced standards, the pristine landscape of effective environmental protection will be sullied forever by the dirty river of ineffective enforcement.

\textsuperscript{225} Andreen, \textit{supra} note 20, at 259–60.
Appendix A

Comparison of NPDES permitted major source non-compliance periods between the states of Washington and Georgia as reported in the QNCRs

Data: In order to compare enforcement consistency, this study used data from the quarterly non-compliance reports (QNCRs) compiled by the regional EPA offices which show all violations of major permitted sources and actions taken on a quarterly basis. Violations may be for an exceedance of pollutant levels or for administrative violations, such as failure to report or to enforce prohibitions. There were 54 different possible pollutant violations, 80 possible reporting violations, and 3 possible enforcement violations. (See Appendix A-I).

The original data consisted of 1) copies of QNCR reports for Georgia NPDES permittees, prepared by the state of Georgia Department of Natural Resources, Environmental Protection Division, for EPA's region IV office in Atlanta, for the six quarterly reporting periods spanning January 1, 1994 through June 1, 1995, and 2) copies of QNCR reports compiled by EPA's region X in Seattle for all states in Region X, for the five quarterly reporting periods spanning April 1, 1994 through June 1, 1995.

Information from this original data for the states of Washington and Georgia, consisting of permitted sources, types of violations, non-compliance status, length of time out of compliance, resolution date or end of non-compliance period, state location, and status as a municipal or non-municipal source, was then entered into the SPSS system for windows, version 6.1, a statistical software package. The labels and headings for the various variables is reproduced in Appendix A-I. Spot checking of entry quality (100 entries) revealed no entry errors, giving a probability of data entry error for this study of between 0 and 3%, at the 95% confidence interval (using the graphical method.

---

1 SPSS is a common software package used for the statistical manipulation of data in the social sciences arena.
for determining proportion distribution, Clopper and Pearson, 1934). The numbers used to represent the various violations for the violations variable (VIOL) are defined in Appendix A-1.

Using the SPSS system, several statistical tests were conducted. The results of these tests, as they actually appear in the SPSS format, are reproduced in Appendices A-2 through A-7.

The data from January 1, 1994 through June 1, 1995, revealed that the average length of non-compliance times in Georgia was 5.5 months for all NPDES sources, 5.4 months for non-municipal NPDES sources, and 5.5 months for municipal NPDES sources. (See Appendix A-4.) In Washington, the average non-compliance period, based on the data from April 1, 1994 through June 1, 1995, was 3.6 months for all NPDES sources, 3.7 months for non-municipal NPDES sources, and 3.5 months for municipal NPDES sources. (See Appendix A-4).

If state non-compliance times are drawn from the same pool of equal non-compliant sources nationwide, it is to be expected that there would be no statistical difference in mean non-compliance times separated by state. A comparison of means of the average length of time of violations of sources was compared, depending on the state in which the sources were located. The tests used "equal" degrees of freedom for all means comparisons (since the distribution of the months of non-compliance should be similar for both). The probability that the difference in means from this comparison was random, if the data were drawn from the same data set of nationally uniform enforcement standards, was less than one in one billion. (See Appendix A-3). The same comparison was done while regressing out effects due to whether a source was municipal or non-municipal and effects due to the type of non-compliance violation, and the probability that the difference in these means was random from this comparison was also less than one in one billion. (See Appendix A-5).

Interestingly, although there did not appear to be major differences in non-compliant times due to whether the source was municipal or non-municipal, some differences appeared to be caused by type of compliance violation. (See Appendices A-3 and A-5). Still, this distinction was nowhere near as important as the obvious differences based on state location of the source. (See Appendices A-2, A-3, and A-5). Washington does report more violations overall, but this may be due

---

2 The graphical method allows a way to determine confidence intervals with small sample sizes or with sampling which has a mean that is very close to the limits of the range (near 0 or 100%). See Wonnacott and Wonnacott, supra note 184, at 274.
to the much larger coastline and presence of more licensed sources. In any event, more violations reported suggest more licensed sources and more vigorous enforcement, supporting the thesis of the paper. Moreover, a much larger number of Washington's violations are reporting violations (1182 out of 1243 vs. 78 out of 133 for Georgia), further indicating a focus on enforcement. (See Appendices A-6 and A-7). The presence of such a significant number of reporting violations, primarily in the state of Washington, suggests that the difference in percentages of violations that are reporting violations could be having an effect on the results.

In order to test the differences in non-compliance when reporting violations are excluded, a new variable was created, MOS.NC1, which showed months out of compliance only for pollutant violations. In this comparison, the number of violations in both states was almost equal, with Georgia having 55 pollutant source violations and Washington having 61. (See Appendix A-6). The mean non-compliance time for the pollutant violations was still higher for Georgia with an average of 6.0 months out of compliance vs. an average of 4.3 months out of compliance for the state of Washington. (See Appendix A-5). The difference between the two averages was still statistically significant at the 95% confidence level, with only a 4.2% chance that the difference in the averages were due to random variations. (See Appendix A-7).
## Appendix A-1

COLUMN HEADINGS USED IN SPSS FORMAT FOR DATA MANIPULATION

<table>
<thead>
<tr>
<th>A- REPORTING PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>B- FACILITY NAME</td>
</tr>
<tr>
<td>C- STATE (LOC): GEORGIA-1 WASH-2</td>
</tr>
<tr>
<td>D- STATUS AS MUNICIPAL OR NON-MUNICIPAL SOURCE (M_I): MUNICIPAL-1 NON-MUNICIPAL-2</td>
</tr>
<tr>
<td>E- VIOLATION (VIOL) (AS LISTED BEGINNING ON THE NEXT PAGE)</td>
</tr>
<tr>
<td>F- VIOLATION DATE</td>
</tr>
<tr>
<td>G- END DATE FOR REPORTING PERIOD</td>
</tr>
<tr>
<td>H- # MONTHS NONCOMPLIANCE (MOS.NC)</td>
</tr>
<tr>
<td>I- BAN DATE-SEWER BAN IMPOSED</td>
</tr>
<tr>
<td>J- MONTHS OUT OF COMPLIANCE FOR POLLUTION VIOLATIONS ONLY (MOS.NC1)</td>
</tr>
</tbody>
</table>

## TYPES OF NONCOMPLIANCE
CONSTITUENTS, GA & WA, MUN/NON

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL EFFLUENT</td>
<td>1</td>
</tr>
<tr>
<td>BOD, 5-DAY</td>
<td>2</td>
</tr>
<tr>
<td>CHLORINE, TOTAL RESID.</td>
<td>3</td>
</tr>
<tr>
<td>COLIFORM, FECAL</td>
<td>4</td>
</tr>
<tr>
<td>NITROGEN, AMMONIA</td>
<td>5</td>
</tr>
<tr>
<td>SOLIDS, FLOATING, VIS DET</td>
<td>6</td>
</tr>
<tr>
<td>SOLIDS, SETTLEABLE</td>
<td>7</td>
</tr>
<tr>
<td>SOLIDS, SUSP % REMOVAL</td>
<td>8</td>
</tr>
<tr>
<td>SOLIDS, TOTAL SUSPD</td>
<td>9</td>
</tr>
<tr>
<td>ALKALINITY, TOTAL</td>
<td>10</td>
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<tr>
<td>ALUMINUM</td>
<td>11</td>
</tr>
<tr>
<td>ANTIMONY, TOTAL</td>
<td>12</td>
</tr>
<tr>
<td>ARSENIC, TOTAL RECOV.</td>
<td>13</td>
</tr>
<tr>
<td>BENZO(A)PYRENE</td>
<td>14</td>
</tr>
<tr>
<td>BIOASSAY</td>
<td>15</td>
</tr>
<tr>
<td>BORON, DISSOLVED</td>
<td>16</td>
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<tr>
<td>CADMIUM, TOTAL RECOV</td>
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<tr>
<td>CARBON TETRACHLORIDE</td>
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<tr>
<td>CHROMIUM, TOTAL RECOV</td>
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<tr>
<td>CHROMIUM, HEXAVALENT</td>
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<tr>
<td>CHLOROFORM</td>
<td>21</td>
</tr>
<tr>
<td>Parameter</td>
<td>Code</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Copper, total recovery</td>
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</tr>
<tr>
<td>Cyanide, free (ammonium chloride)</td>
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</tr>
<tr>
<td>Cyanide, total recovery</td>
<td>24</td>
</tr>
<tr>
<td>Cyanide, weak acid dissociation</td>
<td>25</td>
</tr>
<tr>
<td>Density/water @ 20 deg C</td>
<td>26</td>
</tr>
<tr>
<td>Dieldrin</td>
<td>27</td>
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<tr>
<td>Fluoride</td>
<td>28</td>
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<tr>
<td>Flow, conduit/thru trtmt</td>
<td>29</td>
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<tr>
<td>Hardness</td>
<td>30</td>
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<tr>
<td>Hydrocarbons, petrol</td>
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<tr>
<td>Iron</td>
<td>32</td>
</tr>
<tr>
<td>Lead, total recovery</td>
<td>33</td>
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<tr>
<td>Mercury, total</td>
<td>34</td>
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<tr>
<td>Methylene chloride</td>
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<tr>
<td>Nickel, total recovery</td>
<td>36</td>
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<tr>
<td>Oil &amp; grease</td>
<td>37</td>
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<tr>
<td>Outfall observ, visual</td>
<td>38</td>
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<tr>
<td>Oxygen demand, chem</td>
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<tr>
<td>Oxygen, dissolved</td>
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<td>Ph</td>
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</tr>
<tr>
<td>Phenol, single compd</td>
<td>42</td>
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<tr>
<td>Phenolics</td>
<td>43</td>
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<tr>
<td>Phosphorus, total</td>
<td>44</td>
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<tr>
<td>Selenium, total recovery</td>
<td>45</td>
</tr>
<tr>
<td>Silver, total recovery</td>
<td>45</td>
</tr>
<tr>
<td>Sulphide, total</td>
<td>46</td>
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<tr>
<td>Temperature</td>
<td>47</td>
</tr>
<tr>
<td>Tetrachloroethylene/tce</td>
<td>48</td>
</tr>
<tr>
<td>Toxaphene</td>
<td>49</td>
</tr>
<tr>
<td>Turbidity</td>
<td>50</td>
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<tr>
<td>Zinc, total recovery</td>
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</tr>
<tr>
<td>1,1-Dichloroethylene</td>
<td>52</td>
</tr>
<tr>
<td>1,1,2-Trichloro-ethane</td>
<td>53</td>
</tr>
<tr>
<td>1,1,2,2-Tetrachloro-ethane</td>
<td>54</td>
</tr>
</tbody>
</table>

**REPORTING VIOLATIONS**

- Analytical methods
- Commence monitoring
- Construction sched
- Discharge prevention
- DMR overdue
FAIL ENFORCE IND. PRETR
OPER. LEVEL ATTAINED
SEAFOOD PROD. EFFL.
SLUDGE HANDLING
STICKWATER, EFFL % REMOV
STREAM FLOW
SUBMIT PLANS/SPECS
TOTAL PRODUCTION
TOXICS
COMPLIANCE SCHEDULE
BIOASSAY
BOD 5 DAY
CHLORINE
COLIFORM, FECAL
COPPER
MERCURY
PH
SOLIDS, SUSP. % REMOVAL
SOLIDS, TOTAL SUSPENDED
CONDUIT FLOW
NITROGEN
OXYGEN, CARBON DEMAND
BOD5 % REMOVAL
OIL & GREASE VISUAL
OIL & GREASE SOXHLET
CYANIDE
LEAD
CADMIUM
ZINC
NICKEL
CHROMIUM/TOT & HEX
TEMPERATURE
ARSENIC
SILVER
PHOSPHORUS
2,3,7,8 TET-CL-DI-BENZ-PD
FLUORIDE
ALUMINUM
CHEM O2 DEMAND
SULFIDE
PHENOLICS
IRON 146
BIOSSAY 147
ARSENIC 148
CHLOROFORM 149
ANTIMONY 150
BASELINE MONITORING 151
DIELDRIN 152
RAINFALL 153
PCBs 154
CARBON TETRACHLOR 155
METHYLENE CHLORIDE 156
TETRACHLOROETHYLENE 157
1,1,DICHLOROETHYLENE 158
1,2,DICHLOROETHANE 159
1,1,2,2,TETRACHLOROETHANE 160
TRICHLOROETHYLENE 161
TURBIDITY 162
DISSOLVED OXYGEN 163
ALKALINITY 164
HARDNESS 165
TOTAL DISSOLVE SOLIDS 166
TOTAL NON-VOLATILE SOLIDS 167
PETROLEUM HYDROCARB 168
SELENIUM 169
BERYLIUM 170
RADIUM 226 171
MANGANESE 172
RADIUM 228 173
DICHLORBROMOMETHANE 174
TOLUENE 175
1,1,1,DICHLOROETHANE 176
1,1,1,TRI-CHLOROETHANE 177
BIS (2ETHYL-HEXYL) PHTHALATE 178
CHLORODIFLUOROMETHANE 179

ENFORCEMENT ORDER VIOL
BOD 5 DAY 200
BOD 5 % REMOVAL 201
TSS 202
Appendix A-2

02 May 96 SPSS for MS WINDOWS Release 6.1

- - Description of Subpopulations - -

Summaries of MOS.NC
By levels of LOC

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value Label</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Entire Population</td>
<td>1.00</td>
<td>3.7820</td>
<td>2.0673</td>
<td>1376</td>
</tr>
<tr>
<td>LOC</td>
<td>1.00</td>
<td>5.4737</td>
<td>4.5504</td>
<td>133</td>
</tr>
<tr>
<td>LOC</td>
<td>2.00</td>
<td>3.6010</td>
<td>1.4804</td>
<td>1243</td>
</tr>
</tbody>
</table>

Total Cases = 1668
Missing Cases = 292 or 17.5 Pct

Appendix A-3

02 May 96 SPSS for MS WINDOWS Release 6.1

t-tests for Independent Samples of LOC

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Cases</th>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOS.NC</td>
<td>LOC 1</td>
<td>133</td>
<td>5.4737</td>
<td>.395</td>
</tr>
<tr>
<td></td>
<td>LOC 2</td>
<td>1243</td>
<td>3.6010</td>
<td>.042</td>
</tr>
</tbody>
</table>

Mean Difference = 1.8727
Levene's Test for Equality of Variances: F=256.108 P=.000

t-test for Equality of Means = .95%

<table>
<thead>
<tr>
<th>Variances</th>
<th>t-value</th>
<th>df</th>
<th>2-Tail Sig</th>
<th>SE of Diff</th>
<th>CI for Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal</td>
<td>10.30</td>
<td>1374</td>
<td>0.00</td>
<td>.182</td>
<td>(1.516, 2.229)</td>
</tr>
<tr>
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<td>4.72</td>
<td>135.01</td>
<td>0.00</td>
<td>.397</td>
<td>(1.088, 2.657)</td>
</tr>
</tbody>
</table>
Appendix A-4

02 May 96 SPSS for MS WINDOWS Release 6.1

- - Description of Subpopulations - -

Summaries of MOS.NC
By levels of LOC
M_I  M/I

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
<th>Label</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Entire Population</td>
<td>3.7820</td>
<td></td>
<td>2.0673</td>
<td></td>
<td>1376</td>
</tr>
</tbody>
</table>

 LOC  | 1.00 | 5.4737 | 4.5504 | 133
 M_I  | 1.00 | 5.4758 | 4.4965 | 124
 M_I  | 2.00 | 5.4444 | 5.5478 | 9

 LOC  | 2.00 | 3.6010 | 1.4804 | 1243
 M_I  | 1.00 | 3.5221 | 1.5192 | 588
 M_I  | 2.00 | 3.7059 | 1.5546 | 442
 M_I  | 3.00 | 3.6066 | 1.1799 | 211
 M_I  | 4.00 | 3.0000 | 0.0000 | 2

Total Cases = 1668
Missing Cases = 292 or 17.5 Pct
Appendix A-5

02 May 96 SPSS for MS WINDOWS Release 6.1

** ** M U L T I P L E R E G R E S S I O N ** **

Listwise Deletion of Missing Data

Equation Number 1  Dependent Variable..  MOS.NC

Block Number 1. Method: Enter  LOC  M_I  VIOL

Variable(s) Entered on Step Number

1..VIOL
2..M_I  M/I
3..LOC

Multiple R  .28459
R Square  .08099
Adjusted R Square  .07898
Standard Error  1.98402

Analysis of Variance

<table>
<thead>
<tr>
<th></th>
<th>DF</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
</tr>
</thead>
<tbody>
<tr>
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<td>475.96483</td>
<td>158.65494</td>
</tr>
<tr>
<td>Residual</td>
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</tr>
</tbody>
</table>

F = 40.30542  Signif F = .0000

---------- Variables in the Equation ----------

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<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>Beta</th>
<th>T</th>
<th>Sig T</th>
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</thead>
<tbody>
<tr>
<td>LOC</td>
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<td>.204538</td>
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<td>.001605</td>
<td>-.105212</td>
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<tr>
<td>(Constant)</td>
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<td>.21.049</td>
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End Block Number  1  All requested variables entered.
Appendix A-6
03 May 96 SPSS for MS WINDOWS Release 6.1

Description of Subpopulations

Summaries of MOS.NC1
By levels of LOC

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value Label</th>
<th>Mean</th>
<th>Std Dev</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>For Entire Population</td>
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<td>5.1121</td>
<td>4.6640</td>
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</tr>
<tr>
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<td>6.0364</td>
<td>5.6861</td>
<td>55</td>
</tr>
<tr>
<td>LOC</td>
<td>2.00</td>
<td>4.2787</td>
<td>3.3323</td>
<td>61</td>
</tr>
</tbody>
</table>

Total Cases = 1668
Missing Cases = 1552 or 93.0 Pct

Appendix A-7
03 May 96 SPSS for MS WINDOWS Release 6.1

t-tests for Independent Samples of LOC

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number of Cases</th>
<th>Mean</th>
<th>SD</th>
<th>SE of Mean</th>
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</thead>
<tbody>
<tr>
<td>MOS.NC1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOC 1</td>
<td>55</td>
<td>6.0364</td>
<td>5.686</td>
<td>.767</td>
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<tr>
<td>LOC 2</td>
<td>61</td>
<td>4.2787</td>
<td>3.332</td>
<td>.427</td>
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</table>

Mean Difference = 1.7577

Levene's Test for Equality of Variances: F = 3.182 P = .077

t-test for Equality of Means

<table>
<thead>
<tr>
<th>Variances</th>
<th>t-value</th>
<th>df</th>
<th>2-Tail Sig</th>
<th>SE of Diff</th>
<th>CI for Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal</td>
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<td>.855</td>
<td>(.063, 3.452)</td>
</tr>
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