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Opportunities for Employing Economic
Analysis to Improve Societal Results**

by

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Federal Regulation of Animal and Poultry Production Under the Clean Water Act: Opportunities for Employing Economic Analysis to Improve Societal Results

Theodore A. Feitshans, J.D.* and
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I. Introduction

The Clean Water Act became law in 1972 as an amendment to the Federal Water Pollution Control Act.¹ The declared purpose of Congress was to “restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”² To achieve this purpose Congress established a comprehensive regulatory program to address all sources of surface water pollution. This program included deadlines that have generally not been met by the Environmental Protection Agency (EPA). As a result, various interested groups have brought numerous lawsuits in federal courts against the EPA to force it to comply with the requirements of the Clean Water Act.

II. The Framework Established by the Clean Water Act

Several sections of the Clean Water Act apply to livestock and poultry production. The sections cited as authority in EPA’s January 12, 2001 *Proposed Rule for the National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Confined Animal Feeding Operations* are sections 301,

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1. Clean Water Act, 33 U.S.C.A. §§ 1251-1387 (2002).

2. 33 U.S.C.A. § 1251(a).

304, 306, 307, 308, 402, and 501.³ These sections apply to livestock and poultry operations that may be considered point sources of water pollution. The Clean Water Act makes important distinctions between point and nonpoint sources of water pollution. Point sources are defined in section 502(14) of the Clean Water Act:

The term "point source" means any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural stormwater discharges and return flows from irrigated agriculture.⁴

Animal and poultry production operations that are not point sources are regulated under other sections of the Clean Water Act with section 319 being of paramount importance. Regulation of nonpoint sources is far less stringent and restrictive than regulation of point sources. There is a very significant cost advantage to being regulated as a nonpoint source. Regulation of these nonpoint sources is beyond the scope of this paper. This is not to give the impression that other dischargers are regulated as nonpoint sources; indeed most industries, all sewage treatment plants, and cities and others discharging storm water from storm sewer systems are required to have national pollutant discharge elimination system (NPDES) permits. This topic, however, is also beyond the scope of this paper.

Once it is determined that an animal or poultry production operation is a point source, the entire production operation is regulated as a point source.⁵ To provide an example, a dairy may be deemed a confined animal feeding operation (CAFO) because the dairy cows are confined in a milking facility for part of the day. Once the threshold test for CAFO status (discussed further in this paper under *Threshold Considerations*)⁶ is met, the required permit will include not only the area of confinement but also all other areas involving the dairy cows, including the land upon which they graze.

3. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed.Reg. 2960 (Jan. 12, 2001). As will be discussed later in this paper under TMDLs, section 303(d) was not cited as authority.

4. Clean Water Act, 33 U.S.C.A. § 1362(14) (2002).

5. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 3029-3032 (proposed Jan. 12, 2001) (to be codified at 40 C.F.R. pts. 122 & 412).

6. *Infra* pp. 5-8.

Section 402 establishes the permitting system for point sources of surface water pollution.⁷ Congress denominated this system the national pollutant discharge elimination system (NPDES). The general requirements for issuance of a NPDES permit include specific controls on the release of recognized pollutants and the opportunity for the public to comment on the terms of each permit prior to issue. There are two basic types of NPDES permits: general and individual. General permits are issued, after the opportunity for public comment to cover dischargers whose discharges are relatively minor. Once a general permit is issued, anyone covered under the terms of the general permit need not apply for an individual permit. There are, however, usually conditions in general permits, including notice to EPA of the discharge and, in some instances, an allowance for public comment prior to the discharge being authorized. Individual permits are required of all other NPDES permittees. Public comment is always required for each individual permit application.

EPA is authorized to conduct the NPDES program in each state in the absence of an approved state program.⁸ Once a state program has been approved, the EPA is required to suspend its program within ninety days after submission of the state program. States that wish to either operate their own programs or joint programs with other states under the terms of interstate compacts must submit a full and complete description of the proposed program to the EPA. A competent legal authority within the state, usually the state attorney general, must also submit a statement that the laws of the state, or the applicable interstate compact, provide adequate authority to operate the program proposed. State permits, under any program proposed, must comply with all requirements of the Clean Water Act including regulations promulgated by EPA under its authority; must be of fixed term with a duration not to exceed five years; must be terminable for violation of a permit condition, false statement or inadequate disclosure on the permit application, or changed conditions that require temporary or permanent suspension of the permitted discharge; and must control the discharge of pollutants into wells.⁹ State programs are also required to provide for adequate enforcement, including civil and criminal sanctions.¹⁰ State programs must include a variety of reporting and coordination requirements to ensure an adequate flow of information to the EPA, the U.S. Army Corps of Engineers, and other states that may be affected by permits issued. Where a state fails to meet the requirements of the Clean Water Act, the EPA may withdraw

7. 33 U.S.C.A. § 1342.

8. These programs are conducted by EPA's regional offices.

9. 33 U.S.C.A. § 1342(b).

10. 33 U.S.C.A. § 1342(b)(7).

the state's authority to issue permits.¹¹ The existence of a state program does not limit the authority of EPA to bring enforcement actions.¹² In section 101(b) of the Clean Water Act, Congress recognized the primacy of the state role in the protection of surface water quality. Thus, the Clean Water Act represents a minimum standard for water quality protection with states allowed and encouraged to set their own higher standards. A frequent criticism of EPA is that it takes no action against states that operate lax programs; of course, critics, subject to limitations in the Eleventh Amendment, are free to bring citizen suits against such states to test their program, or against EPA or the alleged violators.¹³

Section 301 of the Clean Water Act¹⁴ provides authority for the effluent limitations that form permit conditions under NPDES permits issued under section 402. Section 301 requires that each NPDES permit holder adopt "best practicable control technology."¹⁵ Best practicable control technology is defined by the EPA in section 304(b).¹⁶ Section 304(b)(1)(B) authorizes EPA to consider "the total cost of application of technology in relation to the effluent reduction benefits."¹⁷ An effluent reduction benefit is not defined in the Clean Water Act. Other factors that the EPA is authorized to consider when assessing the best practicable control technology include the age of the equipment and facilities involved, the process employed and other engineering considerations, non-water quality environmental impacts, and other factors as determined by the EPA.¹⁸ From this authority, EPA has developed a complex approach for evaluating and approving technologies.

Understanding the regulatory approach to CAFOs is assisted by the knowledge that Congress drafted the Clean Water Act with the belief that elimination of the discharge of pollutants to surface waters was both desirable and possible.¹⁹ This approach is reflected in the performance standards for the control of discharges established in section 306.

A. *Citizen Suits*

Section 505 of the Clean Water Act provides a powerful tool to

11. 33 U.S.C.A. § 1342(c)(3).

12. 33 U.S.C.A. § 1342(i).

13. 33 U.S.C.A. § 1365.

14. 33 U.S.C.A. § 1311.

15. 33 U.S.C.A. § 1311(b)(1)(A).

16. 33 U.S.C.A. § 1314(b).

17. 33 U.S.C.A. § 1314(b)(1)(B).

18. 33 U.S.C.A. § 1314(b)(1)(B).

19. 33 U.S.C.A. § 1251(a)(1). When Congress enacted the Clean Water Act in 1972, it set as its goal that discharges be eliminated by 1985!

environmental organizations and others seeking to enforce the terms of the Clean Water Act. Section 505(a)(1) authorizes suits to enforce effluent limits or standards, or orders of the EPA or a state.²⁰ These suits may be brought against any person including an instrumentality of the United States or a state, except to the extent limited by the Eleventh Amendment. Such suits may also be brought against the EPA where the EPA has failed to perform an act under the Clean Water Act that is not discretionary.²¹ Citizen suits to enforce a standard, limitation, or order may not be commenced “prior to sixty days after the plaintiff has given notice of the alleged violation (i) to the Administrator [of EPA], (ii) to the State in which the alleged occurs, and (iii) to any alleged violator”²²

If the EPA or a state is already diligently pursuing a criminal or civil action against an alleged violator, no citizen suit may be commenced except that any citizen may intervene as of right.²³ Actions against the EPA for failure to perform an act may be commenced only after sixty days notice.²⁴ Citizens who may bring citizen suits are restricted to those who have been or may be adversely affected by the alleged violation or failure of the EPA to act.²⁵

Citizen suits must be brought in the district court of the district in which the alleged violation occurred.²⁶ The EPA is permitted to intervene in any such suit as of right. In any such suit, even if the EPA elected not to intervene, no consent judgment may be entered by the court prior to forty-five days after the proposed consent judgment has been served upon the EPA and the U.S. Attorney General. The right to bring a citizen suit does not limit any right that might have existed under state or common law.²⁷

Citizen suits have been a driving force behind EPA’s proposed revisions of its CAFO regulation and effluent limitations guidelines. The current proposed rules are the result of a consent decree settling litigation. The Clean Water Act authorizes the court to award the costs of litigation including reasonable attorney fees and expert witness fees to the prevailing or substantially prevailing party.²⁸ To prevail against the owner or operator of a livestock farm, the party bringing the citizen suit must prove that the owner or operator is a CAFO and demonstrate that

20. 33 U.S.C.A. § 1365(a)(1).

21. 33 U.S.C.A. § 1365(a)(2).

22. 33 U.S.C.A. § 1365(b)(1)(A).

23. 33 U.S.C.A. § 1365(b)(1)(B).

24. 33 U.S.C.A. § 1365(b)(2).

25. 33 U.S.C.A. § 1365(g).

26. 33 U.S.C.A. § 1365(c)(1).

27. 33 U.S.C.A. § 1365(e).

28. 33 U.S.C.A. § 1365(d).

the operator was either operating without a permit or in violation of an existing permit.

B. CAFO Regulations and Effluent Limitations Guidelines Currently in Force: Threshold Considerations

The initial determination is whether a livestock or poultry production operation is an animal feeding operation (AFO). The definition of an AFO is:

[L]ot or facility . . . where . . . (i) Animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12 month period, and . . . [where c]rops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.²⁹

Any day that an animal is confined for any part of that day is counted as a whole day for the purpose of the 45-day calculation. The forty-five days per twelve-month period need not be consecutive; they may be scattered throughout the twelve-month period at issue. Facilities where the animals or poultry are kept on a paved surface or dirt floor and the waste is removed to a vegetated area are not considered kept on a vegetated area. Likewise, animals or poultry kept on a dirt lot with minimal vegetation and some vegetation around the fringes of the lot will not be considered kept in a vegetated area.³⁰

EPA defines the AFO area as the area where the animals are confined plus the areas necessary to support the operation, including waste storage areas.³¹ The definition of the AFO area is important because it determines the geographical area covered by the NPDES permit should the AFO be a CAFO that requires such a permit. Vegetated areas used for spreading waste are not included in the AFO area although improper handling of waste in such areas can give rise to a NPDES permit violation. Separate operations under the same ownership or management that are either contiguous or use the same waste handling system are treated as a single unit for waste handling purposes.

The critical step in determining whether an AFO is a CAFO that requires a NPDES permit is to determine the total number of animal units

29. 40 C.F.R. 122.23(b)(1).

30. EPA, Guidance Manual and Example NPDES Permit for Concentrated Animal Feeding Operations, Review Draft, Washington, D.C. (August 6, 1999).

31. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960 at 2993-2996, 3135-3136 (explaining that EPA's proposed regulation would clarify existing practice).

in the AFO. EPA defines animal units³² for slaughter and feeder cattle as 1.0; for mature dairy cattle as 1.4; for swine weighing over twenty-five kilograms as 0.4; for sheep or lambs as 0.1; and for horses as 2.0. Thus one horse is counted as two animal units, while it takes twenty sheep or lambs to equal two animal units. The conversion to animal units facilitates the determination of whether or not a facility with mixed species is a CAFO. Generally any facility that meets the definition of an AFO is a CAFO if it confines more than one thousand animal units at any given time during a twelve-month period.

The regulations also set levels for individual species. If the AFO exceeds these numbers of any individual species then the facility is a CAFO without regard to the total number of animal units. The chart below lists these numbers.

Category of livestock or poultry	Number
Slaughter and feeder cattle	1,000
Mature dairy cattle (milked or dry)	700
Swine (weighing over 25 kilograms)	2,500
Horses	500
Sheep or lambs	10,000
Turkeys	55,000
Laying hens or broilers if the facility has continuous overflow watering ³³	100,000
Laying hens or broilers if the facility has a liquid manure system ³⁴	30,000
Ducks	5,000

Laying hen and broiler facilities that have neither overflow watering systems nor liquid manure handling systems are not CAFOs under the current regulations; these are dry litter systems. It is EPA's position that dry litter poultry operations either that are improperly operated through storage of litter in improper stack storage systems or conduct improper spreading operations such that rainwater or runoff turns the manure into

32. Note that EPA's definition of an Animal Unit differs from that used by the U.S. Department of Agriculture.

33. A continuous overflow watering system is one that flows constantly as opposed to one that only provides water when a chicken triggers a mechanism, or one that provides stagnant water that is cleaned and refilled on a periodic basis. A liquid manure system is generally similar to the technology used for hogs in contrast to dry litter systems where the chickens are kept on litter and the manure is removed with the litter between flocks. A dry litter system is typically used for broilers, whereas a liquid manure system is typically used for layers.

34. See *supra* note 31.

a liquid slurry can be deemed to have crude liquid manure-handling systems. EPA considers such AFOs to be CAFOs that must make a NPDES permit application. The regulations do not provide animal unit conversion factors for poultry so these species levels are the sole criteria for determining whether poultry facilities are CAFOs.

There is an exemption for large (over one thousand animal units) AFOs if the operator can prove that there has never been nor ever will be a discharge from the AFO, with a limited exemption for extraordinarily heavy rains.³⁵ It is EPA's position that large AFOs cannot meet this burden. Discharges may occur not only through obvious means such as ditches and pipes but also by direct hydrologic connection to groundwater³⁶ and by re-concentration of spread waste by storm water runoff. This latter type of discharge occurs when waste is spread but is not yet incorporated into the soil. Rainfall then conveys the dispersed, spread waste to furrows, hence to be concentrated in ditches, etc., and then discharged to surface waters.³⁷

AFOs from 301 to 1,000 animal units may also be defined as CAFOs if:

Pollutants are discharged into waters of the United States through a man-made ditch, flushing system, or similar man-made device; or pollutants are discharged directly into waters of the United States that originate outside of and pass over, across, or through the facility or come into direct contact with the confined animals.³⁸

The limited exemption for extraordinary rains applies to these smaller AFOs as it does to the larger AFOs. This, however, is likely to be no easier for the operator to prove than for the operator of a larger AFO. As with the larger AFOs, the regulations also list specific numbers of animals and poultry that will place an operation in this category.

Category of livestock or poultry	Number
Slaughter and feeder cattle	300

35. 40 C.F.R. 122, App. B (a).

36. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 3015-3023 (proposed Jan. 12, 2001) (codified at 40 C.F.R. pts. 122 & 412).

37. *Concerned Area Residents for the Environment v. Southview Farm*, 34 F.3d 114, 117-118 (2d Cir. 1994); *Water Keeper Alliance, Inc. v. Smithfield Foods, Inc.*, No. 4:01-CV-27-H(3), No. 4:01-CV-30-H(3), 2001 U.S. Dist. LEXIS 21314, slip op. (E.D. N.C. Sept. 20, 2001) (holding that the questions of whether a spray field is a point source under the CWA and whether a spray field violates the Resource Conservation Recovery Act (RCRA) are questions of fact to be decided at trial).

38. 40 C.F.R. 122, App. B (a).

Mature dairy cattle (milked or dry)	200
Swine (weighing over 25 kilograms)	750
Horses	150
Sheep or lambs	3,000
Turkeys	16,500
Laying hens or broilers if the facility has continuous overflow watering	30,000
Laying hens or broilers if the facility has a liquid manure system	9,000
Ducks	1,500

There is also a third category of AFO that may be a CAFO.³⁹ These are AFOs designated on a case-by-case basis because they are significant contributors to surface water pollution. This determination is always made after inspection of the AFO. Factors the regulations require that EPA consider when making this determination are the size of the operation and the amount of waste reaching surface water; the location of the operation relative to surface water; the means by which the waste is conveyed into the surface water; and the slope, vegetation, rainfall, and other factors affecting the likelihood of a discharge. EPA may also consider other factors that it finds relevant. There is no lower size limit on animal and poultry operations that may be required to obtain an NPDES permit under this category.

Section 502(14) of the Clean Water Act states that:

The term 'point source' means any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, . . . from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigation agriculture.⁴⁰

The second sentence of the definition of a point source has often been erroneously interpreted to exempt livestock and poultry operations from the NPDES program. If the livestock or poultry operation is a CAFO referred to in the first sentence of the definition, then the agricultural storm water exception will generally not apply. It is EPA's interpretation that for AFOs of three hundred animal units or less, as well as for larger units, storm water that passes in direct contact with animal waste and then into a surface water will convert the AFO into a CAFO

39. 40 C.F.R. 122-23(c).

40. 33 U.S.C. § 1362(14) (2001).

that is not protected by this exemption.⁴¹ EPA's interpretation of the agricultural storm water exemption is narrow and does not apply when:

The discharge is associated with the land disposal of animal manure and wastewater originating from a CAFO (which is defined as a point source in the CWA and is regulated as a point source); and the discharge is not the result of proper agricultural practices (*i.e.*, in general, the disposal occurred without a [comprehensive nutrient management plan] CNMP developed by a public official or a certified private party or in a manner inconsistent with the CNMP).⁴²

The courts have generally followed EPA's interpretation of the agricultural storm water exemption.⁴³ Therefore, the handling of storm water must be addressed in the application for the NPDES permit.

III. The NPDES Permitting Process under Existing Regulations

As indicated in the previous discussion of the Clean Water Act CAFOs must either apply for an individual NPDES permit or fit within one of the general NPDES permits already established by EPA or the state permitting authority. The elements of an individual permit include the cover page, effluent limitations, monitoring and reporting requirements, record-keeping requirements, and special and standard conditions. The cover page provides legal notice of the applicability of the permit, the authority under which it is issued, and the applicable dates and signatures. The second element of the permit is the effluent limitations. Effluent limitations are the primary means for controlling discharges of pollutants to surface waters. Effluent limitations go to the heart of the NPDES permitting process and will be discussed separately. The third element of an NPDES permit includes monitoring and reporting requirements. The fourth element includes record-keeping requirements. The fifth and sixth elements are special conditions and standard conditions. Standard conditions are those required in all NPDES permits; these are legal, administrative, and procedural requirements. Special conditions are requirements in addition to the effluent limitations. For CAFOs the most important special condition is that operators develop and implement comprehensive nutrient management plans (CNMPs).

CNMPs were described in EPA's Guidance Manual and Example NPDES Permit for Concentrated Animal Feeding Operations. CNMPs

41. USDA & EPA, *Unified National Strategy for Animal Feeding Operations*, 15, at <http://www.epa.gov/owm/finafost.htm> (Mar. 9, 1999).

42. *Id.* at 17-18.

43. Concerned Area Residents for the Environment at 117-118; Water Keeper Alliance, Inc., slip op. at 7-10.

are based upon guidance developed jointly by EPA and the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS).⁴⁴ CNMPs are designed to be flexible to reflect new technologies and research on manure management practices. CNMPs are always specific to the applicant's site. A general principle of CNMP development is that nutrients in manure applied to crops or forage should not exceed agronomic rates. An agronomic rate for a nutrient is the recommended quantity of nutrient to produce the optimum yield for that crop or forage. CNMPs address not only the geographic area covered by the AFO but also the areas to which the waste is transported for land application.

The first CNMP component addresses the manure and wastewater handling and storage system. It must be designed to divert clean water, including rainwater and runoff from adjacent land, away from the CAFO site. Leakage from the system must be prevented. There must be adequate storage for liquid manure to provide a margin of safety in the event of heavy rain or other precipitation. Dry manure must be stored in such a way that mixing with rainwater or runoff is prevented. The location decision of both liquid and dry manure facilities must be made considering the location of surface waters, flood plains, and other environmentally sensitive areas. Manure should be treated in a manner that reduces losses to the atmosphere, limits a spawning area for pathogens and vectors, confines noxious odors, and stabilizes nutrients to be applied to land as fertilizer. Dead animals and birds must be properly handled to avoid contamination of either ground or surface waters and to avoid risks to public health. Composting and rendering are often acceptable ways for handling dead animals and birds.

The second CNMP component addresses land application of manure and wastewater. Manure is an effective, albeit dilute, fertilizer source, particularly for nitrogen and phosphorus; however, it must be properly handled to minimize environmental damage. Manure has an added advantage over chemical fertilizers in that it is also an excellent source of supplemental organic matter for soils. The EPA views as critical to this CNMP component that nutrient balance be maintained (nutrients must not be applied in excess of "the capacity of the soil and planned crops to assimilate nutrients and prevent pollution.")⁴⁵ The EPA also views as critical that the timing and method of application minimize

44. See USDA, *Part 402- Nutrient Management*, at <http://www.nhq.nrcs.usda.gov/BCS/nutri/gm-190.html> (last visited Apr. 25, 2002); see also USDA, *Nutrient Management, Code 590*, at <http://www.nhq.nrcs.usda.gov/BCS/nutri/590.html> (last visited Apr. 25, 2002).

45. USDA & EPA, *Unified National Strategy for Animal Feeding Operations*, at <http://www.epa.gov/owm/finafost.htm> (Mar. 9, 1999).

contamination of surface waters with organic matter, minimize the loss of nutrients to ground and surface water, and minimize the loss of nitrogen to the air.⁴⁶ Loss of nitrogen to the air reduces the fertilizer value of the manure and, where the nitrogen is in the form of ammonia, contributes to air pollution.

The third CNMP component addresses management of the site where the manure or wastewater is applied. Various cropping practices and conservation measures may be used to minimize movement of nutrients, organic matter, and pathogens from the site of application. The fourth CNMP component addresses record keeping. Detailed records must be kept, retained, and made available to EPA or the state agency upon request. These records must include the amount of manure produced and how it was utilized, including the land to which applied; the date and timing of the application; and the amount of nutrients applied. Records must include both the results of manure and soil testing. The fifth CNMP component addresses alternative utilization options that include transfers to third parties. The sixth CNMP component addresses feed management to reduce the nutrient content of manure.

Every NPDES permit application must be made available for public comment before the EPA or state agency in states with delegated authority can approve it. Generally, the permit, associated permit application, and any required reports that the operator makes to the regulatory authority are public records. The only exception made is for trade secrets. The burden is on the applicant to follow established procedure for designating information to be protected as a trade secret and to prove to the satisfaction of the EPA or state agency that the information is a trade secret. Blanket claims that provide information in support of a permit application as trade secrets are unacceptable.

A. Effluent Limitations

EPA has issued Effluent Limitations Guidelines (ELG) regulations only for feedlots.⁴⁷ The ELG regulations permit no discharges. There is no lower limit on the prohibition against discharges so that, in theory, a single molecule of manure from a CAFO detected in surface water constitutes a violation of the CAFO's NPDES permit. These ELG regulations apply only to the confinement and associated areas for CAFOs with over one thousand animal units. Where land application of manure and wastewater is employed, the land application area is not

46. *Id.*

47. 40 C.F.R. 412 (2001).

covered by the existing ELG regulations. CAFOs permitted for one thousand animal units or less are also not covered by the existing ELG regulations. For smaller CAFOs effluent limitations, guidelines must be developed on an individual basis. Where the technology-based ELG regulation is not sufficient to meet water quality standards, the EPA or state agency may require an additional site-specific, water quality standard-based effluent limitation to ensure that water quality standards are met. While the CNMPs and the collection of best management practices (BMPs) that they contain should ensure that effluent limitations guidelines are met, compliance with the CNMPs is not compliance with the ELG regulations.

B. Total Maximum Daily Loads (TMDLs)

In addition to controls on the activities of specific pollutants that are implemented through the NPDES permitting process, Congress envisioned ambient water quality standards and plans to meet those standards as part of the Clean Water Act. The Clean Water Act provided for retention of existing state water quality standards and development of new standards.⁴⁸ Section 303(d) of the Clean Water Act⁴⁹ requires the EPA to develop TMDLs, if the states have failed to act, for all bodies of water that do not meet water quality standards. The EPA's failure to develop TMDLs in the absence of state action has been the source of many citizen suits against the EPA.⁵⁰

The EPA's neglect of TMDLs is a result of its (and society's) decision to focus on the performance standards or proxies for standards embodied in the NPDES program.⁵¹ The NPDES program focuses on what comes out of the pipe (or the edge of a field) rather than the effects of those effluents on the bodies of water into which they are discharged (or may eventually drain into). While much of the language of the NPDES sections of the Clean Water Act is written to pertain to entities that actually discharge directly into surface waters, its meaning and relevance to those that apply wastewater directly to land is far less clear. The NPDES program is an effluent-based program that uses performance standards (or in the case of CAFOs, proxies defined by prescribed

48. 33 U.S.C. §§ 1313(a)-(c)(2001).

49. 33 U.S.C. §§ 1313(d)(2001).

50. EPA, *Total Maximum Daily Load (TMDL) Program*, at <http://www.epa.gov/owow/tmdl/lawsuit1.html> (last visited Apr. 25, 2002). This EPA site summarizes TMDL litigation over waters in 42 states.

51. COMMITTEE TO ASSESS THE SCIENTIFIC BASIS OF THE TOTAL MAXIMUM DAILY LOAD APPROACH TO WATER POLLUTION REDUCTION, NATIONAL RESEARCH COUNCIL, *ASSESSING THE TMDL APPROACH TO WATER QUALITY MANAGEMENT*, 1 (2001) (hereinafter THE NRC REPORT).

technology and practices) to meet its goals. The TMDL program reflects an approach that is much older than the performance standards approach of the NPDES program.⁵² In enacting the Clean Water Act, Congress chose to shift the focus from ambient water quality to performance standards because the earlier focus on water quality standards had failed to produce results. It was often difficult to tie one polluter's effluents to an overall failure to meet water quality standards. Without this nexus, enforcement proved difficult since a polluter could avoid an enforcement action if regulators could not show this nexus. Additionally, enforcing ambient water quality standards is very expensive. Standards for each body of water must first be set based upon the expected uses of that body of water. Then each body of water must be monitored to ensure that water quality standards have been met. Issues such as appropriate monitoring methods, frequency of monitoring, location of monitoring sites, and others have greatly complicated this approach. It has been asserted that in 1972 when Congress passed the Clean Water Act an ambient water quality approach to improving water quality was neither scientifically nor economically feasible.⁵³

The NPDES program has the advantage that there are a finite number of point source polluters, and these polluters can be required to engage in significant self-monitoring and reporting as a condition of receiving a permit. A performance-based program has the considerable advantage that there is no specific requirement that particular pollutants be tied to particular harms. A permittee either meets performance standards or does not, and, if not, may be found in violation. The NPDES program has resulted in enormous progress in improving surface water quality as it has cleansed the worst sources of water pollution; however, it has not met the Clean Water Act goal of fishable and swimmable water throughout the United States.⁵⁴ Even with the reduction of pollutants from point sources, many bodies of water remain seriously impaired as the result of unregulated or under-regulated discharges from point and nonpoint sources.⁵⁵ Litigation by citizen groups against the EPA has shifted the focus back toward obtaining improvements through the TMDL program.⁵⁶

On July 13, 2000, in response to litigation, the EPA published a final rule to revise its TMDL rule.⁵⁷ As the result of controversy and litigation that this rule created, Congress forbade EPA to use any funds

52. *Id.* at 12-13.

53. *Id.*

54. *Id.* at 1.

55. *Id.*

56. THE NRC REPORT at 1-2.

57. 65 Fed. Reg. 43586 (July 13, 2000).

to implement the rule in either FY2000 (federal fiscal year, October 1 through September 30) or FY2001.⁵⁸ EPA intends to delay implementation of its TMDL rule until April 30, 2003 in order to consider the National Research Council Report (The NRC Report).⁵⁹ The lack of application of economic principles to the design and implementation of TDML rules may be contributing to their controversial reception.

To develop useful ambient water quality standards, two basic requirements must be met: There must be a designated use and there must be criteria against which it may be measured whether or not the designated use is being achieved.⁶⁰ For a designated use to be effective, it must be sufficiently specific such that measurable criteria can be established.⁶¹ Vague goals, such as fishable, swimmable, and supporting recreation or aquatic life are not specific enough to support the development of criteria against which the success or failure of a program to improve impaired waters can be measured.⁶² Developers of ambient water quality standards, as well as courts that will ultimately review those standards, must recognize that science cannot eliminate all uncertainty.⁶³ Any model of water quality in a body of water must include five factors: “alterations in physical habitat, modifications in the seasonal flow of water, changes in the food base of the system, changes in interactions within the stream biota, and release of contaminants (conventional pollutants).”⁶⁴ A change in a single one of these five factors may introduce uncertainty into the system. Moreover, social and economic decisions as to the desired conditions of particular bodies of water cannot be avoided.⁶⁵ The process of developing TMDLs must be continuous (adaptive implementation) because economic and social conditions, including the uses of land in a watershed and the state of scientific understanding, is constantly changing.⁶⁶

The NRC Report states that many current water quality standards are seriously flawed.⁶⁷ Many are unmeasurable.⁶⁸ Some are non-exceedance standards or flow restriction standards that are statistically

58. 66 Fed. Reg. 53044 (Oct. 18, 2001).

59. *Id.*

60. THE NRC REPORT at 23.

61. *Id.*

62. *Id.*

63. *Id.* at 31.

64. *Id.* at 28.

65. THE NRC REPORT at 30.

66. *Id.* at 89.

67. *Id.* at 46, 90.

68. *Id.*

incapable of being met.⁶⁹ The NRC Report states that flaws in standard setting under the TMDL program may have resulted in substantially more bodies of water being listed as impaired than is merited with a resultant failure to concentrate resources on those bodies of water truly in need of improvement.⁷⁰

The NRC Report recommends that a mechanism be established (by act of Congress if necessary) to confine listed waters to those for which the need for improvement is confirmed.⁷¹ The NRC Report notes that there may be a mechanism in the Clean Water Act for analysis of the sort that the NRC Report recommends, including uncertainty analysis and social and economic analysis, through use attainability analysis (UAA); however, the EPA has failed to develop usable standards for this process.⁷² It also notes, by way of footnote, that there is considerable debate over whether 303(d) is a planning exercise only or carries with it the means for enforcing compliance to achieve water quality standards.⁷³ Even if the TMDL program as required by 303(d) is a planning exercise only, states have the discretion through their legislation to establish enforcement mechanisms. Such an approach would be piecemeal and would make little sense in watersheds that extend across state boundaries. The NRC Report suggests “a cautious approach of taking low-cost actions with a high degree of certainty about the outcome, while taking parallel long-term actions to improve model capabilities and revise control strategies.”⁷⁴

IV. EPA’s Proposed CAFO NPDES and Effluent Limitations Guidelines Rule

On January 12, 2001, the EPA proposed to modify 40 CFR Parts 122 and 412, the NPDES permit regulation and effluent limitations guidelines and standards for CAFOs.⁷⁵ Under a settlement of litigation, the EPA is required to issue a final rule no later than December 15, 2002.⁷⁶ The comment period for the proposed rule was extended from its original deadline and closed on July 30. EPA’s proposed ELG

69. *Id.*

70. The NRC Report at 5.

71. *Id.*

72. *Id.* at 90-93.

73. *Id.* at 21.

74. *Id.* at 99.

75. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 3015-3023 (proposed Jan. 12, 2001) (codified at 40 C.F.R. pts. 122 & 412).

76. National Resources Defense Council, Inc., et al. v. Reilly, Civ. No. 89-2980 (RLC) (D.D.C.).

regulations extend its current approach of allowing no discharges.

EPA's proposed rule included alternatives but would in any case dramatically expand oversight of AFOs by treating many AFOs as CAFOs for the first time. EPA estimates that 12,660 CAFOs with more than one thousand animal units exist and almost all of those require a NPDES permit under current regulations.⁷⁷ Of these, only 2,500 have NPDES permits, suggesting a huge noncompliance problem.⁷⁸ For EPA's two-tier option, EPA estimates that 19,100 AFOs would be defined as CAFOs that require NPDES permits. Under the three-tier option, EPA estimates as many as 39,330 AFOs would require NPDES permits. Under both sets of proposed regulations, many dry litter poultry operations that are not currently regulated under the CWA would require NPDES permits.

V. The Clean Water Act as a Constraint on Social Welfare

As noted, above, the Clean Water Act sets a goal, but not a statutorily mandated requirement, that all discharges to surface waters be eliminated. Although the goal of eliminating all discharges may not be a statutory mandate, it suffuses the CWA and has set the tone for litigation. This section will demonstrate that this approach is inconsistent with economic principles and the maximization of social welfare.

Economics is the study of optimal resource allocation to maximize the welfare of people. The purpose of policy and regulation is to improve the welfare of the governed people. The primary measure of whether or not a policy or change in policy improves social welfare is whether or not the value of the benefits created exceeds the costs imposed. We make a few points based on these concepts in the following section of the paper.

First, the CWA does not require EPA to maximize social welfare improvement nor even to avoid social welfare loss in regulatory design. Instead, the CWA arbitrarily replaces the goal of social welfare improvement with the goal of 'discharge elimination.' As a result, EPA is allowed and may even be required by the CWA to adopt regulations that significantly reduce social welfare in order to reduce 'discharges.'

A second point made below is that EPA is not required under the CWA to be efficient in the consumption of resources to achieve the goal of 'discharge elimination.' Basic principles of economics imply that in order for a regulation to be efficient, no other regulation should provide

77. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 2984.

78. *Id.* at 3080.

the same benefits at lower cost. In contrast, EPA is allowed and may even be required by the CWA to adopt regulations that create “deadweight loss”⁷⁹ for society by inefficient attainment of stated goals.

A third point made below is that EPA is not required under the CWA to address social equity considerations in regulatory design. Principles of welfare economics imply that if a regulatory change is truly socially beneficial, then the beneficiaries of the change can compensate those bearing the costs of the change such that no person is left ‘worse off’ after the change. Conversely, EPA is allowed and may even be required by the CWA to adopt regulations that create significant welfare loss for individuals and/or regions of the country.

The combined effect of the three points listed above is that EPA is allowed and may even be required by the CWA to adopt regulations that impose a significant welfare loss on a small number of individuals and/or regions of the country to produce benefits of considerably less value. Our comments below are also intended to highlight how EPA might maximize social welfare subject to the constraints of the CWA and how Congress might amend the CWA to require EPA to maximize social welfare in regulatory design.

Regarding the first point, while EPA considers costs and benefits in regulatory revisions, there is no legal requirement that such revisions improve social welfare. For example, for the currently proposed revision of the AFO/CAFO rules, EPA estimates “costs of the proposed regulations range from \$847 to \$949 million annually” while EPA estimates that the “monetized benefits of the proposed regulations range from \$146 million to \$182 million annually.”⁸⁰ Costs are roughly 5 to 6 times benefits. Allowing that estimates of costs and benefits may be incomplete and subject to estimation error, the current estimates suggest that the proposed rule change will reduce the welfare of the people of the U.S.A. by \$665 million to \$803 million per year. Clearly, ‘discharge elimination’ has supplanted social welfare improvement as the goal of regulation in this case. In practical terms, this means that \$665 to \$803 million per year will not be available to society for other purposes including reducing pollution from other sources.

EPA (or probably Congress) can substantially improve the social

79. A ‘deadweight loss’ is defined as a loss “to the devil of inefficiency which is *of no benefit whatsoever to anybody.*” PAUL A. SAMUELSON, *ECONOMICS* 517, n.10 (9th ed.1973).

80. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 3098; *see* Notice of Data Availability, 66 Fed. Reg. 58555 (Nov. 21, 2001). EPA has indicated the availability of new data as the result of the public comment process that may change these and other estimates.

welfare effects of regulation under the CWA by revising their interpretation of 'pollutant discharge' and by developing social welfare-based criteria for the degree to which 'pollutant discharges' will be eliminated. The CWA lists "agricultural waste discharged into water" as a pollutant although it does not address the question of manure or any compound derived from manure as a pollutant. Subsequent judicial decisions have established that manure can be a pollutant.⁸¹ Agricultural storm water discharges are excluded from the definition of a point source;⁸² however, CAFOs are included within the definition of a point source⁸³ so that all discharges (and potential discharges), including most storm water discharges, must be permitted under the NPDES permit system. The term 'pollutant discharge' seems well defined when the pollutant is a toxic substance and the discharge is a direct release into surface water from a 'point source' such as a sewage discharge pipe. That definition has been greatly expanded under current and proposed CAFO rules to include loss of nutrients from a field and loss of nitrogen to the air. Such a definition imposes social welfare loss when it specifies goals under the CWA that, in many cases, have no social benefit. For example, reduction of the loss of the nutrient phosphorus from a field that does not drain to a phosphorus-limited water body produces no social benefit. Similarly, reduction of 'loss' of elemental nitrogen gas (which makes up seventy-eight percent of the atmosphere) from a field produces no social benefit. A 'dead weight loss' to society is sustained to the extent that any net costs are incurred to achieve those reductions. Society's goal under the CWA should be to reduce environmental damage caused by the discharge of pollutants, thereby creating a social benefit. In this stated goal, a substance is only a 'pollutant' when it causes environmental damage upon introduction to a specific environment. For example, phosphorus is only a pollutant when it is introduced to phosphorus-limited water bodies. Also in this stated goal, a 'discharge' is the release of a pollutant into a specific environment (water body) where it causes damage. Loss of phosphorus from a field that does not reach a phosphorus-limited water or the loss of elemental nitrogen gas are not discharges to be regulated.⁸⁴

Indeed, it has been estimated that, for the United States as a whole,

81. *Concerned Area Residents for the Environment v. Southview Farm*, 834 F. Supp. 1410 (W.D.N.Y. 1993), *rev'd*, *Concerned Area Residents for the Environment v. Southview Farm*, 34 F.3d 114, 1994 U.S. App. LEXIS 24248, 117-118 (2d Cir. 1994).

82. 33 U.S.C.A. § 1362(14).

83. *Id.*

84. Application rates of nitrogen and phosphorus in excess of agronomic rates will not inevitably result in environmental damage. In order for environmental damage to occur, nutrients must be transported from an application site to nutrient-sensitive water.

thirty-five counties have excess nitrogen and 107 counties have excess phosphorus.⁸⁵ EPA has conceded that its proposed CAFO regulations could be more precise.⁸⁶ EPA has indicated that part of the justification for revision of its CAFO regulations is the changes in the livestock and poultry industries that have led to greater 'industrialization.'⁸⁷ EPA fails to provide proof that 'industrialization' of the livestock and poultry industries has made them more polluting, and its proposed CAFO regulation applies equally to 'industrialized' operations and family farms of the same size (of which there are many).⁸⁸ Court decisions also imply that it is the change in the structure of the livestock and poultry industries that has necessitated greater regulation under the CWA.⁸⁹

VI. Conclusions

As stated in the previous paragraph, Congress (and EPA) can also substantially improve the social welfare effects of regulation under the CWA by developing social welfare-based criteria for the degree to which 'pollutant discharges' will be eliminated. As a practical matter, EPA does not require total elimination of pollutant discharges since permitted point source dischargers such as municipal sewage treatment plants and industrial waste treatment plants are routinely discharging pollutants in accord with their NPDES permits. Social welfare can be improved if EPA and state regulatory authorities establish reasonable maximum concentrations and cumulative daily quantities that can be discharged by each discharger directly into water bodies. Social welfare-based criteria for determining the degree of pollutant discharge reduction from municipal dischargers or livestock farms are based on cost of reduction versus benefits of reduction. Beyond the revised definitions of 'pollutant' and 'discharge' in the previous paragraph, EPA should classify CAFOs by their characteristics that determine the marginal environmental damage caused by their 'discharges'. Social welfare

85. Terence J. Centner, *Evolving Policies to Regulate Pollution from Animal Feeding Operations*, 28 ENVTL. MGMT. 5, 599, 606 (2001). These estimates range from 35 up to 266 counties for nitrogen and from 107 up to 485 counties for phosphorus, depending on the assumptions made about the availability of land for the application of waste. A further limitation of this analysis is that an individual producer may not have adequate land available for waste application, even if that person is located in a county that, overall, has adequate land. This analysis also does not account for operators who may be applying waste improperly.

86. *Id.*

87. 66 Fed. Reg. 2960, 2974-5.

88. VUKINA, TOMISLAV, *THE RELATIONSHIP BETWEEN CONTRACTING AND LIVESTOCK WASTE POLLUTION* (Dept. Agric. & Res. Econ., Working Paper, Oct. 2001) (noting that the existing literature does not support the widely held belief that contract livestock producers are larger than independent producers).

89. Water Keeper Alliance, Inc. at slip op. *4.

criteria imply that CAFOs with discharges that cause marginal environmental damage should incur additional costs under revised regulation that do not exceed the reduction in value of environmental damage. In other words, if discharges from a CAFO cause environmental damage of miniscule value, then revised regulations should impose additional costs no greater than the reduction in that miniscule value of damage. These criteria would impose considerable costs on those CAFOs that, due to location (*e.g.*, immediately proximal to points of environmental damage) and perhaps technology and practices, have discharges that cause environmental damage of considerable value. These criteria would not impose significant costs on CAFOs that do not cause environmental damage of significant value. Social welfare-based criteria would eliminate much of the ‘deadweight loss’ imposed by blanket imposition of practices and technology. A second point is that EPA is not required under the CWA to be efficient in the consumption of resources to achieve the goal of ‘discharge elimination.’ Given specific goals of discharge elimination or reduction of environmental damage, efficient regulation would stimulate dischargers and others to attain the goals in the least costly manner. Regulatory costs include costs born by dischargers plus government costs such as monitoring and enforcement plus other environmental damage and other damage to the economy (job loss, income loss, tax revenue loss, asset devaluation, etc.). An example of this type of inefficiency is the blanket imposition of “Best Available Technology (Economically Affordable)” (BAT), zero discharge, the Comprehensive Nutrient Management Plan (CNMP), and the proposed Permit Nutrient Plan (PNP) as the minimum standard for CAFOs to comply with NPDES and ELG requirements. The specified technology and practices impose costs on all CAFOs without regard for the social benefits generated at each individual CAFO. CAFOs that may have been able to achieve similar social benefits through use of lower cost technology and practices incur incremental costs that are ‘dead weight loss’ to society. Congress should modify the CWA to require that regulations allow CAFOs real flexibility in attaining specified environmental damage reduction goals at the least cost. Specific characteristics of individual farms such as size, type, location, climate, soils, and others determine which technology and practices are sufficient. Another element of efficiency is introduced by integrating NPDES programs with TMDLs to allow trading of discharge “rights” and to allow determination of discharge standards in conjunction with TMDL goals.

A third point is that EPA is not required under the CWA to address social equity considerations in regulatory design. Change in regulations can create significant welfare loss for individuals and/or regions of the

country without compensation. For example, new regulations that require that manure nutrients be conserved and spread over a much greater land area disproportionately impact CAFOs in regions characterized by farms of small acreage scattered over numerous non-contiguous fields. The effects of the regulatory change in such a region with a high density of CAFOs are multiplied. Potential damage to the local economy arises from the inability of CAFOs to comply with rules and the termination of operations at some locations. EPA is required to examine the effect of proposed regulations on the distribution of CAFOs and the effect on communities. However, there is no requirement for compensation of individuals as long as only a small proportion of the affected population experience 'severe financial stress.' If the impact on individual communities is found not to be severe, the regulatory change can proceed. No compensation of communities or regions is required for damage to the local economy arising from regulatory change. Analyses of the proportion of the affected population incurring financial stress and analyses of the impact on communities are prone to error and omission. Congress could improve the equity implications of the CWA by requiring that impacts on individuals, communities, and regions be analyzed and that compensation (such as cost share, buy-outs, or transition period payments for compliance) be made available to offset imposed costs. If the regulatory change is truly welfare-improving, society will be 'better off' even after compensation, and no individual or small group will bear a disproportionate share of the costs.

Since the regulatory framework of the CWA as interpreted (probably correctly) by the EPA and the courts does not include maximization of social welfare, socially efficient attainment of goals, or equitable distribution of the costs of regulation (and compliance may in any event be technically impossible), it is hardly surprising that many disputes over CAFOs are resolved through litigation. This problem is exacerbated by the limitations of the CWA to address pollution other than water pollution. For example, CAFO odor is often one of the chief (and legitimate) complaints of plaintiffs in CAFO litigation.⁹⁰ The CWA was also never intended to address changes in the structure of agriculture that may form part of the underlying complaint of many plaintiffs in CAFO litigation.⁹¹ Given the stated and unstated objectives of many of the parties to CAFO disputes and the rather narrow confines into which the CWA forces these disputes, owners of livestock and poultry

90. Odor is also not adequately addressed by the Clean Air Act, 42 U.S.C. §§ 7401-7671q. Odor control also poses serious technical problems of measurement and control.

91. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 2974.

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operations may be forgiven for their widely held belief that their opponents seek not to prevent pollution but to use the CWA to put them out of business. Revision of the CWA and related environmental protection legislation to promote social welfare maximization, efficient attainment of goals, and equity would reduce conflict over environmental improvement and remove constraints on social welfare.