

MERCATUS CENTER
GEORGE MASON UNIVERSITY

REGULATORY STUDIES PROGRAM

**Public Interest Comment on
EPA's National Pollutant Discharge Elimination System Permit
Regulations and Effluent Limitation Guidelines and Standards
for Concentrated Animal Feeding Operations¹**

Docket Number: OW-00-27

The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of the impact of regulation on society. As part of its mission, RSP conducts careful and independent analyses employing contemporary economic scholarship to assess rulemaking proposals from the perspective of the public interest. Thus, this comment on the Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System Permit Regulations and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFO) does not represent the views of any particular affected party or special interest group, but is designed to evaluate the effect of the Agency's proposals on overall consumer welfare.

This comment begins with an explanation of the Environmental Protection Agency's (EPA) "National Pollutant Discharge Elimination System Permit Regulations and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFO)," published for public comment in the Federal Register on January 12, 2001,² hereinafter referred to as the proposed new CAFO regulations. Section II then summarizes EPA's legal rationale and factual justification for the regulatory action. Section III presents a critical analysis of the regulatory proposal and the supporting documentation. Section IV suggests an alternative community-based approach to addressing environmental and public health problems attributed to CAFO's, and Section IV presents conclusions and recommendations. Appendix I offers the RSP Checklist that evaluates the proposed new CAFO regulations according to seven elements, and Appendix II presents a detailed analytical framework for designing a community-based system for assuring water quality.

¹ Prepared by [Sean Blacklocke](#). This comment is one in a series of Public Interest Comments from Mercatus Center's Regulatory Studies Program and does not represent an official position of George Mason University.

² Proposed Rule; see Federal Register, January 12, 2001, Volume 66, Number 9, pp. 2959-3145.

I. The Proposed New CAFO Regulations and EPA's Legal Rationale

This section provides A) an overview of the proposed new CAFO regulations and B) a summary of the legal rationale presented with the regulatory proposal.

A. The Regulatory Proposal

The proposal consists of revisions to two agency regulations. The proposed new CAFO regulations 1) rewrite the regulatory definition of a CAFO and 2) revise the National Pollutant Discharge Elimination System (NPDES) permit requirements for these facilities.

1. CAFO Definitions

First, the new regulations would amend the language defining the CAFO industrial classification at 40 CFR Part 122. EPA requests comment on two basic approaches for defining a CAFO for the purposes of determining applicable NPDES permit requirements.

- The three-tiered approach would maintain the existing regulation's two permit-requirement thresholds at 300 and 1000 animal units. Facilities with more than 1000 animal units would retain their CAFO designations. Smaller animal feeding operations (AFO) with more than 300 animal units but less than 1000 could be designated CAFO's under certain water quality risk conditions or facility design and operation scenarios.
- The alternative two-tiered approach would establish a 500-animal-unit threshold above which facilities with the potential to discharge would incur or retain their CAFO designations. Facilities with less than 500 animal units could be designated as CAFO's under certain water quality risk conditions or facility design and operation scenarios.

EPA also proposes to expand the CAFO regulatory definition to include not only animal rearing facilities themselves, but also the land application sites that are under the substantial operational control of the CAFO as defined in the regulatory proposal.

2. CAFO Effluent Limitation Guidelines

Second, the proposed new CAFO regulations would update Effluent Limitation Guidelines (ELG) for the CAFO industrial category at 40 CFR Part 412. Among a number of things, this entails a) updating existing water retention design standards for production areas, b) revising best management practices for manure handling, storage and land application areas, and c) requiring soil and subsurface testing and manure transfer record-keeping.

a. Design Standards

Existing CAFO ELG's prohibit the discharge of wastewater generated in or passing through the animal production and manure storage areas except in cases of catastrophic storm events, defined in the regulations as 24-hour events that occur only every 25 years. Smaller AFO's are currently subject to wastewater retention design requirements generally at the discretion of state pollution control authorities.

The proposed new CAFO regulations would maintain the no-discharge standard and eliminate the catastrophic-storm-only exemption from the NPDES permitting program. AFO wastewater or runoff posing significant environmental risks, as determined by state pollution control authorities or EPA, is subject to NPDES ELG's under the proposed new CAFO regulations.

b. Best Management Practices

Existing ELG's require the application of best management practices (BMP) for the prevention or reduction of runoff pollution from CAFO animal production and manure storage areas.

The proposed new CAFO regulations maintain the BMP requirement in the ELG's for animal production and manure storage areas and extend NPDES-specified BMP requirements to land application areas under substantial CAFO control as defined in the regulation. Additionally, they require CAFO's to develop, implement, and maintain site-specific nutrient management plans to the specifications of certified nutrient planners. NPDES permit nutrient management plans cover CAFO animal production and manure storage areas as well as permitted land application areas.

c. Testing and Record-Keeping

Soil, groundwater, and manure testing are currently not standard CAFO NPDES permit requirements. Record-keeping of BMP implementation or manure transfer at CAFO's is also currently not generally required under the NPDES permitting program.

The proposed new CAFO regulations add groundwater-to-surface water linkage testing at specified animal production and manure storage and application areas. The regulations also require CAFO's to test land application areas for nutrient content and adjust manure applications to soil nutrient assimilative capacities. Proposed new record-keeping requirements include documentation of BMP implementation and off-site transfers of manure.

B. EPA's Legal Rationale

EPA provides a legal rationale for the regulatory proposal pursuant to 1) its statutory and executive requirements and 2) an Agency consent decree.

1. Authorizing Statutes and Executive Orders

The Clean Water Act authorizes EPA to pursue the promulgation of the proposed regulations. The Coastal Zone Act Reauthorization Amendments provide for the enforcement of water pollution management measures at agricultural facilities in certain circumstances, potentially in cases of runoff from CAFO's.

EPA reconciles its proposal with its jurisdiction under these statutes and with its requirements under Executive Order 13045 on the Protection of Children from Environmental Health Risks and Safety Risks and Executive Order 12898 on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

2. Consent Decree

In the summary section of the preamble of the proposal, EPA explains that the regulatory action has been undertaken, in part, to satisfy obligations arising from negotiations over the terms of a 1992 Consent Decree, *Natural Resources Defense Council, Inc., et al. v. Reilly*.³ The agreement commits EPA to, among other things, propose and take final regulatory action on nineteen industrial categories of facilities that discharge wastewater to the environment.

Regulatory action via the NPDES permitting program is mandatory under the terms of the agreement. No provisions exist for the employment of nonregulatory strategies, regardless of whether they can be demonstrated to achieve like or better water quality at lower costs.

II. EPA's Factual Justification for the Regulatory Proposal

This section summarizes the scientific and economic information presented by EPA in support of the proposed new CAFO regulations. Specifically, it summarizes A) the water quality reports EPA presents in its regulatory proposal, B) the results of the economic analyses EPA has conducted to estimate the costs and benefits of its regulatory proposal, and C) the assessment EPA has completed on the CAFO industry to determine its current organization and projected trends. Section III presents a discussion and critique of these reports and analyses.

A. EPA's Water Quality Reports

The water quality information EPA presents in its regulatory proposal consists of 1) state water quality impairment designations and 2) public health impacts and natural resource devaluations attributable to CAFO's.

³ Civ. No. 89-2980 (RCL) (D.D.C.)

1. Water Quality Impairment Designations

EPA reports that “agricultural operations, including CAFO’s, are considered a significant source of water pollution in the United States.”⁴ According to state reports, the agricultural sector is the leading cause of water quality impairment in the U.S. rivers, streams, and lakes that have been assessed. EPA estimates that water pollutants from agriculture account for 59 percent of water quality impairments to assessed and impaired rivers and streams. It estimates that 31 percent of assessed and impaired lakes may be impaired by agricultural sources. Data available from the states suggest the agricultural sector is the fifth leading cause of water quality impairment in estuaries.⁵

Section III of this comment examines the validity of these figures in light of the limited monitoring data available and other problems. EPA also reports on a variety of studies correlating high nutrient levels in U.S. watersheds with proximal livestock operations.⁶

2. Public Health Impacts and Natural Resource Devaluations

EPA presents several accounts of public health impacts and natural resource devaluations resulting from water pollutants originating at CAFO’s.

For instance, it reports that incidences of illness and even death have been traced to CAFO pollutants in drinking water in the Midwestern U.S.⁷ Between 1987 and 1997, 47 fish kills in the U.S. were attributed to CAFO water pollutants originating at hog farms.⁸ Feedlots have been identified in the contamination of 3 percent of shellfish grounds in 21 coastal states.⁹ And one California community will reportedly require expenditures of \$1 million a year to remove CAFO-generated nitrates from their potable water supplies.¹⁰

B. EPA’s Analyses of Costs and Benefits

EPA also provides 1) a cost-effectiveness analysis of the various ELG alternatives as they would pertain to the two co-proposed CAFO definitions and 2) a cost-benefit analysis of the regulatory action including a partial estimation of its incremental benefits.

1. Cost-Effectiveness Analysis

In the preamble to the proposed new CAFO regulations, EPA explains and compares its estimates of incremental annual costs of pollutant loading removals across selected CAFO-definition/ELG scenarios. EPA conducted cost-effectiveness analysis on CAFO toxics, nutrients, and sediments. No estimates were generated for pathogen reductions.

⁴ 66 FR 2972

⁵ EPA, *National Water Quality Inventory: 1998 Report to Congress* (EPA 841-R-00-001).

⁶ 66 FR 2980

⁷ 66 FR 2983

⁸ 66 FR 2981

⁹ 66 FR 2982

¹⁰ 66 FR 2983

EPA reports that among its selected CAFO-definition/ELG options, the cost-effective alternative for toxics pollutant removal is \$27 per pounds-equivalent.¹¹ The cost-effective alternatives for nitrogen, phosphorous, and sediment reductions are \$4.30 per pound, \$2.10 per pound, and \$0.003 per pound, respectively.¹²

In supporting documentation, EPA compares the relative cost-effectiveness of the CAFO ELG's with ELG's for other industrial categories, many of which reportedly have higher per unit removal costs. In one document the Agency states, "Compared with other effluent guidelines (for toxics), EPA considers this rule to be cost-effective under either co-proposed (regulation) scenario."¹³

2. Cost-Benefit Analysis

EPA reports its estimates of the total costs and benefits associated with the proposed new CAFO regulations. Specifically, EPA reports estimated annual incremental costs across the three major cost components of the proposal. EPA also reports the findings of four benefit-estimation studies used to estimate the range of total annual incremental social benefits associated with the regulatory proposal.

EPA's estimated range of annual incremental costs to CAFO's, permitting authorities, and off-site recipients of CAFO manure are \$830.7 million – \$930.4 million, \$6.2 million – \$7.7 million, and \$9.6 million – \$11.3 million, respectively.¹⁴

EPA's Water Pollution Control Assessment Model finds that Americans value restored and protected swimming, boating, and fishing opportunities expected to result from the proposed new CAFO regulations at between \$108.5 million – \$127.1 million annually depending on the CAFO-definition/ELG alternative.¹⁵

EPA additionally estimates benefits associated with reducing pathogen-laden runoff to shellfish grounds, avoiding CAFO-related fish kills, and preventing CAFO-contaminated groundwater via new CAFO regulations. These estimated benefits range from \$0.2 million – \$2.7 million, \$0.2 million – \$0.4 million, and \$35.4 million – \$53.9 million, respectively.¹⁶

These quantified benefits and costs yield net social costs—costs in excess of benefits—of between \$664.2 million and \$803.9 million per year.

EPA addresses its finding of net social costs by pointing out that it "was only able to monetize a small subset of the range of potential benefits that may accrue under the

¹¹ EPA, *Economic Analysis of the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and Effluent Guidelines for Confined Animal Feeding Operations* (EPA-8-21-R-01-001) p. E-19.

¹² *Ibid.*, p. E-25.

¹³ *Ibid.*, p. E-19.

¹⁴ 66 FR 3099

¹⁵ 66 FR 3099

¹⁶ 66 FR 3099

proposed regulations.”¹⁷ It reports findings from studies estimating or characterizing the benefits to which dollar values have not been assigned. EPA focuses particularly on the additional air quality benefits expected to accrue to CAFO-proximal home dwellers.

Exhibit II.B.2 is a summary of EPA’s cost-benefit analysis of the proposed new CAFO regulations.¹⁸

**Exhibit II.B.2. Estimated Annual Cost and Benefits of EPA’s
Proposed New CAFO Regulations (1999\$)**

Estimated Costs	\$846.5 million - \$949.4 million
Estimated Benefits	\$145.5 million - \$182.3 million
Estimated Net Social Costs	\$664.2 million - \$803.9 million

C. EPA’s Assessments of Industry Organization and Trends

EPA premises its proposed new CAFO regulations heavily on the need to respond to changing conditions in the animal agriculture industry.

EPA summarizes time-series data from the U.S. Agricultural Census and demonstrates that livestock and poultry demand and production in the U.S. has generally increased since the 1970’s. EPA reports that between 1974 and 1997, hog production in the U.S. went from 79.9 million animal units to 142.6 million animal units.¹⁹ Over the same period, broiler production more than doubled. EPA reports that broiler production went from 2.5 billion animal units in 1974 to 6.4 billion animal units in 1997.²⁰

The Census data also indicate a trend toward fewer but larger CAFO operations. This is evident in the fact that while livestock production has increased since 1974, the number of livestock and poultry facilities has fallen from 1.7 million to 1.1 million.²¹ An increasing concentration of pork and milk production in certain states in the U.S is also evident, namely in North Carolina, Arizona, Utah, and Colorado.²²

These reports strongly indicate that there exists the potential for CAFO-generated manure to become increasingly concentrated in certain U.S. watersheds, and that these watersheds are as a consequence losing their capacities to soil-assimilate manure nutrients. EPA reports that only about 3 percent of the cropland in the U.S. is owned by CAFO’s, and these lands are estimated to be able to soil-assimilate only 40 percent of the nitrogen generated on site.²³

¹⁷ 66 FR 3098

¹⁸ 66 FR 3099

¹⁹ 66 FR 2974

²⁰ 66 FR 2974

²¹ 66 FR 2974

²² 66 FR 2975

²³ 66 FR 2975

III. Analysis of the Proposed New CAFO Regulations

This section does not contest the legal, scientific, and economic factual content presented by EPA and summarized in the previous sections. Rather it examines EPA's use of these facts to support action to promulgate the proposed new CAFO regulations.

In general, this analysis finds that EPA A) fails to reconcile its regulatory proposal with a variety of its administrative requirements and B) misrepresents factual information used to support the proposal.

A. Analysis of EPA's Legal Rationale

EPA fails to reconcile the proposal with a variety of its administrative obligations, including those required under 1) executive orders, 2) statutes, and 3) agency policies.

1. Executive Orders

EPA has regulatory cost reporting requirements under a) Executive Order 12866 on Regulatory Planning and Review and b) Executive Order 13132 on Federalism.

a. Executive Order 12866 on Regulatory Planning and Review

Executive Order 12866 on Regulatory Planning and Review requires, in part, that for significant regulatory actions EPA "assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs."²⁴ EPA finds that the proposed new CAFO regulations are a significant regulatory action and has submitted a cost-benefit analysis to the Office of Management and Budget (OMB) for review.

EPA finds that the total annual social costs of the regulations range from \$847 - \$949 million, with coinciding benefits ranging from \$146 - \$182 million annually.²⁵ With projected costs five to six times greater than estimated benefits, EPA has not shown that "the benefits of the intended regulation justify its costs."

b. Executive Order 13132 on Federalism

Executive Order 13132 on Federalism requires, in part, that when EPA develops rules with federalism implications, a process to ensure meaningful public participation by state and local officials will be developed and undertaken. EPA estimates that the new proposed CAFO regulations will cost state governments \$6 million per year on average and will impose no costs on local governments.²⁶ EPA finds these costs imposed as a

²⁴ White House, Executive Order #12866, Regulatory Planning And Review, September 30, 1993.

²⁵ 66 FR 3099

²⁶ 66 FR 3131

result of the proposed new CAFO regulations do not have federalism implications as defined in the Executive Order. And as such, it concludes that public participation requirements under the Executive Order on Federalism do not apply.

Several organizations appear to have taken exception to this finding, including the National Association of Governors,²⁷ the National Association of Conservation Districts,²⁸ and the National League of Cities.²⁹

2. Competing Statutes

EPA clearly has the statutory authority under the Clean Water Act to publish the new proposed CAFO regulations for solicitation of public comment. Furthermore as it stands today, EPA appears to have a legal requirement under consent decree to continue to pursue some derivation of this regulatory action. But in its proposal, EPA fails to reconcile the dictates of the regulatory action with its other statutory requirements to advance more efficient and effective environmental protection. More specifically, EPA does not clearly reconcile its regulatory proposal with a) The Government Performance and Results Act, b) The Regulatory Flexibility Act, c) The Unfunded Mandates Reform Act, and d) The Paperwork Reduction Act.

a. The Government Performance and Results Act

The Government Performance and Results Act requires, in part, that EPA maintain and implement a dynamic agency management strategy for Office of Management and Budget (OMB) review and approval. The strategy is required to have details on the specific expected environmental quality outcomes of each major funded initiative of the agency, explain the intended means of achieving these short-term goals, and demonstrate that these means are among the most cost-effective alternatives for goal attainment.

In 1996, EPA reported that \$611 million to \$5.6 billion *cost savings* could be generated if water quality goals in U.S. watersheds were pursued under a strategy that promoted effluent trading between permitted wastewater dischargers and unpermitted sources of runoff water pollution, including CAFO's as defined in the regulatory proposal.³⁰ This suggests another approach to reducing agricultural runoff pollution, in particular this effluent trading alternative, would likely be a more cost-effective runoff pollution reduction strategy. But an effluent trading strategy, even though explicitly endorsed by EPA, is not included in the analysis of the proposed new CAFO regulations.

²⁷ Letter from Governor Thomas J. Vilsack and Governor Frank Keating of the National Governors' Association to Ms. Sheila E. Frace and Mr. Charles Sutfin of the EPA, September 29, 2000.

²⁸ Letter from Mr. Ernest C. Shea of the National Association of Conservation Districts to Mr. Charles Fox of the EPA, September 15, 2000.

²⁹ Letter from Cameron Whitman of the National League of Cities to Ms. Sheila Frace of the EPA, August 15, 2000.

³⁰ Luttner, M., *President Clinton's Clean Water Act Initiative: Costs and Benefits*, <http://www.epa.gov/docs/epajrnl/summer94/12.txt.html>, 1996.

b. The Regulatory Flexibility Act

The Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act requires, in part, that EPA develop an Initial Regulatory Flexibility Analysis (IRFA) when introducing rules that have a significant economic impact on a substantial number of small businesses.

EPA does find that the proposed new CAFO regulations will have a significant economic impact on a substantial number of small businesses. EPA's IRFA finds that the proposed new CAFO regulations will apply to and affect between 10,500 and 14,630 smaller AFO's, some of which will undergo financial stress or closure.³¹

c. The Unfunded Mandates Reform Act

The Unfunded Mandates Reform Act requires, in part, that EPA complete a cost-benefit analysis when proposing rules with federal mandates that will result in greater than \$100 million in annual costs to state and local governments and the private sector in the aggregate.

EPA finds that the proposed new CAFO regulations will impart annual costs in excess of \$100 million on industry and state and local governments, and as such has conducted this analysis. Private-sector costs are estimated to range from \$831 - \$930 million annually. Costs to state governments are estimated to range from \$5.9 - \$7.3 million annually. As noted above, EPA's estimates of social benefits are significantly less, on the order of \$146 - \$182 million annually.³²

d. The Paperwork Reduction Act

The Paperwork Reduction Act requires, in part, that EPA provide OMB with an estimate of the average annual burden to public and private sector organizations resulting from paperwork requirements included in an agency regulatory proposal.

EPA finds that the average regulatory burden to both the public and private sectors will be from 1.6 million hours and \$37 million annually to 1.2 million hours and \$29 million annually.³³

3. Conflicting Agency Policies

In reporting regulatory costs under these executive orders and statutes and in response to the Clinton Administration's call for "reinventing government," EPA has initiated a variety of programs and policies to promote more efficient and effective federal

³¹ 66 FR 3127

³² 66 FR 3099

³³ 66 FR 3130

governance within the agency.³⁴ In general, it has been and remains to be the stated policy of EPA to

- allow state and local governments maximum flexibility in pursuing the attainment of their environmental goals to encourage innovative problem solving,³⁵
- reduce bureaucratic red tape and the overall regulatory burden on state and local governments and the private sector to reduce compliance costs,³⁶ and
- promote nonregulatory incentive-based strategies in communities to facilitate more cost-effective achievement of environmental goals.³⁷

As explained, the proposed new CAFO regulations reportedly will cost the private sector at least \$831 million annually and will cost state governments at least \$5.9 million annually. Paperwork generated from the regulations is estimated to be at least 1.2 million hours per year. EPA's report that no costs will be borne by local governments and that the regulatory action has no significant federalism implications appears at best to be unresolved. EPA expects that the regulatory action will cause financial stress or closure for at least 10,500 animal feeding operations. The projected social costs of the regulations are five to six times higher than the estimated social benefits.

The proposed new CAFO regulations clearly do not coincide with increased regulatory flexibility or decreased regulatory burden for state and local governments. Moreover, nothing in the regulatory proposal suggests it is an incremental move toward more cost-beneficial or cost-effective reduction of runoff pollution in U.S. watersheds.

B. Analysis of EPA's Factual Justification

This section critically examines A) the water quality reports EPA presents in its regulatory proposal, B) the results of the economic analyses EPA has conducted to estimate the costs and benefits of its regulatory proposal, and C) the assessment EPA has completed on the CAFO industry to determine its current organization and projected trends.

1. Analysis of EPA's Water Quality Reports

As discussed in Section II.A. of these comments, EPA relies on a) state water quality impairment designations and b) public health impacts and natural resource devaluations in U.S. surface waters to support the need for the proposal. A closer examination of these data, however, casts doubt on the magnitude of the impact CAFO's have on water quality.

³⁴ See EPA's Office of Policy, Economics, and Innovation at <http://www.epa.gov/opei/>

³⁵ See Joint Environmental Protection Agency/State Agreement to Pursue Regulatory Innovation, Final Agreement between EPA and states participating in the Environmental Council of States, May 5, 1998.

³⁶ See EPA, *Reinventing Environmental Protection*, March 1999, (EPA 100-R-99-002).

³⁷ See EPA, *Draft Framework for Watershed-Based Trading*, May 1996 (EPA 800-R-96-001).

a. Water Quality Impairment Designations

Every two years, EPA's Office of Water reports on the quality of U.S. surface waters to Congress, as required by §305(b) of the Clean Water Act. Regional EPA offices, the United States Geologic Survey, state pollution control authorities, and a variety of other federal, state, and local organizations contribute to the effort.

State waters that do not meet state water quality standards for water uses are designated by states as "impaired." State pollution control authorities contribute significantly to the biannual effort by reporting the impairment status of their state surface waters to EPA. Between reporting periods, authorities monitor surface waters for a variety of water pollutants, including those associated with CAFO's such as nutrients, metals, and pathogen-indicating bacteria. Laboratory and in-stream water quality measurements are generally guided by standardized scientific methods.

But the national sampling design of U.S. surface waters is not scientifically structured. Water quality monitoring in states has historically been done with the intent to identify water pollution control problems, not comprehensively assess the quality of rivers, streams, lakes, and estuaries. Because of this, inferences cannot be made about the "population" of U.S. surface waters from these "samples" of U.S. rivers, streams, lakes, and estuaries.

State pollution control authorities also periodically review geographic information system mapping data and watershed-level study findings to assist them in making estimations about the sources of water pollutants that are responsible for water quality impairments. These estimates are also not generated in a scientifically structured process and tend to be predominantly subjective in nature.

Thus, while valuable for identifying specific impaired waters, EPA reports on the water quality impairments of U.S. surface waters obtained through federal, state, and local monitoring cannot be meaningfully extrapolated to make determinations about the entirety of U.S. surface water pollution.

Yet EPA appears to make inferences about the condition of all U.S. water bodies in the proposed new CAFO regulations. EPA reports that 59 percent of the assessed U.S. rivers and streams that have been identified as impaired are thought to be in that condition due to some type of agricultural activity. EPA reports that 31 percent of the assessed U.S. lakes that have been identified as impaired are reportedly in that condition due to agriculture.³⁸

It is noteworthy, however, that only 23 percent of U.S. rivers and streams and only 42 percent of U.S. lakes have actually been assessed. And while it is true that agriculture has been identified by states as the leading cause of impairment in these assessed waters, it is also true that states have only actually assessed and attributed impairments to

³⁸ 66 FR 2973

agriculture in 4.7 percent of U.S. rivers and streams and 5.8 percent of U.S. lakes.³⁹ Reports by states of water quality impairments due to *animal feeding operations* indicate that less than 1 percent of rivers, streams, and lakes in the U.S. have actually been identified as impaired by *animal feeding operations*.

Also notable is the fact that estuaries comprise roughly 50 percent of the total of U.S. surface waters, and states report that the agricultural sector is thought to be only the fifth leading source of impairment to estuaries.⁴⁰

Thus, while EPA relies on these state data to suggest that large percentages of U.S. water bodies are impaired by agriculture, the actual fraction of water bodies that have been positively identified as being impaired by agriculture is quite small. Overall, only an estimated 3.7 percent of water quality impairment in the U.S. has actually been attributed to agriculture through any objective or even subjective formal reporting process. Only an estimated 0.35 percent of U.S. surface water pollution has actually been attributed to animal feeding operations through any reporting process. As Exhibit III.B.1.a illustrates, U.S. agriculture, and especially animal feeding operations, has hardly been demonstrated to be a major source of water pollution in the U.S.

³⁹ 66 FR 2973

⁴⁰ 66 FR 2973

Exhibit III.B.1.a. U.S. Water Quality Impairment by Source and Water Body Type

	Total	Total Assessed	Total Assessed & Designated Impaired	Total Assessed & Designated Impaired by Agriculture	Total Assessed & Designated Impaired by Animal Feeding Operations
Rivers and Streams (miles)	3,662,255	840,402 (23%)	291,263 (7.9%)	170,750 (4.7%)	27,320 (.75%)
Lakes (acres)	41,600,000	17,400,000 (42%)	7,900,000 (19%)	2,417,801 (5.8%)	96,712 (.23%)
Estuaries (square miles)	90,465	28,687 (32%)	12,482 (14%)	1,827 (2.0%)	292 [□] (.32%) [□]
U.S. Surface Waters (square miles)	181,518	62,241 [□] (34%) [□]	27,073 [□] (15%) [□]	6804 [□] (3.7%) [□]	634 [□] (.35%) [□]

[□]Based on the 16 percent estimate of total agriculture impairment attributed to animal feeding operations on rivers and streams in 28 states

[□]Back calculated from 181,518 total square miles of U.S. surface water (U.S. Bureau of Census, Statistical Abstract of the U.S., 1998)

EPA reports that of the 840,402 miles of rivers and streams in the U.S. that have been assessed, 170,750 miles have been reported by states to be impaired by agriculture. The 28 states that have differentiated between agricultural sectors in attributing impairment responsibility indicate that 16 percent of agriculture-impaired rivers and streams are thought to be impaired due to animal feeding operations specifically. In other words, 27,320 miles of the total 3,662,255 miles of U.S. rivers and streams, or .75 percent, have actually been identified by states as impaired by animal feeding operations.⁴¹

EPA reports that of the 17,400,000 acres of lakes in the U.S. that have been assessed, 2,417,801 acres have been reported by states to be impaired by agriculture. The 16 states that have differentiated between agricultural sectors in attributing lake impairment

⁴¹ 66 FR 2973

responsibility indicate that 4 percent of agriculture-impaired lakes are impaired due to animal feeding operations specifically. In other words, 96,712 acres of the total 41,700,000 acres of U.S. lakes, or .23 percent, have actually been identified by states as impaired by animal feeding operations.⁴²

EPA reports that of the 28,687 square miles of estuaries in the U.S. that have been assessed, 1827 square miles have been reported by states to be impaired by agriculture. EPA does not report estuary impairment by agricultural sector in the preamble of the proposed new CAFO regulations.

To summarize, EPA accurately reports that 59 percent of assessed and impaired U.S. rivers and streams have been reported by states to be impaired by the agricultural sector. But what appears to be the common interpretation of this, that the majority of U.S. surface waters are known to be impaired by agricultural sources including and especially CAFO's, is incorrect. The fact is, water quality impairments from animal feeding operations are only actually evidenced in a fraction of 1 percent of total U.S. surface waters.⁴³

Most important here is the fact that water quality monitoring of U.S. surface waters and water pollution source determinations in states prohibit scientifically valid conclusions to be drawn about U.S. surface water pollution or polluters.

b. Public Health Impacts and Natural Resource Devaluations

The above discussion showed that the percentage of water bodies actually identified as impaired is significantly less than that suggested in EPA's documentation. Essential to the further discussion of impaired U.S. surface waters is an explanation of the actual meaning of the term "impaired." State pollution control authorities generally classify surface waters as impaired if the designated uses of the water body are not supported. Water bodies anticipated by states or EPA to be impaired in the future are labeled "threatened." In general, what is impaired or threatened are the direct or indirect human uses of the waters. In other words, poor water quality can impair human water consumption, industrial or agricultural water use, swimming, boating, fishing, or the propagation of the flora and fauna that support these and other uses.

EPA presents anecdotal evidence of use impairments, including those brought about by CAFO's, that translate into real public health impacts and real natural resource devaluations in U.S. surface waters. States have identified and reported nitrate levels and pathogen-indicating organisms in drinking water supplies that exceed current public health standards. Wastewater lagoon spills from CAFO's have caused fish kills and shellfish contaminations and possibly human illnesses in the U.S. Nutrient-laden runoff from CAFO manure storage and application areas has contributed to excessive aquatic plant growth in U.S. waters, the consequences of which include impaired potable,

⁴² 66 FR 2973

⁴³ Estimate derived from 66 FR 2973 and U.S. Bureau of Census, Statistical Abstract of the U.S., 1998.

industrial, and agricultural water withdrawals and impaired swimming, boating, and fishing. Other documented public health impacts and natural resource devaluations associated with CAFO's include groundwater contamination, the airborne transfer of disease-causing organisms, and unpleasant odors.

EPA describes these occurrences in some detail in the proposed new CAFO regulations, and clearly they represent problems of concern. However, anecdotal accounts of real problems do not establish that a nation-wide problem exists, or the wisdom of uniform national standards to address problems.

EPA fails to make clear in its regulatory proposal how public health impacts and natural resource devaluations attributable to CAFO's compare with those that are currently reported to be attributable to other sources. As noted earlier, roughly half of U.S. surface water is in estuaries, where water quality impairment from all agriculture has been identified as significantly lower than municipal and industrial wastewater discharge and urban runoff impairments. Not pointed out in EPA's proposal is the fact that roughly half of the U.S. population lives in coastal cities and towns,⁴⁴ where they drink, swim, fish, boat, irrigate, and manufacture in estuarine watersheds.

As explained, impairment status is only a proxy for water quality, which itself is based in part on value judgments rather than science. And human population and aquatic resource use concentrations are only indicative of public health impacts and natural resource devaluations resulting from water pollutants. But a less anecdotal, more comprehensive and objective assessment of the true water use impairments across all U.S. surface waters would likely indicate agricultural water pollutants, and particularly CAFO water pollutants, are not *comparatively* significant sources of water pollution in U.S. watersheds. No such assessment is included in EPA's proposal.

2. Analysis of EPA's Estimated Costs and Benefits

This section provides a critical examination of EPA's 1) cost-effectiveness analysis of its various regulatory alternatives to address CAFO water pollution and 2) cost-benefit analysis of the social impact of its regulatory proposal.

a. Cost-Effectiveness Analysis

In the preamble of its regulatory proposal and in the supporting documentation referenced therein, EPA concludes that its co-proposed regulatory alternatives for revising CAFO ELG's are cost-effective compared to the other regulatory options considered. EPA indicates that the selection of the CAFO industrial classification for the incremental reduction of toxics, nutrients, and sediments in U.S. surface waters is generally consistent with its historic ELG revision policy of targeting sectors with the estimated lowest average pollutant unit reduction costs.

⁴⁴ U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, *50 Years of Population Change Along the Nation's Coast*, Rockville, MD: 1990, p 1.

But in its analyses, EPA notes that the range of pollutant unit reduction costs across and within all subcategories of CAFO's is relatively large. Specifically, the average cost to remove a pound of nitrogen in the hog subcategory is \$20 per pound. The average cost to remove a pound of phosphorous in the cattle subcategory is \$10 per pound. The average cost to remove a pound of nitrogen/phosphorous in the dairy and poultry subcategories is less than \$5 per pound.⁴⁵ This is due in part to the variety of pollutant reduction technologies available to and utilized by the many different types of CAFO's. Thus, the average pollutant unit removal costs applied to the CAFO classification in EPA's cost-effectiveness analysis is likely not synonymous with the actual per unit pollutant removal cost at any particular CAFO.

Not only do EPA's estimates show a wide range of cost-effectiveness, but the cost and effectiveness numbers are based on hypothetical models that rely on flawed data, with little support from monitoring of actual CAFOs.

EPA took an expedited approach to gathering regulatory cost data for the CAFO industry. As opposed to the common practice of administering and analyzing a Clean Water Act §308 industry survey to directly obtain the regulatory costs associated with proposed regulations, EPA relied on existing data. It assimilated from a variety of datasets information on numbers and industrial sectors of facilities, their geographic regions, facility sizes, surrounding land availability for nutrient applications, typical current pollution control equipment and practices, etc. EPA used this information to construct a series of hypothetical "model" CAFO facilities. Expected pollutant-to-stream loading reductions were further modeled, and each model CAFO was assigned cost estimates for each of the regulatory alternatives under analysis.

By EPA's own estimation, this regulatory cost information, and consequently the cost-effectiveness analysis itself, is inaccurate. This is due in part to the lack of data on the typical pollution control equipment and practices that would actually be employed at CAFOs that resemble these model facilities. EPA acknowledges near-absent knowledge of pollution abatement efforts at currently unpermitted facilities and poor knowledge of compliance rates at permitted CAFO's. Though one of the purposes of the proposed regulation is to address deficiencies in the existing regulatory framework, EPA assumes existing measures are completely effective and achieve full compliance with existing rules. This unrealistic baseline underestimates incremental costs to CAFO's of complying with the proposed regulations.

Also highly speculative are the pollutant loadings to streams that would be attributable to each of the model facilities. Although "edge-of-field" models were run for each model CAFO to determine stream loadings of nutrients, toxics, and sediments, no analysis is available to predict the actual pollutant reductions at state priority 303(d)-listed stream

⁴⁵ EPA, *Economic Analysis of the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and Effluent Guidelines for Confined Animal Feeding Operations* (EPA-8-21-R-01-001) Tables E-14 and E-15.

segments. This exclusive reliance on modeled, rather than observed, loadings cannot reflect the variations in CAFO and environmental characteristics across the nation.

So in essence, EPA's suggested cost-effective regulatory alternatives for restoring streams to state-determined standards for water quality are grounded in modeled pollutant loadings from modeled CAFO's with indeterminable pollution control equipment and practices.

Moreover, EPA's sector-level cost-effectiveness analysis does not account for the extent to which each unit of pollutant removed at a particular CAFO affects the impairment status of its receiving waters. "Effectiveness," in the denominator of the cost-effectiveness equation, is measured in terms of pounds of pollutant removed, not impairment. At the watershed level where CAFO source contributions are modeled, the location of a CAFO pollutant's entry into a water body and the dynamics of the impaired water body itself greatly affect the relative cost-effectiveness of any CAFO's reductions in terms of restoring impaired uses.

To summarize and clarify, EPA demonstrates that, given a constraint to regulate at the national level, the proposed new CAFO regulations are likely cost-effective in terms of pounds of pollutant removed at the source across analyzed regulatory alternatives and possibly across toxics, nutrients, and sediment discharging industries. But the same analysis indicates the proposed CAFO regulations, if imposed uniformly across the entire category, cannot be expected to cost-effectively restore or prevent water quality impairments at the watershed level.

b. Cost-Benefit Analysis

EPA estimates that the proposed new CAFO regulations will impose annual net social costs of at least \$664 million. In other words, EPA's own best estimate of the total social benefit of the regulatory proposal is roughly twenty cents on every dollar spent in its implementation.

The fact that estimated costs are so much larger than estimated benefits could reflect one of two possible scenarios. One is that the rule would provide significant benefits that were not quantified and valued, but which, when combined with quantified benefits, would outweigh social costs. EPA's preamble to the proposal suggests this is the case, pointing primarily to anticipated air pollution reductions that would contribute environmental benefits that were not accounted for in the benefit-cost analysis.

The other possible conclusion from EPA's benefit-cost estimates is that the rule indeed imposes more burdens on Americans than benefits. Several pieces of evidence suggest that this alternate conclusion is more accurate.

First, public health impacts and natural resource devaluations in non-priority agricultural watersheds are likely to be less than those associated with impairments in state-priority urbanized watersheds. Yet EPA's benefit estimates depend heavily on willingness-to-pay surveys that do not distinguish between state-designated water body uses.

Furthermore, as EPA's cost-effectiveness analysis recognized, per unit pollutant reduction costs vary tremendously across different CAFO's and watersheds. The diversity of watersheds across the country, each harboring water bodies with different available assimilative capacities, suggests that the benefits as well as the costs of meeting an ELG will vary greatly from CAFO to CAFO and water body to water body.

In fact, EPA's benefit-cost analysis may understate net costs. As discussed above, incremental compliance costs appear to be understated because of the optimistic baseline assumed by EPA's analysis. Further, the benefit estimates are tenuous, and not linked to particular compliance strategies. Because it does not link particular control methods with resulting environmental improvements, EPA's analysis allows for little meaningful marginal analysis between the costs of various regulatory alternatives and their coinciding benefits.

3. Analysis of EPA's Assessment of Industry Organization and Trends

EPA reports extensively on the changing organization of the CAFO industry and the water quality risks thought to be associated with these changes. It relies on reports of significant production increases at larger "factory farms" and estimates of the increased poundage of manure generated at these facilities to justify the proposed regulation.

EPA also cites the increasing concentration of animal feeding operations in certain states as a justification for federal regulatory action. EPA notes studies that have identified heavy nutrient accumulation in many watersheds where these larger CAFO's are concentrating. One report states "...in watersheds where animals are raised in large quantities, such as Susquehanna River in Pennsylvania and the White river in Arkansas, nitrogen from animal manure accounts for 54 and 56 percent, respectively, of the total nitrogen added to the watersheds."⁴⁶

EPA does not, however, correlate its data on states' surface water priorities for remedial action, known as state Clean Water Act §303(d) listed waters, with these CAFO populated watersheds. Thus no correlation between CAFO water pollution and state priorities for water pollution remediation is presented in EPA's proposal.

A referenced U.S. Geologic Survey report that cites high nutrients in CAFO-populated watersheds also finds that "[b]ecause dominant nitrogen sources vary among watersheds, it would be difficult to implement a single management strategy for nitrogen reduction that would be effective throughout the nation."⁴⁷

In summary, EPA presents convincing evidence that U.S. surface waters, ground waters, and air sheds have been and likely currently are affected by CAFO pollution, particularly in certain watersheds. But in no way has EPA demonstrated that CAFO pollution represents a national problem warranting a national solution. EPA's scientific and

⁴⁶ From Pucket, L. J., *Nonpoint and Point Sources of Nitrogen in Major Watersheds of the United States*, U.S. Geologic Survey, Water-Resources Investigations Report 94-4001, February 1994, p. 5.

⁴⁷ *Ibid.*, 46.

economic analyses suggest just the opposite. CAFO pollution is currently concentrated and increasingly concentrating in certain watersheds in the U.S. And as a result, efficient and effective remedial strategies are increasingly dependent on community-based scientific and economic analyses and decision-making.

A fundamental principle of U.S. federal governance is that “economic efficiency in the provision of public goods is best served by delegating responsibility for the provision of the good to the lowest level of government that encompasses most of the associated benefits and costs.”⁴⁸ In U.S. courts, efficiency considerations have sometimes given way to provisions for the prevention of “environmental races to the bottom” resulting from interstate competition. But as a U.S. Department of Agriculture report on the economics of runoff pollution acknowledges, a 1997 Congressional Budget Office report on federalism and environmental protection concluded that “[t]here is currently no data that (environmentally) destructive (interstate) competition occurs.”⁴⁹ EPA essentially fails to address this critical “federalism” issue in the proposed new CAFO regulations.

A consequence of this failure is the continued contradiction of EPA’s stated policy to actively devolve from command-and-control federal regulation and progress to community-based environmental problem solving.⁵⁰

IV. A Community-Based Alternative for Addressing CAFO Pollutants

Historically, federal regulation of water quality has focused on point sources of pollution, and nonpoint sources have largely escaped controls. CAFO’s may well be able to control pollution at a lower cost than further reductions on other sources. However, given the diversity of operations and environments, it is unlikely that uniform national standards will achieve cost-effective reductions in pollutant runoff at CAFO facilities nationwide. Experience over the past decade has shown that the pursuit of community-based water quality decision-making based on watershed-level scientific and economic analyses can yield more socially optimal use of U.S. surface waters and pollution control resources than can additional federal regulation.

EPA analyses indicate that \$611 million to \$5.6 billion *cost savings* can be generated nationally if water quality goals in U.S. watersheds are pursued under a strategy that promotes effluent trading between existing permitted wastewater dischargers and

⁴⁸ Shortle, J.S., “Environmental Federalism: The Case of U.S. Agriculture?” in Braden, J.R., H. Folmer, and T. Ulen, eds. *Environmental Policy with Economic and Political Integration: The European Union and the United States*. Cheltenham, UK: Edward Elgar, 1995.

⁴⁹ Ribaudo, M.O., Horan, R.D., and M.E. Smith, *Economics of Water Quality Protection from Nonpoint Sources: Theory and Practice*, Resource Economics Division, Economics Research Service, U.S. Department of Agriculture, Agricultural Economic Report No. 782, November 1999, p. 32.

⁵⁰ Of particular note is language in EPA’s *Unified National AFO Strategy* to address seven “strategic issues”, including 2) accelerating voluntary, incentive-based programs and 3) implementing and improving the existing regulatory program; and EPA’s statement in the proposed new CAFO regulations that “Today’s proposed rule primarily addresses strategic issue three: implementing and improving the existing AFO regulatory program.”

unpermitted sources of runoff water pollution, including currently unregulated CAFO's.⁵¹ This particular estimate cannot be readily compared with the estimates of costs and benefits associated with the proposed new CAFO regulations. But a comparative analysis of the costs and benefits associated with the proposed new CAFO regulations and EPA's economic analysis of the 1994 Clean Water Initiative,⁵² from which these cost-savings estimates appear to have been derived, would likely provide estimates of the respective efficiencies of the two remedial strategies.

The 1994 Clean Water Initiative promoted a marginally nonregulatory, community-based runoff pollution prevention and reduction strategy. This type of community-based approach relies on watershed-level analyses and subsequent private negotiations and contracting between affected parties to improve water quality. In a number of instances this past decade, this approach has proved more effective than traditional command-and-control approaches implemented at the federal level.⁵³

One example is North Carolina's Tar-Pamlico River Basin Association, which forms a cost-minimizing community of point-source and nonpoint-source dischargers who are collectively improving water quality of the Tar River and Pamlico Sound.⁵⁴

As Meiners and Yandle explained in a 2000 public interest comment on EPA's TMDL proposal,⁵⁵ when Tar-Pamlico was formed in the 1980s following a massive downstream fish kill, federal statutes had failed to provide water quality protection. Every point-source discharger in the watershed was operating within permit limitations, and nonpoint source dischargers were outside the regulatory control network.

Estimates of the incremental cost of reducing a unit of biological oxygen demand (BOD) in the watershed region varied from 10 cents per kilogram to \$3.15 per kilogram.⁵⁶ At one location in the Tar-Pamlico estuary, reductions of harmful nutrient discharge from an industrial point source ranged from \$860 to \$7,861 per pound eliminated. It was estimated that the same pollutant could be removed by farmers at a cost of \$67 to \$119 per pound.⁵⁷ In short, the expected gains from trade were sizable.

⁵¹ Luttner, M., *President Clinton's Clean Water Act Initiative: Costs and Benefits*, <http://www.epa.gov/docs/epajrnl/summer94/12.txt.html>, 1996.

⁵² EPA, *President Clinton's Clean Water Initiative: Analysis of Benefits and Costs*, (EPA 800-R-94-002), 1994.

⁵³ See Environomics, *A Summary of U.S. Effluent Trading and Offset Projects*, prepared for the U.S. Environmental Protection Agency, November 1999.

⁵⁴ Riggs and Yandle, 1997; North Carolina Department of Environment, Health, and Natural Resources, 1992, U.S. EPA, Office of Water and Office of Policy, 1992.

⁵⁵ See [RSP 2000-1](#), Roger Meiners and Bruce Yandle, "Public Interest Comment on the Environmental Protection Agency's Proposed Changes to the Total Maximum Daily Load (TMDL) Program and to the National Pollution Discharge Elimination System (NPDES) and Water Quality Standards (WQS) Regulations," at www.Mercatus.org.

⁵⁶ Yandle, 1993, p. 193.

⁵⁷ EPA Office of Water and Office of Policy 1992.

Today, with help and guidance from EPA and North Carolina, Tar-Pamlico collects revenues from point-source dischargers who are members of the association. The revenues generated are used in turn to make low-cost purchases of reductions from nonpoint-source dischargers who are not association members. The incentives are right for all parties. Operators of publicly owned treatment works have coordinated capital improvements to minimize the cost of improving water quality and have avoided the installation of more costly yet still ineffective advanced control systems by paying discharge fees. Farmers in the region gain revenues by modifying their cropping operations. Meanwhile water quality has improved in the Tar River. Initial estimates of the command-and-control approach to the problem indicated the cost would be \$50 to \$100 million and water quality would not necessarily be improved. By comparison, Tar-Pamlico is achieving improvements at a cost of \$10 million.⁵⁸

Community-based solutions to water quality problems may demand site-specific water quality modeling and monitoring, as well as economic modeling of pollution control costs and benefits. The extent to which watershed-level analyses are needed to provide a foundation for these community-based strategies is generally dependant on the current or proposed diseconomies that stakeholders anticipate can be revealed.

Appendix II to this public interest comment presents an example of an intensive analysis that might provide a community-based framework for addressing CAFO pollution in U.S. watersheds.

V. Conclusions and Recommendations

Most point sources of water pollution are highly regulated. Further tightening of point source discharge regulations would add substantial costs while providing only small marginal improvements in water quality. Therefore, it makes sense for EPA to address runoff from nonpoint sources such as CAFO's.

However, EPA's proposed approach to address runoff pollution from CAFO's is unlikely to yield cost-beneficial or even cost-effective improvements in water quality.

EPA's own analysis indicates the regulations, if promulgated, would impose net social costs of between \$664.2 million - \$803.9 million annually on the U.S. public, and even these figures may understate net social costs. EPA's scientific data do not show confined animal feeding operations are major contributors to water pollution nationwide. The water quality data EPA uses to suggest that CAFO's are a significant nationwide problem are neither comprehensive nor accurate enough to support the conclusions EPA draws.

While EPA does report incidents that reveal CAFO-caused water quality problems in certain watersheds, these do not support uniform nationwide regulation. Rather, they reveal that EPA could achieve greater environmental and public health benefits at

⁵⁸ Riggs, 1993.

significantly lower costs if it facilitated community-based approaches to improving water quality in impaired watersheds.

EPA recognizes the value of more targeted, market-based approaches, yet legal and technical barriers still inhibit EPA's promotion of community-based water quality management in U.S. watersheds.

To progress in the elimination of these barriers and to promote more efficient and effective CAFO pollution prevention and reduction in U.S. watersheds, EPA should:

1. Conduct a comparative cost-benefit analysis of the Clinton Administration's 1994 strategy to reduce runoff pollution with the strategy proposed in the proposed new CAFO regulations. EPA has presented no evidence that indicates water quality benefits under the proposed new CAFO regulations are in excess of those predicted under the Clinton Administration's 1994 Clean Water Initiative that promoted effluent trading in watersheds. In fact, EPA's own reports suggest just the opposite. A comparative cost-benefit analysis utilizing the documentation that accompanied the Clinton Administration's 1994 and 1998 Clean Water Initiatives might shed some light on the relative benefits to surface water users under the two alternative pollution reduction policies.⁵⁹

2. Challenge the legal mandate requiring that only regulatory alternatives can be analyzed and implemented to address CAFO water pollution. It appears to some degree, possibly to a large degree, that the 1992 Natural Resources Defense Council Consent Decree is an obstacle to EPA fulfilling its commitment to abandon command-and-control regulation in favor of more flexible and cost-effective water pollution prevention and reduction policies. Serious consideration should be given to reinitiating negotiations of the terms of this settlement.

3. Increase efforts to promote community-based water quality management in U.S. watersheds affected by CAFO pollutants. More active measures should be taken to institutionalize effluent trading in watersheds. This will entail gaining a commitment from NPDES permitting agencies to make definitive and final pollutant load allocations to identifiable dischargers.

4. Address the scientific deficiencies that currently inhibit the development of more efficient and effective CAFO pollutant prevention and reduction strategies. In order for community-based water quality management to take shape in U.S. watersheds, the public's costs of obtaining objective and relevant information on water pollution sources

⁵⁹ Two key references available for such a comparative benefits distribution analysis are U.S. Environmental Protection Agency, *President Clinton's Clean Water Initiative: Analysis of Benefits and Costs*, (EPA 800-R-94-002), 1994, and U.S. Environmental Protection Agency, *Economic Analysis of the Proposed Revisions to the National Pollutant Discharge Elimination System Regulation and Effluent Guidelines for Confined Animal Feeding Operations*, (EPA-8-21-R-01-001), 2001.

and their respective public health risks and natural resource devaluations must be lowered. This requires the development of more sound scientific water quality monitoring strategies in states and more precise and accurate water pollution modeling.