BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOS): PROPOSED AMENDMENTS TO 35 ILL. ADM. CODE 501, 502 AND 504	))))	R 2012-023

NOTICE OF ELECTRONIC FILING

To: **Attached Service List**

PLEASE TAKE NOTICE that on January 16, 2013, I electronically filed with the Clerk of the Pollution Control Board of the State of Illinois: **ENVIRONMENTAL GROUPS' RESPONSE TO THE AGRICULTURAL COALITION'S MOTION PROPOSING CHANGES TO THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY PROPOSED RULES** on behalf of Prairie Rivers Network, Illinois Citizens for Clean Air and Water, Natural Resources Defense Council and Environmental Law & Policy Center (collectively, "Environmental Groups") copies of which are attached hereto and herewith served upon you.

Respectfully Submitted,

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ENVIRONMENTAL GROUPS' RESPONSE TO THE AGRICULTURAL COALITION'S MOTION PROPOSING CHANGES TO THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY PROPOSED RULES

For the reasons detailed below, Prairie Rivers Network, Illinois Citizens for Clean Air and Water and Environmental Law & Policy Center (collectively, "Environmental Groups") respectfully request that the Illinois Pollution Control Board (IPCB) deny the Motion Proposing Changes to the Illinois Environmental Protection Agency (IEPA) Proposed Rules filed by the Agricultural Coalition (Illinois Pork Producers Association, Illinois Beef Association, Illinois Milk Producers Association and Illinois Farm Bureau) on September 25, 2012. The rule changes requested by the Agricultural Coalition are unnecessary, misleading, and do not protect Illinois rivers lakes and streams from pollution from CAFOs. Accordingly, the Board should reject the proposed rule changes and deny the motion.

I. The CAFO Rules Should Apply to "Waters of the State," Rather Than "Navigable Waters"

As stated in Section III.B of our Final Comments, because the IPCB and IEPA are charged with protecting "waters of the State" from pollution, Environmental Groups propose that IPCB broaden IEPA's proposed rule to apply to "waters of the State" rather than "navigable waters" or "waters of the U.S." Accordingly, Environmental Groups oppose this aspect of the Agricultural Coalition's motion.

The Illinois definition of "waters of the state" is broader than "navigable waters" and "waters of the United States." "Navigable waters" are defined in the federal Clean Water Act as "the waters of the United States, including the territorial seas."[1] In terms of federal law, those terms are fairly interchangeable.[2] "Waters of the United States" is defined as waters that could be used for interstate commerce, and those that have a significant nexus to navigable waters.[3] This federal definition has been subject to much litigation over the past decade to determine which waters are

[1] 33 U.S.C. 1362 (7) (2012).
[2] However, we note our concern that, if used in the CAFO rules at issue in this case, the meaning of "navigable waters" could be interpreted narrowly to exclude many important (and polluted) waters in Illinois.
[3] 40 CFR 230.3 (s) (2013).

subject to federal jurisdiction. A definition subject to uncertain interpretation by courts outside of Illinois, and that on its face relies on interstate commerce or navigability does not make much sense for Illinois, which has clearly stated an intent to protect all waters of the state from pollution.

II. The Board should not weaken IEPA's definition of frozen ground

Environmental Groups oppose the Agricultural Coalitions proposal to weaken the definition of frozen ground so that it "does not include soil that is only frozen to a depth of 2 inches or less." The Agricultural Coalition provides no scientific basis whatsoever for this change.[4] As was discussed by Dr. James at the DeKalb hearing, livestock waste that is surface applied to ground that is frozen at the surface or a depth of less than 2 inches can still cause waste to runoff into surface waters.[5] Scientific stuties have shown that as little as 1 inch of frost prevents infiltration.[6]

If anything, the Board should tighten up the IEPA definition of frozen ground, not weaken it. U.S.EPA recommended that the definition should include soils that are frozen at the surface – effectively beginning measurement for the purposes of this definition at 0".[7] It is easy to determine when soil is frozen at the surface, compared to the difficulties described at measuring whether soil is frozen at a depth below the surface.[8] Accordingly, the definition should at least include ground frozen at ½ inch, if not ground that is frozen at the surface or below.

III. The Definition of "Livestock Waste" Should Include Contaminated Soil as an Example

The Agricultural Coalition proposes a revision to the IEPA definition that removes the language "including but not limited to sludge and contaminated soils from storage structures" from the definition of "livestock waste" put forth at section 501.295 of IEPA's proposed rules. Environmental Groups are concerned that the failure to include the example of soils that have been contaminated by livestock waste could lead the regulated community to believe that discharges of such soils or sludges are not actually prohibited by the Clean Water Act.

Under the Clean Water Act, discharge of any "pollutant" without an NPDES permit is illegal.[9] "Pollutant" includes "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water."[10] The Illinois Environmental Protection Act similarly prohibits the

[4] James, Trans. 10/30/12, p. 252.
[5] James, Trans. 10/30/12, p. 251-52; Funk, Trans. 10//23/12, p. 23.
[6] See, e.g. Thompson, D.B., T.L. Loudon, and J.B. Gerrish. 1979. Animal manure movement in winter runoff for different surface conditions. In: Best Management Practices for Agriculture and Silviculture. Pp. 147-48. (Attachment 1).
[7] IEPA Prefiled Answers to Environmental Groups Prefiled Questions, Attachment 6b and James, Trans. 10/30/12, p. 250-51.
[8] Funk, Trans. 10/23/12, p. 22-24.
[9] 33 U.S.C. 1311(a).
[10] 33 USC 1362 (6).

discharge of any contaminant into waters of the State without an NPDES permit.[11] "Contaminant" is defined as "any solid, liquid, or gaseous matter, any odor, or any form of energy, from whatever source."[12] Under either definition, discharge of any soil, whether contaminated by livestock waste or not, is prohibited without an NPDES permit.

The regulations the Board is now considering should not create the impression that CAFO operators do not need to be concerned with discharges of soil or sludge that has been contaminated with livestock waste. The Agricultural Coalition concedes that sludge or soil that has been removed from an earthen lagoon and land-applied meets the definition of livestock waste.[13] So the definition should be clear. If the problem is with certain terms of art used in "including but not limited to sludge and contaminated soils from storage structures," the Board should change the language to eliminate those terms, rather than removing the language completely. Environmental Groups suggest that "including but not limited to soils and sludges removed from livestock waste storage structures" is an option the Board might consider.

IV. The Board Should Reject the Proposed Section Stating: "no NPDES CAFO permit shall be required for any facility which is not discharging or had not received livestock…"

Environmental Groups oppose the Agricultural Groups suggestion that the Board should add a section reading, "No NPDES CAFO permit shall be required for any facility which is not discharging or has not yet received livestock." We also propose in our own revisions to Section 502.101(b) to remove similar language from the IEPA proposal. Either provision creates an unnecessary anomaly in the law, may chill IEPA's outreach efforts and may create a false impression that CAFOs need not seek necessary NPDES permits.

The Agricultural Coalition wants to add a provision to the CAFO rules that they claim reflects federal caselaw from the *National Pork Producers Council* and *Waterkeeper Alliance* decisions. 635 F. 3d 738 (5th Cir. 2011) and 399 F.3d 486 (2d Cir. 2011). However, these cases reflect federal law, not an interpretation of how federal law and state law is applied through the Illinois Environmental Protection Act. To the extent the federal law applies to the question of who needs a permit in Illinois, it *already* applies based on the cited caselaw. But caselaw can change, and it is never a good idea to try to capture holdings of court cases in statutes or regulations. If yet another case reinterprets the federal rule, then Illinois law becomes out of sync with the federal law. Taking the Agricultural Coalition at its word that the proposed new section adds nothing that is not already in the law, then the only purpose of the section is to discourage IEPA from advancing much-needed outreach with regard to CAFO regulations and create the impression for operators that NPDES permits are not needed, when they may in fact be required.

The Agricultural Coalition argues that permits are "urged upon" CAFOs early, perhaps during construction or before livestock are present at a site. This is not the case. According to a USEPA investigation, which reviewed the Illinois Department of Agriculture's construction permitting process, "[n]o mention is made in public information regarding the LMFA of the

[11] 415 ILCS 5/12 (f).
[12] 415 ILCS 5/3.165 (2013).
[13] Manning, 10/23/12 p. 143.

potential need for the facility to apply for an NPDES permit."[14] The Agricultural Coalition stated in the hearings that a discharger could seek a permit at anytime prior to discharge,[15] and indeed would need to do so to avoid violating 415 ILCS 5/12 (f) and 33 U.S.C. 1311(a). Would the proposed provision, then, restrict IEPA from reaching out to CAFOs before there are discharge problems? IEPA has such a long way to go before it even completes an inventory of CAFOs in Illinois,[16] and only has the resources to bring enforcement actions against a small percentage of CAFOs that violate the Illinois Environmental Protection Act.[17] In order for implementation of this rule to be successful, IEPA will need to do more outreach and education of farmers. The Board should not add provisions to the rule that could chill IEPA's pursuit of such outreach.

To the extent that the Agricultural Coalition argues that this new section is necessary because NPDES permits are often required as settlement conditions of enforcement proceedings, the Board should find that argument disingenuous. Operations that assent to settlement agreements are doing so voluntarily,[18] and those agreements can and should contain whatever terms are necessary to satisfy the parties and reach an agreement. The Board does not have the authority to limit what the Illinois Attorney General may seek in a settlement agreement, and should not seek to do so in this rule.

Finally, the Board should decline to add the proposed section to the rule because it is misleading, and may lead some CAFOs to the improper conclusion that they should not seek a permit. For example, the Agricultural Coalition already portrays the rule as one where CAFOs get a "free pass" on a discharge and cannot be required to seek a permit unless IEPA can prove that the discharge will be "ongoing." Similarly, the Agricultural Coalition objects to requiring an NPDES permit to cover discharges before livestock are present at the CAFO. However, this is inconsistent with federal law and the law is clear that *all discharges without an NPDES permit are illegal*.

Federal regulations clearly state the scope of NPDES permitting requirements in that " [o]nce an animal feeding operation is defined as a CAFO for at least one type of animal, the NPDES requirements for CAFOs apply with respect to all animals in confinement at the operation *and all manure, litter, and process wastewater* generated by those animals *or the production of those animals*, regardless of the type of animal" (emphasis added)[19] Furthermore, included the very definition of a CAFO under federal law is "a lot or facility…where…(i) Animals (other than aquatic 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…"(emphasis added). [20]

[14] Ex. 14 at 15.
[15] Manning, 10/23/12 p. 148-49.
[16] See discussion in Section III.A of Environmental Groups' Final Comments in this proceeding.
[17] Yurdin, Trans. 8/21/12, p. 88.
[18] Trans. 10/23/12, p. 162.
[19] 40 CFR 122.23(a).
[20] 40 CFR 122.23(b)(2).

In the case where the Traditions Dairy turned the river purple with its silage runoff,[21] it did not matter that livestock were not yet present. Those discharges were illegal without an NPDES permit, and cannot be classified as "construction stormwater discharges" subject to the state's general stormwater permit because the silage leachate on site that caused the pollution was not stormwater construction pollution in any sense of the term, but rather dairy production area pollution caused by the improper storage of dairy heifer feed. Similarly, under the Agricultural Coalition's proposal, pollution caused by animal waste remaining on a CAFO site it has been depopulated would not be covered by the CAFO NPDES permit because no animals are present. If the CAFO general permit is inappropriate in these situations, is the Agricultural Coalition proposing that CAFOs should obtain separate, individual NPDES permits to cover the operation before or after animals have been present on site?

More likely, the hope is that the agency will have to rely on the catch-as-catch-can enforcement system in order to discover dischargers, and that many dischargers will go undetected, as they do now.

Furthermore, while Claire Manning concedes that the IEPA's language in 502.101(b) accomplishes the intent of the Agricultural Coalition's proposal,[22] the IEPA's proposed language in this Section is also inconsistent with federal regulations and arguably less stringent than USEPA requirements. The IEPA explained that this was an attempt to clarify the extent of the obligation to apply for an NPDES permit since the Pork Producer's case.[23] The agency goes on to say that the preamble of the 2008 federal rule and a December 8, 2011 USEPA memorandum were consulted in drafting this section of the proposed rule to clarify the implications of the Pork *Producers* case.[24] However, the "qualifying" language IEPA proposes in Section 502.501(b)(1) is not contained in USEPA's current NPDES regulations and could actually be read as being less stringent than federal permitting standards and hence in violation of state program requirements. The 2008 federal CAFO rule preamble pre-dates the *Pork Producers* case and both the preamble language and the USEPA memorandum in which IEPA bases its reasoning on are taken out of context to justify the addition of this language. Most notably, the USEPA memorandum referenced by IEPA states as follows:

> NPPC does not affect the well established principle that discharges of pollutants, whether continuous or intermittent and sporadic, require NPDES permit coverage. CAFOs that have discharged without a permit only cease to be in violation of the Act when circumstances that led to their discharge have changed or been corrected. *CAFOs that have discharged in the past will discharge in the future, and are therefore expected to obtain a permit,* unless the conditions that led to the discharge are fully remedied (emphasis added).[25]

[21] See, Tr. 11/16/12 p. 25-29.
[22] Manning, Tr. 10/23/12 p. 150-51.
[23] SOR at 14.
[24] SOR at 14.
[25] SOR at 14 and Attachment I at 2.

Furthermore, the *Pork Producers* case is a federal 5th Circuit case and is not the law in Illinois. Even if it was Illinois law, the issue of past discharges leading to the requirement to obtain a permit, was merely dicta in that case. For these reasons, and the reasons stated above, the Environmental Groups are opposed to both the Agricultural Coalition's and the IEPA's proposed attempts to codify their interpretations of the caselaw.

V. The Board Cannot and Should Not Create a Right of Review of IEPA Decision to Require a Permit Application

The Agricultural Coalition asks the Board to grant administrative review of IEPA's decision to ask a CAFO to apply for a permit. However, this request must be rejected because asking a facility to apply for a permit is not a final decision subject to review and the Board does not have the authority to expand the review available for IEPA actions under state law. Furthermore, reviewing a preliminary step in the permit process would effectively create a two-tiered permit process, require the agency to develop a full-blown "case" for any facility that may need a permit, and would create serious roadblocks for IEPA's already poor track record in regulating and permitting CAFOs in Illinois.

According to the Agricultural Coalition, Section 502.106, as proposed, is "inconsistent with the federal rules upon which they are drawn" and "antithetical" to the Illinois Environmental Protection Act, the Board's procedural rules and, finally, the Illinois Administrative Review Law. The Agricultural Coalition even goes so far as to claim that IEPA's Section 502.106 modifies the federal rule at 40 CFR 122.23(c)(3). Yet a comparison of Section 502.106 with 40 CFR 122.23(c) shows that the two rules are in fact the same and that in most cases, IEPA simply lifted the language of its proposed rule directly from the federal rule.

Section 502.106 allows the Agency, in specified circumstances, to make a determination that an animal feeding operation (AFO) is a significant contributor of pollutants to waters of the United States and as such, should be designated as a CAFO. An AFO that has been designated a CAFO under Section 502.106 may be regulated under the NPDES permitting program. The two rules are set forth below. Key portions of both rules have been bolded to demonstrate the obvious similarities between them. The IEPA proposed rule reads as follows:

Section 502.106 **Case-By-Case ~~Case-by-case~~ Designation Requiring NPDES Permits**

a) Notwithstanding any other provision of this Part, the **Agency may require any animal feeding operation** not falling within Sections ~~502.102,~~ 502.103 or 502.104 **to obtain an~~a~~ NPDES permit by designating the AFO as a CAFO upon determining that it is a significant contributor of pollutants to waters of the United States**. In making ~~such designation~~ the determination of whether the AFO is a significant contributor of pollutants, the Agency shall consider the **following factors**:

1) **The size** of the animal feeding operation and the **amount of livestock wastes reaching ~~navigable~~ waters of the United State**s;

2) The **location of the animal feeding operation** relative to ~~navigable~~ waters of the United States;

3) The **means of conveyance of livestock ~~animal~~ wastes** ~~and process wastewaters~~ into ~~navigable~~ waters of the United States;

4) The **slope, vegetation, rainfall and other factors** relative to the likelihood or frequency of discharge of livestock waste ~~animal wastes and process wastewaters~~ into ~~navigable~~ waters of the United States; and

5) **Other such factors** bearing on the significance of the pollution problem sought to be regulated.

b) The Agency, however**, may not require a permit under subsection (a)~~paragraph a)~~ of this Section for any animal feeding operation with less than the number of animals ~~units (300)~~ set forth in Section 502.104 above, unless** it meets either of the following conditions:

1) Pollutants are discharged into ~~navigable~~ waters of the United States through a man-made ditch, flushing system or other similar man-made device; or

2) Pollutants are discharged directly into ~~navigable~~ waters of the United States which originate outside of and pass over, across, through or otherwise come into direct contact with the animals confined in the operation.

c) **In no case may a permit application be required** from an animal feeding operation designated pursuant to this section **until there has been an onsite inspection of the operation** and **a determination that the operation should and could be regulated under the permit program.** ~~In addition, no application may be required from an owner or operator of an animal feeding operation designated pursuant to this section unless the owner or operator is notified in writing of the requirement to apply for a permit~~.

As can be seen below, the corresponding federal rule is nearly identical in word, and certainly equivalent in meaning.

40 CFR 122.23

(c) *How may an AFO be designated as a CAFO?*

The appropriate authority (*i.e.*, State Director or Regional Administrator, or both, as specified in paragraph (c)(1) of this section) **may designate any AFO as a CAFO upon determining that it is a significant contributor of pollutants to waters of the United States**.

...

(1) **In making this designation, the State Director or the Regional Administrator shall consider the following factors**:

(i) The **size of the AFO and the amount of wastes reaching waters of the United States;**

(ii) The **location of the AFO** relative to waters of the United States;

(iii) The **means of conveyance of animal wastes** and process waste waters into waters of the United States;

(iv) The **slope, vegetation, rainfall, and other factors** affecting the likelihood or frequency of discharge of animal wastes manure and process waste waters into waters of the United States; and

(v) **Other relevant factors.**

(2) **No AFO shall be designated under this paragraph unless the State Director or the Regional Administrator has conducted an on-site inspection of the operation and determined that the operation should and could be regulated under the permit program**. In addition, **no AFO with numbers of animals below those established in paragraph (b)(6) of this section may be designated as a CAFO unless**: (i) Pollutants are discharged into waters of the United States through a manmade ditch, flushing system, or other similar manmade device; or (ii) Pollutants are discharged directly into waters of the United States which originate outside of the facility and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.

An AFO that has been designated as a CAFO under 40 CFR 122.23(c) may be regulated under the NPDES permitting program.

As has been shown, IEPA's proposal regarding designation of an animal feeding operation as a CAFO for purposes of NPDES permitting is not inconsistent with the federal rule. Nor is the Agency's proposal antithetical to the Environmental Protection Act, the Board's rules or to the Administrative Review Law. The Agricultural Coalition has moved the Board to strike or modify proposed Section 502.106 because it does not expressly grant Board review of an IEPA designation of an AFO as a CAFO in need of apermit. According to the Agricultural Coalition, an express grant of review in the IEPA's CAFO rules is necessary to make the rules "consistent with the statutory framework" in Illinois. The Agricultural Coalition's claims regarding proposed Section 502.106 demonstrate a lack of understanding regarding both the statutory and the regulatory frameworks for review of agency decisions in Illinois. The Board lacks the authority to modify Section 502.106 to grant a right of review that is not provided by Illinois law.

There are a number of ways review of agency decisions may be obtained. Generally, review may be obtained by the judiciary or by an administrative review body. Judicial review of an agency's

action is a question of statutory construction. *Outcom, Inc. v. Illinois Department of Transportation*, 233 Ill. 2d 324, 332 (2009). The agency's enabling statute will often expressly provide for review under the Administrative Review Law (ARL). If the statute does not expressly adopted the ARL or provide for some other form of judicial review and the statute does not bar review or call for unreviewable agency discretion, then judicial review may be obtained by a common-law writ of certiorari. *Outcom*, Inc., 233 Ill. 2d at 333. However, express adoption of the ARL bars other modes of review. 735 ILCS 5/3-102.

The Illinois Environmental Protection Act (the Act) is the enabling statute of the IEPA. Section 41 of the Act expressly adopts the provisions of the Illinois Administrative Review Law. *See* 415 ILCS 5/41 (a). As such, other modes of judicial review of agency action, such as a writ of cert cannot be obtained. And, while Section 41 of the Act provides for judicial review under the ARL, it is only final decisions of the *Illinois Pollution Control Board* that are subject to judicial review under the Act. *Town & Country v. Illinois Pollution Control Board*, 866 NE 2d 227, 238 (2007) (emphasis added).

The Environmental Protection Act does provide for review of certain IEPA decisions regarding NPDES permits. Section 40 grants permit applicants and other parties affected by the permitted facility the right to contest the conditions of a permit or the denial of a permit. 415 ILCS 5/40. Board regulations implementing the Act also provide for review of IEPA decisions. Section 105.200 limits this right of review to review of IEPA's final permit decisions and other final decisions of the Agency to "deny or conditionally grant or approve." 35 IAC 105.200, 105.204.

A decision by the IEPA to designate an AFO as a CAFO under Section 502.106 is clearly not a final decision of the Board subject to review under the ARL. Nor is such a decision a permit denial, a grant of a conditional permit, or a final decision to deny or conditionally grant or approve. As stated by the IEPA, designation of an animal feeding operation as a CAFO under Section 502.106 is "just the first step in the process" of determining whether or not a NPDES permit will in fact be required. According to IEPA, the designation process may reveal that the problem causing a discharge can be fixed and no permit is needed. Tr. 8/21/12, p. 47. As such, Illinois law provides no review of an intermediate decision of this nature. Such conclusion does not render Section 502.106 contrary to the statutory framework that governs review of agency decisions. There is no basis for striking this section of IEPA's proposal, and any attempt to amend the section to provide for an express grant of a right not already provided by existing law would be improper and beyond the scope of the Board's powers.

The Agricultural Coalition argues that Section 502.106 is contrary to the Supreme Court's opinion in *Sackett v. EPA*, 132 S. Ct. 1367 (2012). In *Sackett*, the Supreme Court ruled that a compliance order issued by the US EPA ordering the Sacketts to immediately restore their property in accordance with an EPA work plan was final agency action subject to judicial review under the Administrative Procedures Act (APA). Among the hallmarks of finality identified by the Supreme Court is a requirement that the agency action "marks the 'consummation' of the agency's decisionmaking process." *Sackett v. EPA*, 132 S. Ct. at 1372. While the facts regarding the finality of an IEPA decision to designate a CAFO under Section 502.106 are readily distinguishable from those in *Sackett*, we need not bother with making such distinction. Whether an IEPA decision to designate an AFO as CAFO is sufficiently similar to a decision by US EPA to issue a compliance order in terms of the finality of these decisions is irrelevant. The right to

judicial review identified in *Sackett* was found within the APA, a federal statute that allows for judicial review of final actions by federal agencies. 5 USC §551(1); 5 USC §704. An AFO in Illinois that has been designated a CAFO by IEPA, a state agency, has no right to judicial review under the APA. Even if *Sackett* were to afford IL CAFOs the right to judicial review of designation decisions by IEPA, Section 502.106 would in no way conflict with that right. Accordingly, there is no basis for striking or amending proposed Section 502.106.

VI. IEPA's Technical Standards Should Not Be Weakened to Existing LMFA Rules

The Agricultural Coalition asks the Board to remove IEPA's proposed technical standards for unpermitted Large CAFOs and rely instead on the Livestock Management Facilities Act (LMFA). The Coalition argues that technical standards contained within the LMFA and its implementing regulations should apply to unpermitted CAFOs, such that conformance with the LMFA standards renders any precipitation-related discharge of livestock waste from land application areas an agricultural stormwater discharge, and therefore not a discharge governed by the Clean Water Act.

Although the Agricultural Coalition has repeatedly claimed that IEPA's proposed rules regarding technical standards and NMPs are duplicative of existing statutory and regulatory requirements in the LMFA and associated regulations, the LMFA statutory and regulatory requirements regarding land application of livestock waste provide considerably less protection to surface and ground water than both IEPA's proposal and the Environmental Proposal. We describe those shortcomings in detail below and in Section V of Environmental Groups' Final Comments.

While there certainly is some duplication of the LMFA technical standards regarding land application of livestock in IEPA's proposal, there are key proscriptions and requirements in IEPA's rules that are not contained within the LMFA rules. Prefiled T., James, 11/7/12, pp.5-7. For instance, under IEPA's rules, unpermitted Large CAFOs must utilize appropriate conservation practices to control runoff of pollutants to surface waters. *See* 502.510(b)(8). Unpermitted Large CAFOS must also prepare a winter land application plan in accordance with Section 502.630. *See* 502.510(b)(12). Unpermitted Large CAFOs must develop a plan for the inspection, monitoring and repair of subsurface drainage systems at land application sites. *See* 502.510(b)(13). Unpermitted Large CAFOs must develop a spill prevention and control plan. *See* 502.510(b)(14). And finally, unpermitted Large CAFOs must develop a plan for storing waste when conditions prevent land application. *See* 502.510(b)(16).

None of these requirements are contained within the LMFA standards and thus would not be required under the Agricultural Coalition's proposed changes. Similarly, the LMFA contains no land application setback from conduits to surface waters. *See* 502.510(b)(11); 502.645(b)(2). Conduits to surface waters need protection from land application, because they serve as avenues for land applied waste to reach surface waters. Prefiled T., James, 11/7/12, p. 7. While the LMFA regulations contain a land application setback from potable water supply wells, the setback is just 150 feet. The corresponding setback in the IEPA rule is 200 feet. Section 502.645 (b)(1).

The Environmental Proposal regarding land application of livestock waste provides necessary protections that are lacking in LMFA regulation of land application. The Environmental Proposal

makes all of the land application technical standards in IEPA's proposal applicable to all Large CAFOs, regardless of permit status. Because the vast majority of Large CAFOs are unpermitted (Tr. 8/21/12, p. 149, Yurdin), adoption of the Agricultural Coalition's proposal in favor of the Environmental Proposal would result in a regulatory scheme for hundreds of Large CAFOs that lacks a number of key protections. Should the Board adopt the Agricultural Coalition's proposal in favor of the Environmental Proposal, there would be no restrictions on waste application to lands with steep slopes, because the LMFA regulations have no slope limit for land application. Nor would most Large CAFOs be prohibited from land applying on bedrock outcrops, on land with less than 10 inches of soil covering fractured bedrock, sand or gravel or to fields that already contain a very high amount of soil phosphorus. Finally, the Agricultural Coalition's proposal would allow unpermitted Large CAFOs to land apply despite an imminent forecast of heavy rain.

Each of these land application practices pose threats to water quality. Runoff of nutrients to surface waters is more likely from fields with steep slopes. As slope increases, so does the potential of runoff from fields where waste has been applied. TSD, p. 31. Soil properties such as depth, texture, and permeability are keys in determining the potential for groundwater contamination. In coarse materials like sand, water moves through rapidly, reducing contact between the water and soil particles. TSD, p. 31. Liquid livestock waste applied directly to bedrock, sand or gravel soils will reach ground water quickly without the natural filtering effect of soil cover. Finally, nutrients in liquid waste that moves rapidly through coarse soils will not be available for crop uptake. TSD, p. 32. Dissolved phosphorus in runoff is related to the soil phosphorus in surface soils. TSD, p. 24.

The Environmental Proposal contains prohibitions on each of these practices. *See* Environmental Proposal, Section 502.600. These prohibitions are essential for all Large CAFOs, because all CAFOs are land applying livestock waste. All CAFOs, both permitted and unpermitted, commonly use the same land application practices, equipment and technology. TSD, p. 21. All CAFOs generate waste with the same characteristics. As such, the effects on surface waters of stormwater runoff from land application are expected to be the same for all CAFOs. TSD, p. 21. Large CAFOS regardless of permitted status produce similar quantities of waste and face the same waste management challenges. Tr. 10/30/12, pp. 152-53, James.

As noted above, the Agricultural Coalition's has also moved to make agricultural stormwater discharges from Large unpermitted CAFOS subject only to LMFA regulations regarding waste management plans. In contrast, The Environmental Proposal contains a requirement that all Large CAFOS prepare a NMP in accordance with Sections 502.505, 502.510(b), and 502.515 of IEPA's proposal. *See* Environmental Proposal, Sections 502.102 (c) and 502.500.

The NMP is an important tool for all Large CAFOs that can be used to manage the facility to prevent discharges. Tr., 10/30/12, pp. 208-209, Leder. The NMP provides substantial advantages to CAFO operators:

There are advantages to livestock operations for having a NMP. For example, developing a plan will force livestock operators to evaluate their whole operation and decide on where and when the waste should and should not be applied in order to prevent discharges. The plan is a reference document available to employees who will be managing and land-applying waste. The

plan will include maps showing setbacks from waterways, wells, homes, and other sensitive features that waste should not be applied next to. A plan will also involve taking soil and manure tests to determine appropriate land application rates. The recordkeeping involved will help demonstrate that applicators are applying at appropriate agronomic rates; these records can be used to defend a livestock operator should there be a future discharge. Many people who follow NMPs find that they can cut back on their application rates and still get a high crop yield. Prefiled T., Leder, 10/16/12, p. 6.

It is also an invaluable tool for the Agency and an important source of information for the public. Tr., 10/30/12, p. 208. The NMP is the tool that governs all of the prescriptions and prohibitions contained within the technical standards governing land application of livestock waste. Without a plan, we simply don't see how a CAFO operator could land apply in accordance with Part 502 of the regulations.

In the case of large CAFOs, the operations with permits are essentially the same as those without permits. Large CAFOs, regardless of permitting status, produce large quantities of waste that must be managed responsibly. Both unpermitted and permitted large CAFOs should have to develop and follow a nutrient management plan (NMP). These plans are considered a best management practice and everyone should have one. Prefiled T., Leder, 10/16/12, p. 6.

Section 502.505 and 502.515 of IEPA's proposed rules set forth very specific technical requirements that must be included in NMPs. We believe these requirements are necessary elements for creating clear and effective NMPs. Among other things, 502.505 calls for aerial photos or maps depicting each field available for land application, the cropping schedule for each field, realistic crop yield goals for each crop, an estimate of the nutrient value of the livestock waste, a recitation of maximum application rates and a series of calculations to ensure that waste is applied at appropriate agronomic rates. Section 502.515 includes further details regarding the specific methods for determining rates of application of livestock waste. The practices and the methods called for in these sections are proven and accepted by agencies and by experts in the field. The rate of application methods specified in Section 502.515 are lifted directly from the federal CAFO rule. *See* 40 CFR 122.42 (e)(5). All of this information is obviously essential for determining the correct agronomic rate of application and for minimizing the risks of over application and contamination of surface and ground water.

Although IEPA has stated that unpermitted Large CAFOS are free to land apply without a NMP and using "alternative methods" for ensuring that land application rates are agronomic, the Agency could not identify a single alternative to those listed in its proposed regulations. Tr., 8/21/12, p. 166. Requiring all Large CAFOs to comply with the same technical standards regarding land application of livestock waste and requiring all Large CAFOs to prepare NMPs in accordance with the same sections of state regulations governing NMPs is as clear and as uniform as the Agency can get.

The Environmental Proposal also includes a requirement that the NMP be submitted to the Agency. In recognition of the resource limitations at the Agency, we are not calling for review and approval of the NMPs submitted by large unpermitted CAFOs. We note, that the LMFA does not require submission of the waste management plan unless the CAFO has more than

5,000 animal units (e.g. 5,000 cattle), and submission is to the Department of Agriculture, not to the IEPA. Prefiled T., James, 10/16/12, p. 12.

Submission of the NMP to the Agency is essential because as we have seen, a number of Large CAFOs do not even have NMPs on site. Prefiled T., James, 11/7/12, p. 3. And some that have plans are not using them. Tr., 10/30/12, pp. 187, 199. Submission provides a strong incentive to develop and then use the NMP. It also provides transparency and accountability. Finally, submission of the plan to IEPA could allay public fears and provide assurance to the public that Large CAFOs are in fact developing and implementing their NMPs . Prefiled T., James, 10/16/12, p. 13.

V. Conclusion

For the reasons we described above, Environmental Groups respectfully request the Board to DENY the Agricultural Coalition's Motion Proposing Changes to IEPA's Proposed Rules.

Dated: January 16, 2013

Respectfully Submitted,

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Attachment 1:

Animal manure movement in winter runoff for different surface conditions
Thompson et al.,1979

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ANIMAL MANURE MOVEMENT IN WINTER RUNOFF FOR DIFFERENT SURFACE CONDITIONS

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INTRODUCTION

Land application appears to be the most economical means for utilization and handling of animal waste. The goals for land application of manure are to maximize the use of nutrients available and at the same time minimize any pollution potential. Any time animal waste has been applied to the soil surface without incorporation, there is potential for nutrients to be transported by snowmelt or rainfall to surface waters. By using proper management and conservation practices, the amount of runoff and erosion can be reduced, thus reducing nutrient loss.

Protecting surface water quality and preventing the loss of valuable plant nutrients are two very practical reasons for developing management practices to minimize the nutrient content of surface runoff. Soil and water conservation practices have been developed to minimize soil erosion. Similarly, practices to control nutrient loss are being studied and tested. The results of one such study are presented in this report.

Animal manure is spread on frozen and snow-covered fields during the winter in the northern states when manure storage is not available or is insufficient to store the entire season's manure production. Winter spreading does

not allow the opportunity for incorporation of the manure with surface soil. Therefore, when snowmelt or rainfall occurs, there is a greater potential for nutrient loss than under normal spreading conditions.

BUFFER ZONES

The purpose of this study is to examine the quality of winter runoff under various surface conditions and determine whether a hazard exists due to winter spreading of animal manure. Runoff from manured areas was examined to determine if the nutrient load was significantly different from that of control areas. The influence that a buffer zone has on runoff quality downslope from a winter spreading area was observed for three common agricultural field conditions.

A buffer zone utilized as a management practice may be defined as an area situated between two areas which are in possible conflict. The objective of the buffer zone is to lessen the possibility of adverse impact from land application areas on surface waters. Runoff coming from a field spread with animal manure not incorporated with the soil may contain a high concentration of soluble nutrients, soil and organic particulates. Soluble nitrogen and phosphorus may be leached from the manure and held in solution while organic matter and soil particles are carried in suspension. The function of the buffer zone is to provide an area where nutrients and particulates can be removed from runoff prior to entering the surface water system.

The buffer area may have a permanent vegetative cover or a cultivated surface. The objective of the buffer zone is achieved through adsorption of nutrients, decreasing surface runoff velocity and volume, and increasing surface detention capacity. Other mechanisms such as infiltration, dilution and filtration of particles are taking place in varying amounts on different surface conditions. Soluble nutrients are adsorbed on the surface of soil particles (mostly silt and clay) and thereby removed from the runoff solution. The velocity of surface runoff can be decreased by various types of surface vegetation and crop residue. Increasing surface roughness with fall plowing, or discing, will decrease runoff velocity and increase surface detention time by creating numerous pockets and depressions where runoff can be detained. Large numbers of macrosized surface depressions are created by the tillage tool and these surface configurations are especially important to water management.[1] Values for random roughness created by different tillage practices are given by Burwell *et al.*[2]

The quantity of nutrients carried by surface runoff is dependent in part upon the transport capacity of the runoff. Transport capacity is an expression of the energy associated with moving water in runoff. As the transport capacity increases, the amount of sediment and particulate matter which can be

carried increases. A reduction in the transport capacity of the runoff causes sediment to drop out of suspension and be deposited. By reducing the runoff velocity, the transport capacity is reduced and the amount of material carried in suspension in the runoff is reduced.

LITERATURE REVIEW

Doyle *et al.*[3] found that 4-m buffer strips were effective in reducing levels of nitrogen, phosphorus, potassium and fecal bacteria in surface runoff from manure-treated plots. Their data indicated that the greatest reduction in nutrient levels took place rapidly over a relatively short distance of buffer area. Phosphorus loading rates for manured plots remained higher than control plots after 4 m of buffer but showed a 62% reduction in concentration from runoff collected at the edge of the manured area. Concentrations of indicator bacteria (fecal coliforms, fecal streptococci) were significantly reduced after 4 m of forest and grass buffer strips.

The number of studies evaluating the effectiveness of buffer zones downslope from manure application areas is limited. Results of similar research on overland flow for treatment of animal waste and feedlot runoff can be used for comparison. In an overland flow system there are frequent manure loadings, compared with a single application (per season) in manure applications; however, the principles of nutrient removal as feedlot runoff or diluted manure flows over the soil surface are the same. Several examples of nutrient reduction during overland flow are presented to illustrate the capacity of the soil to remove nutrients from runoff.

Overcash *et al.*[4] reported an overland flow pretreatment of poultry waste. The waste which flowed over a 2.4-ha terrace system carried approximately 20 kg N/day or about 3000 kg N/ha/yr. With a 15-m flow distance, Overcash reported a 60-70% mass reduction in nitrogen. Eighty to ninety percent removal of nitrogen was obtained by increasing the flow distance to 30 m (4.9 ha) while maintaining a constant waste load.

Willrich and Boda[5] reported that COD, PO_4 and inorganic-N showed mass reductions of 67, 62 and 62%, respectively, with an average application rate of 0.48 kg COD, 0.07 kg PO_4, and 0.24 kg NH_3 per 5-hr period on 30.5-m overland flow plots.

The quality and quantity of runoff is somewhat dependent upon the season of application and subsequent weather conditions. The physical condition of the soil (frost content, soil texture and structure) will influence the amount of infiltration and runoff.[6] Two terms are used to describe the structure of frozen soil for the north central states region. Concrete freezing is observed most frequently in cultivated fields or areas with sparse vegetative cover. Honeycomb freezing is characterized by a loose, porous structure

easily broken into pieces. It is found most frequently in grassland, meadows and pastures. As little as 1 in. of concrete frost prevents infiltration of rain or snowmelt while infiltration may be good in the case of honeycomb freezing.

Soil texture is determined by the proportion of sand, silt and clay particles. Soil texture influences infiltraton, and the number of adsorbtion sites, and consequently the quantity of nutrients which can be adsorbed from the runoff. Soil organic matter and manure aid in the formation of soil aggregates. Poor soil structure (limited aggregation) will decrease the amount of infiltration and increase runoff. Zwerman *et al.*[7] found that a single application of 13.5 ton/ha of solid dairy manure increased soil infiltration by 27% in a continuous corn culture.

The season and method of manure application have been shown to have a large-scale effect on amount of manure remaining on the soil surface. Midgley and Dunklee[8] found that the amount of nitrogen lost in runoff from surface-applied manure during the winter was inversely related to the amount previously lost to the air through volatilization. Immediate incorporation with the soil has been shown to be the most effective means of reducing nutrient loss through volatilization and runoff. Hensler *et al.*[9] investigated the influence of the season of application on the nutrient loss from dairy manure. Winter application on frozen, snow-covered ground resulted in a three-fold increase in the annual average nitrogen and phosphorus losses as compared with control areas. Much of this loss resulted from one storm event which occurred only a few hours after the manure was applied to frozen soil.

Manure application on melting snow or just prior to a rainfall event represents the worst possible case for nutrient loss. Klausner *et al.*[10] investigated surface runoff losses of inorganic nitrogen and total soluble phosphorus from field-spread dairy manure and found losses were increased when manure was spread during active thaw periods. Losses were minimized when manure was applied and then covered with snow, which melted at a later date. Klausner found that with a snow-covered, 35-ton/ha application rate, nutrient losses differed little from control areas. Zwerman *et al.*[11] reported a similar conclusion. Nutrient loss from control plots or watersheds originate primarily from natural soil fertility, leaching of organic material on the surface, and precipitation.[10,12]

Witzel *et al.*[13] found that nutrient losses from winter and spring runoff from four small watersheds were the same even though some of the watersheds had winter-spread manure while others did not. On one watershed where fertilizer applications on a per-acre basis were double that of the others, the loss of N and K was lower. Thus, it is evident that runoff characteristics may vary from one location to another independent of manure or fertilizer application and may more often be due to variation in the topography and physical soil properties.

Zwerman *et al.*[11] presented data indicating that nitrogen and phosphorus in runoff was reduced by leaving plant residue on the soil surface. Young and Mutchler[14] indicated that there was only a slight increase in nutrient loss from manured over unmanured corn plots. Higher nutrient losses occurred on manured alfalfa plots than unmanured alfalfa. The characteristics of certain surface conditions make them more likely to retain nutrients from manure applications than others. Upon investigation, Young and Mutchler found very little difference in thawing rates of manured and unmanured alfalfa plots. Data from this experiment and others indicate that there are variations in runoff quality and/or quantity from different surface conditions with an equal amount of animal manure applied.

Manure and plant residue have both been indicated as having effects on runoff. Converse *et al.*[15] observed the average runoff from plots for three years and reported that runoff from the check plots was significantly greater than from manured plots. Similar observations have been made by other investigators.[13,14] Doyle[16] concluded that the concentrations of nutrients (NPK and Na) were dependent on the number of rains previously leaching the manure but was independent of total rainfall and the amount of runoff collected.

EXPERIMENTAL PROCEDURES

Twelve plots (3 x 60 m) were established on a moderately well-drained sandy loam (Hillsdale Sandy Loam) with a slope of 4% (Figure 1). Three sample sites were located on each plot. The first site was located in the manured area 12 m from the upper plot end. The second sample site was located 36 m downslope from the upper end or 24 m downslope from the first sample site. The third sample site was located at the lower end of the plot at 60 m.

Fresh dairy manure was applied to the upper 24 m of plot surface. Two lengths of overlapping buffer zone were tested downslope from the manured area. The second sampling location was located 12 m downslope from the manured area, and the third was 33 m downslope. Runoff collected at the second location had flowed over 12 m of buffer zone and was compared to the quality of runoff which flowed over 36 m of buffer area.

Fresh stanchion barn dairy manure (80% moisture), with a moderate amount of wood shavings and straw bedding, was applied at the rate of 63 ton/ha. The manure was applied uniformly with a pitchfork on a 10-cm snow cover in early January while temperatures were below freezing. During the two years of the study, the manure application was covered by snow which fell within two days after spreading. The first significant amount of snowmelt and runoff did not occur for approximately 30 days after application.

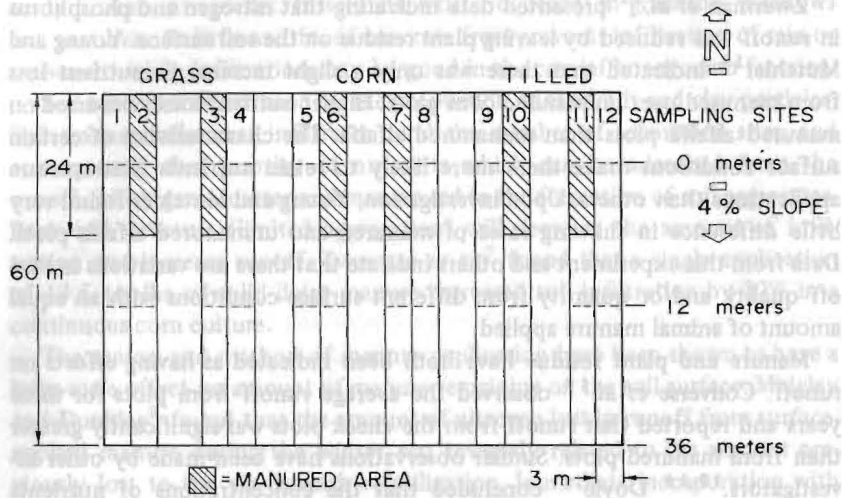

Figure 1. Plot layout.

A proportionate amount of runoff was collected from the plot using troughs across the plots the first year and dust pan collectors the second year and diverted to 200-liter reservoirs which were buried in the ground outside the plot at each sample location. The contents of the reservoir were mixed for one minute with a centrifugal pump before a sample was taken. All samples were refrigerated at 4°C until laboratory analysis was completed.

DESCRIPTION OF SURFACE CONDITIONS

Three surface conditions were studied. Each surface condition with manure-treated and control plots had two replicates, totaling four plots for each surface cover. Grass surface (orchard grass) was selected to simulate effects of winter application on a continuous vegetative cover. Field corn was planted across the slope in 93-cm rows (47,000 plants/ha) in preparation for the other two surface covers. Manure was applied in the spring prior to tillage and planting operations at 34 ton/ha. The corn plot area was sprayed with herbicide prior to corn emergence for weed control. In the fall of the year, the corn was harvested for silage leaving approximately 20 cm of stubble. Four plots were left in this condition and hereafter will be referred to as corn stubble. The third surface condition was created by discing the remaining corn stubble. The area was worked over twice, first parallel to the slope and the final time perpendicular to the slope. Each plot was bordered by galvanized sheet metal. The border material was 20 cm wide and placed in the soil vertically 10 cm deep in the soil with 10 cm above the soil surface.

RESULTS AND DISCUSSION

Winter runoff was monitored for changes in water quality which result from application of animal manure on different surface conditions and the reduction of nutrients in surface runoff as it moves through the buffer zones downslope from the manured area. Data were collected during both snowmelt and rainfall events in the winter and early spring of 1976 and 1977. The results presented here are based on 112 and 95 surface runoff samples taken the first and second year, respectively. Samples were taken at three locations on the plots described earlier. The average values given in Table I for control plots are the seasonal averages of six sample locations from the two replicates of unmanured plots for each surface condition. Values for manure-treated areas are the average of all samples from two replicates of each respective buffer zone. Concentrations in runoff for all the parameters tested were higher in magnitude during the second year of the study. The differences between years can be attributed to variation in meteorological factors and timing of the runoff events. Twelve runoff events were sampled in 1976 and four events were sampled in the 1977 season. More of the 1976 samples were taken later in the season after some initial leaching and decomposition of the manure had occurred. As a result average concentrations for 1976 are biased downward. The increase in concentrations the second year is not likely a result of manure nutrient accumulation in the test plot soil since runoff concentrations from control plots show a similar, though not proportional, increase. The first year of the study the grass plots consistently show a lower concentration of nutrients than the other surface conditions, with the exception of phosphorus which was similar for all. The sampling technique was changed in 1977 to avoid snow and ice accumulation near the sample point which caused some dilution of initial samples. Lower runoff volumes were noted on grass plots, less than 30% of other surface conditions, due to greater infiltration. The second-year results show concentrations in runoff are similar at respective sample sites for all three surface conditions. For each year, concentrations of nutrients in control-plot runoff are similar for all the surface conditions, suggesting little difference in background levels.

The results presented in Table I indicate that average nutrient concentrations decrease as runoff moves downslope from the manured area. The sample site designated as "0 meters" was located within the manured area; concentrations observed at this location represent runoff at the downslope edge of a manured area. Nutrient levels in runoff are highest at this point and represent potential pollution if allowed direct access to surface waters without management. Concentrations at the second sampling location are reduced considerably after flowing over only 12 m of buffer zone. Average nutrient concentrations in runoff which passed over 36 m of buffer zone show that nearly all of the

Table I. Average nutrient concentrations in surface runoff[a] (mg/l).

		COD		NH_3		NO_3		Phosphorus		TKN	
		1976	1977	1976	1977	1976	1977	1976	1977	1976	1977
Grass											
Treated	0 m	155	911	5.0	50.2	—	6.8	1.7	10.7	23.5	115.0
Buffer	12 m	81	633	1.9	28.8	—	3.7	0.6	6.0	14.5	62.9
	36 m	65	333	0.7	17.2	—	2.6	0.7	3.2	12.8	35.5
Control		56	139	1.2	3.3	—	1.7	.84	2.6	10.2	14.3
Corn Stubble											
Treated	0 m	500	1103	18.0	44.6	—	6.1	1.6	8.6	41.9	97.7
Buffer	12 m	182	350	4.7	12.7	—	2.0	1.2	5.3	24.6	35.5
	36 m	71	193	0.4	6.6	—	2.1	0.5	2.8	10.2	31.8
Control		63	179	1.8	8.4	—	3.2	.69	2.6	16.2	25.8
Tilled Surface											
Treated	0 m	586	1006	17.2	60.8	—	6.4	1.9	15.4	42.3	130.0
Buffer	12 m	186	596	3.5	13.0	—	2.5	0.8	4.1	18.4	45.0
	36 m	67	171	0.4	5.4	—	1.5	0.9	3.1	11.0	14.7
Control		71	165	.76	3.6	—	2.4	0.5	2.8	15.7	14.0

[a]From data collected in January, February and March, 1976 and 1977.

manure-contributed nutrients present in the runoff at the 0-m location have been removed.

The degree of variability between runoff events causes large standard deviations to result when a large number of samples from different types of runoff events are analyzed. The variations in concentration are so large that it becomes difficult to draw conclusions without more sophisticated statistical analysis. The variation which tends to mask the actual nutrient removal can be avoided by tabulating data for each runoff event separately. Differences caused by climatic factors and variable plot conditions can be minimized by calculating the percentage reduction of each nutrient which takes place as the runoff moves downslope. The nutrient reduction can be most accurately calculated when the numbers utilized are from the same plot and runoff event. These individual percentage reductions were averaged to arrive at the average percent reduction shown in Table II.

Table II. Percent reduction of nutrients in winter runoff[a].

	Length of Buffer Zone	
	12 m	36 m
Overall Average Reduction (three surface conditions, 2-yr average)	62% (56, 68)	73% (69, 77)
Average for Three Surfaces–1975-76	68% (60, 76)	65% (56, 74)
Average for Three Surfaces–1976-77	60% (53, 67)	77% (72, 82)
Two-year Average by Surface Condition		
Grass Cover	63% (54, 72)	72% (67, 77)
Corn Stubble	55% (39, 69)	68% (59, 77)
Tilled Surface	66% (58, 74)	78% (68, 88)

[a]Average reduction for ammonia, total Kjeldahl nitrogen, total phosphorus and chemical oxygen demand; numbers in brackets give the 95% confidence interval.

The effectiveness of the buffer zone can be judged by its ability to reduce the nutrient concentration in surface runoff. Nutrient concentrations are greatly reduced after runoff has flowed through a 12-m buffer area. The overall average of total nutrient reduction for the three surface conditions, two-year average, was 62% for the 12-m buffer zone and a 73% nutrient reduction for the 36-m buffer zone. The percent reductions for each of the surface conditions are given in Table II. The tilled surface had the highest average

reduction with a 66% reduction at 12 m and 78% after the 36-m buffer zone. The grass surface had the next most efficient buffer zone with 63 and 72% reduction on the 12- and 36-m buffers, respectively. The corn stubble plots removed 55% of the nutrient load in the 12-m buffer zone and 68% in the 36-m buffer zone. The confidence intervals for each group of numbers are given to illustrate the amount variation.

All of the surface conditions compared in this study did an equally satisfactory job of reducing nutrient concentrations in runoff. The numbers used in the calculations to this point included background levels of nutrients. If background concentrations are subtracted, the percentage reductions appear much higher, sometimes going over 100%, suggesting that runoff from manured plots may frequently have lower nutrient concentrations than unmanured-plot runoff.

The average concentrations for control plots (*i.e.*, background concentrations) of each surface condition were subtracted from the concentration of each sample at the corresponding sampling location; these numbers were subsequently averaged to arrive at the values given in Tables III and IV.

Background concentrations are those nutrients contributed to runoff from the same surfaces but without the addition of manure. Background nutrients may possibly be reduced through soil and water conservation practices which were not a part of this study. The objective of the buffer zones was to reduce nutrient concentrations in runoff as a result of surface-applied manure.

Table III. Average percent reduction of nutrients with background concentrations subtracted (2-yr average).

Buffer Zone Length	COD	NH_3	NO_3	P	TKN	Average
12 m	78%	84%	92%	68%	88%	= 82%
36 m	96%	109%	106%	83%	93%	= 97%

Table IV. Average nutrient reduction by winter runoff year (percent)[a].

January February March	COD		NH_3		NO_3		TKN		P	
	12 m	36 m	12 m	36 m	12 m	36 m	12 m	36 m	12 m	36 m
1976	87	94	93	125	–	–	106	104	55	69
1977	69	96	75	93	92	106	69	91	80	97

[a]Background concentrations subtracted for calculations.

Nitrate levels in winter runoff were measured only in the second year of this study. Nitrate concentrations averaged less than 7 mg/l and were reduced to background levels rapidly by an unexplained mechanism. Nitrate levels were so low that they were often lower than background levels at the 0-m sample location. Total phosphorus concentrations occasionally increased as runoff moved downslope as a result of increased soil erosion during rainfall events which carried sediment and attached phosphorus. Total phosphorus was generally reduced to background levels within 36 m. Removal of nitrogen forms was generally higher than phosphorus removal (Table III). From Table I it can be seen that NH_3 and TKN are more readily reduced on tilled and corn-stubble surfaces than on the grass surface condition. COD values were generally the same for all surface conditions except for less COD reduction on the grass surface the second year.

The overall nutrient concentrations are reduced by approximately 60% within the first 12 m of buffer zone with background concentrations not subtracted. With the background subtracted, the percentage reduction should represent the actual reduction of manure-contributed nutrients in the runoff and increase to near 80%. The data collected under the conditions of this study indicate that for any of the three surfaces studied, a 36-m buffer zone will remove between 80 and 100% of the nutrients added by the winter application of animal manure.

CONCLUSIONS

Based upon the conditions of this study our data would lead us to conclude the following:

1. Nutrient concentrations decrease as runoff water moves downslope from a manured area.
2. Nutrient concentrations contained in runoff leaving a manured area are greatly reduced as the water moves across a 12-m buffer strip. In our study, this was equivalent to a buffer strip equal to one-half of the length of the manured area. The extent to which the buffer area would have to be lengthened for longer manured areas is uncertain.
3. On a sandy loam soil with a 4% slope, a buffer zone 36 m long reduced nutrient concentrations in runoff from manured plots to levels equal to unmanured plot runoff.
4. The overall average nutrient concentration reduction for a buffer zone 12 m long was 62% compared with a 73% overall reduction after a 36-m buffer zone if background concentrations are not subtracted.
5. With background concentrations subtracted, buffer zones removed an average of 82 and 97% of the manure-contributed nutrients from winter runoff with a 12- and 36-m buffer zone.

6. Runoff volumes from manured areas have been shown to be less than from unmanured areas by past researchers. Based on the concentrations reported in this study and runoff volumes from manured areas less than, or equal to, those from nonmanured areas, nutrient loading rates in winter runoff from manured areas followed by adequate buffer zones should not exceed those from unmanured areas.

7. The quality of winter runoff from unmanured areas was essentially the same for the three surface conditions observed in this study.

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CERTIFICATE OF SERVICE

I, Jessica Dexter, hereby certify that I have filed the attached **NOTICE OF FILING** and **ENVIRONMENTAL GROUPS' RESPONSE TO THE AGRICULTURAL COALITION'S MOTION PROPOSING CHANGES TO THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY PROPOSED RULES** upon the attached service list by depositing said documents in the United States Mail, postage prepaid (or via email where indicated) in Chicago, Illinois on January 16, 2013.

Respectfully submitted,

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