

Why Storm Water



by

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There are simple reasons to be concerned about storm water. For the environmental planner, phase II implementation of the National Pollutant Discharge Elimination System Regulations (NPDES) represents the new frontier and the new battle with Nonpoint source pollution; “Usually nonspecific, sources that are released in various ways at many points in the environment” (Marsh 203). Storm water is the primary vehicle of this type of pollution in both the rural and urban settings. As agriculture runoff is exempt from the current policy debate this paper will focus on the problem of urban storm water control.

The problem of agricultural runoff is especially acute in industrial farming, but the exclusion of this sector underlines the difficulties inherent in Nonpoint source pollution control. Policy for the urban field has been continually delayed over the last decades and most observers have accepted the increased costs associated.

Most urban growth occurs in the urban fringe areas outside of core cities. For example, between 1970 and 1980, the population of incorporated cities with a population of 100,000 or more (Phase I Cities) increased by only 0.6 million, with populations of many of these cities decreasing. Between 1970 and 1980, the population of urbanized areas outside of cities with a population of 100,000 or more increased 30 times more (an increase of 18.9 million) than the population of these core cities. This is important from a stormwater perspective as numerous studies (e.g., NURP) have shown that it is much more cost effective to develop measures to prevent or reduce pollutants in stormwater during new development than it is to correct these problems later on (EPA qtd in U.S. Senate 376)

Research indicates that implementation of phase II storm water controls offer great promise to improve the public health. An opportunity for environmental scientists to quantify these costs and those associated with delay will develop as we reduce the amount of Nonpoint source pollution. In contrast to the policy debates of the last few decades based on speculation, real data will be developed to evaluate the real cost-benefit relationship in reducing the impact of

storm water. Currently the EPA has offered a guide for cost-benefit analysis: the value of a reducing fatal risks per human life can be averaged or best guessed at \$4.8 million (EPA 90). This represents something that can be tested over time.

The NPDES has been successful in controlling point sources of pollution. Many of the realities of controlling emissions are common sense. The passage of the Clean Water Act made it possible to quickly attack discrete point sources by regulating primarily what industry was putting out of the end of their pipes. It certainly made sense to attack the more obvious problems first.

Beyond common sense, the perspective required is environmental planning, which includes land development, land use, waste disposal, watershed management and water supply among other aspects (Marsh 3). A watershed is defined by where storm water will eventually drain; areas that drain to a different point are part of a separate watershed (Ferguson 50). Political boundaries were not drawn with any acknowledgement of the drainage pattern and this requires communities to work together across jurisdictions. Point sources are located in specific municipalities and cooperation was not as crucial for regulating.

History of Regulation

The Refuse Act of 1899 gave the Federal Government a role in regulating pollution discharges into surface waters; a permit system for these releases was developed between 1969 and 1972 (Arbuckle 1). The changes developed were written into the Water Pollution Control act of 1972 (Marsh 202). Political and legal battles were the primary response and lead to new

amendments in 1977 and the name we have come to know: the Clean Water Act (CWA) (Arbuckle 2).

Early expectations of the measures have not been realized, more than 1000 communities still have combined sewer systems (CSS) that dump raw sewage during storms; cost estimates for replacing these old structure are at about \$20 million per linear mile (Marsh 202). As point sources have been tightly regulated, Nonpoint has become a larger problem with increased development. Not only did we put off the problem of storm water, but we have continued to grow as communities with traditional approaches.

One unique aspect the EPA has reported, “NURP (Nationwide Urban Runoff Program) and other studies have verified that even mean concentration of pollutants in urban runoff from residential and commercial area remains relatively constant from one area to another” (U.S. Senate 377). This must have some relation to the similarities of building materials, commercial developments and lifestyles throughout the United States. Basically the problem is bad everywhere.

Storm Water Pollution System

In the urban context, contaminants that result from all types of land use represent the production stage. Runoff is the removal phase and delivery is accomplished through a system of gutters, ditches, storm drains and sewers. This is the reality that planning and management faces; the first goal in controlling storm water is to slow the flow to allow infiltration and the settling of contaminants (Marsh 202-207).

Impervious surfaces and traditional development practices have all worked to speed the delivery phase as the primary design focus has been flood control (Dennison 19). Storm water has become a leading source of contamination in numerous bodies of water. In 1998, seven thousand days of beach closings was one of the many consequences (Bowen 19). The EPA has long stated, “pollution from diffuse sources, such as runoff from agricultural, urban areas, construction sites, land disposal and resource extraction, is cited by the states as the leading cause of water quality impairments” (qtd in Skoch 1087).

Phase I Storm Water Controls

Storm water control is dealt with in section 402 of the CWA of 1987 (Skoch 1088). Phase I rules were issued in November of 1990; they applied to 217 areas with municipal separate storm sewer systems (MS4s) and a population of 100,000 or more (Dennison 34-36). MS4s “can include roads with drainage systems, municipal streets, catch basins, curbs, gutters ditches, man-made channels, and storm drains” (Vasquez 22). Also included for regulation was storm water associated with industrial activities unless they discharge into CSS. In comparison, phase II will apply to 100 communities in the North East Ohio alone (NOACA 6).

Industrial activity was defined by the Ninth Circuit court of appeals in 1992 in the case *American Mining Congress v. EPA*; the plaintiff had argued that the word activity only applied to the present time, but the court disagreed and ruled phase I rules were applicable to inactive mines (Skoch 1089). Almost every aspect of the CWA has been contested down to the meaning of the word activity.

The National Resource Defense Council (NRDC) contested an exemption for oil and gas exploration. The Ninth Circuit essentially ruled that the definition of contamination was for the EPA administrator to decide; the exemption applied to discharges free of contaminants (Skoch 1091). Important legislation often requires the interpretation of the court and implementation of NPDES has often hinged on battles over simple word usage and supposed intent.

Implementation has been a difficult fight for industry, municipalities and environmental groups. By 2000, over 800 more MS4s were included in phase I; of a total 1059, 1017 received or were completing their permits (Harrop 774). The easy part of the EPA's two tier attack against storm water was finally showing results. However, only industrial sites must reach levels in their discharges that will not compromise water quality standards; MS4s in contrast must, "reduce the discharge of pollutants to the maximum extent possible" (Harrop 779).

During the debate to once again amend the CWA in 1993, the NRDC provided a compelling outline of the delays in regulating storm water up to that time. They outlined extensions to deadlines and the creation of the phased permitting by congress in 1987 (U.S. Senate 375). The action was due to frustration with the EPA as was remarked:

...stormwater runoff from urban areas contain large volumes of toxic materials and other pollutants. Since 1972, municipal separate storm sewers have been subject to point source permit requirements of the Clean Water Act. However, EPA only recently began to develop a permit program for these sources (U.S. Senate 374).

Senator Stafford added:

as my colleagues know, I generally do not support willingly any delays in environment programs especially a program to control a source of toxic pollution as important as this one is. EPA should have developed this program long ago. Unfortunately it did not (U.S. Senate 377).

Phase II Storm Water Controls

The CWA amendments of 1987 were the birth of the two tiered approach the EPA has followed. First the congress offered blanket extension through October 1, 1992 for all storm water discharges (CWA 159) They directed rules to be established for large MS4s by 1989, medium MS4s by 1991 and small MS4s by 1993 (Harrop 773). The deadline was missed for the large municipalities and as mentioned above phase I rules were issued in 1990, combining the large and medium category.

Amendments to the CWA in 1994 forbid any effluent limitations until December 31, 2009 for storm water discharges; another deadline among many that has been extended. There was a demand for “reasonable progress toward attainment of applicable waster quality standards (Water Quality Act 1994 81-82). Six year beyond the congressional deadline, EPA finally completed phase II rules in December of 1999 (Harrop 777). A deadline was set for March 10, 2003 for compliance with these rules; smaller municipalities should have programs in place or risk EPA enforcement (Vasquez 22). In practice this could include a project to develop a plan. The City of Euclid currently is involved with other municipalities to develop a phase II project for the Euclid Creek watershed. A planning process to develop implementation goals begun in earnest in 2003 and is currently scheduled to conclude next year.

Phase II will involve over 8,000 cities and counties and requires plans that involve six goals:

- Public education and outreach
- Public participation and involvement
- Illegal discharge detection and elimination

- Construction-site runoff control
- Post-construction runoff control
- Pollution prevention and municipal good housekeeping (Vasquez 24)

Implementation is not based on numeric effluent limits on pollution levels. Storm water is difficult to quantify and a basic lack of knowledge is a serious barrier; in essence MS4s do not have to meet any measurable goals (Harrop 776). The requirements are for the municipalities to engage in best management practices (BMPs). Clearly these regulations are a step in the right direction, but their design and the thirty year policy debate foreshadows a long battle ahead.

BMPs or non structural measures can include simple aspects like street cleaning and educating the public of the role they can play in pollution control (Butler and Davies 434). Model ordinances are also a key factor that allow a community to take advantages of successes in other communities. NOACA recommends for communities in Northeast Ohio a model two step ordinance for construction that requires stabilization of the site after initial work (9). Best management techniques are widely shared; in controlling storm water any success gains attention in the environmental planning community.

The efficiency at which BMPs can reduce pollutants remains unclear, but having a clear measure of water quality offers a community the chance to evaluate their impact (Harrop 782). This type of environmental monitoring will offer planners new concrete data for policy debates. Perhaps Nonpoint source pollution can be eliminated in the long-term through the implementation of NPDES permits, but during this process data must be gathered to fill in the holes of our knowledge. David Pyzoha offers a fitting truism, “simply put, you cannot solve what you cannot define. You can not solve anything without support” (14)

Erwin Ordeal, then executive director of the Northeast Ohio Regional Sewer District, testified to congress in 1990, “It now seems we have come full circle because, in spite of significant water quality improvements, we are still grappling today with the issue of how best to provide the funding support needed to address the unfinished water quality agenda” (Reauthorization of FWPCA 60). Real data and real funding have been a constant objective for every stake holder in the storm water debate.

Pollution control is not the only concern for the cities involved. Their problems range from storm sewers collapsing in spring thaws, intersections flooding due to new housing developments, surface waters nutrient loading, and millions of dollars in flood damage (Pyzoha 13). These associated problems with storm water represent a quantifiable impact on the budgets of these cities and seem to offer a greater incentive than public health. Rational environmental planning can reduce costs in the long-term.

The wide-ranging regulations of the CWA make permitting for wastewater and stormwater discharges an area of particular interest for local governments. The complexities of meeting permit requirements are increasing, as the challenges of maintaining water quality in areas with growing populations and thriving industry multiply (Keyworth and McNurney 140).

The public health impact is difficult to quantify, but “the effects of health risks touch us all in many ways, and actions to address health at the population level benefit everyone in society (Institute of Medicine 180). Education of both policy makers and the public is vital in this debate.

Cleveland – Collinwood and Nottingham

Nottingham Village shows little resemblance to the community that once thrived along the last mile of Euclid Creek. In the 1960's construction of the Lakeland freeway destroyed any semblance of village life. The Nottingham school and countless historical sites were destroyed to make the trip to the suburbs seamless.

First transportation, in the form of railroads, helped the village of Nottingham develop into one of the most wondrous places in Cleveland. To the north were Euclid Beach and an adjoining resort community; to the south lived the workers from the railroads and all those services in support. In a time before mass media the neighborhood was the source of information; the community was vibrant.

Second transportation, in the form of a freeway, extended the transportation corridor and ripped the heart of a historic and wonderful way of life. Residents began moving to the newer suburbs and left a hole in the community that to this day has not been addressed. Out migration in the absence of rational environmental planning has increased the costs of NPDES phase II implementation to both the core and fringe city.

Councilman Polensak, the representative from Collinwood and Nottingham, at a public utilities committee meeting in 2002 questioned Keith Riley, from the Ohio EPA, about this very problem:

What are you really doing to get a handle on what is taking place in the suburban communities that contribute so much to the problems that we are experiencing in the City of Cleveland and along the Lakefront? Because it's like, we are looked upon like we are second class. Who cares if they dump sewage? It is all going to go down hill. We are not going to get it, because it goes in Cleveland, and who cares about those folks down there? So I would like to know what the Ohio EPA really does? Because, it is not only water quality and storm water quality, but, then I look throughout the Greater Cleveland area and, specifically, at the city of Cleveland and I see these old abandoned factories laced

with all kinds of hazardous material that have been abandoned by some of the biggest companies, like Fortune 500 companies, and, again, they just waltzed away (144).

In response Mr. Riley began on the defense:

I agree with you, wholeheartedly, that the Ohio EPA has not been charged in dealing with storm-volume problems that face many of our communities. Whether you are in the suburbs or whether you are in Downtown, Cleveland, it is an issue that has been under-regulated since it was incurred by the Clean Water Act. Basically you can pave every square inch of Ohio and flood everybody out. Up until the nineties, we had no storm water regulations (145).

Later in his testimony, Mr. Riley remarked that they are coming “pretty late in the game” and that they now see that eighty-five percent of the remaining pollution is related to storm water (147). According to Martin Freedman and Bikki Jaggi in their economic analysis of environmental regulations, the EPA tried a balanced approach that would not threaten the viability of business, “Unfortunately, this cooperative process has made the achievement of the original goal of clean waterways by 1985 more of a dream than a reality” (253).

The regulations had withstood the Reagan administrations insistence on cost-benefit justification. Freedman and Jaggi continued, “We have no doubt that from a societal perspective, the benefits of environmental legislation outweigh the cost” (253). In the long-term, as mentioned above, we should gain a better picture of the benefits if we are consistent in our data collection.

Socioeconomic status has been directly linked to a “gradient in health status.” Poor communities, like Collinwood, on top of other problems must deal with greater environmental stressors (Institute of Medicine 60). The storm water running down the hill to Cleveland may eventually slow, but today it grows faster with each development in the upper watershed.

Conclusions

Out migration from the City of Cleveland coupled with constant development in the fringe cities represents an increase to the cost of storm water mitigation. Nonpoint source pollution as a primary problem is a fact of life in the short-term. The NPDES regulations are not flawed in any specific way, but the policy debate and delays have had real impacts on the public health.

As Nonpoint source pollution in the long-term is brought under control an opportunity exists to assess the true cost-benefit of the CWA. That data will certainly be used to the advantage of environmental planners in future policy debates.

Freedman and Jaggi in their final analysis concluded, “the approach that would probably be most successful in achieving clean air and water and maintaining a vibrant economy is one that allows for experimentation and encourages cooperation among business, government and environmentalists” (261). The more data planners acquire: the more they will be listened.

Whether or not we can meet water quality standards is not guaranteed without a minimum performance standard; the Ninth circuit court has left the decision to apply tougher requirements to the discretion of the EPA and other permitting authorities (Harrop 195). Public participation and education campaigns to raise awareness will be essential for further improvements in the water quality arena.

One Idea

Looking into the issue of storm water control in Cleveland, one is forced to return to the problem of out migration that has increased costs for the implementation of NPDES. Essentially Cleveland has lost half of its population in the last thirty years; that translates to a far less dense core city.

What strikes me as I travel up the watershed to my sisters house is that I have a choice of ten transportation corridors to use. In general I change with each trip and randomly find congestion. If the traffic patterns were studied closely it seems that Cleveland doesn't need that many roads.

My idea would be to remove certain roads and transform an area into pedestrian islands that make use of innovated development strategies. An important aspect would be measures to slow the storm water. Granted up the watershed there are real problems, but does Cleveland need that many roads to repair given the decline in density?

Innovative urban redevelopment can address many of the critical issue facing Cleveland and the region as a whole. Perhaps even the occasional urban canyon could be transformed into something approaching a natural one.

Appendix I: One Possible Focal Point

I believe there should be a park in honor of Louis Moses at St. Clair and Nottingham Road tied to a Main Street *TOD*. Mr. Moses, the son of Mary Dille and Augustus Moses (a real estate pioneer), was one of the most successful and respected developers in Nottingham Village up through 1917. The City owns land along Euclid Creek and could use the initiative to help with phase II storm water control.

In 1912, Louis Moses served as the secretary for the Cuyahoga Park Board; among the first of four community leaders appointed. He was instrumental in the formal creation of the park system and specifically in the protection of the Euclid Creek Reservation, which he envisioned as much larger.

In 1917, Louis Moses bought stock in the Land Title Abstract and Trust company. By 1918, he was a member of the board; in 1919, he was president. In 1932, the name was changed to the Land Title Guarantee and Trust Company and it was the largest title insurance company in Ohio. Louis Moses would remain president until his death in 1952.

In 1917, with the passage of the Park District Act and creation of the Cleveland Metro parks Mr. Moses was one of the first three appointed to the board. Through 1928, he served as the Vice President of the board and was elected president in 1929; leaving in 1930 due to business pressures during the great depression; he later served again as Vice President from 1937 through 1939.

It does not fall to the lot of many men to be present at the birth of an idea, to nurture that idea, and over many years to protect it and to guide it and give intelligent direction to its growth. Not many reap the satisfactions which come to one who realizes that he, thru sacrifices of time and effort, has made contributions which have made his community a better place for all citizens to live in. Such must have been the satisfaction which came to Louis A. Moses as viewed the progressive development of Cleveland Metropolitan Park System.¹

Whereas, it was the good fortune of the community that in addition to his business acumen and the development of his own interests he was able to devote so much of his time to building up

¹ Cleveland Metropolitan Park District, Cleveland Ohio. Resolution 2787 passed at the news of Louis Moses' death in 1952.

the great Metropolitan Park System. His expert knowledge of land values was of **immeasurable** benefit in laying out that park system. In his careful concern with the city's needs he helped materially to build the network of parks into one of the country's finest. The park system was only a portion of his interest, for he identified himself with all worthy movements that would advance this city towards its commercial and cultural objectives. Builders of vision such as Mr. Moses are too rare. His dedication has left in the Metropolitan Park System a lasting memorial.²

Historical Preservation can be the vital tool to help this neighborhood of Cleveland. Nottingham's future is connected with both North and South Collinwood as city planners currently divide the neighborhood. The division is artificial due to the freeway dividing the neighborhood. Best practice environmental planning is done at the watershed level and the key issue a **TOD** could address by creating a new focal point connecting the village and its geology.

Nottingham Village has a revitalization program developing at St. Clair and Nottingham. The local hardware store is the first example of the storefront project of Cleveland helping improve the neighborhood. An expansion of this work can be created through the "Main Street Concept," which is attempting to revitalize historic neighborhoods throughout the country.

To the west is the historic five-point's commercial district and to the east is the old world section of East 185th. Connecting the history and the historic neighborhoods offers a wealth of opportunity; all that is required is more research, desire and the will of the community.

Past and future success of Cleveland is directly connected to Nottingham Village. History is one of our greatest resources and like other must be dug up and refined before we lose it forever.

² Cleveland City Council, Resolution No. 668-52; April 9, 1952

Bibliography

Arbuckle, J. Gordon. "Introduction and Overview of the Clean Water Act." Clean Water Handbook. Ed. J. Gordon Arbuckle and Russel Randle. Rockville, Ma: Government Institutes, Inc. 1993.

Bowen, Gary. "A Drain on the Budget: National Pollutant Discharge Elimination System Regulations." American City and County. 118, i3 (March 1, 2003)

Butler, David and Davies, John. Urban Drainage. New York and London: E & F Spon. 2000.

Cleveland City Council. Public Utilities Committee Meeting: October 2002. Cleveland Public Library: Public Administration. 2003.

Dennison, Mark. Storm Water Discharges: Regulatory Compliance and Best Management Practices. New York and London: Lewis Publishers. 1996.

Ferguson, Bruce. Introduction to Stormwater. New York: John Wiley and Sons. 1998.

Freedman, Martin and Jaggi, Bikki. Air and Water Pollution Regulation: Accomplishments and Economic Consequences. London: Quorum Books. 1993.

Harrop, Stacy. "Municipal Separate Storm Systems: Is Compliance with State Water Quality Standards Only a Pipe Dream?" Environmental Law. 31, i3 (Summer 2001), 767-805.

Institute of Medicine. The Future of the Public's Health. Washington: The National Academies Press. 2003.

Keyworth, Mark and McNurney, John. "Waste Water and Stormwater Discharges." Municipal Environmental Compliance Manual. ed. Dowden, Lisa. London and Ann Arbor: Lewis Publishers. 1995.

Marsh, William. Landscape Planning: Environmental Applications. Hoboken, NJ: John Wiley & Sons. 1998.

NOACA. "NOACA Model Approach to Phase II Storm Water Management Plan." NOACA Governing Board. 2003

Pyszoha, David. Implementing a Stormwater Management Program. London and Ann Arbor: Lewis Publishers. 1994.

Skoch, Edwin. "Regulation of Storm Water Discharges Under the Clean Water Act." Environmental Law. 23, n3 (July 1993), 1087-1105

U.S. EPA. "Guidelines for Preparing Economic Analysis." Office of the Administrator. 2000.

U.S. Congress. The Clean Water Act as Amended by the Water Quality Act of 1987: Public Law 100-4. Washington: U.S. Government Printing Office. 1988

U.S. House of Representatives. Reauthorization of the Federal Water Pollution Act, Hearings before the Subcommittee on Water Resources. 101-64. Washington, D.C.: GPO, 1991

U.S. House of Representatives. The Water Quality Act of 1994, and Issues related to Clean Water Act Reauthorization, Hearings before the Subcommittee on Water Resources and Environment. Hr 3948. Washington, D.C.: GPO, 1995

U.S. Senate. Reauthorization of the Clean Water Act, Hearings before the Subcommittee on Clean Water, Fisheries and Wildlife, S. Hrg. 103-328. Washington, D.C.: GPO, 1993.

Vasquez, Ralph. "Second Wave of Federal Stormwater Rules to Soak Small Towns Nationwide." Public Management. 85, i2 (March 2003), 22.