Controlling Stormwater:

Some Lessons From The Maryland Experience

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October, 1990

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The Sediment and Stormwater Management Administration (SSA) was incorporated into the Water Management Administration (WMA) in October, 1992. For additional information concerning this publication, please contact WMA (410) 631-3543.

INTRODUCTION

The State of Maryland has implemented a number of programs designed to control nonpoint source pollution. Maryland's Stormwater Management Program is the cornerstone of efforts to control urban nonpoint source pollution and has received national and international attention. This paper provides a synopsis of State efforts to control stormwater, a review of the strengths and weaknesses of the programs, and some observations about the implications of new federal programs and regulations for Maryland programs. Lessons from the Maryland experience are summarized.

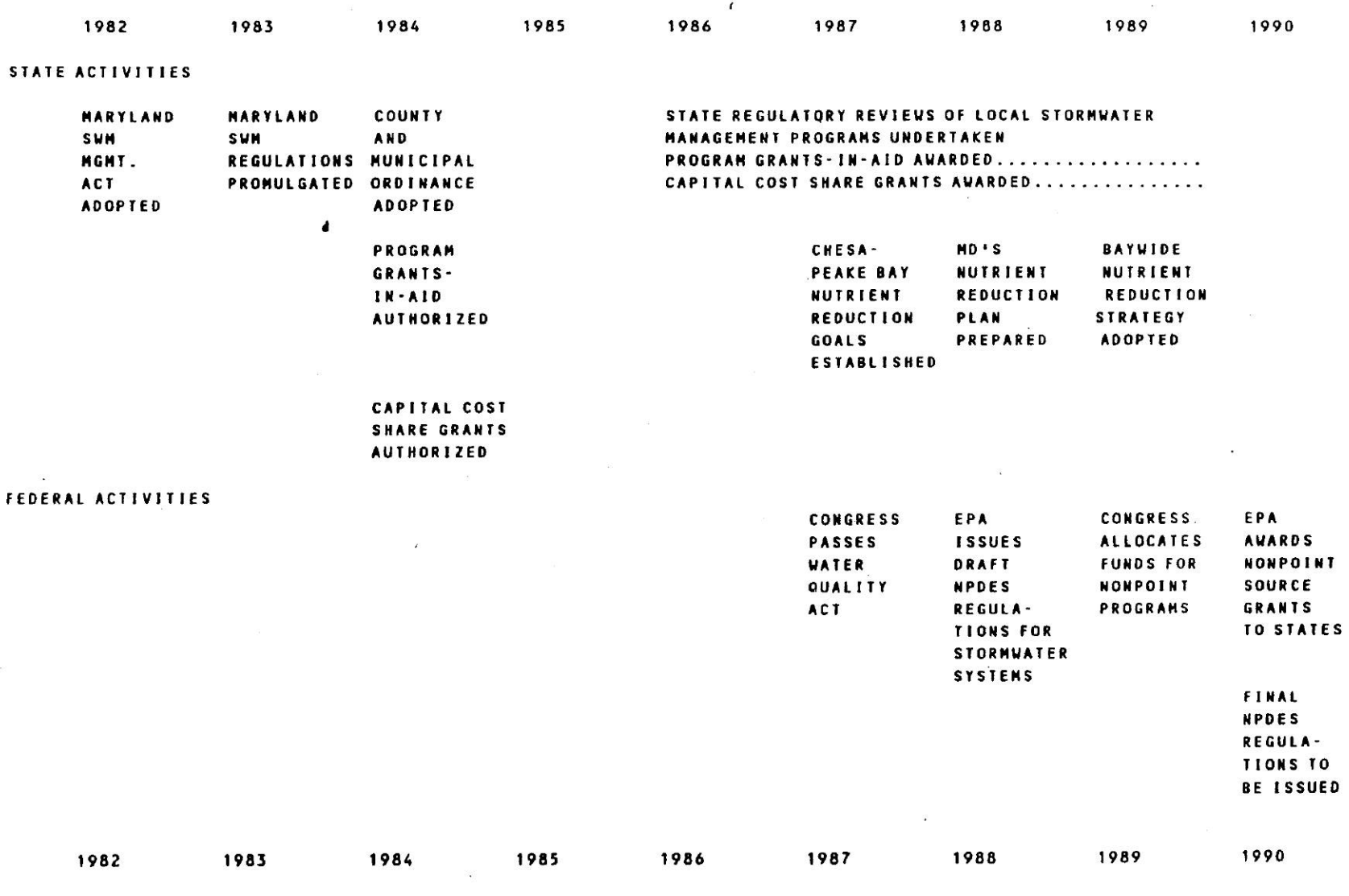
STORMWATER MANAGEMENT IN MARYLAND

The Stormwater Management Act

Programs to control urban stormwater in Maryland are a subset of a wide variety of programs aimed at controlling urban nonpoint source pollution. Related programs not reviewed here include, for example, a parallel, complementary Erosion and Sediment Control Program also administered by the Sediment and Stormwater Administration; the Department of Natural Resources' Chesapeake Bay Critical Areas Program; and the Department of the Environment's Water Quality Certification Program. Figure 1 is a timeline that includes significant events in the evolution of programs to manage stormwater in Maryland.

The Stormwater Management Act was passed by the Maryland General Assembly in 1982. The primary goal of State and local programs established by the Act is to "maintain after development, as nearly as possible, the predevelopment runoff characteristics." Regulations promulgated by the State in 1983 define this to mean, for quantity control for most of Maryland, on-site control of the 2 and 10 year storm events. In addition, for quality control, the Administration has established a list of preferred management practices. Pursuant to this list, local officials responsible for plan review are required to investigate the feasibility of infiltration of the first half inch of runoff -- the so-called first flush that contains most of the pollutants in runoff. If infiltration is not feasible, other practices may be used. These other practices, in order of preference, are vegetated swales, retention ponds, extended detention ponds, and detention facilities. The position of each practice on the list was determined primarily by its potential to provide pollutant removal. Infiltration is preferred because it offers the highest potential for reduction in pollutants such as sediment and phosphorus, has potential for groundwater recharge and maintenance of base flow, and mitigates thermal impacts. All incorporated counties and municipalities in Maryland were required to adopt ordinances, by 1984, that establish programs which, at minimum, provide these controls on every development that disturbs more than 5,000 square feet of land and significantly changes sit hydrology (waivers may be issued if the differences in pre- and post- two and ten year discharge are less than 10%).

FIGURE 1. MILESTONES IN THE EVOLUTION OF MARYLAND'S STORMWATER MANAGEMENT PROGRAM



SWM=STORMWATER

The Act is quite broad, and those who drafted it recognized that it would significantly change the way development occurs throughout the State. The authors also recognized that the mandates of the law would push technical knowledge in the area of stormwater management and that significant assistance would have to be provided to local governments to achieve successful implementation. The Act authorized local governments to establish fee systems to cover the cost of plan review and program implementation, mandated that State regulatory officials review local programs at least triennially, required that the State conduct research and provide technical assistance and training in the application of stormwater management technology and program implementation, and provided for civil and criminal penalties for violation of the law.

In addition to establishing minimum controls and preferred practices, the 1983 regulations established state responsibilities, criteria for exemptions and waivers, and requirements for construction and maintenance inspection and enforcement. State regulatory staff responsible for program review are required to determine whether local programs are "acceptable." To be acceptable, local programs must have (1) an approved ordinance, (2) adequate administrative procedures, (3) adequate plan review, (4) acceptable construction inspection and enforcement, and (5) acceptable maintenance inspection and enforcement.

Since 1982, the Administration has worked with Maryland's 23 counties and 151 municipalities to implement local programs. Forty-seven municipalities chose to implement programs; the remaining 104 adopted resolutions that gave the County governments the authority to implement programs within their respective jurisdictions. The Administration has conducted 25 local program reviews, completed a number of research studies, and held several training conferences and workshops to assist local officials. Details concerning implementation are summarized below.

Stormwater Program Grants-in-Aid

In 1984, as part of a legislative package known as the Chesapeake Bay Initiatives, the General Assembly authorized two additional programs related to stormwater management. One of these was the Stormwater Management Grants-in-Aid Program. This program, which became effective in 1985, has allocated approximately $1.5 Million annually to local governments to assist them with implementation. Grants-in-Aid may be used to fund personnel; to apply, local governments must have an Administration-approved program. Criteria used to evaluate funding requests are not rigorous and pertain mainly to the "reasonableness" of the request. In general, this refers to whether there appears to be sufficient work to justify the proposed positions. To assist local jurisdictions in estimating manpower requirements, the Administration provides productivity guidelines to local jurisdictions. Most funds are used to pay plan review staff and inspectors; some clerical and administrative positions also are funded. The grants program is competitive; some local governments choose not to seek support. The program is not an entitlement program.

Stormwater Pollution Control Cost-Share Program

The Stormwater Pollution Control Cost-Share Program, which also was authorized in 1984 and implemented in 1985, is a grant program that provides matches of up to 75% of the cost of stormwater management retrofits -- projects to serve areas developed without stormwater management. The objectives of the Cost-Share Program are to demonstrate best management practice (BMP) pollutant removal efficiency, cost effectiveness, social acceptability, and maintenance requirements. Grants are awarded competitively; funds for the projects are raised through the sale of state bonds. In total, between 1984 and 1990, the General Assembly authorized $5 Million for capital projects.

Chesapeake Bay Agreements

In 1987, the Governors of Maryland, Virginia, and Pennsylvania, the Mayor of Washington DC, the Chairman of the Chesapeake Bay Commission, and the Administrator of the USEPA signed an agreement calling for a 40% reduction in nutrient loadings to the Chesapeake Bay. In 1988, Maryland's Nutrient Reduction Plan was completed. This Plan outlines a strategy for implementation of the nutrient reduction objectives. In general, the Plan calls for a 40% reduction in all point and nonpoint sources, including urban stormwater. To control urban runoff, three programs are identified: (1) the continuation of the existing cost share program; (2) a massive new retrofit program

to be funded by stormwater utilities; and (3) a redevelopment program aimed at "explicit management of development intensity. No complete cost estimates for implementing these programs are available. Although direct construction costs for retrofits have been estimated at $71,000,000, this estimate is extremely low and does not include any ancillary costs such as planning, modeling, or design.

EPA Nonpoint Source Control Programs

In 1987 Congress passed the Water Quality Act, a comprehensive overhaul of the Clean Water Act. In Section 319, the Act required that all states develop assessment and management reports that identify and categorize sources of nonpoint pollution and outline coordinated strategies for implementation of programs to control them. The primary goal of Maryland's Assessment and Management Reports is to implement the Nutrient Reduction Plan. State officials made nutrient reduction the focus of the nonpoint source program because significant effort had been put into developing the Nutrient Reduction Plan, quantitative goals already were in place (i.e., the 40% reductions), and steps towards implementation already were underway. Maryland's Assessment and Management Reports were approved in August and December, 1989, respectively. In 1989, Congress authorized $40 Million for implementation of nonpoint source management plans, and in March, 1990, EPA awarded to Maryland a grant for FY 1990 for $447,771.

NPDES Permits for Stormwater Discharges

The 1987 Water Quality Act also directed EPA to promulgate regulations to require National Pollutant Discharge Elimination System (NPDES) Permits for stormwater discharges. It appears that numerous industries and at least five major jurisdictions in Maryland will be required to apply for permits. To receive permits, local jurisdictions must have in place, among other items, programs to control pollutants from urban runoff from both existing and new development. Final regulations are to be issued in July 1990. Like existing NPDES programs for wastewater treatment facilities and hazardous waste management operations, the program is designed to be administered by the States.

Observations

To summarize, Maryland requires by statute and regulation that local governments manage both the quantity and quality of runoff from new development; the State assists local governments in implementation with both program grants and technical assistance. The State also has established a grants program for capital projects to address pollution problems in older areas developed without stormwater controls. Since creation of these programs, the State has established an extremely ambitious objective: a 40% reduction of nitrogen and phosphorus loadings from urban runoff from existing areas. More recently, the USEPA has required that the State develop nonpoint source management plans to address urban stormwater runoff. Finally, EPA will soon begin regulating some stormwater systems and facilities. Thus, the government apparatus to manage stormwater in Maryland includes the State's regulatory program, two grant programs, and the nutrient reduction program, all of which now are overlain by two federal programs, one of which is regulatory. This may seem complicated, but readers should keep in mind that this is only a partial picture. We have not described at all, for example, the State's Erosion and Sediment Control Program, which in certain ways is more complex than the regulatory program required under the Stormwater Management Act. In addition, the Maryland's Critical Areas Law establishes special stormwater-related requirements for projects in the Critical Area (the strip of land 1000 feet wide that surrounds the high tide area of the Chesapeake Bay). The Department of Environment's Water Quality Certification Group has issued special guidance and requirements for stormwater discharges into wetlands. Though incomplete, these brief summaries provide a good snapshot of some of the major state and federal activities that impact the stormwater management component of nonpoint source management program.

IMPLEMENTATION

We provide here some results -- an overview of the status of implementation of each of the programs summarized above. We conclude this section with a subjective evaluation of progress. When possible, we make judgements of both technical progress (i.e., an assessment of progress towards objectives) and administrative performance.

The Stormwater Management Act and Implementation of Local Programs

Local jurisdictions implemented stormwater management programs in 1984 following approval of local ordinances by the Administration. In late 1984 and early 1985, the State completed a cursory review to determine whether the local jurisdictions had begun implementation. The data that were collected were used to set priorities for the first round of triennial field reviews. To date, the Administration has reviewed all the counties but one and Baltimore City (a total of 23 jurisdictions have been reviewed). None of the 47 smaller municipalities that opted to implement their own programs has been reviewed. Using the five criteria noted above, the Administration determined that 13 of the programs were acceptable; 10 were found to be unacceptable. Since the initial review, two programs have been brought into compliance and are now acceptable. Presently, according to the most recent data available, 15 of the major programs in the State are acceptable, while 8 are unacceptable (Table 1).

These findings require some interpretation. Per the regulations (COMAR 26.09.01), programs can be unacceptable if they are deficient in any of the categories. In general, programs found to be deficient had inadequate administrative procedures or documentation in files, were failing to provide adequate plan review, were issuing waivers for too many projects, or were failing to provide adequate construction inspection. Reviewers during the first round of reviews essentially ignored the issue of maintenance: the program was too new for local officials to establish a performance record in this area. While a about a third of the counties apparently are operating unacceptable programs, these data may be misleading. Many of the findings were made four to five years ago when programs were new and few data were available for evaluation. During the early reviews, programs were judged to be acceptable if all programs elements were in place; track records for performance evaluations were not available. The findings of program evaluations are summarized by year in Table 2. We conclude from these data that the Administration has become more stringent in its review of local programs. This makes sense; as local officials gain experience, it seems reasonable to expect more of them. However, given that almost a third of the programs were last reviewed in 1985 and 1986 when reviews were less rigorous, it may be that more than eight of the major jurisdictions are not operating acceptably.

Although a number of programs may be unacceptable, it is difficult to judge what this means in terms of environmental impact. For example, a finding of unacceptable for failure to provide adequate documentation in plan review files may be nothing more than a paper deficiency. On the other hand, it may be a clue that local officials are issuing waivers in situations in which stormwater management, at least quality controls, ought be required. In and of itself, issuance of a waiver may not be significant, either in terms or runoff quantity or quality. However, the cumulative effects of waiving projects are precisely those that the regulations are intended to prevent.

Several problems emerged consistently during the reviews. These include the issuance of waivers for development of agricultural land in row crops because hydrologic models show that runoff volumes will decrease following development, failure to adhere to the preference list for facilities, no construction inspections, failures to require submittal of as-built plans, no maintenance of facilities (including failure to maintain inventories), and the failure to notify homeowners' associations that responsibility for maintenance had been transferred to them. While some of these problems can and have been corrected during the review process, others will require changes in regulations.

Table 1. Most Recent Sediment and Stormwater Administration Stormwater Reviews.

County/ City	Date of Review	Finding
Allegany	2/87	Acceptable
Anne Arundel	6/89	Acceptable
Baltimore County	4/86	Acceptable
Baltimore City	4/87	Acceptable
Calvert	10/85	Acceptable
Caroline	4/87	Unacceptable
Carroll	4/86	Acceptable
Cecil	3/90	Acceptable
Charles	11/85	Acceptable
Dorchester	4/87	Acceptable
Frederick	5/89	Unacceptable
Garrett	7/97	Acceptable
Harford	8/87	Unacceptable
Howard	10/88	Unacceptable
Kent	3/87	Unacceptable
Montgomery	1/88	Acceptable
Prince George's	11/86	Acceptable
Queen Anne's	4/90	Acceptable
Somerset	9/89	Unacceptable
St. Mary's	3/86	Unacceptable
Talbot	9/89	Unacceptable
Washington	Ongoing	
Wicomico	4/86	Acceptable
Worcester	11/85	Acceptable

Current Status: 15 Acceptable (65%)
8 Unacceptable (35%)

(Note: Programs in Cecil and Anne Arundel Counties initially were found unacceptable but in rereviews were found to be acceptable.)

Table 2. Findings of Program Reviews by Year.

Year	Jurisdictions found Acceptable	Jurisdictions found Unacceptable	Reviews
1985	3	0	3
1986	4	1	5
1987	4	3	7
1988	1	2	3
1989*	1	4	5
1990*	2	0	2
Total	15	10	25

* Includes one re-review in which one county is upgraded from unacceptable to acceptable.

In assessing the review process, we also examined our own performance. First, reviews have not been completed as frequently as required by the Stormwater Management Act. Not only have the major jurisdictions not been reviewed triennially (in 1990 a second round of reviews should be completed), but only one of the 47 municipalities (Baltimore City) which elected to implement their own programs has been reviewed. The failure to achieve timely reviews is attributable primarily to staff shortages; only two to three individuals have been available at any one time to undertake reviews, and these individuals also have had other responsibilities.

The 23 reviews completed initially have been conducted by nine individuals, including several engineers, a geographer, and a planner. Despite general guidance in the regulations, reviewers have emphasized different criteria, and the reviews reflect this. We examined each of the reviews in detail to determine if the reviewers addressed the same program elements. We established seventeen items pertinent to the review and noted whether reviewers commented on that program aspect. For example, we found that each review included a summary comment on the quality of plan review, but that comments about the quality of hydrologic and hydraulic calculations were included in only 15 of the 23 reviews. Seventeen of the reviews included the number of inspectors on staff, but only eight noted the types of enforcement tools available to the inspectors, and nine reviewers included findings relative to enforcement activity and the use of enforcement tools. Of the 17 program elements that were included in the review, the only single program element that was mentioned explicitly in each of the 23 initial reviews was the quality of plan review and design. Staff responsible for program review have used the assessment of past reviews to develop new procedures for conducting triennial reviews to ensure consistency in administration. These include a requirement for annual administrative reviews based on data supplied by each local jurisdiction in a detailed 20 page data form.

Stormwater Program Grants-in-Aid

Data on the program grants-in-aid awarded by the Administration are presented in Table 3. Between 1985 and 1988, the State of Maryland has awarded almost $9 Million in grants-in-aid. Twenty-one of Maryland's 23 Counties have requested and received funds; nine of the 47 municipalities have requested and received funds. Slightly over 82% of the total funds have been awarded to counties; almost 18% has been awarded to municipalities. Of the counties that have received funds, 14 of the programs at the last review were acceptable; seven were unacceptable. One of the two counties that has not requested funds was unacceptable; a review has not been completed for the other. The City of Baltimore is the only municipality to receive funds that has been reviewed. In sum, 65% of the grants has gone to counties with acceptable programs; just over 17% has gone to counties with unacceptable programs. Just over 6% of the total grants has been given to Baltimore City, which operates an acceptable program. Program reviews have not been completed for the other eight municipalities that have received almost 12% of the total awards.

It is difficult to assess the effect that the grants have had on jurisdictions responsible for implementing stormwater programs, let alone the effects of the grants on mitigating adverse effects of development on water resources. We do not even know, for example, the percentage of each local stormwater budget that is comprised of state funds. Thus, we cannot assess the extent to which state funds have helped local jurisdictions to establish successful program. We noted above that just over 17% of the grants ($1.56 Million) has been allocated to seven counties that operate unacceptable programs; we do believe that the number of unacceptable programs would be higher if state funds were not available.

With respect to impact on the environment, enough data are available for us to make a general assessment of whether the funds are being allocated to the "right" jurisdictions. Intuitively, we would hope to grant funds to those jurisdictions where the greatest impact on the environment is occurring, which is, in this case, where the most amount of development is occurring. We present in Table 4 the total funds granted to each major jurisdiction between 1985 and 1990 along with the total number of housing starts between 1985 and 1988. Although the grants are not tied directly to development levels, we would expect to see the funds track the development. This generally seems to be the case: the difference between the percentage of total funds received and the percentage of total housing starts in most cases is very small. We conclude the following: for those smaller jurisdictions, the percentage of funds received generally corresponds to the percentage of housing starts. However, among the larger jurisdictions, there is greater variation. For example, Prince George's County has received more than 22% of the total grants, although only [illegible] percent of the total housing starts have

Table 4.Stormwater Grants-in-Aid and Housing Starts

COUNTIES	Program Grants TOTAL FY 1985 FY 1990	PERCENT OF TOTAL GRANTS	HOUSING STARTS 1985-1988	PERCENT OF TOTAL
Allegany	219,542	2.4%	877	0.5%
Anne Arundel	798,304	8.9%	15,429	9.3%
Baltimore	695,750	7.8%	21,222	12.8%
Calvert	197,451	2.2%	3,515	2.1%
Caroline	0	0.0%	954	0.6%
Carroll	165,049	1.8%	6,698	4.0%
Cecil	108,707	1.2%	3,252	2.0%
Charles	344,645	3.8%	6,242	3.8%
Dorchester	127,409	1.4%	721	0.4%
Frederick	75,234	0.8%	7,844	4.7%
Harford	442,359	4.9%	11,338	6.8%
Howard	309,855	3.5%	15,805	9.5%
Garrett	134,840	1.5%	1,200	0.7%
Kent	128,917	1.4%	399	0.2%
Montgomery	622,146	6.9%	30,342	18.3%
Prince George's	2010,816	22.4%	20,121	12.2%
Queen Anne	173,204	1.9%	2,182	1.3%
Somerset	8,790	0.1%	674	0.4%
St. Mary's	533,382	6.0%	3,327	2.0%
Talbot	65,751	0.7%	1,426	0.9%
Washington	0	0.0%	2,955	1.8%
Wicomico	203,862	2.3%	2,829	1.7%
Worcester	13,477	0.2%	3,730	2.3%

occurred within the County. For Baltimore, Howard, and Montgomery Counties and Baltimore City, the percentage of housing starts that have occurred in the jurisdiction is higher than the percentage of total program grants that have been awarded to the jurisdiction. Howard County is the only one of these five major jurisdictions that had an unacceptable program at the time of review. It appears that local officials in Prince George's County have been more aggressive in seeking funds than other local jurisdictions. One other program that stands out in this crude analysis is St. Mary's County. St. Mary's County has received approximately 6% of the total grants awarded, although the number of housing starts in the area comprises just two percent of the total. Despite receiving funds disproportionate to development activity, St. Mary's program was unacceptable at the time of the last review.

Stormwater Pollution Control Cost-Share Grants

Since 1984, the General Assembly has authorized approximately $5 Million for stormwater pollution control grants. The Sediment and Stormwater Administration has obligated 47 grants totalling $4.97 Million. The funds have been used to support a variety of projects, including seven infiltration facilities, 19 extended detention facilities with wetlands, two extended detention dry ponds, eight wetlands, one sand filter, and 10 other practices. The projects are at various stages of implementation.

Overall, 14 jurisdictions have received cost-share grants (11 counties and three municipalities). Of the counties that received grants, four had unacceptable stormwater programs at the time of the last review. Two of the municipalities that received grants never have been reviewed. Prince George's County has received a disproportionate share of funds (21.7%); Baltimore County has received an unexpectedly small share (3%; Table 5). Like the grants-in-aid, the cost share program is not an entitlement program. Since retrofits are not required by state law or regulation, the effort put forth at the local level to identify and rectify stormwater pollution problems varies greatly. To a significant degree, the allocation of cost-share funds to local jurisdictions reflects the sophistication of local programs.

Table 5. Stormwater Pollution Control Cost Share Grants by County.

County City	Number of Projects	Total Funds ($)	Percent of Funds
Allegany	1	65,000	1.3%
Anne Arundel	5	777,000	15.6%
Baltimore	2	147,000	3.0%
Calvert	1	24,578	0.5%
Caroline	1	25,000	0.5%
Dorchester	2	320,908	6.5%
Harford	4	416,750	8.4%
Howard	1	37,500	0.8%
Kent	1	45,000	0.9%
Montgomery	9	826,000	16.6%
Prince George's	12	1,080,000	21.7%
Baltimore City	3	628,508	12.6%
Crisfield	1	303,750	6.1%
Ocean City	4	272,400	5.5%
Total	47	4,969,394	100%

Chesapeake Bay Agreements

Regionally, implementation of the Chesapeake Bay Agreements is being coordinated through an Interstate Implementation Committee. In Maryland, The Sediment and Stormwater Administration has been designated as the lead agency for nonpoint source pollution controls. An Interagency Steering Committee has been established to coordinate all state-wide efforts to control all types of nonpoint source pollution, including nutrients, conventional pollutants, and toxics. The Committee presently is updating Maryland's Nutrient Reduction Plan, which is the best developed statement of the State's overall efforts to control pollution in the Bay. Sections of the Nutrient Reduction Plan concerning nonpoint pollution have been extracted and used to develop Maryland's nonpoint source management plan for USEPA pursuant to Section 319 of the Water Quality Act. Specific implementation activities have included extensive retrofit efforts in selected or targeted watersheds.

EPA Nonpoint Source Control Programs

While the State of Maryland has been active in stormwater management, direct federal support for implementation of related nonpoint source management programs has evolved more recently. The State of Maryland has redefined existing programs to control nonpoint pollution in the Bay, particularly the Chesapeake Bay nutrient reduction plan, to fit into the framework outlined by EPA pursuant to Section 319 of the Clean Water Act. In March, 1990, the State of Maryland received its first nonpoint source implementation grant. Projects, activities, and items funded include:

1. One staff position to coordinate nonpoint source programs;
2. Two staff positions to implement stormwater utilities;
3. One stormwater retrofit project manager;
4. Four agricultural soil conservation planners;
5. Groundwater modeling study;
6. Demonstration wetlands joint use project;
7. Cooperative Extension Service nonpoint source conference.

These projects were identified by a statewide, interagency task force that was created to guide implementation of projects funded by EPA. As is evident from the projects, about half of the programs are for projects related to urban nonpoint source programs. The coordinator position will be based in the Sediment and Stormwater Administration to strengthen existing programs. The staff to assist with utilities will build on ongoing technical assistance activities to help local jurisdictions identify adequate financing for programs, and the stormwater retrofit project manager will improve the existing cost-share program by strengthening management capabilities, including capabilities for project evaluation. At this time, we anticipate that funds will be available under Section 319 for the next three or four years and that in years hence funds will be used increasingly for implementation of capital and educational projects.

NPDES Permits for Stormwater Discharges

EPA expects to issue final regulations for implementation of the permit system in late July or August of 1990. The State of Maryland has determined that municipal permits will be issued by the Sediment and Stormwater Administration; industrial permits will be issued by the Hazardous and Solid Waste Management Administration. While details of the permitting program have not been developed, it is clear that implementation of the program will require substantial effort and resources not presently available to the Administration.

Administration

Primary responsibility for implementation of the Stormwater Management Act initially was delegated to the Sediment and Stormwater Division within the Maryland Department of Natural Resources (DNR). In 1984, the Division included only three staff members. In 1987, a new Department of the Environment (MDE) was created, and programs were transferred from DNR to

LESSONS LEARNED

To sum up, the State has made significant investments in managing stormwater. Since 1984, the State has awarded $9 Million in program grants-in-aid and about $5 Million for pollution control cost share projects. We estimate that the annual costs to administer these programs (including stormwater regulatory reviews) is about $1 Million annually. We believe these investments have resulted in significant progress. All the counties have implemented programs. Literally thousands of best management practices (BMPs) have been built in Maryland. Most of these are functioning, though perhaps not as designed. With respect to existing programs, we need to improve in a number of areas, both at the local and state levels. The pending stormwater regulations have the potential to significantly impact the Administration's current operations and budget. We are not optimistic that implementation of new federal permit requirements will proceed smoothly. For example, the draft regulations specify that, to obtain a permit, local governments must have water quality monitoring and modeling programs as well as stormwater management programs, sediment and erosion control programs, retrofit programs similar to those already in place in Maryland. These will require significant new resources. We would like to share the following observations.

* State law and regulations are making a difference. On-site controls are helping to mitigate the effects of urbanization. With respect to pollution control, however, these controls simply slow the rate of pollution. BMPs are not 100% effective. Regulators and stormwater managers should be emphatic about the limitations of the practices that are being used.

* Effective stormwater management requires a commitment by elected decision makers at the local level. Despite the existence of state regulations and technical assistance activities, a number of programs at the local level in Maryland are not acceptable. We believe that this results, in large part, from the failure of local officials to allocate adequate resources to the programs. This is particularly a problem in moderately populated jurisdictions that now are experiencing significant growth.

* Given that BMPs have limitations in their ability to control pollutants, growth management must be viewed as a key element of nonpoint source control efforts. Planning at the watershed scale to mitigate against nonpoint source pollution will be required for efficient allocation of scarce resources. For example, major, yet-to-be defined elements of Maryland's Nutrient Reduction Plan involve definition of growth management objectives through watershed planning processes.

* The State's plans for implementation of the federal NPDES program are not well developed. We do not know at this time exactly what the regulations will require or the number of people that will be required to administer the permit system -- even though, according to timetables set forth by EPA, implementation should be occurring.

* Finally, the Maryland experience suggests that evolution of programs will be required to control urban nonpoint source pollution effectively. Despite the existence of path breaking regulations and significant financial and technical assistance, there have been problems with implementation. Recognition of the pervasiveness of the nonpoint source problem and the limitations of even innovative structural approaches leads to the conclusion that growth management approaches are essential; Maryland's program must evolve to incorporate these. Responding to federal regulatory requirements will require additional new elements in the State's stormwater programs. Continual evaluation and reevaluation will be essential to achievement of objectives.

MDE. The Division was elevated to the Sediment and Stormwater Administration (SSA), an organizational leap of two steps. The Administration now includes three programs: (1) the Policy and Evaluation Program, which is responsible for local program reviews, (2) the Construction Management Program, which administers the two State grant programs, and (3) the Compliance Program, which is responsible for sediment and erosion control inspection and enforcement and is the largest program. Table 6 includes a summary of the Administration budget and number of staff for Fiscal Years 1987 through 1991. The budget remained relatively constant between FY 1987 and FY 1989, but increased significantly between FY 1989 and FY 1991. The growth primarily has been for more inspectors to strengthen the erosion and sediment control inspection and enforcement. The Compliance Program is by far the largest in the Administration, accounting for over two-thirds of the staff (in FY 1990), very few of whom have any involvement with stormwater management. The Construction Management Program is the second largest in terms of budget and personnel. The FY 1991 budget figures for this program include, however, about $1.6 Million for the Stormwater Program Grants-in-Aid, about 89% of the Program budget. The Policy and Evaluation Program, which has primary responsibility for review of local stormwater programs, is the smallest of the three Program, accounts for fewer than 10% of the Administration employees and about 12% of the Administration Budget. The Division responsible for review of local programs presently includes only three staff members.

Excluding administrative and clerical staff, approximately five to six technical staff (planners and engineers) actually work to administer stormwater regulations and grant programs. No new positions have been authorized to the Administration specifically for development of programs to achieve the 40% reductions in nutrients in urban nonpoint source loadings to the Bay, although the sediment and erosion control initiatives work towards this goal. The Sediment and Stormwater Administration has been designated the lead agency in Maryland to administer EPA's nonpoint source programs; the 319 grant will fund four additional staff people in the SSA. The SSA also has been assigned responsibility for development and administration of the NPDES system; however, no positions have been authorized to assist with development of the program.

Table 6. Sediment and Stormwater Administration, Staff and Budget.

Fiscal Year	1987	1988	1989	1990	1991
Budget (Million $)					
Policy and Evaluation					0.6
Construction Management					1.8
Compliance					1.4
Other Grants and Administration					1.1
Total Budget	3.3	3.2	3.4	4.1	4.9
Permanent Positions					
Policy and Evaluation					5
Construction Management					8
Compliance					39
Other Grants and Administration					6
Permanent Positions	46	44	43	58	58