

CONSTRUCTION NONPOINT SOURCE POLLUTION:
A PROPOSED CONTROL PROGRAM

by

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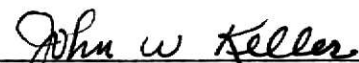
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Chapter 1

PROBLEM ASSESSMENT

Nonpoint sources contribute significant pollutant loadings to the surface waters of the State. Agriculture, particularly row crop agricultural practices, is the single most significant activity to degrade the water resource base of Illinois (1). Certain other nonpoint sources contribute large quantities of pollutants to the water resource base. In Illinois construction, surface mining, timber harvesting and salt water intrusion due to secondary recovery production techniques for petroleum are other significant nonpoint sources. The distribution of problem occurrence also contributes to the complexity of formulating statewide abatement strategies. For example, surface and deep mining activity, timber harvesting and petroleum extraction are generally restricted to the southern one-third of the State. On the other hand, construction related nonpoint sources are geographically dispersed throughout the State, manifested in various forms and subject to a significantly smaller degree of oversight than the other sources previously mentioned (2).

Nonpoint source abatement strategies not only face the complexities of geographic problem dispersion, they also must account for site-specific nature of nonpoint source control techniques. This situation is the direct opposite of the point source control programs which have evolved in the State. These programs rely on a generic system of process controls, wasteload allocations, permit conditions and a heavy public

sector subsidy through the construction grants program. As a result, the management system for point source control can be centralized without a loss of program effectiveness and abatement efficiency. Nonpoint source controls, from a management and implementation standpoint, are decentralized. The example of this management approach is the programs developed by the United States Department of Agriculture, Soil Conservation Service and implemented through the local governmental units called soil and water conservation districts.

In addition, point sources are of primary concern during low flow conditions of surface water systems while nonpoint sources (except for acid drainage from inactive deep mines and baseflow contributions from groundwater sources) are of minimal impact under these conditions. However, nonpoint sources of pollution are most critical in terms of negative impact on water resources during high flow conditions when point sources have little to no impact on water quality. Consequently, these technical and management differences in point and nonpoint source control are significant and must be accommodated in order for the State to fulfill the mandates of the Clean Water Act. If they cannot be effectively integrated and resolved, nonpoint sources may negate the water quality gains achieved by the costly (in terms of capital investment) reductions achieved through point source effluent limitations.

Urban and rural construction activity involves the excavation and displacement of large volumes of soil and vegetative cover resulting in severe local and in some instances regional nonpoint source problems which can cause detrimental physical and biological changes to streams and lakes. About 1.6 million acres of land are disturbed by construction activities, 90 percent of which is for highways and roads and another 5

percent each for urban residential and urban non-residential construction (3). The annual sediment yield nationally to the water resource base is estimated to be 200 million tons, an average of 124 tons per acre per year (4). The purpose of this report is to examine the costs associated with the development and operation of regulatory programs for nonpoint source control in Illinois, in this instance, construction site erosion control. Moreover, this report will primarily address the costs (economic, social and institutional) of the local-regional-state regulatory hierarchy as it relates primarily to private sector financing of these activities. The distinction is important because the development of a strategy for construction site erosion control must include under its umbrella, public sector financing of those activities as well.

It is useful, in the process of developing a comprehensive approach to the problem of construction nonpoint pollution, to have an understanding of the dynamics involved with this particular water quality problem area. The basic force behind the occurrence of severe construction related erosion problems is population growth and the attendant expansion of services to support that growth. Consequently, the occurrence of nonpoint source pollution due to construction can be fairly well defined, that is, it is usually most severe where urbanization (i.e., land conversion from rural to urban use) is most intense. The area allocated to construction in Illinois is estimated to be on the order of one hundred thousand acres per year for housing, commercial and industrial development, highways and the like (5). For example, in the six county greater Chicago metropolitan area, the land consumed for the provision of urban shelter and support is estimated at 24,000 acres per year (6). In both the short and long term, these

changes are the source of much of the 852,000 tons of sediment polluting that area's streams and lakes (7). This is unfortunately representative of the order of magnitude with regard to mitigating the water quality impacts of construction.

The nationwide effort directed toward the development of 208 water quality management plans has revealed that pollution from urban and urbanizing area runoff is a more serious problem than previously thought. The pervasiveness of the problem can be seen in Table 1.1.

Moreover, given the independent nature of rural to urban land conversion and development in Illinois and the rest of the United States, the prospects for uniform equitable and workable system of management is a formidable task.

The daily conversion of thousands of land parcels from rural to urban use occurs primarily near cities and thereby is an intensively used and important environmental area. This process of land conversion and its alteration of runoff characteristics is an extremely serious problem. The effects of poor construction erosion control and the resulting impact on stream water quality are significant. According to Powell, et. al. (8): "In terms of volume, sediment ranks above sewage, industrial wastes, and chemical pollution combined." On an annual basis, sediment is usually over 90% of the pollutant load carried by most streams. The 208 Water Quality Management Plan for Illinois identified sediment as the number one pollutant in the State's waters. It was estimated to be on the order of 182 million tons per year (9).

For the purposes of this report construction activities refer to the actual development of homes, schools, roadways, industrial sites, etc. Conversely, construction practices refer to all related site preparation

work such as cleaning, rough grading, on-site material handling (concrete and asphalt preparation, etc.), soil stabilization and stockpiling and site restoration after construction activities have been completed. It should be noted that the water quality impacts of construction activities and practices are site specific. This is one reason why it is difficult to prescribe a top down approach to this problem area. Moreover, the amount and type of pollution generated during construction is dependent upon the type and duration of the various construction practices employed, the location and extent of the construction activity, the rainfall event distribution and rate of occurrence and finally the physical susceptibility of the site to erosion (as expressed as a function of slope, slope length and soil type).

Table 1.1
National Significance of Nonpoint Sources of Pollution

Region (Number of basins)	Urban Runoff	Con- struc- tion	Hydro- logic Modi- fica- tion	Silvi- cul- ture	Min- ing	Agri- cul- ture	Solid Waste Dis- posal	Indi- vidual Dis- posal
Northeast (40)*	70**	15	20	10	20	55	35	63
Southeast (47)	57	2	21	30	15	62	9	40
Great Lakes (41)	54	7	2	15	41	59	15	39
North Central (35)	54	6	3	6	40	89	9	29
South Central (30)	50	0	23	13	53	87	13	40
Southwest (22)	23	0	18	5	36	73	0	35
Northwest (22)	23	23	23	27	23	55	9	32
Islands (9)	67	67	22	0	0	78	22	89
All basins (246)	52	9	15	15	30	68	14	43

*Number of basins.

**Percent of basin affected, in whole or part.

Source:

United States Environmental Protection Agency. National Water Quality Inventory - 1977 (Washington: Government Printing Office, 1978), p. 15.

Physical Impacts

Traditionally, no construction activity occurs until the site is cleared of the majority of vegetative covering and site rough graded. This exposed soil surface before and during construction activity invite the natural erosive forces of water, wind and overland runoff to cause rates of sedimentation of extremely high magnitudes. These changes in erosion and sedimentation values due to conversions in land use/land cover characteristics can be illustrated in the following table:

Table 1.2
Selected Quantitative Effects on
Surface Erosion Values

Initial Land Use	Type of Conversion	Magnitude of Change (1)
Forestland	Row Crops	100-1000 times
Grassland	Row Crops	20- 100 times
Forestland	Fire	10-1500 times
Row Crop	Construction	10- 50 times
Grassland	Construction	200- 500 times
Forestland	Construction	1000-2000 times

(1) Magnitude of change of surface erosion from disturbed surface assumes "1" for initial status. For example, the table illustrates the conversion of forestland into row crops may increase surface erosion 100 to 1000 times.

Source:

United States Water Resources Council, Second National Assessment. The Nation's Water Resources 1975-2000: Water Quantity, Quality and Related Land Considerations (Washington: Government Printing Office, 1978), p. 154.

Few data have been collected in Illinois which accurately quantify the construction activity related water pollution problem, although investigations are currently underway to establish such quantitative

linkages (10). While certain monitoring data, such as that collected by the Illinois EPA to study urban stormwater problems (11), do indicate significant increases in suspended solids and other pollutants during periods of rainfall and subsequent runoff events, these cannot be solely attributed to construction activity. It is recognized that without such data it is not possible to directly characterize the full nature and extent of the construction site erosion problem in Illinois. However, a qualitative evaluation, based upon estimates of construction activity and potential amounts of erosion, is possible at this time. A quantification of the problem is not necessary for policy formulation in terms of State initiated action. The review of current literature and national data readily reveals that the problem exists in all areas of urbanization, the extent of which only varies with the erosion factors.

It is clear that in urban areas and their urbanizing fringes, construction activity is overwhelmingly responsible for sediment loadings. The U.S. Department of Agriculture recorded a soil loss of 220 tons of sediment per acre per year from a construction site near Baltimore (12). A related study in Virginia also produced the following results (13):

<u>Type</u>	<u>Sediment Runoff in tons/square mile/year</u>
Undeveloped watershed	146
Construction starting	280
Construction well underway	690
Advanced construction	2300

Still another study suggests that sediment yield is roughly 700-1800 tons per square mile per year with every 1000 person increase in population (14).

Southwest Illinois Metropolitan Area Planning Commission (SWIMPC) located in the Illinois portion of the St. Louis SMSA, recently completed

a study of soil losses from an upland watershed which was undergoing urbanization (15). The majority of sites visited has been under development for one to five years. In many cases, construction activities were limited from five to ten single family residences with lots of 1/2 to 1/4 acre in size. Slope gradients ranged from 2% to 22% and slope lengths ranged from 50 feet to 250 feet. There was little evidence that efforts were being made to cover exposed soil or stabilize steep slopes on these sites. In many cases, roadside gutters and catch basins were filled with sediment. Average annual soil losses from these sites were estimated to range from 5 tons/acre/year to 250 tons/acre/year. Most sites were located near or transected by a stream or drainage ditch, thus increasing the potential for sediment delivery from the site.

This study revealed that erosion rates during development can increase by 250% or more over present agricultural uses. Annual erosion rates from construction sites would average about 50 tons/acre/year versus 14 tons/acre/year for agricultural land. Erosion from construction sites constitutes a potential major source of sediment in the study area. Although soil erosion rates can be expected to diminish with completion of the project the sediment removed from the site continues to present environmental problems for years to come. Damage to the land does not come from erosion alone. The increased runoff erodes stream banks and channels and causes flooding below the construction site, and the sediment pollutes streams, lakes and reservoirs and damages the area where it comes to rest.

Urban development projects generally have two common characteristics: 1-they involve soil disturbance, resulting in modification of the physical, chemical and biological properties of land and water resources;

and 2-they are short lived in the sense that the construction phase ends when development and building activities are completed. However, it is not uncommon for water quality problems originating from the original development to continue to persist in the form of poor drainage and urban runoff problems. If all other factors were held constant for any two sites the water quality effect of construction erosion will largely depend on the sediment delivery rate, for each site, to bodies of water. In general the closer a site is to water the higher the potential delivery rate. Another factor influencing water quality is the ratio of the construction site area to the total basin area of the receiving water. A project in a small basin will have a greater effect than if the same project occurred in a large basin.

The usual result of the urbanization of an area, whether it be a large scale development in a short period of time or an equally large development over several years, is a change in all the factors which effect runoff:

- . decrease in soil porosity through compaction by equipment
- . an elimination of surface areas which retain precipitation
- . an increase in impermeable surfaces
- . a construction of channels to carry off the excess surface water and alteration of natural drainage
- . an increase in site slopes due to terracing
- . a decrease in vegetation (trees, grasses, shrubs, etc.) thereby decreasing transpiration and interception
- . an increase in the smoothness of surfaces increasing runoff velocity

An alleviating factor in construction work, in contrast with other nonpoint sources of pollution, is that construction is a relatively short term activity. The disturbances of cover and displacement of soil generally cause only temporary and localized increases in the potential for erosion or production of other pollutants.

During the interval that the land is disturbed, the soil loss and runoff of sediment or other pollutants such as chemicals, oils, etc. will be a function of probabilistic precipitation intensities, event durations and runoff velocities. These water quality impacts can be summarized into a relative order of impact as shown in the following table:

Table 1.3
Impact of Construction Projects on Water Quality

Parameter	Impact*
Sediment	High
Nutrients	Medium
Dissolved Solids	Low
Metals	Medium/Low
Pesticides/Herbicides	Low
Oils/Synthetic Chemicals	Low

*High, moderate or low estimation of impact are relative to expected yields from predisturbed surface on benthetic areas for sediment and relative to urban runoff for chemical pollutants.

Source:

United States Environmental Protection Agency. Impact of Hydrologic Modifications on Water Quality (Washington: Government Printing Office, 1975), p. 117.

When water quality degradation from construction activity occurs, its impact can be severe in terms of local environmental impact. Construction activities frequently occur in small watersheds in or nearby densely populated areas. As mentioned earlier, sediment is not the only pollutant associated with construction activity, but it is the major one. It is the greatest water pollutant by volume and it is also a carrier of other pollutants such as bacteria, nutrients, pesticides, and heavy metals. The effects of sediment upon both the physical and biological

environment are varied:

1. It causes changes in stream flow characteristics.
 - a. By decreasing the storage capacity of water bodies, flood danger is increased.
 - b. Water treatment costs are increased.
 - c. Sediments increase the turbidity which can cause increase heat absorption with resultant thermal effects.
2. Aquatic life disruptions are caused by the presence of suspended solids and sediments.
 - a. A decrease in photosynthesis results from the reduction in light penetration.
 - b. Benthic plants and animals are covered resulting in their suffocation.
 - c. Sediments cover bottom spawning and feeding areas.
 - d. Sediments impair the ability of game fish to see their prey and their mates. Bass and sunfish give way to carp, buffalo fish, and bullheads. Sport fishing is reduced, thus impairing recreational use.

Economic Costs

The costs associated with these typed of water quality impacts and water use impairments can be quantified. They are real costs and are both of a direct and opportunity cost nature. The study of construction site erosion and sedimentation in terms of economic impact is relatively new and the cost assessment approaches exhibit many variations. Costs associated with construction site erosion control can be grouped in the following fashion: (1) costs associated with water quality degradation

and use impairment; (2) costs associated with initial placement control practices; and (3) costs associated with maintenance of control practices. A review of costs associated with water quality degradation and use impairment will be discussed first. This will be followed by a discussion of control practices.

There are few studies which reliably assess the cost of water quality degradation due to construction site erosion control. However, the following examples will illustrate the magnitude of those costs. An attempt was made in the Seneca Creek watershed of the Potomac River to quantify the damages due to construction site erosion (16). The Seneca Creek watershed is a small watershed undergoing the process of urbanization outside of the Washington, D.C. metropolitan area. Estimates were prepared for damages resulting from sediment transport and deposition to the watershed and Potomac River Basin to: municipal water supply, industrial process water, commercial and recreational fishing, boating and aesthetics. These damages were converted to dollars per ton of sediment by estimating the portion of the total load responsible for the particular item. The results of this cost assessment are listed below (all costs are expressed in 1972 dollars):

<u>Water Use</u>	<u>Cost</u>
Municipal Water Supply	\$0.30/ton of sediment
Industrial Process Water	\$0.23/ton
Commercial Fishing	\$1.30/ton
Recreational Fishing	\$0.90/ton
Boating	\$0.80/ton
Dredging	\$0.70/ton
Aesthetics	<u>\$2.60/ton</u>
Total Cost	\$6.83/ton of sediment

These values were not evaluated in terms of impact for sediment inputs of different sized and quite possibly deviate extensively from average values.

Several reports were prepared during the 208 water quality management program for inclusion in the initial plan for Illinois related to the impact of sediment deposition on State waters. Some of these reports attempted to quantify the economic impact that erosion and sedimentation had on Illinois waters.

Total lake storage capacity loss for Illinois due to sedimentation is estimated to be 8,263 acre-feet per year. Forty lakes measured by Illinois State Water Survey (ISWS) account for 1,145 acre-feet per year, while an additional 130 lakes for which estimated sediment loss values were derived account for 2,590 acre-feet per year. The remaining Illinois lakes and impoundments are estimated to be losing 4,528 acre-feet per year. Table 1.4 summarizes estimated annual costs of lake (reservoir) sedimentation in Illinois. All costs are in 1978 dollars.

Table 1.4

Estimated Annual Costs of Sedimentation in Terms of
Dredging and New Lake Construction for All
Illinois Lakes and Impoundments

	Total Surface Area Acres	Percent of State Lake Surface Area	Annual Capacity Lost Acre-Feet	Annual Dredging Cost \$ x 10 ⁶	Annual Replacement Cost \$ x 10 ⁶
Group I*	22,486	8.2	1,145	2.3	.39
Group II**	101,195	37.0	2,590	5.7	.99
Group III***	150,115	54.8	4,528	9.7	1.67
TOTAL	273,796	100.0	8,263	17.7	3.05

*40 lakes surveyed by Illinois State Water Survey (ISWS).

**130 lakes for which estimated sediment loss values were derived.

***Remaining Illinois lakes and impoundments.

Source:

Illinois Environmental Protection Agency. Final Report: Task Force on Agricultural Nonpoint Source Pollution (Springfield: State of Illinois, 1978), p. 68.

Dredging the sediment at a cost of \$1.25 per cubic yard would require \$17.7 million annually for all Illinois lakes and impoundments. Forty-five percent of the cost is assessed to the 40 ISWS surveyed lakes (\$2.3 million) and the 130 additional selected lakes (\$5.7 million). The other \$9.7 million is charged to remaining Illinois lakes and impoundments. The \$1.25 per cubic yard of dredged material is thought to be a minimum rate. Expenses can run as high as \$6.00-\$7.00 per cubic yard due to costs of disposing spoil materials.

Figures show replacing lost storage capacity by new lake construction to be approximately one-sixth that of dredging sediment. The estimated yearly total for Illinois is \$3.05 million, \$0.39 million for 40 ISWS surveyed lakes, \$0.99 million for 130 lakes for which estimated sediment loss values were derived, and \$1.67 million for the remaining Illinois lakes and impoundments. Replacement cost estimates may be somewhat deceiving. The assumption that a replacement reservoir of equal size could be constructed on a similar site may not be valid in all cases. A similar site may not exist or be available for purchase, forcing acquisition of more expensive lands. This may also require taking acreages of prime agricultural land out of production.

Another sedimentation related cost for state, county, and township governments is the removal of sediment from roadside drainage ditches. A survey of state highway district maintenance engineers and county highway superintendents generated the following conclusions:

1. For eight of nine highway districts and 37 of 102 counties in Illinois, the annual expenditure for removal of sediment from roadside ditches is estimated to be \$2.97 million. The quantity of material removed is 1.1 million cubic yards.

2. It is conceivable that over \$6.3 million is spent annually for sediment removal from roadside ditches by all state highway districts and county maintenance forces combined.
3. Based on comments received from participants in the survey, not enough time and money are spent to fulfill ditch cleaning needs.

To address the sediment problem by dredging or new lake construction is to accept the current erosion rates and associated damages. Considering other factors such as loss of soil productivity and cost of removing sediment from roadside ditches, it is more efficient to direct efforts and finances towards measures preventing erosion. Aesthetic value, recreational value and property value are lowered by erosion and sedimentation. Though a total dollar amount cannot be determined for these losses, they can be rather excessive in instances where recreational use is inhibited or structural damage occurs.

Abatement Strategies

When an area is exposed during construction, the severity of erosion can be greatly reduced if proper control measures are used. Erosion control measure perform one or more of the following functions: minimize soil exposure, control runoff, shield the soil and bind the soil. Control measures or best management practices (BMP's) are well known and there are many reports which discuss them. Basically, all the reviewed references contain similar principles or concepts for reducing erosion, sediment loss and other pollutional impacts. These concepts include:

1. Limiting the time of duration that disturbed ground surfaces are exposed to rainfall and runoff water.
2. Diverting runoff from above the site which would contribute runoff to

areas subject to erosion.

3. Reducing the velocity of the runoff water on all areas subject to erosion below that necessary to erode the material.
4. Applying a ground cover sufficient to restrain erosion on that portion of the site which further construction activities will not be undertaken.
5. Collecting and detaining runoff from the site in sediment basins to trap sediment being transported from the site.
6. Making provisions for permanent protection of downstream banks and channels from the erosive effects of increased velocity and volume of stormwater runoff resulting from the facilities constructed.
7. Limiting the angle for graded slopes and fills to an angle no greater than that which can be retained by vegetative cover or other adequate control device or structure.

All BMP's are based on the preceding principles and concepts. Any BMP used for construction projects must be suited for specific conditions on specific sites. Most erosion control practices can be grouped into the following categories: surface roughening, interception and diversion practices, vegetative soil stabilization, and non vegetative soil stabilization. The functional relationship of these practices can be seen in Table 1.5.

Practices that prevent transportation of sediments from a site area will also deter movement of many other pollutants such as oils, pesticides, solid wastes, metals, etc. from the site area. Pollutants carried in solution, however, will pass through all sediment control defenses. In this case, proper application of materials and "good housekeeping" activities must be used to do the job. They will involve such things as

Table 1.5
Construction Site Runoff Control Practices

Control Practice	Functions
Selective Grading and Shaping	Reduces critical slope lengths and gradients, thus slowing runoff.
Vegetative Buffer Strips	Slows runoff velocity, thus filtering sediment from runoff. Reduces volume of runoff by increasing surface ponding.
Roughened Surface	Reduces velocity while increasing infiltration rates. Collects sediment and holds water.
Benches	Reduces runoff velocities by decreasing effective slope lengths. Retains some sediment. Provides access to slopes for revegetation.
Diversion Structures	Collects and directs water from vulnerable areas to prepared drainageways and so reduces erosion potential.
Grade Control Structures	Slows velocity of flow, reducing erosive capacity. Usually permanent.
Grassed Waterways	Grass tends to filter sediment and slow runoff and so stabilizes drainageways.
Level Spreader	Collects channel or pipe flow and converts it to sheet flow. Increases deposition.

Source:

Illinois Institute of Environmental Quality. Control of Nonpoint Sources: Construction Activities (Preliminary Draft) (Springfield: State of Illinois, 1977), p. 12.

optimum dosage and proper use of pesticides and fertilizers with special attention to not applying them in excess of quantities required, limiting application only to points of need, and prohibiting application in

periods of weather extremes such as freezing conditions which render the ground impermeable and ensure runoff of materials. Washing facilities for equipment should be located and concentrated at specific points where draining waters can be collected in impervious holding ponds. Washing of finished surfaces to remove excess concrete or other chemical residues should be undertaken only after holding ponds have been provided to catch drainage waters. Waste quantities of paints, oils, and greases should be collected and transported off site for sanitary disposal. Pollution from other waste materials such as rubber, plastic, or wood building materials; food containers; sanitary wastes; and miscellaneous solid and liquid materials can be controlled by the use of adequate disposal facilities and the transport of these materials from the sites to authorized disposal areas.

In most cases, a combination of limited grading, limited time of exposure and a careful selection of BMP's with sediment trapping facilities can provide the most practical method of mitigating pollutional impacts. Existing control practices, properly used, provide an adequate technical basis for the design of reasonable control systems. Several other steps can be taken to minimize erosion from construction sites.

The preparation of a site grading schedule is useful. When land is developed, the size of areal exposure should be minimized as mentioned previously. This can be done through the use of staged or phased grading. Minimizing grading of large or critical areas during the season of maximum erosion potential (May 1 through September 30) obviously can reduce the risk of erosion. A field review by experienced personnel will assist in developing this schedule since soil type, vegetative cover, topography, drainage areas and channels can cause wide variations in the

applicability of any given technique from site to site or even within a site.

From an institutional standpoint, the adoption of a general land use plan based upon a comprehensive inventory of soil, water, and related resources can also be of assistance. The land use plan can restrict development in environmentally sensitive lands with high erosion potential. Steep slopes, soils with high percentages of silt and fine sands, and floodplains should be left undisturbed whenever possible. Development should be geared to the topography, soils, waterways and natural vegetation of each particular site.

However, in addition to land use planning guidance, detailed planning is needed to integrate construction phase timing with the best use of erosion and sediment control technology. For example, sediment basins used in conjunction with on-site erosion controls offer the best sediment control, in terms of on-site retention. Downstream, multi-purpose impoundments designed with sediment storage capacity can also increase trap efficiency.

As with all other control and abatement strategies for nonpoint source management, preventative approaches are the preferred course of action. Given the temporal aspects of construction site nonpoint source pollution (i.e., rainfall dependent), preventative control approaches are the only viable options for water quality management. As has been demonstrated in the preceeding pages, there are many well defined technical options and their efficiencies are clearly understood. Consequently, the abatement of construction related nonpoint pollution is not as much a matter of problem definition and/or abatement effectiveness but rather it is one of implementation, planning and management.

Moreover, it becomes a matter of proper timing and arrangement of those three factors.

Summary

The basic premise of this report is that for the purposes of water quality management, pollution resulting from sedimentation and other pollutants (including storm runoff) can be mitigated by the proper application of appropriate structural and soil stabilization measures. Emphasis should be placed on the words "proper application". In the context of nonpoint source pollution control, these words imply the implementation of individual or institutional planning activities which incorporate nonpoint source abatement prior to and during actual construction. The proper application of structural and vegetative techniques has its major importance in terms of the processes (preliminary design, final design, etc.) relative to the procedures (statutory laws, ordinances, land use regulations, zoning and subdivision regulations) specified by Federal, State, and local governmental units. In addition, there are the site specific methods and systems (contract specifications, design standards, and construction site BMP's) for achieving control of sedimentation, runoff and other pollutants.

The technical options previously discussed can be implemented through the regulatory, fiscal/administrative, and proprietary powers of government. Despite the now dominant role of the federal government in regulating point sources (through construction grants, discharge permits and civil/economic sanctions), the control of nonpoint sources -- specifically construction site erosion -- remains almost entirely a state and local responsibility. This distinction has been clear since the original

formulation of water quality management planning in the Federal Water Pollution Control Act Amendments of 1972 and subsequent Clean Water Act of 1977. Both these acts stress that Section 208 planning develop statewide and areawide strategies, including regulatory programs, for controlling all sources of water pollution. This approach must recognize the preventative abatement strategies for managing nonpoint sources are in essence inseparable from land use controls, which have traditionally been exercised for the most part by local governments.

The mandates of federal water quality legislation coupled with the particular nature of nonpoint source control and the fragmentation of implementation authorities and management responsibilities clearly suggest that potential obstacles may arise during abatement strategy formulation (particularly at the state level). Because the preventive approach to construction site erosion control requires coordination at many levels, conflict may occur. This is especially likely between those entities with management responsibilities (Illinois EPA) and those with implementation authority (local governments). It is not known at this time whether or not this arrangement will change significantly in the near future. Consequently, existing institutions will have to be used to establish an effective statewide program of construction site erosion control.

To accomplish this objective, the process of establishing a program for construction related nonpoint control must be viewed from a certain perspective. First, there is the actual method of nonpoint runoff control through reduction and prevention. This entails a host of abatement measures which are both physical and regulatory in nature, with enforcement authority resting primarily at the local level.

Secondly, in order to control construction related pollution, these abatement measures must be applied systematically to insure uniformity of approach in all areas where construction activities critically impact water quality. Thus the management of the problem, from a state perspective, requires an awareness of the institutional constraints present. This will require consideration of who has jurisdiction over this source of pollution and what is required of those agencies, both initially and on a continuing basis, in order to formulate an equitable control strategy. The remainder of this report will be devoted to an examination of those constraints.

Chapter 2

INSTITUTIONAL ASSESSMENT

The institutional framework which presently surrounds the control of construction erosion is complex. It includes agencies of various powers and authorities at the federal, state, regional and local levels. These agencies are involved through regulatory, financial, educational or public works mechanisms or some combination thereof. All governmental levels can bring regulatory power to bear on the problem of construction site erosion control. However, the complexity of institutional arrangements is such that these authorities and powers may not be able to be invoked at all times or their application is inappropriate for the particular problem at hand.

In this section of the report, the federal government will be dealt with in a very brief manner in order to more fully assess local and state prerogatives for action in this subject area. This assessment will include an examination of local authorities and their use of traditional land use control powers. The state level assessment will examine executive agency strategies available to compliment those local authorities and/or those options which can be used to pre-empt or supercede local prerogatives.

One of the key premises underlying this report is that the existing institutional sets and control authorities are inadequate in terms of solution to construction related water quality problems. The inadequacy of existing authorities and structures may be a function of inappropriate

application and use of existing controls or the absence of the necessary legal and statutory basis for action altogether. This is one of the determinations to be made in this report. A detailed understanding of the existing situation in Illinois is a prerequisite to making determinations on the need for new authorities or programs. It is necessary therefore to develop an institutional picture on those agencies presently or potentially involved in the control of construction erosion.

An initial screening of all federal and state agencies active in Illinois yielded the following major agencies that are, or could be, involved in some aspect of the control of construction related erosion and runoff (16):

Federal

Environmental Protection Agency
Soil Conservation Service
Corps of Engineers
Forest Service
Department of Transportation
Agricultural Stabilization and Conservation Service
Housing and Urban Development

State

Environmental Protection Agency*
Pollution Control Board
Department of Transportation*
Department of Conservation*
Capital Development Board
Department of Agriculture*

Those state agencies marked by an asterisk currently are designated management agencies for implementing portions of the 208 water quality management plan. The control programs of these agencies, as well as those of local governments, can be of a regulatory or non-regulatory nature. Regulatory programs which relate to construction activity currently exist from the federal level down to local units of government. Non-regulatory administrative programs generally consist of

review and procedural methods which have the potential for mitigating adverse erosion associated impacts through application of review criteria and performance standards. Although these programs exist at all levels of government they do not begin to adequately address all of the projects in Illinois nor have they been guided by a central purpose. In other words, the level at which the exercise of control authorities and methods prove to be most effective has yet to be determined. This is true for both the actual abatement of construction related pollution as well as providing an operational and accountable management system.

A recent study (17) conducted as part of the continuing planning phase of Illinois' water quality management program identified over thirteen federal acts, authorities and/or executive orders which to a greater or lesser degree have applicability to construction site erosion control programs. These statutory citations are listed in Table 2.1. Those with greater applicability to the Illinois case will be highlighted in greater detail in the following sections.

Table 2.1

Applicable Federal Statutes Related to Construction
Site Nonpoint Source Control in Illinois*

Agency/Department	Title/Legal Citation
Agriculture	Watershed Protection and Flood Prevention Act of 1954, PL 83-566 (16 USC 1001), as amended by the Food and Agriculture Act of 1962, PL 87-703 (16 USC 1001) and the Rural Development Act of 1972, PL 92-419 (7 USC 1921)
Commerce	Coastal Zone Management Act of 1972, PL 92-419 (7 USC 1451 <u>et seq.</u>)

Table 2.1 (continued)

Agency/Department	Title/Legal Citation
Defense (U.S. Army Corps of Engineers)	Emergency Flood Control Act of 1974, PL 78-318 (33 USC 701a)
	An Act Authorizing Construction, Repairs and Preservation of Certain Public Works on Rivers and Harbors, PL 75-685 of 1938 (33 USC 540,542). aka Urban Studies Program
	River and Harbor Act of 1956, PL 84-826 (33 USC 426e-h)
	River and Harbor Act of 1899, 30 stat. 1121 (33 USC 401), 55th Congress
	Clean Water Act of 1977, PL 95-217 (33 USC 2151). Amends the Federal Water Pollution Control Act of 1972, PL 92-500 (33 USC 2151)
Environmental Protection Agency	Clean Water Act of 1977, PL 95-217 (33 USC 2151). Amends the Federal Water Pollution Control Act of 1972, PL 92-500 (33 USC 2151)
Housing and Urban Development	Housing and Community Development Act of 1977, PL 95-128 (42 USC 301). Amends the Housing and Community Development Act of 1974, PL 93-383 (42 USC 5301). Supercedes Housing Acts of 1954, 1955 and 1965
	Flood Disaster Protection Act of 1973, PL 93-234 (42 USC 4001 <u>et seq.</u>)
Interior	Surface Mining Control and Reclamation Act of 1977, PL 95-87 (30 USC 1201 <u>et seq.</u>)

Table 2.1 (continued)

Agency/Department	Title/Legal Citation
Transportation	Federal Aid Highway Act of 1970, PL 91-605 (23 USC 101 <u>et seq.</u>)
All Federal Agencies	National Environmental Policy Act of 1969, PL 90-190 (42 USC 4321 <u>et seq.</u>)
	Executive Order #11514, Protection and Enhancement of Environmental Quality, March 15, 1970
	Executive Order #11988, Floodplain Management, May 24, 1977
	Executive Order #11990, Protection of Wetlands, May 24, 1977

*Citations searched under the general descriptions of Flood Control/Construction, Municipal Permits and Construction.

Source:

University of Illinois, Bureau of Urban and Regional Planning Research. Inventory of Federal and State Water Quality Statutes and Regulations (Springfield: Illinois Environmental Protection Agency, 1980), pp. I 1-45 and II 1-115.

Federal Programs

Perhaps the most readily discernible application of federal law and regulation to construction site erosion control in Illinois is the National Environmental Policy Act of 1969 (PL 90-190) as implemented by federal agencies through Executive Orders 11507 dated February 4, 1970 (18) and 11514 dated March 15, 1970 (19). Passed by the Congress in 1969, Section 102(2) (C) of the National Environmental Policy Act (NEPA) (20) set forth the requirements that all federal agencies prepare an environmental

impact statement (EIS) for all "proposals for legislation and other major federal actions significantly affecting the quality of the human environment . . .". In the almost 11 years since passage and implementation of NEPA, the Council on Environmental Quality and the courts have interpreted the requirements of NEPA into a separate body of law replete with its own intricacies. For example, the word "action" has been interpreted to include any land development project provided that it is federalized in some way, either through federal financial support or federal program requirements, and becomes a federal action required by statute. The U.S. Department of Housing and Urban Development has extended its own EIS requirements to any private housing insured by federal mortgage insurance, provided that the project exceeds a specified numerical size threshold.

With regard to defining which federal actions are significant enough to warrant submission of an EIS, the courts in *Hanly v. Mitchell* (21) set forth a two-pronged test. First to be considered is the extent to which the proposed project creates adverse impacts beyond those already created by existing land uses in the area. Second, the proposing agency must discern the project's anticipated incremental impact on the environment. However, application of this test in subsequent litigation has been less than satisfying, as the courts so far have not been explicit enough in defining the level of environmental significance of an action's impact that must be reached before an EIS need be prepared (22).

Obviously, the EIS process has the potential to disclose adverse impacts due to erosion from construction projects if the proposing agency and reviewing agencies, both state and federal, are aware of the problem. For major projects such as highways, utility plants, and dams,

the EIS can serve as a tool for focusing concern on this problem. However, the EIS process is limited in effectiveness as a control measure in that only major projects requiring a federal action will be reviewed, and it is unclear as to how severe the construction erosion must be in order to force a review of the project by the proposing federal agency. In addition follow-up action to ensure that proposed mitigating measures are utilized is often lacking.

Additional federal help can be provided through the auspices of continuing programmatic responsibilities of these agencies. Some federal agencies provide services related to floodplain management that might be useful in assisting local governments to develop a construction erosion control element as part of a larger floodplain management program. Each U.S. Army Corps of Engineers district office, under provisions of the Flood Control Act of 1974, offers technical assistance in this area, including design review, data gathering and analysis, and general program assistance. The level of effort is dependent on availability of district manpower and funding. Additionally, the U.S. Soil Conservation Service administers a Resource Conservation and Development Program which provides assistance to local governments on a cost-sharing basis for any economically feasible works project providing for conservation and utilization of natural resources so as to provide employment and other economic opportunities for residents of the project area. While potentially useful sources of assistance in implementation of local construction erosion programs, it would not appear feasible to place undue reliance upon them since the major concerns of these agencies with other natural resource management issues (e.g., flood control and agricultural land conservation) will act to constrain the effort they can

allocate to construction erosion control programs.

Interagency cooperation during the initial phases of project planning can lead to more substantial environmental benefits and economies. Obvious benefits include forehand knowledge of existing facilities and future plans, and compatibility of design relative to land use, storm sewer systems, and highway construction, among others. The degree of coordination between federal agencies and the various state and local groups relative to construction and development activity varies in relation to the authority of each group. Public institutions are frequently compartmentalized by design - a situation which essentially guarantees the lack of easy communication within and between units, and the fragmentation of the decision making process.

An important document illustrating the need for more effective future coordination of construction plans (and presumable water quality objectives) between Federal, State, and local governments was issued on February 9, 1971, by the Executive Office of Management and Budget (OMB). Known as revised Circular A-95, this document contained a mandate for added cooperation between all levels of government in the evaluation, review, and coordination of federally assisted programs and projects. In essence, the OMB urges the creation of opportunities for contact and communication within and between the several levels of governments. This step would appear to be a necessary precondition for the coordination of federal development projects.

It is clear that all these federal approaches, whether they be regulatory, administrative or coordinative/educational in nature will not be sufficient enough in scope nor likely to be exercised at the level in which implementation can most effectively occur. In other words, action

to mitigate the problems associated with construction related nonpoint sources must take place at the State and local level. Consequently the timing, application and usage of the authorities best exercised at their respective levels must be carefully considered.

Provisions for federal funding and assistance to states and local jurisdictions were of course included in the Federal Water Pollution Control Act Amendments of 1972 and the subsequent Clean Water Act of 1977. There are also references to "land use requirements" in the Act which have caused much concern at the local level of government (23). Federal regulations and program guidance from USEPA has clearly put the responsibility for establishing and implementing the land use control and land treatment aspects of the Act with the State (24). In doing so, they have put the responsibility at the level(s) of government that is most capable of exercising it, on the basis of both legal powers and political acceptability.

State and Local Programs

It can hardly be debated that it is more politically acceptable for the states than the Federal government to develop programs to control polluting land uses, including those related to construction site erosion. However, whether the political situation of an individual state will permit them to exercise this responsibility effectively enough to mitigate pollutional impacts, when the economic livelihood of members of the private sector (both individual and corporate) may be affected, is another question.

Illinois State Government, like all other state governments derives its power from the State constitution and the Tenth Amendment to the U.S.

Constitution. This amendment reserves to the states all the traditional, commonlaw powers not expressly granted to enact water pollution control and a variety of types of land use regulations. This is the state's "police power" which permits them to regulate private activities for the protection of public health, safety and welfare. But the state's power (and therefore its local subdivision's power) to regulate land use is also limited by certain provisions of the Fourteenth Amendment to the Federal constitution that protects private rights. These are: (1) the provision that private property may not be "taken" for public use without just compensation; and (2) the provision that all persons are entitled to equal protection of the law.

Whether or not a given land use regulation is sufficiently stringent to constitute a "taking" that requires compensation is a frequently litigated issue. The courts in different states have used different lines of reasoning, which has led to different rulings arising from similar regulations and fact situations. The most prevalent ruling is that a land use regulation is considered a taking if it results in extreme reduction of economic value of the land.

Nationally, there are many state and local laws concerning sedimentation which are applicable to the discussions here. In general the case law makes it eminently clear that downstream owners can recover damages if changes and costs are well documented. A number of cases exist in which liability has been imposed for sediment injury resulting from nearby land disturbing activities. In a 1958 decision (*Turner v. Goldwasser*, 179 N.Y.S. 2d 663) the Supreme Court of New York upheld an award of damages against a land developer whose construction activities resulted in deposition of sediment and debris in a previously uncontamin-

ated ornamental pond. In a 1967 North Dakota case (Thorson v. City of Minot, 153 N.W. 2d 764) damage awards were upheld for a number of landowners injured by the operation of a municipal landfill resulting in flooding from surface waters and the deposition of mud and other debris on the landowner's properties. In a 1973 Georgia decision (Shaheen v. G & G Corp., 198 S.W. 2d 853) recovery was obtained by a landowner injured by flooding and sedimentation resulting from the grading of an adjacent lot.

Recent court opinions dealing with environmental/land use/water quality legislation of the late 1960's and early 1970's, however, indicate that the courts are no longer interpreting the taking clause to mean elimination of commercial value by regulation always amounts to a taking. Indications are that the courts are less likely to invalidate a statute or ordinance if it is based on a considered judgement of both the rights of the property owner and the costs to the public of allowing the restricted land use to continue. The courts are also likely to insist that a valid regulation must be carefully drafted to avoid restricting activities that are not harmful. At the local level, this underscores the renewed importance which the comprehensive plan has acquired as a result of this particular drift in judicial thinking. Moreover, some commentators have noticed a definite tendency of the courts in the 1970's to approve land use regulations that are statewide or regional rather than local (25).

In addition to its police powers to regulate land use, the State also has the power to raise taxes and to condemn privately owned land for legitimate governmental purposes (including nonpoint source control) on payment of "just compensation". The State has delegated many of these

powers to local governments of general jurisdiction, such as cities and counties. The State has also created special purpose governments, such as sanitary districts or the soil and water conservation districts and endowed them with the government powers necessary to carry out their functions.

Historically, most land use regulation in Illinois has been at the local level and has been aimed at the regulation of building (zoning ordinances, building codes, subdivision regulations) not resource use. Although local governments frequently do not have all the regulatory (or taxing) powers of the State, they should be considered the appropriate level for deciding where commercial, residential, industrial and public facility development should take place. In many cases the State has already given local governments of special and general jurisdiction the basic authorities necessary to either directly or indirectly impose nonpoint source controls. In many cases the State can use its existing state level regulatory authority to accomplish the same purpose or enact enabling legislation to allow (or cause) local units to assume more responsibility. As pointed out in the initial 208 Water Quality Management Plan, the latter was identified as a recommended course of action (26). A summary of applicable state agency statutory authorities, regulations and local enabling legislation can be found in Tables 2.2 and 2.3.

Table 2.2

Applicable State Statutes and Regulations Related to
Construction Site Nonpoint Source Control in Illinois

Agency/Department	Title/Legal Citation
Agriculture	Ill. Rev. Stat. Ch. 5, Sec. 106 <u>et seq.</u> ; Laws 1937, p.10, Sec. 1 <u>et seq.</u> (as amended), Soil and Water Conservation District Act
Capital Development Board	Ill. Rev. Stat. Ch. 127, Sec. 751 <u>et seq.</u> ; P.A. 77-1916 Sec. 1, Capital Development Bond Act of 1972
Transportation	Ill. Rev. Stat. Ch. 19, Sec. 52 <u>et seq.</u> ; Laws 1911, p. 115, Sec. 5 <u>et seq.</u> (as amended), Regulation of Rivers, Lakes and Streams Ill. Rev. Stat. Ch. 42, Sec. 472; P.A. 77-167, Sec. 1 <u>et seq.</u> , Drainage, Flood and Pollution Control Ill. Rev. Stat. Ch. 19, Sec. 126, <u>et seq.</u> Laws 1945, p. 376, Sec. 1 <u>et seq.</u> , Control of Floods and Conservation of Water
Environmental Protection Agency/ Pollution Control Board	Ill. Rev. Stat. Ch. 111 1/2, Sec. 1001-1007; P.A. 76-2429, Sec. 1-7; Environmental Protection Act -- Title I: General Provisions Ill. Rev. Stat. Ch. 111 1/2, Sec. 1011-1013; P.A. 76-2429, Sec. 11-13; Environmental Protection Act -- Title III: Water Pollution
Conservation	Ill. Rev. Stat. Ch. 127, Sec. 6305; Laws 1917, p. 2, as subsequently amended, Prevention of Pollution
Mines and Minerals	Ill. Rev. Stat. Ch. 96 1/2, Sec. 4501 <u>et seq.</u> ; P.A. 77-1568, Sec. 1; Surface Mined Land Conservation and Reclamation Act

Source:

Ibid, pp. III 6-24 and IV 9-82.

Table 2.3

Applicable Enabling Acts for Local Units Related to
Construction Nonpoint Source Control in Illinois

Local Unit	Title/Legal Citation
County	Ill. Rev. Stat. Ch. 34, Sec. 414, P.A. 80-489, Sec. 1, Maps, plots, and subdivisions -- Rules and Regulations governing streets, public grounds, water supply, sewer, etc.
	Ill. Rev. Stat. Ch. 34, Sec. 422, P.A. 78-255, Sec. 61, Building Construction, Alteration, and Maintenance -- Rules and Regulations
	Ill. Rev. Stat. Ch. 34, Sec. 430, Laws 1961, p. 2620, Sec. 1, Removal of Obstructions from Watercourses
	Ill. Rev. Stat. Ch. 34, Sec. 436.1, P.A. 76-1831, Sec. 1, Discontinuance of issuing of building permits
	Ill. Rev. Stat. Ch. 34, Sec. 3001 <u>et seq.</u> , Laws 1957, p. 1110, Sec. 1; Regional Planning
	Ill. Rev. Stat. Ch. 34, Sec. 3151 <u>et seq.</u> , Laws 1935, p. 687, Sec. 1 <u>et seq.</u> as amended, Zoning
Municipalities	Ill. Rev. Stat. Ch. 24, Sec. 11-13.1 <u>et seq.</u> , P.A. 77-1373, Sec. 1, Zoning
	Ill. Rev. Stat. Ch. 24, Sec. 11-30.8, Laws, 1961, p. 2620, Sec. 1, Grading and Drainage of Lots -- Corporate Authority of Municipalities
	Ill. Rev. Stat. Ch. 24, Sec. 11-12.5, Laws 1961, p. 2757, Sec. 1, Plan Commissions -- General Powers

Table 2.3 (continued)

Local Unit	Title/Legal Citation
River Conservancy Districts	<p>Ill. Rev. Stat. Ch. 24, Sec. 11-56.1, Laws 1941, Vol. 2, p. 19, Sec. 23-61, Definition and Abatement of Nuisances</p> <p>Ill. Rev. Stat. Ch. 42, Sec. 383, Laws 1967, p. 3818, Sec. 1, River Conservancy Act</p> <p>Ill. Rev. Stat. Ch. 42, Sec. 409, P.A. 76-2439, Sec. 1, Pollution of Stream -- Duty to Prevent -- etc.</p>
Soil and Water Conservation Districts	<p>Ill. Rev. Stat. Ch. 5, Sec. 106 <u>et seq.</u>, Laws 1937, p. 10, Sec. 1 <u>et seq.</u>, as amended, Soil and Water Conservation District Act</p>
Surface Water Protection Districts	<p>Ill. Rev. Stat. Ch. 42, Sec. 448-471, Laws 1953, p. 1510, Sec. 1-24 (as amended), Surface Water Protection Districts</p>
Drainage Districts	<p>Ill. Rev. Stat. Ch. 42, Sec. 473, P.A. 80-1495, Sec. 21, Pollution Abatement Control - Additional powers of drainage districts</p>

Source:

Ibid, pp. V 8-66.

As shown in the proceeding tables, there are numerous acts, authorities, powers and duties ascribed to state and local agencies or units of government. The effectiveness of these powers vary tremendously with the traditional use and exercise of those powers. At a surface glance, many entities appear to be entitled by law to act clearly and forcefully in the water quality problem areas of concern in this report. However, historical, judicial and administrative forces have in fact

limited the application of those powers. The following paragraphs will highlight those powers which have retained effectiveness and thus have the potential for application.

The Illinois Environmental Protection Act and corresponding Illinois Pollution Control Board (IPCB) Rules and Regulations, Chapter 3, address the general problem of water pollution in the state. Specifically, paragraph 1012 of the Act and the general use water quality standard in Rule 203 of IPCB Regulations, Chapter 3, can be broadly interpreted as limiting discharge of contaminants in concentrations sufficient to constitute water pollution in runoff from construction sites. However, Illinois presently has no water quality restriction on suspended solids and sedimentation in lakes and streams. Generally, the Act and attendant regulations appear to offer limited potential for controlling construction site erosion at this time. The lack of specific water quality standards for sediment, the most visible and extensive construction site pollutant, and the limited applicability of existing laws and regulations to typical construction activities could act to confine efforts at the state level to control this problem, given current legislative and regulatory authority.

Recent legislative initiatives hold some promise for strengthening a statewide approach to construction site nonpoint source pollution. Illinois Public Act 80-159, which became effective January 1, 1978, amended the state Soil and Water Conservation District Act to require the following:

- a) The Illinois Department of Agriculture is to develop and coordinate a comprehensive state erosion and sediment control program, including guidelines to be used by soil and water

conservation districts in Illinois in implementing this program;

b) The Department of Agriculture is to develop guidelines for implementing and administering the comprehensive state erosion and sediment control program that reflect localized conditions, including techniques and methods for the control of erosion and sediment resulting from land disturbing activities;

c) Within two years of adoption of the state program and guidelines, each soil and water conservation district is to implement its own sediment and soil erosion control program, including the development and adoption of conservation standards for various types of land uses.

Its scope is limited however by its definition of "land disturbing activity" which specifically excludes "any plat of subdivision approved by municipal or county units of government". An ensuing statement in the legislation that the Act encourages the establishment of sediment and erosion control ordinances at the municipal and county levels.

The guidelines which have been developed under the provisions of the 1978 amendments to the Soil and Water Conservation District Act only briefly address construction erosion and basic principles of control.

Another reference in the statutes which relates to construction specifies that any person who petitions any municipality or county agency for variation, amendment, or other relief from a zoning ordinance or who proposes to subdivide vacant or agricultural lands must furnish a copy of the petition or proposal to the soil and water conservation district in the area. The district then has 30 days to issue its written opinion to the municipality or county. The purpose of the law is to encourage the use of available soils information in the evaluation of local land

development proposals. The Illinois Attorney General has since ruled that with respect to this requirement the county or municipal zoning authority is without jurisdiction to take final action on a subdivision plat or zoning petition until it has received the opinion of the area soil and water conservation district (27). However, no penalties can be applied for violation of the law and only 25 to 30 soil and water conservation districts perform this review.

The provisions of the state Soil and Water Conservation District Act appear to offer limited potential in mitigating the adverse impacts of soil erosion and sedimentation from construction sites. Construction erosion is only briefly addressed in the statewide erosion control program developed by the Illinois Department of Agriculture, and while district review and comment upon land development proposals can serve to raise the awareness of the need for sound conservation practices at the construction site, participation is essentially voluntary as no penalties are provided for circumvention. The limited number of soil and water conservation districts reviewing land development proposals, lack of full time staff for most districts, and lack of adequate funding techniques limit the districts' potential in this review process.

An additional problem with soil and water conservation districts is that they do not have jurisdiction from border to border within the county (or counties). Districts cover only those areas of a county which were not incorporated at the time of formation of the district. This means that urban centers which have a high potential for construction activities are excluded. It is recognized however that most construction activity occurs on urban fringe areas that may or may not be part of an incorporated area.

State programs to assist in floodplain management with applicability to construction erosion are centered in the Division of Water Resources of the Illinois Department of Transportation. The Bureau of Local Assistance in the Division is a source of aid for local officials in applying for state and federal flood control projects. Staff also provide technical assistance by advising on alternative BMP's and regulatory program designs. Those local governments that wish to include construction erosion control elements in their flood plain programs might find the Division a helpful source of information on structural management techniques and general program design. The Illinois Department of Transportation also utilizes construction erosion controls on highway projects. Since IDOT is a significant capital construction entity, these site procedures can become an important method of mitigating adverse highway related construction erosion impacts. IDOT followed the lead of USDOT and has developed a water quality manual for use in conjunction with highway construction (28).

The manual that IDOT has compiled and enacted through administrative and internal action is illustrative of the type of non-regulatory programs which can be undertaken. Recently, the Governor issued an Executive Order, 80-4, Preservation of Illinois Farmland. In this order the Governor directed that those state agencies which had programs or policies which significantly impacted prime agricultural land review their policies related to conversion of those lands. The purpose of the order is to ensure that the state makes an effort to "minimize the conversion of prime farmland that results from the direct or indirect effects of state programs and also to encourage the achievement of related goals, such as reducing the loss of soil through erosion" (29). Agencies of the Executive Branch perform numerous functions which effect the

management of Illinois natural resources. As such, decisions on state grants and capital improvements may have significant impacts, yet often they are not viewed as a proper method to cause, in the context of this report, better management of environmental and natural resources.

The agencies identified -- Capital Development Board, Department of Conservation, Department of Commerce and Community Affairs, Environmental Protection Agency, Institute of Natural Resources, Department of Mines and Minerals, Department of Transportation, Bureau of the Budget, and the Illinois Commerce Commission -- might well serve as a basic list of those state agencies with extensive involvement in capital construction for the state. This involvement can take the form of either direct construction activity, such as IDOT's highways and waterways construction programs, or through oversight power on the state financed projects, such as the Capital Development Board has. In both types of examples the administrative, procedural and performance standard oriented type actions that could be taken would significantly impact a portion of the problem. In a conceptual sense this would mean "good housekeeping" across the entire spectrum of a state sponsored or supervised project, from its inception to final completion. This type of action can take place at the local level of government as well, although the effects would normally be of a much lesser extent.

Any or all of the approaches previously mentioned could be undertaken entirely at the state level, through the enactments of the state legislature and the administration of regulatory, fiscal or proprietary functions by agencies of the executive branch to which the legislature has delegated the necessary authority. However, Illinois has delegated a large measure of its police power (in terms of its application to construction site

erosion) to local governments, either through the home rule provision of the State Constitution and through the enabling statutes. Thus municipal charters, adopted in accordance with the constitutional and statutory provisions, are the fundamental sources of local government authority.

There are several possible legislative provisions regarding the powers of municipalities and counties which may be exercised in the control of construction site erosion at the local level. The first of these is the Plat Act, applicable to parcels of land being subdivided into two or more parts, any of which is less than five acres. Paragraph two of this act specifically provides that before the plat can be approved by the municipal or county authorities the subdivider must submit a statement by a professional engineer that the drainage of surface waters will not be changed as a result of the project or, if it will be changed, that adequate provisions have been made for collection and diversion of surface waters into public areas or drains to which the subdivider has access, and that such drainage waters will not be deposited on the property of adjoining land owners in such concentrations as may cause damage to their property. The wording and intent of this provision is general enough to leave some doubt as to the applicability of these provisions to control subdivision site erosion. Major commercial or industrial installations being constructed on land parcels that are not subdivided, however, are not subject to these requirements.

Also, related to potential control of construction site erosion are the subdivision and zoning powers of local governments. By law, comprehensive plans developed for municipalities may be implemented by ordinances establishing reasonable requirements governing, among other concerns, stormwater drainage. Storm and flood water runoff channels and

basins may be required, depending upon applicable ordinances in existence at the time.

Likewise, zoning powers are granted to corporate municipal authorities for a variety of purposes, including one so that "hazards to persons and damage to property resulting from the accumulation or runoff of storm or flood waters may be lessened or avoided". Similar powers are also granted to counties.

As part of their building codes, municipalities may prescribe rules and regulations for grading and drainage of lots. Likewise, county authorities may establish reasonable rules for building construction for general public health and welfare purposes.

In Illinois, Kane County has enacted an ordinance for controlling erosion from land undergoing development. Site development permits are required for projects involving earth movement or modifications meeting or exceeding specified size criteria. Performance standards and specifications are incorporated into the ordinance by reference for the purpose of delineating procedures and methods of operation of erosion control measures to be used in design of approved site development plans. Several municipalities in Northeastern Illinois have also adopted construction erosion ordinances. In a similar action, Winnebago County adopted a retention/detention ordinance in 1976 for the purpose of controlling storm water runoff within unincorporated parts of the county. The ordinance, which set down criteria for the design of new developments, resulted in incorporation of storm water detention facilities in the design of 62 of 80 new developments in Winnebago County in the 18 months after enactment. Many large urban areas are currently considering storm water control ordinances. These ordinances exemplify

enlightened efforts at the local level in the control and management of storm water runoff in developing areas.

Clearly, various state institutions and local units of government have different authorities and functions which are applicable to construction related nonpoint source control. It is likely that in order to develop a workable statewide management program the cooperation of these organizations is necessary. Consequently, the nature of this cooperation and coordination is dependent on the nature of those institutional control approaches which appear to hold the most promise. Moreover, the successful implementation of these approaches becomes a function of the technical adequacy of a given approach as well as the perception of its applicability by the implementing authority. These two evaluation benchmarks will be used in the following pages to further assess the usefulness of the State Soil and Water Conservation District Act and local government regulatory authorities to implement a statewide control program.

State Analysis

The current soil erosion and sedimentation legislation is limited in several ways as a specific vehicle for mandating uniform construction erosion programs across the state, but it does establish the legislative intent and the authority in the realm of encouraging local program development. The state program established under PA 80-159 is basically an advisory program to be carried out through the 98 Soil and Water Conservation Districts (SWCD). It declares water pollution from nonpoint sources a serious problem and designates the Illinois Department of Agriculture (IDA) as the lead agency to control sediment and erosion. It

authorizes the IDA to work in cooperation with the SWCD Advisory Board, established under the new law, and other appropriate state and federal agencies to establish guidelines for an erosion and sedimentation control program.

The heart of this program is centered around the development of soil loss limits and standards applicable to all land uses. The state has adopted, as of April 1980, regulations implementing this legislative requirement. The guidelines, expressed as T (tolerance) values for soil loss in tons/acre/year, are set to become more restrictive over the next 20 years. The guidelines specify that all soil losses must fall below 4T by 1983 and below 1T by the year 2000 (the T value for most Illinois soils is 5 tons/acre/year).

The SWCD's are to establish particular erosion control guidelines which meet state minimums for their areas and advise local landowners about the application of the guidelines if requested. The SWCD's may also receive complaints from citizens regarding erosion and advise the landowner of any violation of the local standard. The SWCD may hold hearings and publish the findings if the landowners fails to comply, but no enforcement penalties are authorized. If districts fail to adopt a set of guidelines, the state may impose them. Once again it should be stressed that the SWCD's do not have nor does any agency have program enforcement authority under PA 80-159. Violators may be exposed, but they are not subject to any civil or economic sanctions.

In sum, the current legislation does little to address specific construction site erosion control problems. It is wholly advisory and says little about the interest of the state in regulating construction related nonpoint source pollution. These limitations can be categorized

as follows:

- 1) There is no specific provision for construction related control programs;
- 2) The law does not mandate local control ordinances or even specifically promote SWCD assistance to local jurisdictions;
- 3) SWCD reviews are advisory only;
- 4) SWCD's are not authorized to expand and pursue the program;
- 5) There are no sanctions to be imposed for non-compliance;
- 6) SWCD's are only specifically authorized to review plans in response to citizen complaints and cannot enforce their findings; and
- 7) While the standards and soil loss guidelines approach may be suitable for agricultural applications, states with clearly developed construction control programs tend to favor the more easily monitored and enforced best management practice approach as a basis for state and local program standards.

It is interesting to note that the original form of what eventually became PA 80-159 required the establishment of a strong enforceable regulatory program. Moreover, the definition of land disturbing activities originally included any plat of subdivision approved by municipal or county units of government rather than the current statutory language which specifically excludes these activities. The original bill, House Bill 818, was actively supported by the Illinois Association of Soil and Water Conservation Districts. The subsequent law was the result of strong lobbying from the Illinois Municipal League (IML) to exclude virtually any urban related construction activity and enforceable control program. Moreover, as a result of the Municipal League's efforts, over 70 communities petitioned for withdrawal from local

districts prior to the cut off date of December 31, 1979. Unfortunately, many of these communities were located in the rapidly urbanizing counties of the Chicago and St. Louis SMSA's (30).

The following is a substantive excerpt of a letter from an official with the Illinois Municipal League to the Director of the Illinois Department of Agriculture. It is essentially a chronology of IML's opposition to the originally proposed legislation and IEPA's 208 Plan recommendations. It is indicative of the type of concerns surrounding the preemption or appearance thereof with regard to local land use authorities (31):

"Illinois EPA with the defeat of HB 818 in it's mandatory form, was then faced with the problem of receiving Federal approval of it's 208 Plan. A voluntary program would seemingly not meet federal statute requirements. At this point one must turn to the Illinois EPA 208 Water Quality Management Plan. A concise plan of future events is unfolded in the Summary: Agriculture Section of the Illinois 208 Water Quality Management Plan. The intent of Illinois EPA in the past, present and future, based upon it's own documentation, is to establish a mandatory Soil and Water Erosion Control Program.

The establishment of such a program would provide for two land use authorities within municipalities also having a Soil and Water Conservation District. Prior to January 1, 1980, municipalities with a portion or all of their boundaries within a Soil and Water Conservation District may assure that two future land use authorities will not exist by passing a resolution removing themselves from the District.

A major problem in making the decision to withdraw from a Soil and Water Conservation District is predicated on the following:

- 1) the program is voluntary at the present time, and
- 2) services and assistance provided by Districts are in many instances beneficial, and
- 3) finally, will Illinois EPA be successful in establishing a mandatory program, either by action in the Illinois General Assembly or by Federal mandate?

Of the three points above:

- 1) We have no argument with the fact that the present program is voluntary. The problem is that disconnection must take place prior to January 1, 1980. If a municipality does not withdraw by that date, there does not exist the authority to withdraw in the future should the program become mandatory.
- 2) Such services and assistance as presently provided by Soil and Water Conservation Districts could be provided after withdrawal by

either contract or intergovernmental cooperation.

3) The problem posed will have to be determined by either the Illinois General Assembly or in the court system. We can only assume the advocates of a mandatory program will continue their tenacious efforts.

In summary: the mandatory program proposed by Illinois EPA in HB 818, though defeated in the Illinois General Assembly, has been included in the "208 Water Quality Plan". Federal statute requires the plan to be implemented."

Local Analysis

While local governments have traditionally exercised responsibility for many environmental programs, recent programs have resulted in increased management problems. Demand for new spending, need for new staff expertise, new political pressures, and the search for comprehensive and long-range solutions are some of the added burdens on local officials. Forced to seek new tools, local governments have little experience from which to draw. New ideas attempted by a local government will most likely not become widely known. When information about new programs is disseminated, seldom is any systematic evaluation available. As a result, the role of local governments and their problems and needs cannot be defined accurately. This not only retards the effectiveness of local governments, but also of state and federal environmental programs which recently have had greater impact on local environmental activities.

It would appear that local units of government in Illinois have sufficient authority to undertake construction erosion control programs. And as has been illustrated, there are encouraging signs that some municipalities and counties are enacting multi-purpose program, e.g., stormwater runoff and control ordinances. However, although there seems to be sufficient statutory support, the application of these approaches may not be sufficiently widespread at the present time.

There are 102 counties in Illinois. Of this number 19 counties are covered by water quality management plans developed by regional planning agencies designated by the Governor. The remaining counties in the nondesignated area are covered under the state water quality plan. As a step in evaluating the extent to which local regulatory programs may impact water quality, all 83 counties and municipalities over 10,000 population in the nondesignated portion of the state were surveyed as part of the initial 208 planning effort (32). From the results of this survey, five basic types of regulations with applicability to construction site erosion control have been presented in Table 2.4. While this survey did not assess enforcement effectiveness, examination of the five types of regulations does provide some insight into the willingness of local units to enact certain types of regulatory programs.

Table 2.4

Inventory of Selected Local Regulations in the State
Nondesignated Area: Existing and Proposed

Unit	Subdivision Regulations	Building Codes	Zoning Ordinance	Floodplain Ordinance	Drainage/ Erosion
Counties:					
14 SMSA	14/10 *	8/0	14/0	2/4	2/0
69 Non SMSA	41/3	13/1	25/3	30/2	7/0
Municipalities:					
Home Rule**	19/0	19/0	19/0	11/4	7/0
Non Home Rule:					
over 10,000	23/0	19/0	24/0	5/2	3/0
under 10,000	53/0	4/1	47/4	24/0	1/0

*Existing/Proposed

**Home Rule municipalities are for the most part over 25,000 population

Source:

Illinois Environmental Protection Agency. Inventory of Existing Federal, State and Local Regulatory Programs (Draft) (Springfield: IEPA, 1978), p. 91

In general these findings indicate that larger municipalities and counties in the more populous areas of the state have made more extensive use of regulatory programs. This can likely be attributed to two factors. One is that as the population increases, more land use conflicts arise. The second factor is that larger units of government with a larger tax base can support a more intensive regulatory program. It is interesting to note that in those areas with greater population and land use pressures, more traditional land use controls (zoning and subdivision regulations) seem to be favored, rather than problem specific techniques like drainage or erosion regulations.

The ordinances inventoried may have negative or positive effects on water quality (e.g., some subdivision ordinances may have specific requirements for erosion control while others do not) thus, there develops a certain ambivalence towards the effectiveness of the traditional forms to combat construction related erosion. Additionally, drainage/soil erosion and floodplain regulations may be subsets of zoning ordinances, building codes, subdivision or other ordinances. Administrative actions on the part of these local units can also impact construction related pollution as discussed earlier. Consequently it seems probable that some of these units inventoried did not perceive these subregulations or administrative actions as separate control options available to them for application to construction related problems. This implies that the development of effective local construction erosion control programs are more dependent on certain perceptual thresholds being reached rather than establishment of statutory authorization.

Although this inventory did not assess attitudinal preferences among local officials, related survey research suggests that this aspect of the

decision-making process for local program is crucial. In a research project funded by USEPA, an attempt was made to identify those factors contributing to the development of environmental management programs at the local level (33). During 1974, a survey of municipalities with 10,000 and over population and counties over 50,000 was conducted along with four field studies of local governments. A brief review of the findings in this study is useful in characterizing the current inadequacy of local application of police powers related to construction nonpoint source abatement in the state.

In order to determine the motivations of local governments to develop environmental programs, the survey asked local officials to identify the major factors contributing to and inhibiting the development of environmental programs. While these officials indicated that the stimulus of state and federal requirements contributed to the development of environmental programs, the majority of all local officials surveyed (75%) saw their role as "concerned local officials" as the critical element in the enactment of programs. Several other contributing factors were also identified. Citizen support was another important contributing factor, 50% of the cities and 54% of the counties listed public support and 44% and 58% active environmental and civic groups, respectively. Surprisingly only 38% of the cities indicated state and financial incentives as a contributing factor, although 51% of the counties cited this (34). Clearly then local official perception and definition of environmental/water quality problems coupled with identifiable public (political) support appear to be the key determinates of local program development and enactment.

The obstacles to local program development are numerous but

predictable. The major problem identified by about 70% of the local governments was inadequate finances. Environmental needs compete for scarce resources in local governments. New program initiatives may require substantial funds for acquiring staff expertise or other expenditures. Over half of the respondents mentioned fragmentation of responsibility between levels of governments. This fragmentation was seen as existing primarily between the roles of the state and federal governments -- i.e., promulgating requirements, and assisting local governments to meet those requirements. This results in local frustration or inaction. Most local units will not initiate programs if anticipated actions at the federal or state level would cancel these efforts. For example, local governments were reluctant to adopt standards if they anticipated preemption of that function by the state (35).

Finally, the third most important obstacle identified was the lack of expertise. Local officials indicated a preception of a lack of proven strategies or tools. Since environmental management had been viewed until recently as a local prerogative, efforts have refocused on existing tools, such as land use controls, because many cities have limited statutory capability for innovation in this area. Even when strategies have been developed there has been little evaluation of them or staff expertise employed to implement innovation. Interestingly enough the survey also revealed that apparently permissive or enabling legislation was not considered important in the development of programs. The existence of enabling legislation permitting governmental action was listed by only 28% of the cities and 46% of the counties as important (36).

The preceeding analysis has suggested some ways that land use controls already in place in Illinois are being modified or used with

assumed water quality goals in mind. However, many localities do not use the land use powers they already have. This may in part be due to motivational and perceptual factors. Even allowing for some overlap among levels of government in the state, the gap between the few sophisticated communities and the majority of communities is obviously considerable. Thus many places may be able to make significant progress towards abating construction nonpoint pollution by simply implementing the powers they already have. On the other hand it may be asking too much to expect more than a relative handful of communities will have the resources and commitment to go beyond these traditional methods and adopt more involved systems of planning and the concurrent implementation programs.

Summary

The techniques for controlling water pollution are not likely to be effective unless the task of implementing them is entrusted to appropriate agencies. These become more variant and more numerous as one moves from the federal down to the local level of government. Typically, water pollution regulation in Illinois is exercised by the state and local governments and by the U.S. Environmental Protection Agency (EPA). Point source regulation is carried out mostly by the state and federal environmental protection agency through the National Pollutant Discharge Elimination System (NPDES) permitting process.

Local governments (municipalities and counties) are the main regulators of nonpoint sources that result from the urbanization process, such as suburban erosion septic tanks and stormwater runoff. In general, there is the appearance of much less regulation of nonpoint sources than

point sources. Regulatory techniques used include zoning, subdivision ordinances, grading and fill requirements, and other land use and performance controls.

In concluding this institutional assessment, local general purpose governments in Illinois have demonstrated the following potential strengths that argue for their continued involvement in construction nonpoint source pollution control:

Political Acceptability - Regulation of nonpoint source pollution through standard land use controls is a traditional local prerogative. Displacing or even sharing these controls encourages opposition to proposed action programs.

Recognition of Political Interests - Majority views can be mobilized and exerted best within smaller local units.

Administrative Efficiencies - Government costs/manpower savings can result if local regulatory agencies are able to "piggyback" water quality assignments with current tasks. It is also easier and normally quicker for regulated parties to deal with their local agencies.

Comprehensiveness and Equity - General purpose local government tends to be more concerned with overall governmental equity than are special purpose districts.

There are however other institutional considerations that offset total reliance on local government program development.

Geographic Inadequacy - More local units are usually smaller than the hydrologic region in which construction nonpoint problems occur.

Inability to Control Externalities - Local jurisdictions cannot control externalities that occur when the costs and benefits of

control programs are not contained within the same jurisdiction.

Inadequate Funds and Expertise - Smaller jurisdictions often lack money to acquire technical expertise, data and adequate monitoring and enforcement personnel.

Lack of Political Will - Many smaller jurisdictions lack the motivation to adequately regulate a major local builder or impose control costs on friends and neighbors.

The State on the other hand has advantages which accrue to it given its political authorities and powers:

Geographic Adequacy - State agencies are rarely geographically restrained. Solutions based on priority river basins or watersheds can increase economic effectiveness in regulatory programs.

Coordination of Controls and Planning - Coordination of water quality management and regulatory control is assigned to a single environmental agency.

Comprehensiveness and Equity - The State can on a broad scale coordinate water quality objectives with other natural resource and social equity issues.

Legal Sufficiency and Expertise - The State has the policy powers that allows it to regulate the nonpoint pollution source. Moreover, the State has a greater resource base to draw from.

The two main deficiencies with additional State regulation are:

Lack of Accessibility - The public has less access to and control of State regulatory agencies because of political and geographic distance. Conversely, quick response times to nonpoint source pollution events is critical to effective abatement. The State simply cannot run everywhere at once.

Less Political Acceptance - The State may prove less politically acceptable than localities as drafters of regulations. The recent experience with H.B. 818 very clearly underscores this point.

There is no one clear cut institutional model to base program development on in Illinois. However, through this review and analysis of State and local authorities and powers, it may be possible to recommend a system of state and local controls for construction nonpoint source pollution. This system should seek to maximize the strengths that each level can bring to bear on the problem while minimizing those inherent weaknesses which would diminish program effectiveness.

Chapter 3

PROGRAM DESIGN

"A decade ago, I learned a little memory trick to remind me of the powers of government. It turns out that the letters of the word ACID stand for four things that government can do for or to its citizens.

The letter A stands for advice, and we all know governments have plenty of that. The letter C stands for control, wherein governments use their police power authority to compel certain actions or to prohibit action. The letter I stands for incentives, such as the federal income tax incentives that encourage home ownership, or the proposed price guarantees for the purchase of synthetic fuels. Finally, the letter D stands for direct action. Examples here include the highway built by government or the patient cared for by the authorities in a state mental hospital.

There was a time, no doubt, when most public problems could be addressed by using one of these four public policy devices: advice, regulation, economic incentives or disincentives and direct action. For the most part, those simpler days are gone, and the interesting public problems are generally addressed through a rather complex set of governmental actions. I would remind you, therefore, that although my remarks are limited to the role of regulation in urban erosion and sediment control, we must not lose sight of the other powers of government that can and must be turned toward this exceedingly complicated issue." (37)

Regulatory power is rarely exercised for the exclusive protection of water quality from nonpoint sources of pollution. Additional purposes are almost always present, in the pursuit of numerous environmental, economic, and social objectives. This is true with respect to regulations that are specifically addressed to the control of runoff, erosion, and sedimentation resulting from construction. In addition to preserving water quality, such regulations may seek to avoid flood damage, preserve land and ecosystems, protect aesthetic and other amenities, recharge groundwater supplies, and to channel developments along suitable lines. In choosing among strategies for construction nonpoint source control, the development

of a state control system must inevitably take into account a host of considerations that include but go well beyond water quality. Perceived regulatory strategies without an overall planning context can perpetuate and aggravate conflict among different public and social objectives. Consequently, the development of a cohesive regulatory approach should seek to integrate to the maximum extent possible, comprehensive planning for land use and development in all affected areas and at all governmental levels. Local government application of this concept would result in greater emphasis on the planning process. The state level application would cause development of consistent procedural requirements and enhanced capabilities for technical expertise in a support function to local governments. That is, the state must establish a clear policy through action, program support and legislation if needed.

It is clear that the nature of institutional relationships in Illinois is part of the problem with respect to comprehensive construction erosion strategy development. The nature of the preventive approach to this problem also underscores its complexity by the numbers and types of institutions that must be involved to establish a successful control program. The preventive approach to construction erosion control is, by and large, an indirect one. The more direct approach would be to collect all site runoff and divert it off-site for settling and treatment. Although direct, this approach would be very costly. More importantly, it addresses itself to the results, not the causes, of the pollution. When the causes of construction nonpoint pollution becomes the focus, then the control of the runoff becomes one among a number of goals of a control program. The sources of construction site runoff are also the sources of other problems, and control techniques useful for pollution abatement are

also useful for other functions. This once again emphasizes the importance of the traditional comprehensive plan process at the local level in any state strategy formulation.

While this increased degree of complexity can be a disadvantage, it can also lead to certain important benefits: (1) it is more equitable to shift the burden of control onto those areas and individuals which cause or experience severe impact of the problem; and (2) it is more acceptable to the electorate that tax dollars should be spent on programs which contain several legitimate goals instead of attempting to justify expenditures upon the grounds of construction site erosion control alone (38). Thus, even with the added institutional complexity, a comprehensive approach to the causes of construction nonpoint pollution makes sense on the grounds of equity and practicality.

Consequently, at least four major factors should be considered in the course of program development for construction nonpoint source pollution in Illinois. The allocation of regulatory responsibilities and implementation authorities for construction site erosion among agencies should take into account:

- . the temporal and spatial nature of construction related problems and variations in immediate institutional responses;
- . the nature of the control systems to be used, the coordination needed to carry them out and methods of program accountability (both local and state);
- . the requirements of program support to ensure effectiveness in control approaches; and
- . the initial and ongoing implementation needs of the program.

Each of these factors highlights a different aspect of the

institutional arrangements necessary to carry out a state initiated construction nonpoint pollution control program. First, the nature of the problem itself allows for the identification of those governmental units and agencies which hold jurisdiction over the problem area and can most appropriately respond to problem development. Second, the type of cooperation and coordination desired from these responsible agencies depends in large part on what implementation controls and accountability systems appear promising, since many of these controls/systems necessitate different forms of coordination. Third, whatever control approaches are selected, its continued effectiveness will entail maintenance of the implementation techniques both from a fiscal and technical support aspect. Finally, an overriding concern is to consider the means required to implement the program to make it understandable and acceptable not only to the agencies which will do the regulating, but also the interests being regulated and the public at large.

The remainder of this report will be devoted to an assessment of regulatory program requirements and the necessary mix of state and local control options. This will be followed by an examination of current programs which have been developed in other states for strengths and weaknesses in their respective approaches. This will provide the basis for programmatic recommendations in the development of a construction nonpoint source program in Illinois.

Regulatory Program Design

One means of influencing the implementation of control mechanisms is through the establishment of regulatory programs which place requirements and/or restrictions on activities which impact or accelerate runoff and

erosion. A variety of approaches exist in instituting a regulatory program depending on the objectives to be accomplished and on the institutional framework which will administer and enforce the program. Each program has certain common elements, however, including a defined set of regulations, a means of enforcement, and a defined area in which the regulations apply.

Control techniques are often implemented by the activities which are impacting or accelerating erosion process. Governmental units or agencies can have several roles in influencing implementation, however. One potential governmental role is in regulating activities and requiring implementation of desired nonpoint source control practices and techniques. Another potential governmental role is in providing economic assistance or tax advantages to activities which institute these practices. In addition, government units or agencies can provide technical assistance or carry out education programs to gain acceptance and aid in implementing runoff and erosion controls. The alternatives possible for these elements can be grouped by categorical headings according to: scope of regulations; type of regulations; enforcement mechanisms; and area of application. These categorical groupings can be found in Table 3.1.

Scope

Regulatory programs can be established which apply to a specific activity because of its importance or relative contribution to runoff and erosion problems. In this way, regulations can be based on the characteristics of the specific activity and can include regulation of the type of practices or techniques which may be employed in conducting the activity. Regulatory programs can also be established which place restrictions on the amount of eroded soil and other pollutants which can

be discharged to surface waters. This can be accomplished through regulations which require specific treatment processed prior to discharge or by establishing requirements for the maximum amount or concentration of suspended sediment and other pollutants in discharges.

Another approach could be a regulatory program aimed at establishing requirements and/or restrictions on the manner in which activities can modify or impact natural features which influence erosion. These features include topography, runoff, surface characteristics, and channel characteristics. Regulations or standards can then be established for each feature. An example would be regulations for surface runoff which require that natural runoff rates cannot be increased as the result of modifications by any land disturbing activity.

Table 3.1
Components of Regulatory Programs for
Construction Nonpoint Source Control

Scope of Regulations	Type of Regulations	Enforcement Mechanisms	Area of Application
Regulate Specific Activities	Specification Standards	Permits	State County SWCD's Local
Regulate Impacts on Natural Features	Performance Standards	Licensing Monitoring Inspection	Erosion Sensitive Areas
Regulate Sediment	Discretionary Requirements	Project Plan Review	
Regulate Discharge to Surface Waters	Plan Conformance	Educational/ Technical Assistance	

Source:

United States Environmental Protection Agency. Evaluation and Development of Institutional Systems for Environmental Management (Washington, D.C.: USEPA, 1976), p. 79.

Type

Regulations can establish requirements and/or restrictions for runoff and erosion control in a number of ways. These include the use of specification standards, performance standards, discretionary requirements established on a case-by-case basis, and requirements established by a specified plan. Specification standards establish detailed restrictions and/or requirements for implementing specific erosion control practices. Examples of specification standards include requirements for paving all roads receiving over a specified traffic loading, or requirements for all land development projects to include the construction of holding ponds with a capacity sufficient to retain runoff associated with storms having a recurrence frequency of 25 years.

Performance standards establish requirements for the performance of erosion control measures. This can be accomplished by establishing maximum allowable erosion rates, maximum sediment discharge rates, or maximum allowable impacts on natural features. Examples of performance standards include requirements that the amount of soil which erodes from a roadway cannot exceed that which would occur from that same land area prior to construction, or requirements that land development projects cannot increase runoff rates over those occurring naturally during a storm having a recurrence frequency of 25 years. On the other hand, regulations can establish requirements and/or restrictions for erosion control which are specified on a case-by-case basis, dependent on the discretion of a governmental unit, agency, or commission. Criteria or guidelines are usually developed to serve as the basis for determining specific requirements or restrictions.

Regulations can require conformance with specific comprehensive plans

which establish varying restrictions and/or requirements for erosion control on a location, time and/or activity basis. The requirements or restrictions can be in the form of either specification or performance standards for each varying condition addressed or established in the plan. This enables requirements or restrictions to be established in a comprehensive manner, taking into account conditions existing at various locations within the planning area for various time frames. It is also possible to modify requirements or restrictions as conditions change by updating the plan. A number of different types of plans can be specified as the basis for regulating construction nonpoint sources, including land use plans, water quality and waste management plans, drainage and flood control plans, and specific erosion control plans.

Land Use Plans

The process of assigning zoning classifications or allowable uses to land areas can include using criteria for minimizing runoff and erosion and its effects on water quality. It is also possible to include control requirements or restrictions as part of zoning classification descriptions.

Water Quality and Waste Management Plans

Plans can be developed which establish water quality standards and waste load allocations for specific water bodies. Requirements and restrictions for runoff and erosion control can then be established to meet these standards and allocations.

Drainage and Flood Control Plans

The planning for drainage facilities and flood control can include the use of criteria aimed at runoff and erosion control. Restrictions and requirements established by these plans would then help minimize construction

related problems.

Runoff and Erosion Control Plans

A plan can be developed specifically for construction nonpoint control. The plan can develop requirements and restrictions on an area basis for any or all land disturbing activities. The requirements or restrictions could be based on analysis of present runoff and erosion problems, water quality conditions, and the potential for runoff and erosion problems based on analysis of natural features.

Enforcement

The enforcement of regulations is usually necessary to assure their being followed or implemented as specified. A number of mechanisms exist for enforcement, including the use of permits, licensing, monitoring, inspection, and project plan reviews. A permit is a written warrant granted by a governmental unit or agency which conveys the right to conduct a specific activity, normally for a given period of time and/or at an identified location. It then becomes unlawful to conduct the activity without having a valid permit. This system can be utilized to administer and enforce regulations by making compliance with the given requirement or restrictions necessary to obtain and hold a permit. It is often required that the applicant must provide detailed information concerning the proposed activity prior to being granted the permit in order to assure compliance with the regulations. Activities which commonly can require a permit for enforcement of erosion control regulations include construction, grading, land development, and discharge of surface waters in closed conveyance systems.

Any individual or enterprise which conducts or undertakes a specific

activity can be required to obtain and hold a license. A condition for doing so may be that the individual or enterprise must be familiar with runoff and erosion control regulations and that he conform with the regulations which apply to that activity. The license can then be revoked if applicable regulations are not complied with. Activities with which licensing can be used for regulating runoff and erosion control include land development and construction.

A program can be established to monitor compliance with regulatory programs and/or to assist in establishing discretionary requirements or modify specific requirements. Monitoring programs can use aerial photography or field surveys to assess runoff and erosion rates and to assure that control mechanisms are being implemented as required. Water quality monitoring programs can also be utilized to assess problems associated with suspended sediments in rivers, streams, and lakes. Monitoring programs can then ascertain the success of control regulations as well as help enforce them.

Inspection is a means of assuring that runoff and erosion control mechanisms are implemented as required. This can be accomplished in conjunction with permit and licensing programs whereby the individual who obtains a permit or license notifies the regulatory agency or governmental unit at specified times during or after instituting runoff and erosion control mechanisms. The governmental unit or agency then performs the inspection to assure that control requirements are met. Inspection can also be accomplished on a random basis and carried out without the need for notification by those required to implement runoff and erosion control mechanisms.

A review of project plans, layouts, and construction details can be

required prior to undertaking specified activities. This review process can then make sure that required runoff and erosion control mechanisms will be implemented as part of the project and can confirm the appropriateness of specific designs.

Education/Technical Assistance

Education programs can be utilized by governmental agencies to provide planning or technical assistance to those implementing control mechanisms. Education programs can also be used to inform individuals as to the need for these controls, and thus gain acceptance for implementing control mechanisms as part of carrying out various activities.

Many governmental agencies have the capability to provide planning or technical assistance in the area of runoff and erosion control. These agencies also provide technical assistance in the form of field evaluations and recommendations for specific problems and locations. Many federal and state agencies participate in review of proposed projects, or assist in the development of site specific or comprehensive plans by other agencies.

Another approach to planning or technical assistance is for a governmental agency to actually work directly with an individual who perceives that he has a runoff or erosion problem. The Cooperative Extension Service and the Soil Conservation Service through the local conservation districts provide technical assistance in this way. A technical specialist may assist the individual in the preparations or review of plans designed to minimize runoff and erosion on a planned or existing project. This assistance is normally provided at no direct cost to the individual, but may require a commitment of some sort by the recipient of the assistance.

General information programs can be conducted as advertising campaigns

in which runoff and erosion control needs and mechanisms are described in an attempt to educate the general public and minimize practices which accelerate runoff and erosion. In this way people can become generally aware of the importance of controlling runoff and erosion, and the broad spectrum of activities which can generate erosion and attendant water quality problems.

Education programs can also be aimed at specific activities in which governmental agencies work closely with groups in developing improved practices and implementing mechanisms for runoff and erosion control. Such programs can include discussions or seminars with activity oriented groups (e.g., developers) covering specific aspects of runoff and erosion causes and concerns and appropriate control mechanisms.

Application

The area to which regulatory programs apply can vary. They can coincide with the jurisdictional area of the governmental unit, agency, or commission which is responsible for enforcing and administering the programs. This could be the entire state, a county, a city or town, or a special district such as a soil and water conservation district.

Regulatory programs for construction nonpoint control can also be applied to special areas where there is a potential for runoff and erosion problems. These areas can include sensitive lands which are determined on the basis of natural features including topography, surface characteristics, runoff quantities and rates, climatic conditions and stream channel characteristics. Other areas can be considered for special control waters in the state. The regulatory programs would then apply only in the selected area or areas, thereby reducing the requirements for administration and enforcement.

Governmental units or private sector agencies can assist in the implementation of nonpoint source mechanisms through economic programs. These programs can include direct economic assistance in the form of grants or loans to individuals developing runoff and erosion control facilities. Tax incentives can also be used which provide economic incentives to those implementing desired control mechanisms. It is also possible to include some elements of runoff and erosion control in development activities financed by the private sector.

Funds can be provided to any individual or enterprise which implements desired runoff and erosion control mechanisms. These funds can be in the form of either direct grants or low interest loans aimed at assisting runoff and erosion control. The criteria by which funds are dispersed can be either discretionary, determined on a case-by-case basis, or can be determined by needs established on an areawide basis through comprehensive planning. Funds can also be provided from one governmental unit to another, as in the case of funds provided by SCS to a county SWCD for establishment of an erosion control program.

A difficulty in administering funding assistance programs is in determining appropriate allocations of monies among assistance requests. Normally, available funds are not sufficient to meet all desired expenditures and prioritization systems must be developed and administered. Grants for capital expenditures can also have the effect of promoting capital intensive problem solutions since those implementing the controls can look on assistance monies as being essentially free. Thus, if those implementing the controls must finance operations and maintenance costs, solutions will be sought which minimize these costs, often at the expense of capital expenditures. A final problem can be the delay in implementation

of some controls by those waiting for assistance. This can be especially critical if the program is underfunded and those implementing controls attempt to wait for assistance.

Taxing policies can be developed which provide economic incentives to those implementing desired runoff and erosion control mechanisms. One means of providing tax incentives is through policies which reduce property taxes for those areas which are excluded from development and maintained in a natural state, including buffer areas adjacent to shorelines, wetland areas, and other areas which have high potential for runoff and erosion problems if disturbed. Another means of providing tax incentives is through investment tax credits for facilities constructed for the purpose of runoff and erosion control.

Many industrial and commercial projects obtain financing from a bank or other financial institution. As part of the process of securing this private sector financing the prospective borrower must normally submit to the lender a detailed plan for the project. A component of this plan could be a resource conservation plan, with runoff and erosion control as an integral part of the conservation plan. Either the terms of the financing, or the availability of financing could be partially dependent on the adequacy of the resource conservation plan.

State Program Models

The resource requirements for governmental strategies to assist or ensure implementation of runoff and erosion control mechanisms are dependent on the level of control desired and on the specific implementing strategy being utilized. Costs associated with these programs are primarily related to the numbers and types of personnel utilized in the program. In addition, economic programs have costs directly related to

the monies spent in implementing runoff and erosion controls.

The resources required to implement a regulatory program are dependent on its specific provisions. In general, manpower and cost requirements are lowest for administering regulations in the form of specification standards since little administration effort is needed to determine specific control requirements which are specified in the standards. Discretionary and performance standards require higher manpower and dollar cost levels since greater efforts are required to determine the appropriateness of specific controls. In addition, greater costs are expended in these programs in gathering and maintaining information which serves as the basis for determining control needs. Types of information needed to administer discretionary and performance standards include descriptive information on physical characteristics of the land area and information on water quality levels in the various surface waters of the area under consideration.

Economic programs require resources which are equivalent to the costs of controls being assisted or funded by the programs. Thus, estimates of these cost requirements must be made in order to adequately fund these types of programs. In addition, manpower is required to administer the programs. The manpower needed can be considerable to ensure that public monies are being spent as authorized.

Resources expended in administering education programs are mainly related to the amount of manpower utilized. The level of expertise required in these programs is normally high since the individual providing assistance must have sufficient education and knowledge to assist in selecting, designing, and implementing the appropriate runoff and erosion control mechanisms. The actual resource requirements are a function of

level of assistance required in implementing controls.

Consequently, the format in a statewide strategy for implementing construction nonpoint source control is critical. The remaining portion of this section will be devoted to an examination of selected state programs currently in operation around the country. At the present time twenty states, the District of Columbia, and the Virgin Islands have enacted erosion and sedimentation control legislation applicable to the problems of construction nonpoint pollution. This includes legislation such as amendments to conservation district laws, water quality laws, and erosion and sediment control laws. Some of these laws are broad in scope, whereas, others deal with specific areas of concern.

All of the laws contain some provision for enforcement of control requirements, most of which involve three general types of regulatory mechanisms: (1) approved erosion and sediment control plans required for specified and disturbing activities; (2) approved plan required for issuance of a permit for an activity involving land disturbing activities; and (3) requirements for compliance with established permissible soil loss limits. Additionally, these regulatory strategies can be of either voluntary or mandatory in nature as well as state and/or local in placement of enforcement functions. The categorical groupings for these general regulatory strategies can be found in Table 3.2. For the purposes of this report, four states were selected for in-depth program assessment: Iowa, Maryland, Ohio, and Virginia. Iowa and Ohio have voluntary programs, while Virginia and Maryland have mandatory program requirements.

Table 3.2
General State Regulatory Strategies for
Construction Nonpoint Sources

State	Type One	Type Two	Type Three	Other
Delaware		X		
District of Columbia		X		
Georgia		X		
Hawaii				*
Illinois				**
Iowa				**
Maine	X			
Maryland		X		
Michigan			X	
Minnesota	X			
Montana			X	
Nevada	X			
New Hampshire		X		
New Jersey			X	
New York				***
North Carolina	X			
Ohio	X			
Pennsylvania		X		
South Carolina		X		
South Dakota			X	
Virginia			X	
Virgin Islands		X		

Type One: Voluntary compliance with advisory guidelines on plans.

Type Two: Permits required to conform to state/local guidelines on plans.

Type Three: Permits and plans required to conform with standards based regulations/ordinances.

*No permit system, but regulations are standards based.

**Iowa and Illinois represent special examples of voluntary programs in which the SWCDs, not local counties or municipalities administer the principal state programs and act on violations of state guidelines and SWCD programs.

***No specific reference to construction site erosion.

Comparing the four states selected with all other states listed in Table 3.2 reveals the following rationale for their selection (39):

1. There are eleven states with erosion and sediment control laws, five with laws based on conservation district laws and one based on water quality and stream control. Ohio, Virginia and Maryland base their programs on sediment and erosion control laws while Iowa's is based on a conservation district law. Thus, these four states are fairly representative of the range of existing programs.
2. Five states give lead agency responsibilities to soil and water conservation agencies, three to departments of natural resources, and five to a range of other state level agencies. The rest of the states assign program responsibilities jointly between these offices. Iowa and Virginia operate programs from state soil and water conservation offices while Ohio and Maryland operate from a State Natural Resources office. Again, this allowed for a fair representation of program options.
3. Ohio, Virginia and Maryland rest local program responsibilities in local units of government (counties and municipalities). Soil and water conservation districts then assist local governments in reviewing erosion abatement plans. Iowa and Illinois, however, rest principal authority for state programs in the SWCD's. Consequently, the inclusion of Iowa as a model provided the basis for examining alternative program procedures based on special purpose rather than general purpose local units.

A more specific and detailed listing of state programs and corresponding local requirements are outlined in Table 3.3 and 3.4. Current program requirements for Illinois according to P.A. 80-159 have

also been listed for comparative purposes. Four evaluation benchmarks were established to isolate predominant program traits. These benchmarks were as follows: (1) State Program Type, (2) SWCD Role, (3) Local Unit Role, and (4) Technical Assistance Function.

Table 3.3
Selected State Program Responsibilities
for Construction Nonpoint Sources

State Responsibilities	Illinois	Iowa	Maryland	Ohio	Virginia
Develop Policies/Programs		X			X
Develop Criteria/Guidelines	X	X	X	X	X
Adopt Rules/Regulations				X	
Approve Local Plans/Programs	X*	X*	X	X	X
Perform Enforcement Functions			X	X	
Approve State/Federal Agency Plans				X	
Adopt Programs in Local Inaction	X	X	X	X	X
<u>Technical Assistance:</u>					
Ordinances/Regulations	X	X	X		
Cost-Sharing			X	X	
<u>Control Methods:</u>					
Approve of Control Plans			X	X	X
Soil Loss Limits	X	X		X	
Permits			X	X	X

*Approval of local programs in Iowa and Illinois is related to soil and water conservation districts only.

Source:

National Association of Conservation Districts. Summary of Principal Provisions of State Laws Providing for Erosion and Sediment Control (October, 1979).

Table 3.4
Selected Local Program Responsibilities
for Construction Nonpoint Sources

Local Responsibilities	Illinois	Iowa	Maryland	Ohio	Virginia
<u>SWCD's:</u>					
Review/Approve Plans			X		X
Establish Soil Loss Limits	X	X			
Local Unit Assistance			X	X	
Adopt Standards/Guidelines	X	X	X		X
Adopt Rules/Regulations		X			
Enforcement Function		X	X	X	X
Adopt Erosion Control Program	X		X		X
<u>Cities/Counties:</u>					
Adopt Program					X
Review/Approve Plan				X	
Adopt Ordinances			X	X	
Issue Permits			X		X
Enforcement Function			X	X	X
Issue Rules/Regulations			X	X	

Source:

National Association of Conservation Districts. Summary of Principal Provisions of State Laws Providing for Erosion and Sediment Control (October, 1979).

State Program Type

As described in Table 3.2 there were three types of state programs. The first type was one where there was no formal state program, but local jurisdictions were encouraged to adopt the necessary ordinances through existing enabling legislation for their conservation districts (40). The impetus for local programs to act was that the localities were experiencing sedimentation problems or had been made aware by state or county officials as to the existence of a problem in their area. Counties and localities

then adopted their own programs.

A second type of state program could be described as a formal voluntary program. That is one in which the state takes an active role in developing guidelines, standards, and criteria for control program development.

The state also provides technical and advisory assistance to those local jurisdictions trying to develop or implement control programs along state established guidelines. Ohio and Iowa are examples of this type of program (41). The Agency responsible for carrying out the program guidance function is the Department of Natural Resources (DNR) in Ohio and the State Soil Conservation Commission (SSCC) in Iowa.

The most extensive state dominated type of regulatory program exists in Maryland and Virginia where state enabling legislation was passed designating a lead state agency for oversight and administrative purposes (42). These legislative actions also require mandatory adoption of ordinances at the county and municipal level. The designated lead agency establishes the statewide criteria for program development, aids localities in implementation of requirements and monitors them for compliance and program effectiveness. Both in Virginia and Maryland the enabling legislations allow for the state lead agency to impose sanctions on local jurisdictions in non-compliance. These sanctions range from imposition of the State model program localities where no program has been developed (43) to a moratorium on building permits in areas where local programs are found inadequate (44).

Maryland's program is administered through its DNR, while Virginia's is administered by the technical staff of the SSCC. In both states violation of state and local programs are considered to be a misdemeanor

punishable by a fine and/or imprisonment. However, these states found the judicial enforcement process of little use since it was difficult to prosecute such actions as criminal offenses, and in both cases are attempting to change the penalty from a misdemeanor to a civil offense in order to ensure the credibility of the sanctions (45).

SWCD Role

The initial establishment of soil and water conservation districts (SWCD's) in the 1930's had its primary focus on the provision of technical assistance to aid farmers in agricultural best management practices for erosion control. More recently, their technical assistance function has extended into the area of urban development and construction erosion problems.

In Maryland, Ohio, Virginia, and Iowa, the SWCD's are a prime source of technical assistance in reviewing the adequacy of developers' construction erosion plans. This role is based on legislative authorization. In Iowa the SWCD's are the primary implementation unit for the State mandated programs, and in 1980 were given additional authority to initiate action on their own against violators. The SWCD's in Iowa also serve as technical reviewers for programs adopted by counties and municipalities (46).

On the other hand, in Virginia a different pattern has emerged. County offices of environmental engineering are already in place where development is most rapid; and consequently, technical assistance from SWCD staff is less critical for program success. Nonetheless, approximately 70% of the 94 county programs in Virginia make use of SWCD assistance in some capacity for plan review (47).

In general soil and water conservation districts do not get involved in plan monitoring or enforcement or in areas of program administration.

However, as manpower and resources permit, districts are willing to provide plan review functions as well as offer assistance to both local program officers in establishing local programs and to developers seeking help in designing appropriate site erosion control plans. Clearly, districts feel that the technical assistance function is what they have expertise in and do not feel that the role of program enforcement and administration is appropriate, although they are are statutorily able to do so (48).

Local Unit Role

There are three primary components to local programs resulting from state mandates. These program components are: (1) administration of the implementation program, (2) review of developer erosion control plans and provision of technical assistance by SWCD's, and (3) inspection and enforcement of the program.

The implementation of local programs is normally carried out by agencies already involved in development oversight. In Ohio one county program (Lancaster County) was administered by the regional planning office and the municipal program of the city in that county (Engelwood) was administered by the City Engineer (49). Similarly, in Virginia many county programs were run by the county department of Environmental Engineering or Public Health. In some cases new positions were created to carry out local program mandates. For example, Queen Anne's County in Maryland created the position of Sediment Administrator as part of their local sediment control ordinance.

Local administrative functions consist of establishing standards and criteria, permitting procedures which require approved sediment erosion

control plans and enforcing program requirements to achieve compliance with stated objectives.

Minimum standards/criteria are usually based on best management practices (BMP's). In areas where there are strong state programs, local erosion control standards generally follow those established by the state. This is the case in Maryland and Virginia. In Ohio where the program is voluntary, most local jurisdictions have adopted the BMP schedule and program guidelines suggested by the State.

The second component of a local control program is review of developer erosion control plans. Plans are reviewed not only for the adequacy of the control practices but in the scheduling of their application as well. Then plans are either recommended for approval or denial, based on how well they meet local or state promulgated standards.

The last component of local control programs is inspection and enforcement. Inspections serve two purposes. First, they determine whether developers are following through with their approved control plans; and second, they assess the effectiveness of applied erosion control procedures. These review procedures work best when development sites are inspected with some frequency and when the inspections are diligently carried out. Manpower constraints may present problems for local jurisdictions. When administrators are lax in performing inspections, developers are lax in complying. In some cases a fee is charged for inspection. This encourages immediate and continued compliance in order to avoid additional costs due to follow-up inspections.

Enforcement goes hand-in-hand with inspection of development activities. Local sanctions range from withholding subsequent building permits needed by the developers to stop work orders to imprisonment and

finer. In all cases, the effectiveness of enforcement programs is a function of the credibility of the deterrent and sanctions. An implementable enforcement system is the key to an effective local program. As suggested earlier, many sanctions exist to deal with non-compliance with sediment control programs. It is also apparent that some sanctions will not be proven effective, while the effectiveness of others is dependent upon local support of the program.

Any type of enforcement which requires a court procedure to be implemented, as in the case of sentences and fines, is not effective due to the fact that the time involved in going through the process is not compatible with the immediacy of the problem involved. Consider the case of Chesterfield County Virginia. Whenever the County tried to take violators to court for non-compliance, the court handed down one continuance after another until the cases were dismissed. In those cases where the court did choose to act, by the time a decision was handed down, the development was complete and the on-site problem was no longer existent (50).

Conversely, some of the most effective sanctions are stop work orders done by administrative fiat. Linking building permit issuance to successful implementation of site erosion control practices and requirements for performance bonds or placing funds in any escrow account are other examples. Bonds or escrow accounts can be required of developers in an amount estimated to cover the cost of implementing the approved control measures. For example, the sediment control program in Queen Anne's County Maryland used the escrow fund rather than the performance bond approach. The total implementation cost is placed in escrow and as portions of the control practices are in place, the sediment control

administrator can release these funds accordingly (51).

Technical Assistance

Technical assistance, particularly if the form of informational and educational programs, is an effective part of any construction control program, either state or local. Training programs are a necessary and helpful tool, although such programs exist formally only in Maryland and Virginia.

Educational programs are particularly important for two specific groups: (1) program administrators involved in the fields of site planning, review and inspection, and (2) developers, contractors and engineers involved in site plan development and site supervision roles. In Ohio a broader range of interest groups were approached. There the lead state agency, Ohio DNR, has made a concerted effort to demonstrate to the general public the need for construction erosion control programs through the dissemination of information about erosion damage, model local ordinances and BMP's (52).

Virginia has had various training programs in operation since 1976. One level of training is aimed at site planning and engineering personnel while another level is devoted to construction site superintendents and inspectors (53). An instructor's manual was developed by the state lead agency and seminars have been held for potential teachers of these courses which are usually conducted in community college systems within the state.

In Maryland state sponsored training programs have been an integral part of the program since the enactment of the State Sediment Control Law in 1970. The law requires that any person in charge of on-site clearing

and grading operations or sediment control associated with a construction program be certified as having attended a Maryland DNR (state lead agency) approved sediment and control training program prior to beginning the project (54).

Summary

Effective control of construction related nonpoint source pollution requires a flexible regulatory approach. This is true for both local and state programs, whether they are voluntary or mandatory in nature. As of 1980 twenty states, the District of Columbia, and the Virgin Islands had enacted sediment laws applicable to direct control of construction activities. The most extensively developed state program and presumably the most effective was that of Maryland. That program established a statewide standard to be enforced through county or other local regulations. If local units do not pass and enforce their own sediment control laws, the State is authorized to step in and establish the required programs. This potential for infringement on local powers generally provides most jurisdictions with sufficient incentive to establish the necessary programs. Most other active state programs reviewed here or in the literature incorporate many of the components in Maryland's approach.

Mandatory or voluntary state level approaches would appear to be a function of a number of factors. Legislatively enacted programs, both mandatory or voluntary, are usually predicated with several objectives in mind. It may be the legislative purpose to establish the severity of the construction nonpoint source problem and the authority of the specified unit (state or local) to deal with it. Secondly, the establishment of guidelines and criteria through state legislative or policy pronouncements

offer convenient models or standards for specified governmental entities with implementation responsibilities. These models and standards can act as inducements for action, especially at the local level, where the prospect of designing ordinances and standards might otherwise prove to be a technical or political impediment for action. Finally, state initiated programs of either type can serve the less easily measured objectives of policy leadership and the establishment of legitimacy for actions undertaken at the local level.

At the local level, a successful and effective program appears to be a mix of several items. Particularly at the local level, the relationship of comprehensive planning to implementation techniques is undeniable. This is true in terms of establishing the rationale for program development. It also provides a basis for prioritizing physically sensitive areas due to high erosion potential or overriding environmental values. Actual implementation of local programs must incorporate the site planning process with a careful set screening criteria in order to insure the adequacy of site control plans. Consistent monitoring of construction through inspection is necessary to identify any changes that might require different BMP's than initially agreed upon. Finally, a local program must establish the credibility of its deterrent by aggressive enforcement of penalties and/or sanctions for non-compliance. To this end, clearly established administrative procedures are the preferred enforcement mechanisms over judicial processes. This is due primarily to the necessity for timely response to construction related water quality impacts and for the maintenance program credibility through quick imposition of sanctions.

Finally, regardless of state or local program composition, education

and technical assistance is an important function in overall program effectiveness. As mentioned earlier in this section, the lack of expertise at both the local and state level can quickly reduce the most carefully thought out program to so much pointless bureaucracy. Therefore, training programs for local and state program officers, SWCD staffs, developers, contractors, construction site personnel and site planners is extremely beneficial. Workshops are an excellent means of improving the quality of control programs as well as making program development or compliance seem less formidable. The wide spread communication of technical information tends to enhance the expertise of the regulators as well as those subject to the regulations. Greater expertise in local jurisdictions may tend to reduce pressure on SWCD staffs to perform reviews and provide other forms of technical assistance. For although the SWCD's represent the most common and widespread local and state resource in terms of technical expertise, they are characteristically devoted to agricultural applications of their expertise, which is their primary mission.

Other educational and motivational approaches sponsored by state or local program officials could include open hearings for the development and dissemination of program standards and model ordinances. In particular, the input of developers and contractors could actively be solicited during the course of program development. These types of exercises have the added benefit of publicizing the scope and nature of the problem. This tends to lend itself to establishing construction nonpoint source control as a legitimate item for inclusion in the public agenda.

The current status of erosion and sediment control program development

applicable to construction nonpoint source pollution in Illinois is well below that of the states reviewed here. Various state agencies have interests in such controls, but from a practical standpoint, the application of their jurisdictional authorities and powers has been limited. The Illinois Department of Agriculture and the 98 soil and water conservation districts in the State are active primarily in agricultural lands. The Illinois Department of Transportation has set its own erosion and sediment control standards for highway and bridge construction. IDOT is also responsible for regulating all construction in the floodplain. The Illinois Environmental Protection Agency has minimal standards related to the construction impacts of water and wastewater treatment work as well as their supporting facilities.

House Bill 818 was originated to establish a comprehensive sediment control program for land disturbing activities and had direct applicability to construction related erosion. The final bill, Public Act 80-159, was only a small portion of what was originally intended. Though it is a positive step, it is a long way from being a comprehensive state program. Having discussed the general basic regulatory components, as well as the examination of how these components fare under actual operating conditions, has identified key program concepts. What remains is the application of these concepts to the Illinois case. This will be the subject of the final chapter of this report.

Chapter 4

PROGRAM PROPOSALS

On June 24, 1976, the Illinois Environmental Protection Agency (IEPA) accepted a grant from the U. S. Environmental Protection Agency in the amount of \$1,471,000 to assist in the development of a Water Quality Management (WQM) Plan for the 83 nondesignated counties in the State. Illinois officially began its WQM planning process in November of that same year. Two years later, in December of 1978, a draft WQM plan consisting of five volumes and nearly one thousand pages of text was completed. Much of the draft plan was devoted to an assessment of nonpoint source water quality impacts and potential abatement strategies.

Significant support, criticism and suggestion was received by the Illinois Environmental Protection Agency during a series of public meetings and hearings held on the draft Water Quality Management Plan. From the first of the year until April 9, 1979, the date the official record closed, Illinois EPA received more than 1,100 comments. Over 200 witnesses testified at the public hearings. A review of the comments indicates that the public involvement effort succeeded in stimulating a high level of interest by the agricultural community with about three out of four of those testifying representing farm interests. Other major interests represented include State, substate agencies and local units of government, economic interests, private citizens, public interest groups and environmental groups (55).

Most comments were on the agriculture portion of the plan. While virtually all commenters supported the goals and objectives of the

program aimed at controlling soil erosion from agricultural sources, many were also critical of the Agency for proposing a standard based, complaint oriented regulatory program rather than one that would be based entirely on technical assistance, education, and cost-sharing. The construction site erosion portion of the draft plan elicited comments dealing primarily with costs of the program. Developers pointed out that a State regulatory program would probably add time delays with resultant increased costs for projects. Other comments centered on the costs for local governments if they were to be responsible for a construction erosion program. Construction site erosion problems, it was felt, should be addressed fully as the Illinois EPA develops needed regulatory programs, giving special attention to fiscal impacts. A number of persons representing agricultural interests pointed out that urban sector problems, including construction erosion, affected them (56).

Due to the time constraints faced during the initial planning phase, emphasis was placed on perceived problem areas of which agriculturally related nonpoint pollution was assigned the highest priority. The intention was to establish a framework for dealing with nonpoint sources, something which had never fully been accounted for within IEPA's regulatory framework, starting with the priority categories first and moving from there during the continuing planning phase (57). Consequently, agriculturally related nonpoint source controls and abatement strategies were developed in some detail during the initial planning process. Other categories, such as construction nonpoint source pollution, were only vaguely outlined. These ostensibly were to be developed in more detail during the continuing planning phase of the WQM process, when functional and programmatic experience with these problems had been acquired (58).

The milestones established for the development of a control program related to construction nonpoint sources were identified in the initial plan. It was proposed that a statewide regulatory program be developed. The tentative milestones in the development of the program are listed below (59):

1979 - A committee of state agencies (Departments of Agriculture and Transportation, the Illinois EPA, and other agencies) be formed along with representatives of the construction industry and other public and private sector representatives. Recommendations from the committee should be made on the proper administrative agency, proposed legislative changes, size of projects to be regulated and the form of administrative review. Recommendations should also be made for actions which state agencies could take for controlling erosion from state projects (or federal projects administered through state agencies). Examples of these projects are highway projects, sewerage treatment plant construction, capitol development projects, etc.

1980 - A guidebook should be developed which will clearly explain this program both in terms of administrative processes and BMP's which could be used for projects. Local options for use by counties and municipalities should be explored in detail. Existing model ordinances and ones to be developed by the Illinois EPA should be considered for inclusion.

1980-1982 - An educational program should take place to make the program known to the public and the construction industry.

1982 - Full enactment of the regulatory program should take place.

In July of 1979, following the certification of the WQM plan by the Governor, IEPA issued a document entitled "Five Year Strategy for Controlling Water Pollution Problems from Point and Nonpoint Sources: Fiscal Years 1979-83". The purpose of this strategy was to outline the methods and objectives to be undertaken in order to achieve problem resolutions for those areas identified in the plan. The five year objectives for construction nonpoint pollution identified in that document are as follows:

1. To control water quality problems associated with major

construction site activity.

2. To identify Best Management Practices developed from the agriculture studies which are applicable to construction site erosion problems.
3. To develop technical guidance which will assist in the selection of BMP's for the appropriate construction sites.
4. To assist management agencies in the implementation of model regulations for soil erosion and sedimentation and detention of runoff from construction sites.
5. To develop statewide enabling legislation, if necessary.

From a policy standpoint, the program milestones established in the WQM plan and objectives from the five year strategy are complimentary. For example, establishment of an interagency taskforce coupled with information/education activities clearly serve objectives three and four of the strategy. Moreover, the transfer of applicable BMP's from agriculture abatement strategies parallels the concept of outward expansion of program experience from agriculture to other nonpoint source activities. However, these two documents only suggest what course might be taken in terms of developing a state control program. They both identify tools and techniques that could be used (education programs, interagency committees and the like), but the overall framework into which these options fit was not characterized.

A construction nonpoint source control program for Illinois must have, from a design standpoint, the following three goals. First, the program must protect those waterways in the State subject to construction nonpoint sources. Secondly, a control program must allow for the most effective use of available intervention strategies at the local or state level.

Finally, the program must be flexible in order to hold down implementation costs to government and those entities subject to regulatory control in order to establish equity between control requirements and the water quality benefits received. Moreover, flexibility in program design must be able to accomodate innovative responses to site specific problems or particular institutional requirements.

In order to develop a comprehensive program to accomplish these goals, general objectives must be achieved. These objectives must be achieved simultaneously at both the state and local level in order for abatement of this polluttional source to be realized. In other words, the program should specify the level at which control authorities and methods are most effective as well as providing for an operational and accountable management system. Consequently, performance objectives for a system with these requirements can be stated as follows:

1. A state initiated construction nonpoint source control program should provide for consistency in enforcement approaches.
2. A state initiated program should allow for a "reasonable cost" approach to implementation. That is, the cost of program implementation for enforcement purposes should be able to be recouped through various financial options (self-financing).
3. A state initiated program should provide for "quality assurance" within its regulatory structure. That is, the establishment of a program which in fact causes construction site erosion control practices to be used because of program credibility.

A further set of issues to be considered in the development of a construction nonpoint source control program for Illinois centers on the status and administration of that program. In particular, the questions

of where responsibility for program development and enforcement should lie, what level of government and what type of authority must be addressed.

The role of IEPA, as the state's water quality management agency, in the program must be considered especially if the possibility of reporting requirements as part of the control system are accepted as an evaluation technique. Moreover, IEPA's role as a capital construction agency, along with other capital agencies must be incorporated within the program. Likewise, the accessing and transfer of technical control expertise available through the Illinois Department of Agriculture, the 98 soil and water conservation districts and IDOT must also be accommodated to implement the important function of education and technical assistance.

From a local perspective, program procedures such as the need or desirability of requiring certification of site inspectors or construction site personnel must be established. Coordination with other relevant state and local agencies in a regional context must be planned for, along with enactment of information transfer and expertise building programs. An optimal basis for identifying violations through inspection or complaint based systems, as well as related enforcement approaches, must be decided upon and the need for additional statutory determined. Finally, the administrative, economic, political and technical barriers to adoption and successful implementation of control programs should be identified and strategies to mitigate their influence on the implementation process should be incorporated into the overall program design.

Recommended State Program Elements

From a national perspective, recently enacted state statutes reflect a trend in state and local legislation towards stronger measures for

erosion and sediment control and water quality. In many cases established regulatory mechanisms of local governments are being linked with the expertise and experience of conservation districts, overall planning and management capabilities of state soil conservation agencies, and the technical expertise of the Soil Conservation Service. Moreover, many of these trends are currently manifest in Illinois through various statutory or administrative actions at the state and local level. The critical task is to focus activities already underway to combat construction site nonpoint pollution, as well as providing a comprehensive framework from which additional action can be undertaken.

There are three applicable design assumptions which can be used in the development of the necessary policy framework. First, as is usually the case with any newly regulated area, inertia and stress exists in terms of goal attainment. Secondly, due to limited administrative and other resources, implementation must be on a priority basis in terms of geographic areas and target implementation authorities. Finally, from a technical standpoint, the abatement of construction nonpoint pollution lies predominately in management practices, as opposed to capital-intensive structures. Thus, educational and technical assistance functions must be prominent at all implementation levels.

In general, it does not appear necessary for Illinois EPA to pursue a course which would cause enactment of new state legislation to gain improved construction nonpoint source abatement, at least at this time. As previously stated, there are some advantages to a mandatory, legislatively initiated state program; but a number of feasible and less costly tactics to achieve a comprehensive state regulatory program are already available to State program administrators. Given the likelihood

of opposition from organized interest groups (Illinois Municipal League, contractors and homebuilders associations, etc.) this would be an undesirable expenditure of political capital.

During the course of plan development, agriculture received the majority of attention in regard to nonpoint source control. Consequently, the plan formulated a system geared towards performance standards, best management practice evaluation, and technical analysis to be developed during the continuing planning phase of the WQM program. This pattern of development has been consistently supported during three subsequent federal funding cycles which have followed initial plan formulation, certification, and USEPA approval (61).

In the process of final plan formulation, the agricultural community in Illinois was quite vocal as to their preferences in terms of preferred control strategies. Moreover, they expressed their willingness to do their fair share. One significant omission in their estimation was the failure of the 208 plan to clearly address the urban sources of erosion (construction). Although in general terms the construction nonpoint source problem may be minimal when assessed at the State level, the willingness of the State to substantively address all nonpoint sources can do much to insure continued commitment by the agricultural sector to address the primary problem.

Based on these two givens - that a legislatively initiated mandatory control would be a waste of political capital and that a control program for construction nonpoint source is a necessary adjunct to the primary program established for agriculture - several basic objectives become apparent. These objectives become one of developing internal programs and policies for specified state agencies, the linkages of these programs to

overall policy goals and the interaction of the State (through those specified agencies) to local units of government and affected interest groups (i.e., builders and developers). Fortunately, much of the basic framework for the realization of these policy objectives have either already been identified or there are existing interagency relationships.

The initial Water Quality Management Plan recommended that a committee of state agencies be formed. The implied task of this group is to make recommendations on the proper administrative agency, proposed legislative changes, size of the projects to be regulated, and form of administrative review. Moreover, this group was also to recommend what action state agencies could take to control erosion from state sponsored projects or federal projects administered through state agencies. The program proposed here does not now envision a mandatory and direct regulatory role for the State at this time. However, even under this scenario, a state level interagency committee can still serve a number of useful purposes.

The composition of this committee is fairly easy to determine. In fact, a working framework for this group already exists. As mentioned earlier in the Institutional Assessment section of this report, there is currently a committee of state agencies (constituted by Executive Order from the Governor) examining the impacts of their capital construction and/or funding activities on the conversion of prime farmland to non-farm uses. And while not all these conversions result from construction activities of those agencies, their involvement in the issue of construction nonpoint source control would certainly be beneficial. These agencies - Capital Development Board (CDB), Department of Commerce and Community Affairs (DCCA), IEPA, IDOT, Bureau of the Budget (IBOB), Department of Conservation (DOC), Illinois Commerce Commission (ICC), Department of

Agriculture (IDA), Illinois Institute of Natural Resources (IINR), and Department of Mines and Minerals - form the core of those agencies which have significant actual or potential impact on nonpoint erosion and sedimentation problems. All of these agencies, with the exception of the Department of Mines and Minerals, can play a prominent role in the establishment of the state level component of an overall construction control program. Each agency's role can be further identified by its relationship to the problem source, as well as to the constituencies impacted by a control program.

IDOT, IEPT, IDOC, and ICDB can be characterized as the prime capital construction agencies in the State. This is true for both solely state funded projects as well as federal funded projects under State supervision. IDOT has under its jurisdiction those projects of direct concern here: roadways, bridges, waterway development and airports. IEPA has under its authority the construction of wastewater treatment plants and related works. IDOC has oversight regarding those recreational developments funded through their program. The ICDB is the prime sponsor of all other state required buildings and grounds improvement. Beyond direct oversight on capital projects, both IDOT and IEPA have permit authority for works of a capital intensive nature such as the issuance of construction authorization for sewers, waterlines, dams, canals, drainage/flood control projects and the like. To a lesser extent, ICC shares a similar permitting function with authorization oversight on new pipelines, transmission lines and other similar structures.

Consequently, it is proposed that those agencies with primary sponsorship of state capital construction - IEPA, IDOT, IDOC and ICDB be instructed to develop cooperatively a construction nonpoint procedures

manual to be used on all state sponsored or supervised projects. Further, it is proposed that the field supervision personnel of all the aforementioned agencies be trained in site control procedures and be periodically certified as to proficiency in those areas necessary for compliance assurance. Those agencies with regulatory oversight through a permit issuance process (IEPA, IDOT, and the ICC) should be encouraged to establish a standard permit condition which incorporates the practices and procedures outlined in the interagency committee handbook. It is recommended that IDOT be designated as the lead agency for handbook and procedural development for this component of a total state program.

Prior to development of this procedural and practices manual, those designated management agencies for construction nonpoint control at the state level should establish application criteria. These application criteria are to be developed as a screening device to establish threshold guidelines for projects to be included under such practice requirements. This should be done so as not to unduly burden existing regulatory staff functions from a project management standpoint, as well as minimizing the number of small individual projects (small boat docks, minor waterline extensions, etc.) which are subject to general permit issuance. The underlying premise here is to work towards a system in which the administrative requirements of the regulatory program bears a reasonable relationship to the water quality benefits received.

It should be noted that this proposed component of the regulatory framework would be applicable only to those projects which fall within the previously mentioned threshold criteria and are funded primarily by state revenue sources or subject to direct state oversight of federal construction funds. This would also apply to those projects which require

a state issued construction authorization permit. However, the development of this procedure is not intended to encompass those projects which do not fit within this definitional criteria. It is not the intention of this particular aspect of a comprehensive state program to establish the foundation for a state dominated permit system, such as in Maryland. Nor will this system supplant or preempt local land use control prerogatives. Under this proposal reliance on local program authorities is quite important for overall program success.

In addition to the consolidation of internal and external state agency policy/program functions, the development of an educational or technical assistance function must have equal footing with the more direct action suggested in the preceeding paragraphs. As proposed in the initial WQM plan recommendations for construction nonpoint control, the development of a guidebook was suggested to be followed by an educational program effort. It is recommended that this proposal be vigorously acted upon. The following paragraphs will be devoted to some of the performance requirements of such an educational system.

Although the system presently being proposed has a high level of state involvement, including non-regulatory administrative requirements for specified state agencies, the burden of direct regulatory responsibility will fall to local units of government within the State. As has been discussed at some length in the preceeding sections of this report, the performance of local implementing units is critical. Some of the previous weaknesses in local level performance in regards to this issue have resulted from a lack of expertise in terms of program design and enforcement options. Moreover, there has been a lack of understanding as to what has been done in other communities to address the same problem, as well as what

is currently possible under existing enabling authority. Consequently, a program of education, technical assistance, and technology transfer must be developed as a logical bridge between state and local program elements.

A number of state agencies previously identified in the Governor's Executive Order can be singled out as key links in the bridging effort. Those agencies best suited for this job are Department of Commerce and Community Affairs (DCCA), Illinois Institute of Natural Resources (IINR) and the Illinois Department of Agriculture (IDOA). DCCA is concerned with improving local government performance in the delivery of services among other things. Consequently, a large part of the Agency's program is devoted to the development of a skill base within communities which request assistance. DCCA is also responsive to State requests to provide service oriented training sessions in order to improve local government performance. A good example of this is DCCA's sponsorship (with IDOT) of a series of regional workshops to improve streetsweeping and urban "housekeeping" techniques. This program is being funded in part with WQM planning funds and has been undertaken on behalf of IEPA's urban stormwater management strategy. Given this willingness to participate in such undertakings, it would appear reasonable to request DCCA's continued involvement in the state water quality management program.

With the role of DCCA identified as one of information transfer, the role of the remaining state agencies becomes more apparent. The Illinois Institute of Natural Resources (IINR) was originally established by the Illinois Protection Act of 1970 (62). This act created the Illinois Pollution Control Board to act as the rule making body and first court of law for environmental matters; it also created IEPA as the Board's regulatory arm and the IINR as the research and policy development entity related to IPCB and IEPA mission statements. Consequently, IINR becomes

a likely partner with the IDOA in terms of applied research and technology transfer related to construction nonpoint source control.

Just as a lead agency has been recommended for insuring internal state agency program consistency and guideline development (IDOT), so should an agency be designated for statewide guidance development and technical assistance. As mentioned earlier, the ready availability of technical assistance and expertise is one of the key factors in effective implementation of a voluntary local oriented program. In Illinois the location of administrative responsibility for overall development of this technical assistance element would most conveniently fit into the IDA - Division of Natural Resources. The DNR was upgraded from a bureau to a division on January 1, 1980, and its staff increased fourfold. This was done primarily in response to the passage of P.A. 80-159 which caused the development of statewide soil loss guidelines for agriculture. The Office of Management and Technical Assistance within the Division has taken on major responsibility for program implementation. With the new expansion of resources in the DNR, there is interest in expanding efforts in the area of public education (63). This expansion makes the education/training and BMP guideline development feasible statewide.

The DNR also acts as the state authority for the SWCDs and administers the state and federal fundings supporting them. The number of SWCD staff funded by the state has grown since the enactment of P.A. 80-159. Currently there are 35 staff, classified as administrative aides, which are shared among existing districts (each aide is given a multi-district responsibility). In addition of these 35 state sponsored staff, federal Soil Conservation Service staff are also administered through the DNR to fund District Conservationists and Conservation Technicians.

Most SWCDs receive appropriations from counties and municipalities ranging from \$500 to \$5000 per year (64). These appropriations pay for soil surveys, advice on zoning changes, and support for services to the public provided by SWCD staff. Consequently, it becomes clear that there exists within IDA/DNR a broad based and locally accessible pool of technical expertise which can be tapped in terms of statewide program development. The key issue then becomes how to maximize performance in the areas of construction nonpoint source control without minimizing support for the historical agency mission of agricultural soil conservation.

The use of agriculturally oriented agencies to address technical support issues in construction nonpoint source control are important for two reasons. First, it potentially makes it easier for state initiated policy objectives to be coordinated in the area of public education based on established lines of communications. Secondly, it allows for the direct use and control of existing state personnel in terms of assigning staff specialists in erosion control to bolster local program development. These two advantages can quickly be negated by inappropriate use of the existing structure and unnecessary diversion of staff expertise from perceived problem areas.

The existing structure for control of erosion in the State is set within the framework of soil loss standards. These standards, while appropriate for agricultural applications, are of limited utility for construction erosion estimation (65). These restrictions are severe enough to impede program development if they are used as the basis for local programs. The same is true of instream water quality standards for sediment, since practical techniques are not available for estimating sediment delivery directly to streams from construction projects. While

the current state standards in Illinois are based on soil loss, there appears to be substantial advantages to having state established and publicized BMPs rather than using strict application of current standards. Consequently, it is recommended that IDA/DNR with the cooperation of IDOT adopt a best management practice approach and put out handbooks and guides for BMPs geared to various types of earth disturbing activities, soil types and topographic characteristics.

It is important that the existing resource pool be carefully targeted in relation to technical assistance service provision. Just as it is important to establish an easily understood system of control practices (BMPs related to specific activities rather than straight soil loss standards), so is the level of effort expected from local SWCDs. In essence, it becomes a matter of constituency building within the institutional structure. Many districts see their role as primarily devoted to agricultural needs. To force them to undertake carte blanche support of a "urban oriented" service program is likely to meet with some resistance. Thus, minimum standards of program support should be mutually worked out among IDA/DNR, SWCDs and local units. Since technical assistance requirements in this area are likely to be unevenly distributed, model service contracts or interlocal agreements between local governments and the SWCDs should be provided in those areas of high demand. This will allow the development of critical program linkages and evaluation benchmarks to be established. These two concepts will be developed in greater detail in the following paragraphs.

The primary role of IEPA, in relation to the overall construction nonpoint source control program, is the provision of linkages between program goals, designated management agencies and implementation

objectives. As mentioned earlier, a well developed construction nonpoint control program seems to be a desirable adjunct to the agriculture nonpoint control program. Additionally, urban stormwater runoff and management objectives would also be served by a construction control program. Thus, IEPA should provide the necessary rationale for program development through a clear and consistent relationship between programs recommended and WQM objectives.

The way to establish such relationships for the statewide portion of the overall program is for IEPA to designate priority areas for action. Through the identification of geographic areas of concern, the process for program evaluation and implementation criteria can be determined. The problems of geographic dispersion with construction nonpoint impacts coupled with limited resource availability for the technical assistance function indicates this to be a prudent course of action. Consequently, it is recommended that IEPA conduct a risk and needs assessment for construction nonpoint source impacts. As an initial screening criteria for this type of activity, it is further recommended that the nine SMSAs within the State -- Chicago, Rockfor, Rock Island, Peoria, Bloomington, Champaign, Decatur, Springfield, St. Louis -- encompassing 20 counties be initially targeted for further program development.

A number of activities can be undertaken to insure implementation of program objectives, if this targeting approach is adopted. From a statewide perspective, state agencies with capital construction responsibilities or permitting authorities will be able to immediately concentrate on improving procedural reviews and personnel expertise for staff and projects located in these areas. They will also be able to further refine and use permit conditioning by providing threshold size

and locational criteria for projects or activities requiring permits. IBOB as the State A-95 Clearinghouse can also serve as a check on this process by close review of federal grant applications according to categorical types, state agency oversight or sponsorship and locational characteristics. From a technical assistance and technology transfer standpoint, DCCA and IINR will be able to focus their initial research and educational demonstrations within these targeted areas. IDA/DNR can also act to insure the adequacy of staff resources in these areas and assist in the establishment of formal service agreements as alluded to earlier.

What remains is the linkage between statelevel (those efforts related to state programs and performance) and statewide (those activities related to implementation of local programs and performance) elements for construction nonpoint source abatement. The remaining portions of this chapter will be devoted to the requirements of that linkage.

Recommended Local Program Elements

The brunt of regulatory action for construction nonpoint control, as envisioned in this proposal, will fall on local units of government. The willingness of officials at the local level to undertake such responsibilities and the quality of the programs they enact are the two important features of the local program design. Consequently, the focus of developing the local program element becomes one of building local constituencies in those targeted areas and insuring the adequacy of the implementation tools used (i.e., ordinances). These two activities are fortunately interrelated and can be discussed interchangeably.

There are numerous ways in which the state (primarily IEPA working through DCCA and specified planning commissions or other local government

service groups) can encourage local involvement in construction nonpoint source abatement. These techniques can be described as follows: (1) promotion of the value in construction nonpoint source abatement; (2) provision of clear and consistent state program guidelines; (3) accessible, locally available technical assistance once programs are adopted; (4) dissemination of information on program/policies to local officials and contractors; and (5) development of consistent and applicable model ordinances as well as instruction in the implementation of BMPs geared to site specific conditions. This latter point is a subset of dissemination programs aimed at local officials and builders. Of all local program elements, the last point may be the most critical in terms of local level performance. The two key components here are the technical scope of the implementation tools used and the financing mechanisms used to recoup regulatory costs.

It is recommended that IEPA develop a detailed set of model ordinances for use in local regulatory programs. These ordinances should be designed within the framework of current enabling authorities for ease of use by local municipalities and counties. The intention of these model ordinances is not to usurp local land use prerogatives but rather to assist in the application of the proper tools to achieve the desired objective of construction nonpoint source abatement through responsible local programs.

In the review of currently used local land use techniques in Illinois, it was implied that the more traditionally thought of tools such as zoning and subdivision ordinances were the tools local officials were most comfortable with. Consequently, it is not unreasonable to expect that as local officials accept new nonpoint source responsibilities, they

will turn to the old familiar tools. Since a number of the counties and municipalities within the targeted areas have subdivision ordinances already, this route would be a likely candidate to develop revised ordinances around and its use creates some uniformity among dispersed local programs. However, there is a major limitation in the use of this technique that suggests that this approach be de-emphasized in model ordinance development.

The major limitation with using subdivision regulations per se or significantly rescoping them is that it excludes from regulation those major projects for which subdivision permits are not required, such as shopping centers, office buildings and industrial sites. Thus the problem becomes one of program coverage within specified geographic areas to avoid problems with categorical exclusions. Consequently, model ordinance development is recommended to take place in the form of new ordinances, such as grading and excavating or site development ordinances. This approach retains the advantage of using existing staff or commissions involved in subdivision review, but would allow extension of program coverage beyond only those projects requiring subdivision review.

Conversely, there is a need to expedite the review of small projects subject to the local review process. This could be accomplished by the development of standard grading plans to be used in conjunction with proposed ordinances. These standard plans are used on specified types of small scale projects, and the developers would be held responsible for their on-site implementation automatically. Spot checks would be conducted to insure compliance.

The quality of review for developer submitted plans and the quality of follow-up inspections for compliance are important as well. The

enactment of model ordinances does not guarantee that the plan reviews or compliance assurance process will be effective in practice. Of all local program components, this particular aspect of review and monitoring could be viewed as the weakest program link. This weakness can be attributed to the lack of staff expertise and credibility in program follow-up and monitoring. Variations and inequities in program performance within the priority areas reduces overall effectiveness and fails to establish consistent regulatory procedures which the regulated community (developers) can plan on. In other words, there is less incentive to comply when program procedures are variable in practice or application.

In order to avoid these types of programmatic shortfalls, it is recommended that communities within target areas enter into formal agreements with local districts to provide staff support for plan reviews unless or until local staffs have received training for such activities. As recommended earlier, provisions should be made for the execution of service contracts between local SWCD staff and select governmental units to do both review and monitoring under the auspices of local ordinances. Under such an arrangement, cities or counties would retain authority over the imposition of sanctions.

The issue of sanctions could be handled in a number of ways which would allow for flexibility in local response but still provide for credibility in deterrence. There are two basic facets to sanction imposition: type and severity of penalties and the legal-administrative arrangements for sanction execution. The recommended combination of sanctions are stop work orders (administratively issued), use of escrow accounts rather than performance bonds for site control plans and the ability of the local implementation authority to undertake civil action

in the event of lengthy non-compliance. This listing in order of desirability allows for ease in administration, flexibility and credibility in program response, and can be practically administered without resorting to judicial recourse.

State and Local Resource Commitments

The state and local program costs associated with the proposed construction nonpoint source control program will undoubtedly vary within the selected priority areas. Increased costs to state and local implementation authorities under this voluntary format are clearly likely. The extent of the resource commitment will vary with the extent of program enactment. Moreover, program costs also vary over the life of the program. As all parties come to know what is expected of them, time spent on both initial plan review and monitoring are reduced at the local level. At the state level, costs and personnel requirements are reduced with time due to the incorporation of these procedures into the framework of normal business operation. Program effectiveness at both levels improves with the establishment of program consistency and credibility.

Costs to local jurisdictions (counties and municipalities) will undoubtedly vary within the state, depending on the rate of development and the extent of local program activities. If a large portion of local plan reviews and monitoring are performed by SWCD personnel, much of the cost to local programs are in effect shifted to state or federal resources. Costs to the state will vary according to the intensity of effort in the areas of education, training, provision of expertise in local program development assistance, as well as the de facto subsidy of construction nonpoint source staff support through selected SWCD's. The

state can to some extent shift costs to the federal level through the use of staff and training grants potentially available.

Although state educational costs may be initially high, this program component may be an excellent cost saving technique. The burden of state agency and local agency program reviews could conceivably be reduced as developers or contractors become more expert. These programs could also reduce local manpower costs over the long term as the private sector becomes more adept in designing and implementing recommended BMP's, thus minimizing follow-up monitoring requirements.

The program costs to state and local designated management agencies can be offset in several ways. Program development staff for state lead agencies might be funded, at least partially, through federal grant sources (USEPA, USDA, USHUD). Local SWCD staff support could also be subsidized for construction nonpoint source work through the USDA/SCS staffing agreements, a use consistent with current program intent.

The principal area of fiscal concern is at the local implementation level, since the regulatory burden is greatest there. The primary means for financing county and municipal program administrative costs, aside from general revenue funds, are fees for plan review and monitoring charges. Fees for plan reviews are used by many jurisdictions within other states which have been reviewed in this report. These fees are usually set to cover, in a representative fashion, the local unit costs for processing and handling materials. As noted earlier, local program elements should be allowed to develop with a maximum degree of flexibility, and this should include financing aspects of local programs. Thus, as office and staff costs fluctuate or as the level of development varies, the financing structure can be responsive to such changes.

Based on the recommendations for a voluntary program outlined in the preceeding portions of this chapter, the following additional resources should be anticipated for both program initiation and continued administration:

- . Lead state agency staff commitments (IDOT, DCCA, IDA/DNR and IINR) for developing standards, capital agency handbooks, model ordinance development, dissemination programs, assistance to local jurisdictions for program adoption, participation in local hearings and advisory meetings as well as advisory local program reviews.
- . Additional IEPA staff resources devoted to detailed risk and needs assessment, assistance to lead state agencies and local implementation units, establishment and maintenance of consistent policy linkages among construction nonpoint source abatement programs, WQM objectives and local capabilities, identification and targeting of policy and program priority areas.
- . Lead local agency (SWCD's) staff allocation for technical assistance to municipal or county jurisdictions in construction nonpoint source program development, assistance with or performance of plan reviews for larger more complex development projects, provision for program administration on a contractual basis.
- . Lead local agency (counties) performance of staff reviews and provision of technical assistance to developers, undertaking of site inspection and compliance assurance functions in unincorporated areas, coordination with state lead agencies and SWCD's for service provision and ordinance development.

- . Lead local agency (municipalities) performance of staff reviews and provision of local technical assistance to local developers, undertaking of site inspection and compliance assurance functions in incorporated areas, coordination with state lead agencies, SWCD's and county programs for service provision and ordinance development.

Summary

The proposed program for the abatement of construction nonpoint sources within the State of Illinois has two active program levels. There is a state level program element and a statewide program element. State level refers to those activities undertaken through policy and program coordination between specified state agencies in this report. This applies to those state agencies which have been identified as major capital construction, permit conditioning or educational and technical assistance entities within the framework of this program. To a large extent, policy on program responsibilities and coordination requirements follow directly from these identified functions.

Statewide program requirements refers to those activities undertaken through policy and program coordination among local (city, county and district) and state agencies. Under the proposed program, no mandatory state enabling legislation will be sought after at this time. Rather than working on new state legislation to require local enactment of construction nonpoint source control programs, the thrust of the proposed abatement strategy will be to develop, promote and disseminate program materials for use under existing state and local governmental authorities. This approach has been selected due to the desire to implement that

portion of the State WQM plan concerning construction nonpoint source in the most expedite manner. The pursuit of mandatory state enabling legislation would be an undesirable expenditure of time and staff resources under current conditions.

The use of existing statutory frameworks will require some modification to enact the proposed strategy. State enabling legislation currently prescribes the establishment of soil loss tolerance standards for agricultural activities and encourages their use for urban construction activities. It has been recommended that as a matter of policy and program guidance, program standards which incorporate suggested best management practices applicable to construction nonpoint sources and model ordinances suited to local conditions adaptable to a BMP approach be developed. This should be done in lieu of strict prescription and transference of current soil loss standards to the construction nonpoint source abatement program.

Given this emphasis on BMP application and model ordinance development for local level implementation programs, a number of activities will have to be undertaken for the express purpose of constituency building. As mentioned earlier in this report, due to the voluntary thrust of this program and the need for program flexibility in response to local conditions, the degree to which educational and technical assistance must play a role in overall strategy implementation cannot be understated. To this extent, state agency programs become the bridge to local implementing governments which in turn become a link to the regulated community, i.e., builders and developers.

Consequently, information on the economic and social costs related to construction nonpoint sources should be developed and disseminated in

selected areas. From this base training programs in BMP application are recommended to be conducted around the state for local officials, developers, contractors and state agency personnel stationed in field offices throughout the State. The educational aspect of the control program should have as its objective the reduction of opposition to overall program goals. Resistance to program enactment and the inability to establish program credibility in the initial implementation stage is a function of the sophistication at local level.

It is assumed that local developer opposition to program enactment will lessen as their experience with program requirements increases. Moreover, the building of local staff expertise will also promote this goal by the development of consistency in program application at this level while retaining flexibility for local response. The intention is to build uniformity in expectation concerning the program among implementing and regulated groups.

A necessary compliment to the educational aspect of the program is the increase of technical assistance services for construction nonpoint source abatement at the local level. The target groups for this effort would once again be contractors, developers and local program officials. The best way to provide this service element is to increase the local accessibility to such services and developing the necessary guidance materials to be used at that level. It has been recommended that the 98 Soil and Water Conservation Districts in the State be designated as the primary service provider at the local level. It was further recommended that the IDA/DNR act as the primary developer of technical guidance material for use in the statewide program in conjunction with IEPA. In areas where demand for assistance is expected to be high, formal

contracts for provision of such services should be developed.

There were a number of state agencies which were designated to undertake responsibilities in conjunction with the proposed program. IDOT was designated to act as lead agency for development of consistent procedural manuals for itself, IEPA, IDOC and ICDB regarding construction nonpoint source abatement practices applicable to agency projects. Moreover, IDOT was given responsibility to assist in adapting this procedural guide for use in the construction permit issuance and conditioning process of IDOT/DWR, IEPA and ICC. Additionally, all previously mentioned agencies were to bolster personnel training for field staffs related to site practices in an effort to improve compliance assurance on state job sites.

IINR and IDCCA were designated as lead agencies for educational and research programs for information transfer to local implementing levels. IDA/DNR was recommended as lead agency for technical assistance provision to local units and private contractors. IDA/DNR is to work within the strong linkage to SWCD personnel in the matter of positioning staff resources and expertise in areas of high demand without comprising the historical mission of service to the agricultural sector.

The role of IEPA can be defined by the concept of program linkage. That is, the provision of clear and consistent policy reference points through the use of the State WQM plan and its subsequent operational format from which state level and statewide program elements are evaluated. IEPA will also establish threshold criteria for state level elements related to state sponsored or state oversight projects to be covered by the procedural handbook and permit conditioning umbrella. For statewide program elements, IEPA is to be responsible for identification

of priority geographic areas for construction nonpoint source abatement action. It is initially recommended that 20 counties in 9 SMSA's be initially targeted for inclusion with the statewide priority category.

From an operational standpoint, the construction nonpoint source abatement program is recommended at all times to be defined as a necessary adjunct to the agricultural and urban stormwater nonpoint programs of the Agency. IEPA will also be responsible for the development of local model ordinances to be used with flexible BMP guidelines to be developed in conjunction with IDA/DNR. Local model ordinance development will be the principal means whereby private sector financed construction activities are incorporated in this proposed program. While the most common local ordinance which would likely be modified to accomplish program objectives, the subdivision ordinance, allows for exemption of many large projects from oversight. To avoid this regulatory oversight, IEPA should develop model ordinances along the lines of grading or excavating ordinances which incorporate local permitting features. These ordinances should also provide for flexibility and immediacy of response at the local level.

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CONSTRUCTION NONPOINT SOURCE POLLUTION:
A PROPOSED CONTROL PROGRAM

by

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AN ABSTRACT OF A MASTER'S REPORT

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This report examines the impact of construction nonpoint sources and the potential abatement strategies which can be implemented on a local and statewide basis. The basic research methodology was a review of the literature and modified case study approach on several states which have enacted various types of voluntary or mandatory control programs. The objective of this research was to identify basic program components in either a voluntary or mandatory program format. From this information a state which currently does not have a formally identified program (Illinois) was selected to assess and recommend approaches appropriate to that state. This was accomplished through four specific analyses: a problem assessment; specific institutional assessment of Illinois; identification of general control program characteristics and; specific program proposals for Illinois.

The problem assessment concluded that construction nonpoint source problems are widespread nationally but extremely localized in impact in comparison to other nonpoint source such as agriculture. This was based on a review of the literature and documents developed during Illinois's water quality management planning program. Moreover, the degradation of the water resource base in areas of urbanization from this nonpoint source gives it significance from a population impact standpoint.

The institutional assessment identified the array of federal, state and local programs and authorities applicable to construction nonpoint control. This assessment concentrated on state and local authorities in Illinois. An analysis revealed that local enabling authorities were sufficient to implement control programs at the municipal or county level. In addition, a range of state level administrative actions were identified through an evaluation of state agency program authorities. A critique of current state legislation pertinent to erosion and sediment control as well as local government application of land use authorities was undertaken. This assessment revealed areas where improvement in performance were needed.

In the identification of general program design requirements, a case study examination of five states was undertaken. These states were representative of the range in voluntary and mandatory program elements in the 21 state programs identified nationally. Key performance areas for both state and local implementation units as well as necessary support functions such as educational and technical assistance were derived. Location criteria for placement of program authorities at both the state and local level were highlighted.

The report concludes with a recommended program based on the Illinois situation. A program which is strongly supportive of local implementation and enforcement options was suggested. Priority areas for local program application were recommended along with the identification of state support functions. Program and policy linkages are suggested to be used as reference and evaluation criteria for initial state program development. It was suggested that program development be viewed as a necessary support element in the overall program of nonpoint source abatement in Illinois. A mandatory state dominated program was not recommended as the preferred course of action.