

## SEDIMENTATION AND URBANIZATION

I'm pleased that you asked me to keynote your conference on sediment control. This is the month that will see more nationwide concern, especially by students, about environment than ever before in history. Many will have a unique opportunity on April 22 to develop a greater environmental awareness.

What are your area's particular pollution problems? What needs to be done to alleviate them? How do we make the public aware? Do we need to reexamine some basic attitudes about our values? These are some of the questions that will be discussed.

In any event, we hope April 22 will not merely be one day set aside to think about natural resources and conservation. It should be considered the beginning of a perpetual, concerted team effort--building on what has been done.

You, who have been in the front ranks of conservation action for a long time, will welcome this added interest and support. But your story and your concern needs to be told, too! Soil erosion has long been a national problem. Soil and water conservation has long been the best answer. There is much yet to be done--and the key problem areas have broadened--even shifted. Soil erosion produces sediment. Sediment is a pollutant--it lowers water quality. What are the facts?

--Sediment is the worst pollutant by volume.

--There are 550,000 miles of eroded streambanks, according to the U.S. Army Corps of Engineers.

--Roadsides in the U.S. yield 56 million tons of sediment per year.

--The Nation's major reservoirs accumulate one million acre-feet of sediment per year.

--Sedimentation increases many times when rural areas urbanize.

--A study in the Potomac River Basin showed that urban development yielded 50 times as much sediment as agricultural and forested land.

--A study of soil erosion in the Detroit metropolitan area showed these results:

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Material used by Norman A. Berg, Associate Administrator, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C., at the Regional Conference on Sediment Control, University of Wisconsin, Waukesha, Wisconsin, April 1, 1970

- . Erosion on construction sites produced about the same amount of eroded material from 2.1 percent of the urban area as erosion does on the other 97.9 percent of the area.
- . To evaluate urban erosion, the total source area, both urban and rural, must be considered. Tributaries extending out into rural areas contributed sediment to the surface water resources of the metropolitan area.
- . Erosion on land under development averages 69 tons per acre per year. This rate on 15,947 acres produced more than 1.1 million tons of sediment in the Detroit metropolitan area in 1968.

Therefore, I welcome this opportunity to meet with you who represent the organizations and agencies that influence the use and treatment of Wisconsin's land and waters.

It is appropriate that this conference on sediment control is held here in southeastern Wisconsin where communities and the regional planning commission have been working closely with SCS and conservation districts for a long time.

Your gathering is one of many that should result from last September's National Conference on Sediment Control. I understand that the National Association of County Officials, a sponsor of that conference, has asked the Federal Water Pollution Control Administration to finance 25 State meetings or at least 9 regional meetings.

The work of that first conference is summed up by an impressive "Community Action Guide for Soil Erosion and Sediment Control" that NACO has just completed. County and conservation district officials from around the country had a chance to review and strengthen a draft of the guide as a major activity of the conference. This handy publication has been a major cooperative undertaking; we hope every county in the Nation will undertake to use it.

The Southeastern Wisconsin Regional Planning Commission and the counties represented were among the first planning bodies in the Nation to recognize the value of soil survey information in planning many aspects of land use. Our relationship with Kurt Bauer and his staff has been most rewarding in terms of his agency's aims and our own objectives. The commission has just published a "Soils Development Guide" which should be of real help to local communities along with the commission's other planning reports.

Urban development of soils was of major concern at the national sediment conference because growing communities and new towns are coming to grips with a rapid change in the action of soil and water--a growing and severe sediment pollution problem. It constitutes an instant reversal of protective land use that may have been followed for many years. It poses a threat to reservoirs and flood-control structures. It is expensive--a half billion dollars or more a year--and it is destructive.

For local soil and water conservation districts and the SCS, it poses a threat to our work of more than three decades in resource protection and improvement.

For planners and conservationists, sedimentation poses a threat to the basic mutual aim of matching environmental quality with economic growth.

You'll hear about several case studies later today on handling sediment problems. I want to outline in general what the urban sediment problem is and what can be done about it.

- LIGHTS
- 1 Here's a typical piece of the rural conservation scene--a tract of land used for a purpose that suits the characteristics of the soil, and fitted with vegetation and planting methods that control water flow across the property.
  - 2 Now let's suppose that a metropolitan area grows out to meet this property. This happens to at least a million acres of farmland a year--that's 3,000 acres a day. The land waits for a time, idle but still protected...
  - 3 Then the bulldozers come in, and it's a whole new ball game. Acre upon acre is laid bare as farmland turns into land for housing or stores or highways or airports. Sometimes it lies unprotected for years while financing is arranged. But nature doesn't wait to begin her work.
  - 4 With the loss of ground cover, water moves across the land on its own terms--faster and more concentrated--picking up soil as it flows and leaving gullies behind.
  - 5 Leaving land wide open to the elements like this can drastically increase soil erosion in a year's time.
  - 6 The eroded soil moves from higher ground to lower ground,
  - 7 and is carried along in the water into storm sewers.
  - 8 Eventually, it reappears downstream. Here, a muddy tributary from a construction site joins a relatively sediment-free stream.
  - 9 Most of the soil particles don't stay suspended in the water for long. They drop out to fill the natural streambed and clog expensive water disposal structures.
  - 10 Many other soil particles reach lakes and reservoirs. They reduce the storage capacity for municipal water supplies that already are strained to the limit in many communities now. They increase water bills, and often they destroy the lake's usefulness for recreation and scenic enjoyment.
  - 11 This sign in a cemetery sums it up pretty well.
  - 12 But the cost of removing sediment is staggering.
  - 13 Each year, nearly half a billion cubic yards of sediment is dredged from rivers and harbors.

- 14 Dredging can cost from 50 cents to two dollars and more a cubic yard, a bill that is paid not so much by the people who created the problem, but by all taxpayers, many of them far downstream from that critical source of sediment.
- 15 A more direct cost to homeowners may occur when sediment fills a streambed and robs it of its capacity to carry storm runoff.
- 16 The result is flooded yards and basements and recreation areas;
- 17 and when the waters recede, an expensive cleanup job begins. These are all damages resulting downstream from the unwise construction practices.
- 18 But what about the construction site itself? You can't take away tons of soil without effect--and the effect can be very expensive...
- 19 Careful construction work is washed out in a single rainstorm...
- 20 backyards disappear downhill...
- 21 or threaten to engulf the house...
- 22 and roads wash out before they can be paved. Is sediment control so expensive that the risk of construction damage or legal action by downstream landowners is preferable? I don't think so!
- 23 It is possible to have more homes for more people without first wrecking the landscape and polluting our water...
- 24 It is possible to carve out a space for a house without removing every tree in the vicinity...
- 25 It is possible to build commercial or industrial centers a piece at a time without leaving the whole site bare for years...
- 26 It is possible to build highways, even great ones, without ruining waterways for miles downstream. How to do it? Many of the answers are already available; many are being used in southeastern Wisconsin.
- 27 First--and foremost--is to plan for sediment control as a regular part of any construction planning, with whatever technical help may be needed. And follow the plans. It is far cheaper to foresee problems and prevent them than to try and correct them later.
- 28 Second, find out about the soils--how well they will drain, how erosive they are, what kinds of plants are needed to protect them during or after construction, and other facts.
- 29 Third, leave vegetation on the ground until just before construction, and disturb only as much area as is needed at one time.

- 30 Fourth, help water move more safely off the property by putting in storm drains early...
- 31 and by getting quick vegetation on natural channels between buildings...
- 32 and getting vegetation below storm drains or other outlets. This is nothing more than the farmer's good old grass waterway. It's a good example of the principles that fit both farm and suburbia.
- 33 Fifth, stabilize hillsides and roadbanks quickly. On gentle slopes, seeding or sodding may work well...
- 34 But on steeper slopes, seeding lawngrasses may not do the job at all and sod may be the answer to give quick cover or do the job where seeded grass has failed.
- 35 But even sod won't fit everywhere.
- 36 These men are sodding a nearly vertical cliff, where chances of any grass surviving are slim, and chances of mowing and maintenance are even slimmer.
- 37 Slopes can be protected until plants are established, by using a straw mulch that helps hold the soil and keep it moist while grass grows. A light asphalt spray also would be effective here.
- 38 Jute matting works well, too, and rots away after its job is done.
- 39 A close-up shows how tight the matting holds, but how it still leaves room for grass to grow.
- 40 In critical areas, using boards for temporary terraces may protect the site until plants can get a strong foothold.
- 41 All of these methods prove the point that banks can be beautiful.
- 42 A sixth vital step is to place sediment traps or basins at low points in the construction site to trap soil that does get loose. Some erosion is inevitable while the land is disturbed, but these basins will keep sediment from leaving the site and having to be dredged out of reservoirs and channels at taxpayers' expense.
- 43 Sediment basins simply hold the water long enough to settle out soil particles, and may later serve as attractive ponds.
- 44 These are just some of the principles and practices that can be followed to create attractive buildings at the lowest cost to the community and its environment. We don't have all the answers yet, by any means. SCS and conservation districts are working with many groups to adapt other farm-based techniques to new situations.



- 45 The Agricultural Research Service has more than 400 scientists engaged in conservation research, and sedimentation studies are a major effort.
- 46 They are developing equipment and techniques for measuring and reducing sediment production. This gravel drain is an example.
- 47 The concern of USDA and conservation districts and more and more local governments is that each year the sediment that collects in our reservoirs represents the loss of enough water capacity to supply a city of  $5\frac{1}{2}$  million persons for a year.
- 48 Our concern is for the many other pollutants that are carried with sediment in uncontrolled water, often adsorbed on the surface of the soil particles.
- 49 So, just as conservationists took the challenge of wasted land--like this gully...
- 50 and found an opportunity for a beautiful land--just as we've helped make rural America not only productive but also a fine place to live and work--
- 51 Citizens and governments have a challenge in both town and country of changing the use of land without ruining the land and the water that drains from it.
- 52 They have an opportunity to assure the kind of pleasant surroundings that city people move out to find in the first place...the kind of pleasant surroundings that you in Wisconsin work toward every day.
- LIGHTS

Principles and techniques are available, then, to avoid sediment damage. Your aim at this conference and in your work back home should be to get every community and every builder to follow an urban development code that includes these guidelines.

We would suggest that a workable sediment control program is one in which responsibility is transferred all along the line from the people who plan a land-use change, to those who review it, to the builder, the bulldozer operator, the sediment control inspector, the landscape architect, the nurseryman, the homeowner. These people must be helped to understand what they are doing, and to care about the consequences of their actions. They must be helped, not pushed.

A workable program is one that is flexible enough to fit each local situation.

And a workable program is one that encourages action before communities need the dredge. Planning is the keyword--choosing sites carefully on the basis of soil surveys and other information, and planning erosive control measures that fit the soils, topography, and climate. Planning is your long suit in southeastern Wisconsin. You have a head start.

Sediment is the Nation's number one water pollutant in terms of volume. It can be controlled. The time is now.

And more help is on the way. I mentioned the new Community Action Guide for Soil Erosion and Sediment Control. Its basic purpose is to develop community understanding of the serious nature of the sediment problem, and to outline ways to organize, finance, administer, implement, and enforce local programs. Emphasis is on erosion and sedimentation in developing areas where construction alters drainage patterns, increases runoff and silt load, and removes vegetation for months or years at a time.

It is one of a series; each focuses on "an administrative approach to programs on terms that local officials can understand, providing a relevant frame of reference for the local decision-making process." (Other guides pertain to air and water pollution control programs, outdoor recreation, solid waste management, etc.)

It is based on interviews with representatives of many Federal and State agencies as well as 15 local governments that are already administering sediment control programs. Case histories are included.

The guide has 64 pages and is illustrated with black and white photos and organizational charts. It is nontechnical. It resulted from a 12-month project begun January 15, 1969 by the National Association of Counties Research Foundation. The Federal Water Pollution Control Administration provided a \$41,000 grant for research, writing, and publication. The authors were Dr. Mel Powell, director of contract research, National Association of Counties; William Winter, research associate, National Association of Counties; and William Bodwitch, research assistant, National Association of Counties.

#### Content of the Guide:

Chapter 1 introduces the problem and its extent. Although the sediment problem is widespread, its nature varies with soils, climate, and land use.

Chapter 2 deals with organizing a program that is consistent, comprehensive, and effective and yet interferes with development as little as possible. Few localities have exercised such control because it usually requires limitations on various kinds of land use. The issue is administrative and political--not just scientific and technical.

Chapter 3 explains areawide approaches. Authors suggest that the county level is the best middle ground for organization, enactment, and enforcement of ordinances. Counties in the same watershed might share planning and operations staffs. Special districts are another consideration; e.g., drainage, irrigation, etc.

Chapter 4 lists legal authorities required to initiate and carry out sediment control. Sources of authority and alternative financing methods are mentioned. It also explains how sediment/erosion control procedures can be written into existing development regulations and inspection agencies.

Chapter 5 covers planning for sediment and erosion control. It includes the need for preliminary watershed research and studies of existing laws and agencies likely to be involved.

Chapter 6 deals with ways to gain public support and acceptance for regulations. It stresses the use of media as well as meetings to reach all influential groups whether they are sources of support or opposition. Work with civic organizations, and builders associations is particularly important.

Chapter 7 covers financing methods (bonding, etc.) and sources of State and Federal financial and technical assistance; e.g., SCS, HUD, Interior, Corps of Engineers, etc.

Chapter 8 describes personal training and needs for planning, implementing, and enforcing sediment control programs.

Chapter 9 explains how implementation seems to have worked best--at the planning level. (Review of subdivision plats and building plans before building and/or grading permits are issued.) Provisions for inspection, fines for violation, and all other regulations must apply to public projects as well as private development.

Chapter 10 reviews and summarizes local government's role.

The Guide will appear as an insert in The American County (NACO's magazine) and reach about 21,000 county officials throughout the United States this spring. It will be sent to all offices of the Soil Conservation Service. The Department of Housing and Urban Development; U.S. Army Corps of Engineers; National Association of Conservation Districts; and Soil Conservation Society of America also have ordered copies. A limited number will be free on request from the National Association of Counties, 1001 Connecticut Avenue, Washington, D.C. 20036.