Public and non-profit open space lands in the town include:

Owner	Location	Size (in acres)
State of Wisconsin, DNR	Waubesa Wetlands	127
Nature Conservancy of Wisconsin, Inc.	Waubesa Wetlands	77.4
State of Wisconsin, DNR	Mud Lake, East Side	101.7
State of Wisconsin, DNR	NE Corner, Hook Lake	62.9
State of Wisconsin, DNR	Mud Lake Marsh, SW of Hwy. 51	10
State of Wisconsin, DNR	North Shore of Lake Kegonsa	19
Dane County	Lake Waubesa, Border of McFarland	31.75
Dane County	NW Corner of Town	80

In addition, the Oregon Sportsmen's Club owns 26.6 acres on the southeast side of Hook Lake, and the Oregon Retriever's Club owns 21 acres on the southwest side of Hook Lake.

In conclusion, the town has considerable flexibility in the way in which the acquisition of property rights can be used as a tool in preserving its open space system. The costs involved require that the town use this tool selectively, when other tools appear to be inadequate or inappropriate. Funding sources, such as the ORAP/LAWCON fund, may be available on a 50-50 matching basis for the acquisition of open space resources.

When specific acquisition cases arise, the method of acquisition, the type of ownership, and ultimate owner can be tailored to the needs of the situation. Finally, the town should maintain close communications with other agencies and groups involved with the acquisition of open space resources to help ensure that acquisition efforts achieve maximum effectiveness in preserving the town's open space system.

INFORMATION SOURCES

David T. Wagner
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DNR, Southern District
(ORAP/LAWCON Program)
266-6914

Clifford E. Germain
Scientific Areas Coordinator
DNR (Waubesa Wetland Area)
266-8916

Jon R. Bergquist
Madison Area Wildlife
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Cal DeWitt
Nature Conservancy Steward
222-1139

Owens, David, et al, "Nonregulatory Techniques for Urban Growth Management," Department of Administration, Division of State Planning and Energy, 1 West Wilson Street, Madison, WI, April, 1978.

E. EROSION AND SEDIMENTATION CONTROL

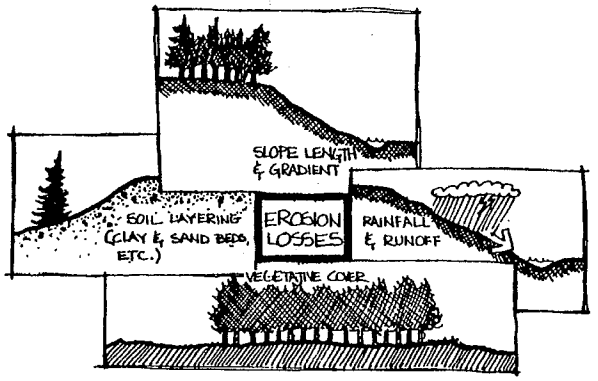
Throughout this study our thoughts have been guided by the concept that the natural resources of the town are all part of a system. What happens in one part of the system can effect what happens in the rest of the system. Perhaps the problem of erosion and runoff best illustrates this situation. Sedimentation from construction sites, borrow pits, farm fields and eroding gullies ends up in the town's streams, wetlands, and lakes. Poorly managed runoff scours out stream and wetland channels, which lowers the water table, releases excessive nutrients to the lakes, and causes water flow to bypass wetlands.

One of the more important conclusions of our study team was that the protection of the town's natural resources must include increased protection from sedimentation and runoff damage. Currently there are no significant erosion and sedimentation control programs in effect in the county, although the county is working toward the adoption of a non-agricultural control ordinance. Perhaps the town could play a leadership role in encouraging the county to speed up the development of a program at that level.

The steep topography and drainage maps of the different study areas of the town show the origin and destination of runoff in the town, as well as areas where steep slopes can cause severe erosion problems.

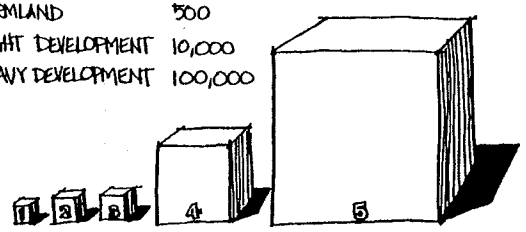
These maps illustrate that runoff problems do not respect the town's borders. Runoff and sediment is carried into the town by Swan Creek, Murphys Creek, and Door Creek. Eroded soils from housing construction in McFarland end up in Mud Lake. At the same time, excessive runoff and erosion that occur in the Town of Dunn end up in surrounding towns. Therefore, the long-term solution lies in different units of government cooperating with each other to solve the problem.

The following discussion describes some of the basic principles and procedures involved in the development of an erosion and sedimentation control program. Control of problems caused by non-agricultural activities is discussed first, followed by a brief discussion of agricultural erosion and sedimentation problems.



CHARACTERISTICS WHICH AFFECT SOIL EROSION

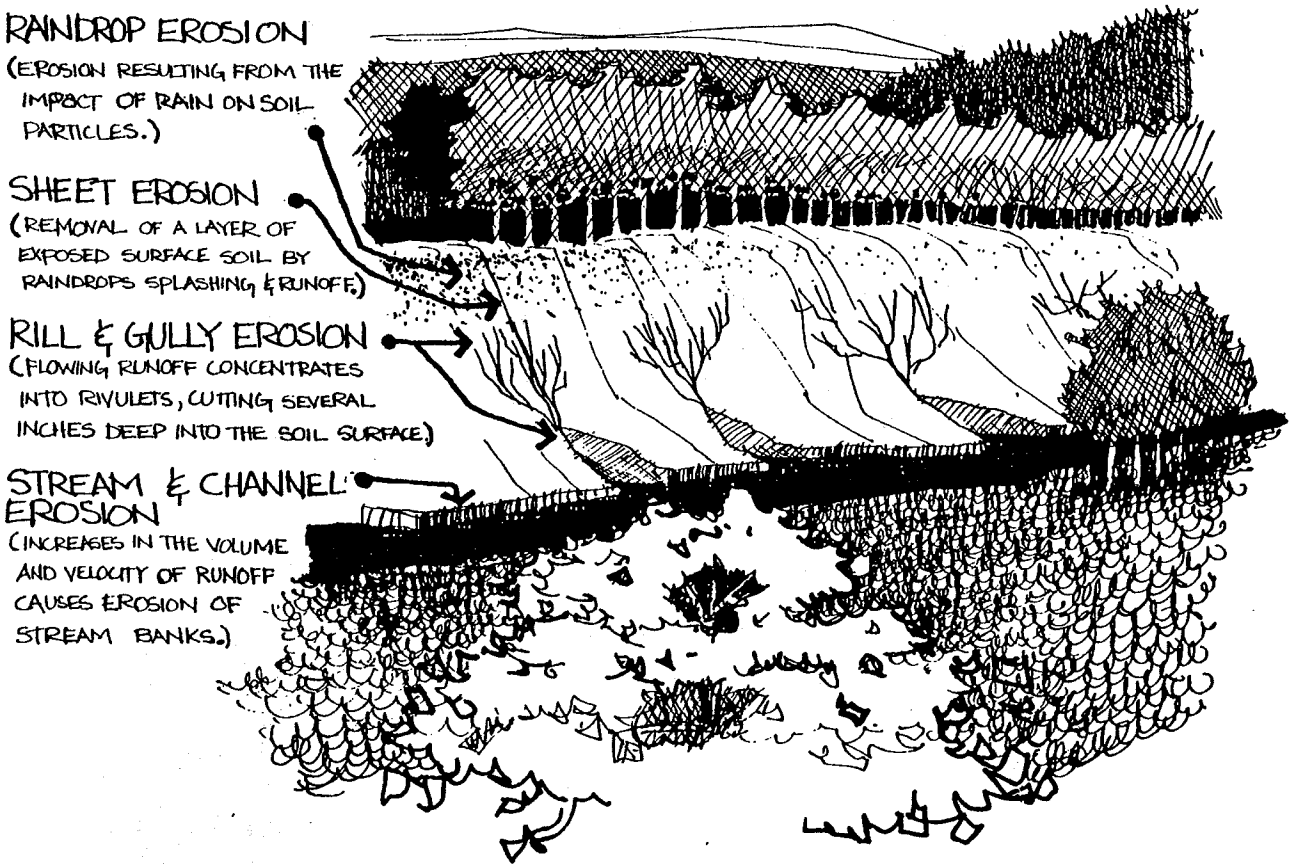
LAND USE	SEDIMENT VOLUME
	100 TONS/SQ MI./YR.
1. WOODLAND	
2. MIXED RURAL AREAS	300
3. FARMLAND	500
4. LIGHT DEVELOPMENT	10,000
5. HEAVY DEVELOPMENT	100,000



VOLUMES OF SEDIMENT ERODED FROM LAND OF DIFFERENT USES. (SOURCE: TOURBIER, P6)

Editor's note: Much of the material for this discussion came from: Porter, Jr., Harry L., COMPREHENSIVE EROSION AND SEDIMENT CONTROL PROGRAM FOR JOB SUPERINTENDENTS AND INSPECTORS. Sediment Control Manpower Project, National Association of Conservation Districts, Washington, D.C., 1976.

TYPES OF EROSION



EROSION AND SEDIMENTATION: BASIC PRINCIPLES

Soil erosion is the removal and loss of soil due to falling and flowing water. The erosion process includes both the detachment and transport of soil particles. The force of rain falling on bare soil loosens it and carries it downslope. There are four basic types of erosion: raindrop erosion, sheet erosion, rill and gulley erosion, and stream and channel erosion. Each of these types of erosion can be found to occur in the town, and each can be prevented if people manage their land wisely.

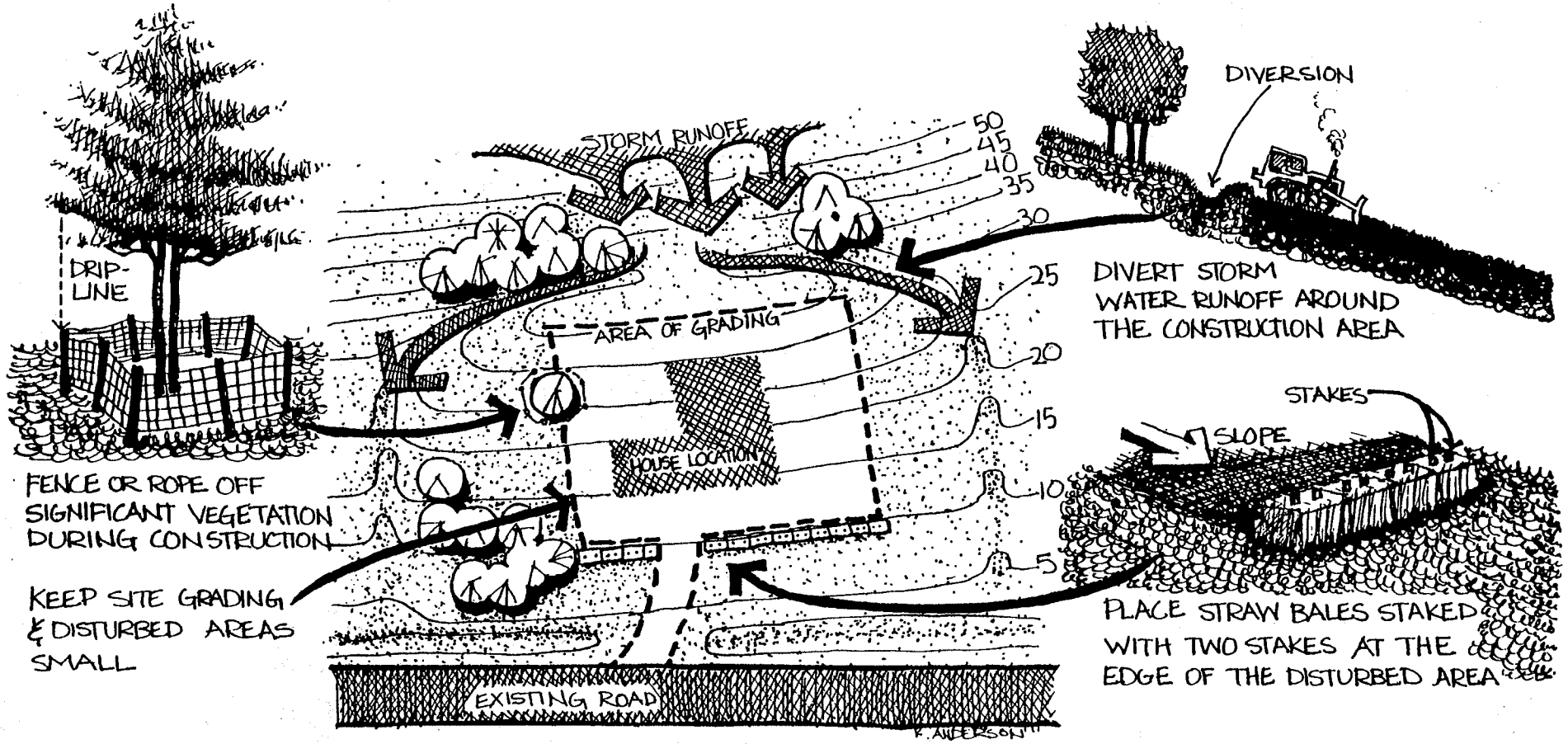
Sedimentation is the end result of erosion. Sedimentation is the settling out of soil, sand, and gravel that has been transported by water. It occurs where the velocity of water carrying eroded materials slows enough to allow these materials to settle out. Sedimentation from development and poor cropping practices ends up in the town's wetlands where it clogs the natural filtering action of the vegetation and destroys fish spawning and feeding areas. Nutrients which accompany the sediments cause algae blooms and result in excessive growth of seaweed, creating poor swimming conditions in the lakes.

There are three basic principles that should be followed when developing erosion and sedimentation control plans for construction and other land disturbing activities:

1. Erosion control on the site should be the first line of defense. Control at the source of construction activity prevents both erosion and sedimentation damage. In some cases it may be the only way to have control of very fine sediments.

2. Sedimentation control is a backup for erosion control measures and is the second line of defense. Sedimentation control provides a backup when all possible erosion control measures have been utilized. Sediment should be filtered out of the runoff water or allowed to settle out before the runoff leaves the site. Care must be taken so that runoff released from the site will not cause gullies or channel erosion and sediment damage in wetland areas.

3. Erosion control and sediment control should be coordinated with long-range plans for the management of the flow of water leaving the site. Erosion control is not always completely effective during or following construction. It must be backed up by adequate provisions for slowing water flow and trapping sediment before it leaves the site. To insure against downstream damages, an evaluation must be made to determine what is needed to counteract the higher runoff that could occur after construction is completed. Erosion and sediment control and the control of the amount and rate of runoff must be planned along with the total plan for the site. If this is not done during the planning for the total development, the contractor or the town will be left with limited, costly, and unsatisfactory options for erosion and sediment control.



PROTECT VEGETATION AND PREVENT SOIL EROSION DURING CONSTRUCTION.

In putting these three principles into action, there are eight objectives that contractors should follow:

1. Fit development and roads to the natural features of the site, such as soils, topography, vegetative cover, and the natural drainage system. Avoid exposing steep erodible soils to rainfall and runoff. Protect buffer strips along drainageways, streams, and other vulnerable areas during construction.

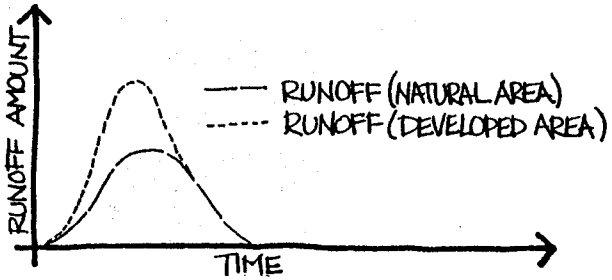
2. Protect bare soil from raindrop erosion. Keep both the area of soil exposed and the length of time that it is exposed to an absolute minimum. Temporary mulches accompanying seedlings should immediately follow grading. Jobs should be done in stages so that both time of exposure and areas exposed are kept to a minimum. Jobs can also be staged to avoid the periods of most erosive rains and hot, dry periods unsuitable for quick revegetation.

3. Maintain the infiltration function of the soil to the fullest extent possible. Choose layout and designs to minimize the amount of impervious areas. Retain areas of unique or stable natural vegetation whenever possible. Keep compaction due to traffic and construction machinery to a minimum except where compaction is specified for some structures as a means of improving their stability.

4. Keep runoff velocities low. The energy generated by runoff from steep or long slopes can be minimized by the use of interceptors or diversions to shorten slopes and carry the water off at a controlled grade and velocity.

5. Protect disturbed, bare, and wooded areas on the site from runoff which flows from areas above the site. Again, diversions and interceptors can be used to carry upslope runoff around the site. Wooded areas are as vulnerable to gullying as bare ground.

IMPROPERLY PLANNED DEVELOPMENT RESULTS IN INCREASED RATES AND AMOUNTS OF RUNOFF



6. Control sediment at the development site perimeter. This is accomplished by retarding runoff and filtering or trapping sediment. Vegetative and mechanical measures combine to slow runoff in level spreaders and grassed waterways. Mechanical measures such as gravel outlet structures, sediment basins, and sediment traps slow or hold runoff and allow sediment to settle out.

7. Develop permanent controls for the release of excessive stormwater runoff which result from the new development. These controls are needed to prevent channel erosion downslope and channels and siltation in the town's wetlands.

8. Maintain installed control practices, both during and after the construction period. During the construction period, practices must be diligently checked, especially if there is a threat of rain. A close-of-day check is recommended, and a check for damages after each rain is equally important. Look for damaged diversion berms, damaged waterways, clogged or filled sediment traps, downdrains, and other critical runoff carrying practices. Improperly used straw bales can result in breaching and gullying. Be sure that outlet areas are properly protected. Check for rills and repair them before they become gullies and provide diversions so they do not re-form. After the construction period, permanent control measures should be checked periodically to see that they are functioning properly.

PLANNING FOR EROSION AND SEDIMENTATION CONTROL

Erosion and sedimentation controls must be planned for with the same care and attention that goes into the design of roads and utilities. Proper planning requires a knowledge of the factors that cause soil erosion and those that prevent it. There are four basic factors which determine the amount of erosion and runoff that will occur on a site: the length and gradient of slopes, the type of soil layers, the type and amount of vegetation cover, and the amount of rainfall that is expected to occur. Engineers can predict runoff amounts by using formulas such as the soil-cover-complex method.

Once the amount of predicted runoff has been calculated, preventive measures can be chosen and designed for the site. As mentioned earlier, these measures should be designed right along with the total plan for the development. This ensures that the greatest range of control options can be used.

In developing a soil erosion and sedimentation plan, contractors should choose measures that fulfill the eight control objectives previously mentioned. Besides temporary measures for control during the construction phase, the plan should include permanent measures to prevent long-term erosion of streams and wetland channels. Some of the available permanent controls are listed in the table on the following page.

To ensure that erosion and sedimentation plans are adequately prepared, plan requirements should be spelled out in town or county ordinances. This lets contractors know what's expected of them and prevents misunderstandings.

Plans should be carefully reviewed and monitored. Experience has shown that ordinance requirements mean little if they are not backed up by a process for implementing those requirements. A well-functioning review and monitoring process requires that inspectors, engineers, and job superintendents maintain close communications and share a common view of what requirements call for. An ideal review and monitoring process for a housing development might take into account the following six steps:

1. Study of the plan, and site, and the timing of plan implementation.

2. Pre-construction conference between the job superintendent, inspector, and engineer.

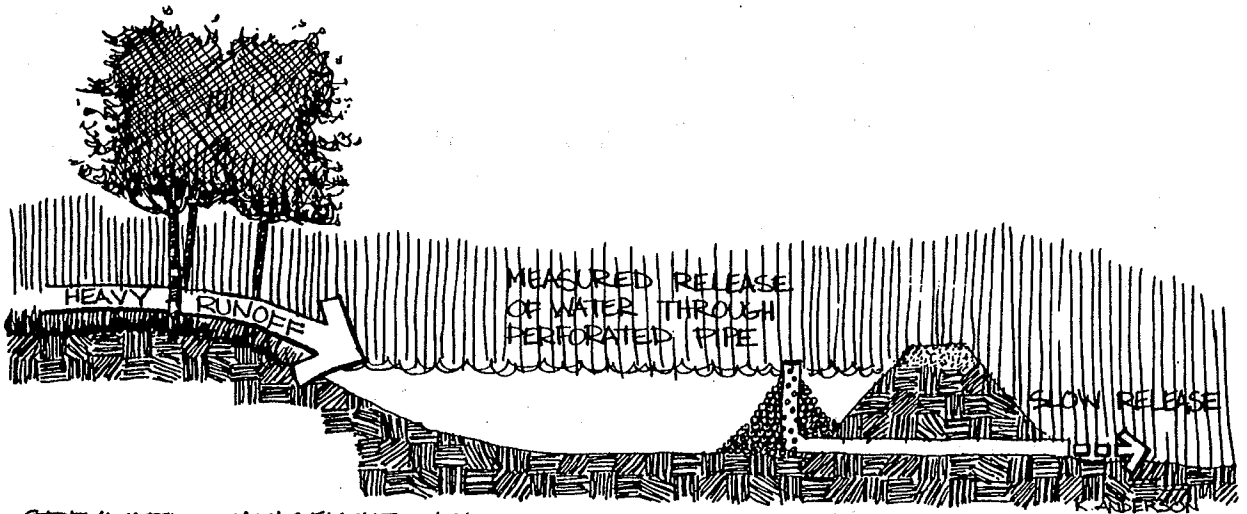
3. Site preparation—checking and maintenance.

4. Grading and installing utilities—checking and maintenance.

5. Construction of buildings or roads—checking and maintenance.

6. Installing of permanent controls—checking and maintenance.

Inspectors and job superintendents should know both state law and local ordinance requirements, their own responsibilities, the erosion and sedimentation process, control principles and practices, and the content of control plans.



STORMWATER MANAGEMENT MEASURES, SUCH AS DETENTION BASINS, CAN REDUCE THE RATE AND AMOUNT OF RUNOFF. THIS HELPS NUTRIENTS AND SEDIMENTS SETTLE OUT AND REDUCES THE SCOURING OF GULLIES AND STREAM CHANNELS.

Permanent Measures to Control Increases in Runoff and Decreases in Infiltration Due to Urban Development*

Function	Measure
Delay of Runoff from Roofs	Gravel Barriers on Flat Roofs, 'Findams' on Pitched Roofs
Infiltration of Precipitation 'At Source' Prior to Concentration	Dutch Drains. (Gravel- Filled Ditches with Optional Drainage Pipe in Base)
Infiltration of Precipitation 'At Source' Prior to Concentration	Porous Paving—Asphalt
Infiltration of Precipitation 'At Source' Prior to Concentration	Precast Concrete Lattice Blocks and Bricks
Increase Time of Concentration Increasing Length of Overland Flow	Terraces, Diversions, Runoff Spreaders, Etc.
Infiltration of Runoff After Preliminary Concentration	Seepage Basin or Recharge Basins (Single Use)
Infiltration of Runoff After Preliminary Concentration	Recharge Basins (Multi-Use)
Infiltration of Runoff After Preliminary Concentration	Seepage Pits or Dry Wells, Pits Usually Filled with Gravel or Rubble
Infiltration of Runoff After Preliminary Concentration	Pits, Gravity Shafts, Trenches, Tile Fields
Infiltration of Runoff After Preliminary Concentration	Seepage Beds or Ditches
Infiltration of Runoff After Preliminary Concentration	Seepage Areas (Multi-Use)
Delay of Runoff	Detention Basins
Runoff Control	Detention Ponds on Minor Waterways

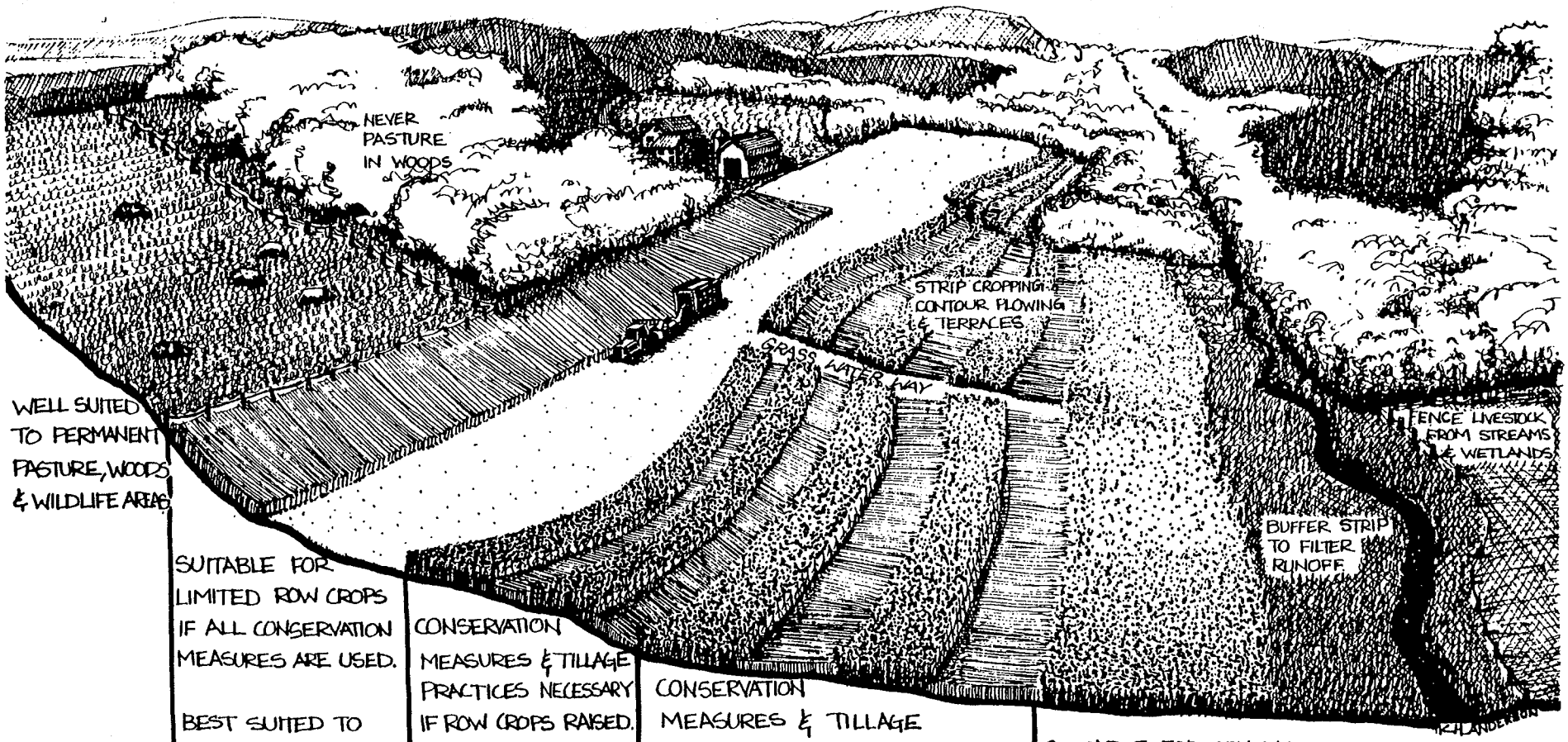
*(from Toubier, J., and R. Westmacott, WATER RESOURCES PROTECTION MEASURES IN LAND DEVELOPMENT: A HANDBOOK, Office of Water Resources Research, U.S. Department of Interior, Washington, D.C., 1974. NTIS No. PB-236 049).

The appendix volume of this report contains two sample erosion and sedimentation control plans. These are included to provide examples of what might be expected of contractors and developers. The appendix volume also includes the model ordinance developed by the Dane County Regional Planning Commission. This ordinance would regulate significant erosion and sedimentation sources with the exception of agricultural activities. If this or a similar ordinance were to be adopted, it would have to be backed up by effective inspection and enforcement procedures. Control plan requirements are found in both the county and town subdivision ordinances. Although specific standards are not spelled out in either ordinance, they do provide the authority to require erosion and sedimentation control plans. Until a county-wide ordinance is adopted, the town should seek assistance in making these ordinances work more effectively.

AGRICULTURAL EROSION AND SEDIMENTATION CONTROL

Agricultural activities also contribute their share of runoff and sedimentation to the town's lakes and wetlands. With the decline of dairy farming and the increase in cash cropping in the town in recent years, the amount of runoff and sedimentation has increased.

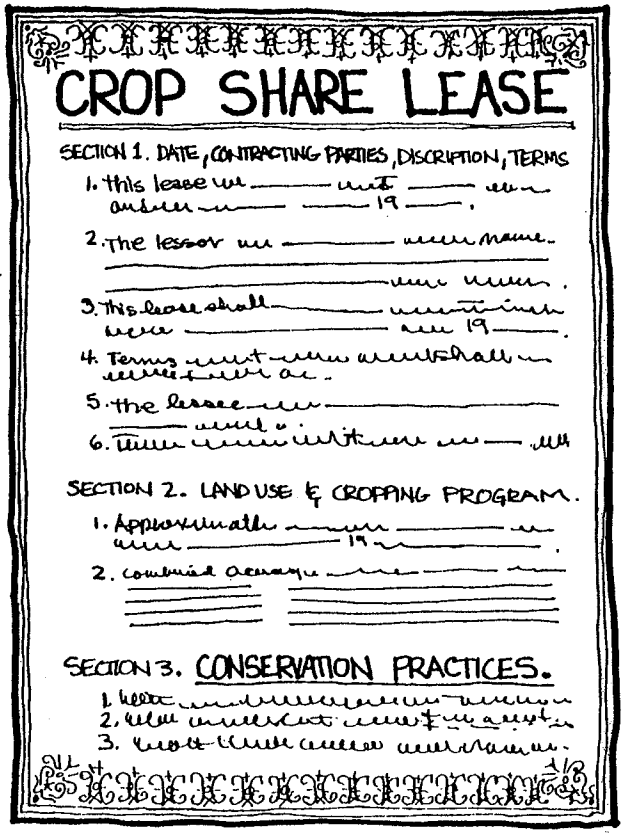
Several conservation tillage practices are available including chisel plowing, zero tillage, and till planting. These help cut down soil erosion and can reduce time, labor and energy costs. Techniques for control of barnyard runoff near streams are also available. The Dane County Soil and Water Conservation District (SWCD) Office can help landowners inventory their soil and water resources, develop a farm conservation plan, and help landowners implement the plan. In addition, the County Agricultural Stabilization and Conservation Service


NEVER PASTURE IN WOODS
STRIP CROPPING CONTOUR PLOWING & TERRACES
GRASS WATERWAY
FENCE LIVESTOCK FROM STREAMS & WETLANDS
BUFFER STRIP TO FILTER RUNOFF
WELL SUITED TO PERMANENT PASTURE, WOODS & WILDLIFE AREAS
SUITABLE FOR LIMITED ROW CROPS IF ALL CONSERVATION MEASURES ARE USED.
BEST SUITED TO SMALL GRAINS, HAY, & PASTURE.
CONSERVATION MEASURES & TILLAGE PRACTICES NECESSARY IF ROW CROPS RAISED.
LONG CROP ROTATIONS
CONSERVATION MEASURES & TILLAGE PRACTICES RECOMMENDED.
SHORT CROP ROTATIONS.
SUITABLE FOR CONTINUOUS ROW CROPS IF CONSERVATION TILLAGE USED.
MAY BE SUBJECT TO FLOODING.
20%+ SLOPE
12-20% SLOPE
6-12% SLOPE
2-6% SLOPE
0-2% SLOPE

(ASCS) Office provides cost-sharing programs for the installation of soil conservation measures.

Because of the high level of cash cropping in the Town of Dunn, runoff and sedimentation probably occurs at a higher level than in more rural towns. Therefore, the need is greater for erosion control measures. At the same time, because the town is closer to the Madison area, property taxes are higher, which cuts into the farmer's profit margin. Therefore, some farmers in the town may be less able to pay for conservation measures even though the need may be greater than in areas where property taxes are lower. The town could promote a higher level of public funding for cost-sharing measures, with adjustments for farmers living in areas with higher property taxes. Perhaps the town should petition the SWCD board and the ASCS committee to place increased emphasis on cost-sharing and technical assistance programs that are specifically related to water quality protection. The current cost-sharing funds allocated to these types of activities is well below the amount of funding needed.

Over 60 percent of the cropland in the town is rented by the owners to other farmers, seed corn companies, and canning companies. People who rent out their land still have the primary responsibility to see that the land is not overworked or improperly used. The best way to ensure that rented land will be properly cared for is to include requirements for soil conservation practices and appropriate crop rotations in a written lease. Provisions can also be included for paying the renter for improvements that will contribute to long-term soil protection and production. The county Extension office can supply sample lease agreements, which can be prepared with the help of an attorney.



INCLUDE REQUIREMENTS FOR CONSERVATION PRACTICES IN YOUR LEASE.

INFORMATION SOURCES

Dane County Soil & Water Conservation
District Office
266-4270

Dane County Agricultural
Stabilization and Conservation
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251-2158

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Dane County Regional Planning Commission
266-4886

Michigan Department of Natural Resources, MICHIGAN SOIL EROSION & SEDIMENTATION CONTROL GUIDEBOOK, Soil Erosion and Sedimentation Control Unit, Lansing, Michigan, 1975.

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Without a complex knowledge of one's place, and without the faithfulness to one's place on which such knowledge depends, it is inevitable that the place will be used carelessly, and eventually destroyed.

–WENDELL BERRY
A Continuous Harmony (1972)